

GENE-CML5

3.5" Subcompact Board

User's Manual 2nd Ed

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Packing List

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

| Item | Quantity |
|-----------------------------------|----------|
| GENE-CML5 | 1 |
| CPU Cooler (TH1CML5010) | 1 |
| CPU Cooler Backplate (TH6CML5010) | 1 |
| Screw Kit (9767ECD001) | 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 at 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 WITH TEMPERATURES BEYOND THE DEVICE'S PERMITTED STORAGE TEMPERATURES (SEE CHAPTER 1) 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 | ○ | ○ | ○ | ○ | ○ | ○ |
| 外部信号 连接器及线材 | ○ | ○ | ○ | ○ | ○ | ○ |
| <p>O: 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 | ○ | ○ | ○ | ○ | ○ | ○ |
| Wires & Connectors for External Connections | ○ | ○ | ○ | ○ | ○ | ○ |
| <p>O: 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> | | | | | | |

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Chapter 1

Product Specifications

1.1 Specifications

System

| | |
|-----------------------------|---|
| Form Factor | 3.5" Subcompact Board |
| CPU | Intel® 10th Generation Core™ i7/i5/i3/Pentium/Celeron SoC i7-10700TE (8C, 2.0 GHz, up to 4.4 GHz) i5-10500TE (6C, 2.3 GHz, up to 3.7 GHz) i3-10100TE (4C, 2.3 GHz, up to 3.6 GHz) G6400TE (2C, 3.2 GHz) G5900TE (2C, 3.0 GHz) |
| CPU Frequency | Up to 4.4GHz |
| Chipset | Intel® Q470E/ H420E/ Q470 |
| Memory Type | DDR4 2933/2666/2400 MHz SODIMM x 2 (Dual Channel, Non-ECC) |
| Max. Memory Capacity | Up to 64GB |
| BIOS | AMI UEFI |
| Wake on LAN | Yes |
| Watchdog Timer | 255 Levels |
| Power Requirement | +12V |
| Power Supply Type | AT/ATX (Default: AT) |
| Power Consumption (Typical) | Intel® Core™ i7-10700TE, DDR4 3200Mhz 32GB, 4.47A at +12V |
| Dimension (L x W) | 5.75" x 4" (146mm x 101.7mm) |
| Operating Temperature | 32°F ~ 122°F (0°C ~ 60°C) |
| Storage Temperature | -40°F ~ 176°F (-40°C ~ 81°C) |
| Operating Humidity | 0-90% @ 40°C, non-condensing |
| MTBF (Hours) | 380,571 |

System

| | |
|----------------------|----------------|
| Certification | CE/FCC Class A |
|----------------------|----------------|

Display

| | |
|---------------------------|------------------|
| CRT/LCD Controller | Chrontel CH7517A |
|---------------------------|------------------|

| | |
|---------------------|----------|
| Video Output | DP++ x 1 |
|---------------------|----------|

VGA x 1

LVDS x 1

| | |
|----------------------------------|-------------|
| Backlight Inverter supply | Max 12V, 2A |
|----------------------------------|-------------|

I/O

| | |
|-----------------|--|
| Ethernet | Intel® i210/i211,10/100/1000Base, RJ45 x1 Intel® i219,10/100/1000Base, RJ45 x1 (Support vPro® only with i5/i7 + Q470/Q470E variant) |
|-----------------|--|

| | |
|--------------|--|
| Audio | High Definition Audio Interface, Line-in/Line-out/MIC (Without Amplifier) |
|--------------|--|

| | |
|-----------------|--|
| USB Port | USB3.2 Gen 2 x 2 (Rear I/O, Gen 2 for Q470/Q470E only) |
|-----------------|--|

USB2.0 x 4 (Pin header)

| | |
|--------------------|--------------------|
| Serial Port | RS-232/422/485 x 2 |
|--------------------|--------------------|

| | |
|----------------------|---|
| Parallel Port | — |
|----------------------|---|

| | |
|----------------------|---|
| HDD Interface | — |
|----------------------|---|

| | |
|----------------------|---|
| FDD Interface | — |
|----------------------|---|

| | |
|------------|-------------------------|
| SSD | SATA III (6.0 Gbps) x 2 |
|------------|-------------------------|

SATA power connector x 1 (+5V)

| | |
|-----------------------|-----------------------------------|
| Expansion Slot | M.2 M Key 2280 PCIe [x4]/SATA x 1 |
|-----------------------|-----------------------------------|

FPC x 1 (For Q470/Q470E only)

| | |
|------------|------|
| DIO | 8bit |
|------------|------|

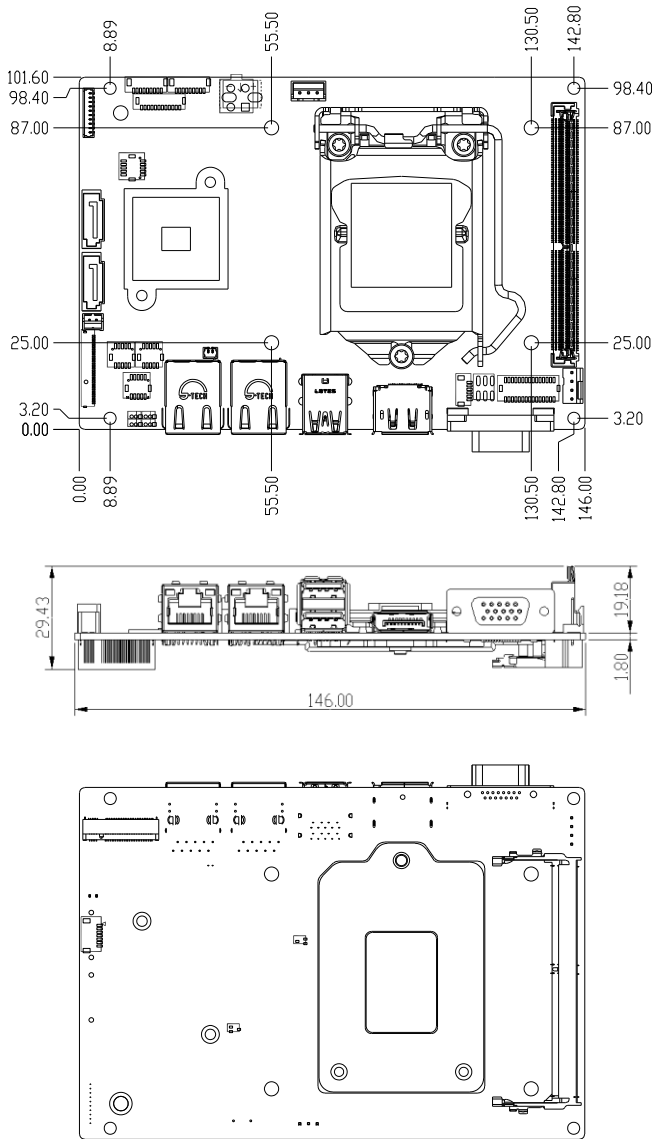
I/O

| | |
|--------|---------|
| SIM | — |
| TPM | TPM 2.0 |
| Touch | — |
| Others | — |

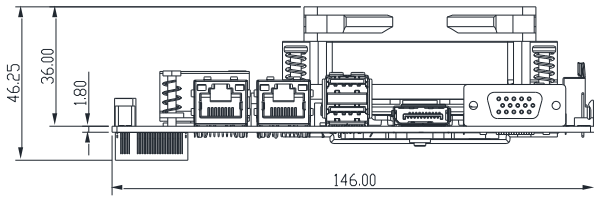
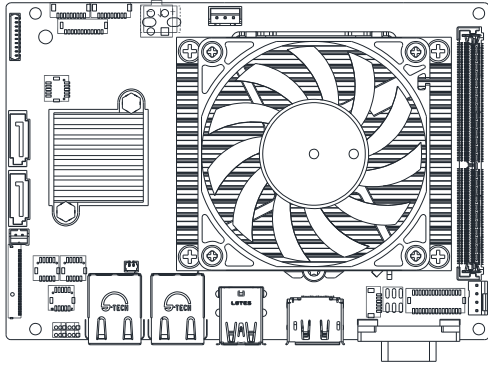
Chapter 2

Hardware Information

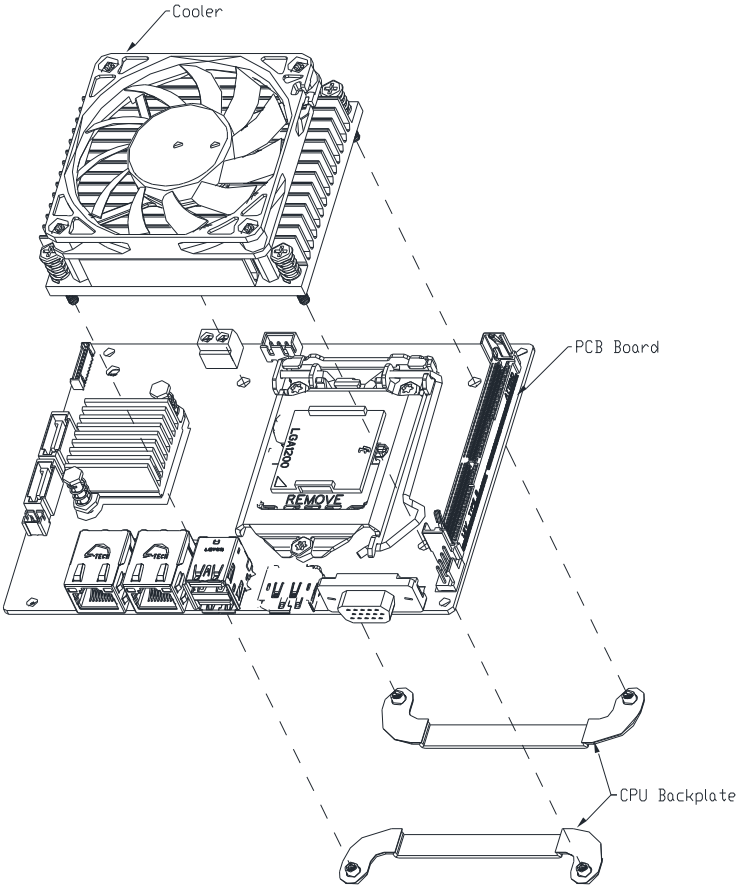
2.1 Dimensions



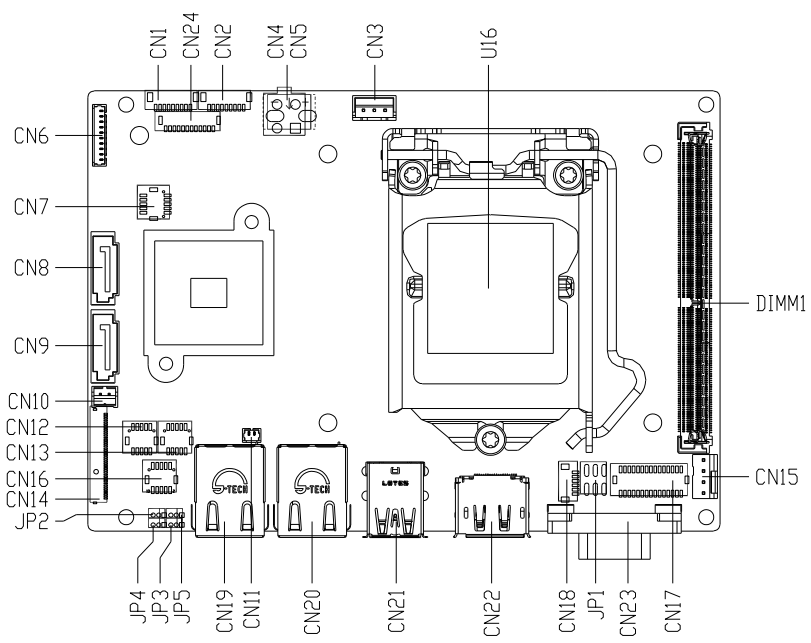
With Thermal Option (Part No. GENE-CML5-FAN01)

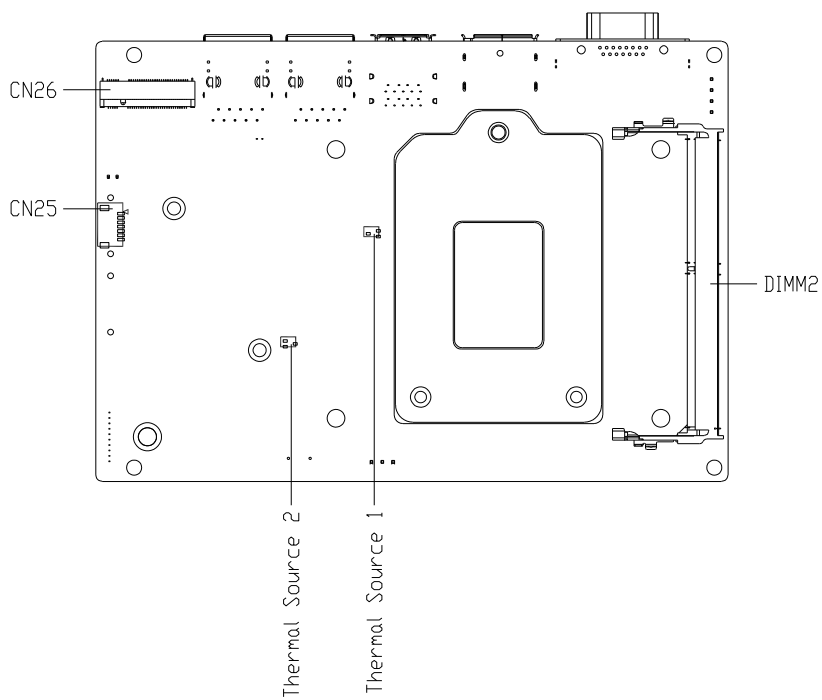


Thermal Option Assembly



2.2 Jumpers and Connectors



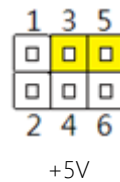
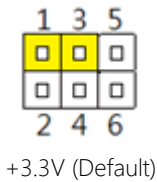


2.3 List of Jumpers

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

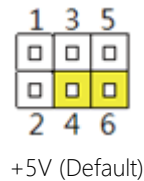
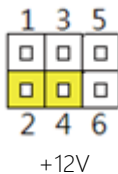
| Label | Function |
|-------|--|
| JP1 | LVDS Operating VDD Selection & Backlight VCC Selection |
| JP2 | Auto Power Button Enable/Disable Selection |
| JP3 | LVDS Backlight (BKLT) Control Selection |
| JP5 | Clear CMOS |

2.3.1 LVDS Operating VDD Selection (JP1)



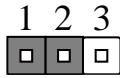
Note: To avoid damage to the system, do connect Pins 1,3,5 with Pins 2,4,6.

2.3.2 LVDS Backlight VCC Selection (JP1)

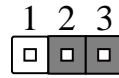


Note: To avoid damage to the system, do connect Pins 1,3,5 with Pins 2,4,6.

2.3.3 Auto Power Button Enable/Disable Selection (JP2)



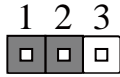
Disabled



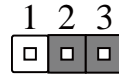
Enabled (Default)

Note: When disabled, Power Button must be used to power on the system.

2.3.4 LVDS Backlight Control Selection (JP3)

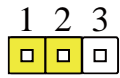


VR Mode

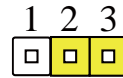


PWM Mode (Default)

2.3.5 Clear CMOS Jumper (JP5)



Normal (Default)



Clear CMOS

2.4 List of Connectors

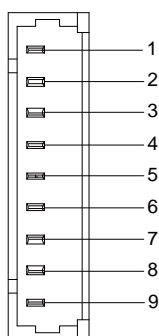
Please refer to the table below for all of the board's connectors that you can configure for your application

| Label | Function |
|-------|--|
| CN1 | COM Port 2 |
| CN2 | COM Port 1 |
| CN3 | External +5VSB Input |
| CN5 | External Power Input |
| CN6 | Audio I/O Port |
| CN7 | Digital IO Port |
| CN8 | SATA Port |
| CN9 | SATA Port |
| CN10 | +5V Output for SATA HDD |
| CN11 | Battery Connector |
| CN12 | USB 2.0 Port |
| CN13 | USB 2.0 Port |
| CN14 | FPC |
| CN15 | FAN CONN |
| CN16 | Front Panel header |
| CN17 | LVDS Port |
| CN18 | LVDS Port Inverter / Backlight Connector |
| CN19 | LAN (RJ-45) Port 2 |
| CN20 | LAN (RJ-45) Port 1 |
| CN21 | USB3.2 Gen2 Port 1/ Port 2 (Dual Port) |
| CN22 | DP++ Port |
| CN23 | VGA Port |
| CN24 | LPC Port |

| Label | Function |
|-------|-------------------|
| CN25 | BIOS Debug Port |
| CN26 | M.2 M-Key |
| DIMM1 | DDR4 SO-DIMM Slot |
| DIMM2 | DDR4 SO-DIMM Slot |

2.4.1 COM Port 1/ Port 2 (CN1/CN2)

Note: CN1 is COM Port 2; and CN2 is COM Port 1.



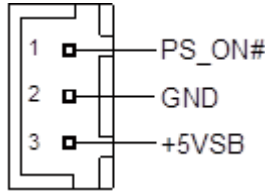
| RS-232 | | | |
|--------|----------|-------------|--------------|
| Pin | Pin Name | Signal Type | Signal Level |
| 1 | DCD | IN | |
| 2 | DSR | IN | |
| 3 | RX | IN | |
| 4 | RTS | OUT | |
| 5 | TX | OUT | |
| 6 | CTS | IN | |
| 7 | DTR | OUT | |
| 8 | RI | IN | |
| 9 | GND | GND | |

| RS-485 | | | |
|--------|----------|-------------|--------------|
| Pin | Pin Name | Signal Type | Signal Level |
| 1 | RS485_D- | I/O | |
| 2 | NC | | |
| 3 | RS485_D+ | I/O | |
| 4 | NC | | |
| 5 | NC | | |
| 6 | NC | | |
| 7 | NC | | |
| 8 | NC | | |
| 9 | GND | GND | |

| RS-422 | | | |
|--------|-----------|-------------|--------------|
| Pin | Pin Name | Signal Type | Signal Level |
| 1 | RS422_TX- | OUT | |
| 2 | NC | | |
| 3 | RS422_TX+ | OUT | |
| 4 | NC | | |
| 5 | RS422_RX+ | IN | |
| 6 | NC | | |
| 7 | RS422_RX- | IN | |
| 8 | NC | | |
| 9 | GND | GND | |

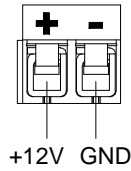
Note 1: COM Port RS-232/422/485 can be set by BIOS. Default is RS-232.

2.4.2 External +5VSB Input (CN3)



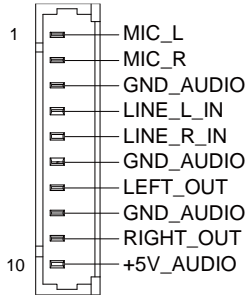
| Pin | Pin Name | Signal Type | Signal Level |
|-----|------------|-------------|--------------|
| 1 | PS_ON# | OUT | +5V |
| 2 | GND | GND | |
| 3 | +V5A_SB_IN | PWR | +5V |

2.4.3 External Power Input (CN5)



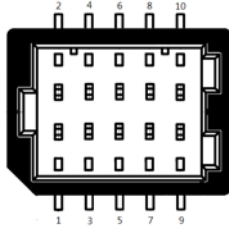
| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1 | +VIN_EXT | PWR | 12V |
| 2 | GND | GND | |

2.4.4 Audio I/O Port (CN6)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|-----------|-------------|--------------|
| 1 | MIC_L | IN | |
| 2 | MIC_R | IN | |
| 3 | GND_AUDIO | GND | |
| 4 | LINE_L | IN | |
| 5 | LINE_R | IN | |
| 6 | GND_AUDIO | GND | |
| 7 | LEFT_OUT | OUT | |
| 8 | GND_AUDIO | GND | |
| 9 | RIGHT_OUT | OUT | |
| 10 | +5V_AUDIO | PWR | +5V |

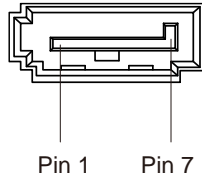
2.4.5 Digital I/O Port (CN7)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1 | +V5S | PWR | +5V |
| 2 | DIO0 | I/O | |
| 3 | DIO1 | I/O | |
| 4 | DIO2 | I/O | |
| 5 | DIO3 | I/O | |
| 6 | DIO4 | I/O | |
| 7 | DIO5 | I/O | |
| 8 | DIO6 | I/O | |
| 9 | DIO7 | I/O | |
| 10 | GND | GND | |

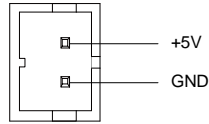
Note: DIO +V5S max driving current is 0.5A

2.4.6 SATA Port (CN8/CN9)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1 | GND | GND | |
| 2 | SATA_TX+ | DIFF | |
| 3 | SATA_TX- | DIFF | |
| 4 | GND | GND | |
| 5 | SATA_RX- | DIFF | |
| 6 | SATA_RX+ | DIFF | |
| 7 | GND | GND | |

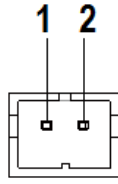
2.4.7 +5V Output for SATA HDD (CN10)



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

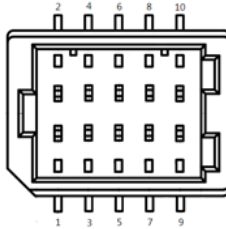
Note: SATA HDD +5V max driving current is 0.5A

2.4.8 Battery Connector (CN11)



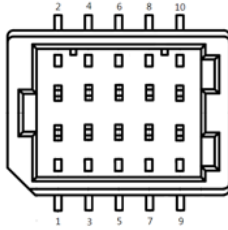
| Pin | Pin Name | Signal Type | Signal level |
|-----|----------|-------------|--------------|
| 1 | +3.3V | PWR | 3.3V |
| 2 | GND | GND | |

2.4.9 USB 2.0 Port (CN12)



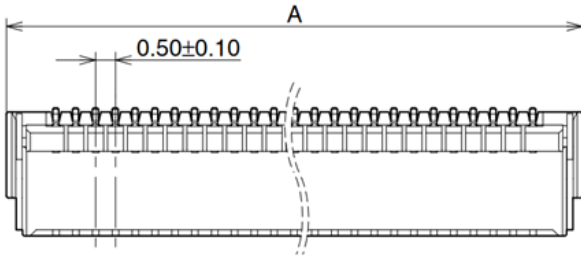
| Pin | Pin Name | Signal Type | Signal Level |
|-----|------------|-------------|--------------|
| 1 | +V5A_USB_3 | PWR | +5V |
| 2 | +V5A_USB_3 | PWR | +5V |
| 3 | USBD5- | DIFF | |
| 4 | USBD6- | DIFF | |
| 5 | USBD5+ | DIFF | |
| 6 | USBD6+ | DIFF | |
| 7 | GND | GND | |
| 8 | GND | GND | |
| 9 | GND | GND | |
| 10 | GND | GND | |

2.4.10 USB 2.0 Port (CN13)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|------------|-------------|--------------|
| 1 | +V5A_USB_2 | PWR | +5V |
| 2 | +V5A_USB_2 | PWR | +5V |
| 3 | USBD3- | DIFF | |
| 4 | USBD4- | DIFF | |
| 5 | USBD3+ | DIFF | |
| 6 | USBD4+ | DIFF | |
| 7 | GND | GND | |
| 8 | GND | GND | |
| 9 | GND | GND | |
| 10 | GND | GND | |

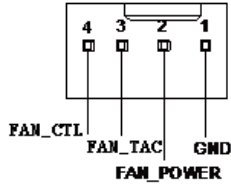
2.4.11 FPC (CN14)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|--------------|-------------|--------------|
| 1 | +V3P3S | PWR | +3.3V |
| 2 | +V3P3S | PWR | +3.3V |
| 3 | +V3P3S | PWR | +3.3V |
| 4 | SMB_DATA | I/O | |
| 5 | SMB_CLK | I/O | |
| 6 | BUF_PLT_RST# | I/O | |
| 7 | +V3P3A | PWR | +3.3V |
| 8 | GND | GND | |
| 9 | PCIE_18_RXP | DIFF | |
| 10 | PCIE_18_RXN | DIFF | |
| 11 | GND | GND | |
| 12 | PCIE_20_RXP | DIFF | |
| 13 | PCIE_20_RXN | DIFF | |
| 14 | GND | GND | |
| 15 | PCIE_19_RXP | DIFF | |
| 16 | PCIE_19_RXN | DIFF | |
| 17 | GND | GND | |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------------|-------------|--------------|
| 18 | PCIE_17_RXP | DIFF | |
| 19 | PCIE_17_RXN | DIFF | |
| 20 | GND | GND | |
| 21 | PCIE_20_TXN | DIFF | |
| 22 | PCIE_20_TXP | DIFF | |
| 23 | GND | GND | |
| 24 | PCIE_19_TXN | DIFF | |
| 25 | PCIE_19_TXP | DIFF | |
| 26 | GND | GND | |
| 27 | PCIE_18_TXN | DIFF | |
| 28 | PCIE_18_TXP | DIFF | |
| 29 | GND | GND | |
| 30 | CLK_PCIE_FPC_N | DIFF | |
| 31 | CLK_PCIE_FPC_P | DIFF | |
| 32 | GND | GND | |
| 33 | PCIE_17_TXN | DIFF | |
| 34 | PCIE_17_TXP | DIFF | |
| 35 | GND | GND | |
| 36 | +V12S | PWR | |
| 37 | +V12S | PWR | |
| 38 | +V12S | PWR | |
| 39 | +V12S | PWR | |
| 40 | +V12S | PWR | |

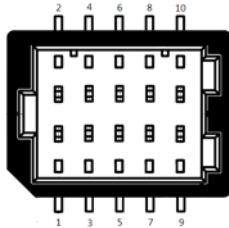
2.4.12 CPU Fan (CN15)



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

Note: FAN Connector FAN_POWER max driving current is 1A

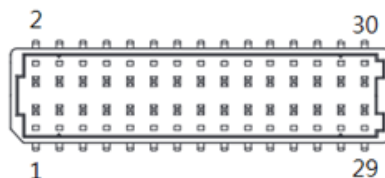
2.4.13 Digital I/O Port (CN16)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 1 | GND | GND | |
| 2 | EXT_PWRBTN# | I/O | |
| 3 | FP_HDLED- | I/O | |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|-----------|-------------|--------------|
| 4 | FP_HDLED+ | I/O | |
| 5 | FP_SPKR- | I/O | |
| 6 | +V5S | PWR | |
| 7 | GND | GND | |
| 8 | PWRLED+ | I/O | |
| 9 | GND | GND | |
| 10 | HWRST# | I/O | |

2.4.14 LVDS Port (CN17)



Note: LVDS Operating VDD can be set by JP1, reference Ch 2.3.1 for details

| Pin | Pin Name | Signal Type | Signal Level |
|-----|--------------|-------------|--------------|
| 1 | LVDS_BKLTEN | I/O | |
| 3 | +VDD_LVDS | PWR | |
| 5 | LVDSA_CLK# | DIFF | |
| 7 | +VDD_LVDS | PWR | |
| 9 | LVDSA_DATA0# | DIFF | |
| 11 | LVDSA_DATA1# | DIFF | |
| 13 | LVDSA_DATA2# | DIFF | |
| 15 | LVDSA_DATA3# | DIFF | |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|---------------|-------------|--------------|
| 17 | LVDS_DDC_DATA | I/O | |
| 19 | LVDSB_DATA0# | DIFF | |
| 21 | LVDSB_DATA1# | DIFF | |
| 23 | LVDSB_DATA2# | DIFF | |
| 25 | LVDSB_DATA3# | DIFF | |
| 27 | +VDD_LVDS | PWR | |
| 29 | LVDSB_CLK# | DIFF | |
| 2 | LVDS_BKLCTL | I/O | |
| 4 | GND | GND | |
| 6 | LVDSA_CLK | DIFF | |
| 8 | GND | GND | |
| 10 | LVDSA_DATA0 | DIFF | |
| 12 | LVDSA_DATA1 | DIFF | |
| 14 | LVDSA_DATA2 | DIFF | |
| 16 | LVDSA_DATA3 | DIFF | |
| 18 | LVDS_DDC_CLK | I/O | |
| 20 | LVDSB_DATA0 | DIFF | |
| 22 | LVDSB_DATA1 | DIFF | |
| 24 | LVDSB_DATA2 | DIFF | |
| 26 | LVDSB_DATA3 | DIFF | |
| 28 | GND | GND | |
| 30 | LVDSB_CLK | DIFF | |

Note: LVDS Connector +VDD_LVDS max driving current is 0.5A

2.4.15 LVDS Port Inverter/ Backlight Connector (CN18)

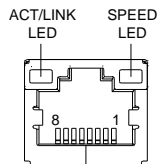


| Pin | Pin Name | Signal Type | Signal level |
|-----|----------------|-------------|--------------|
| 1 | +VCC_LVDS_BKLT | PWR | |
| 2 | +VCC_LVDS_BKLT | PWR | |
| 3 | L_BKLTNESS | I/O | |
| 4 | GND | GND | |
| 5 | GND | GND | |
| 6 | LVDS_BKLTEN | I/O | |

Note 1: LVDS Backlight VCC can be by JP1. (See Ch 2.3.2)

Note 2: Backlight Connector +VCC_LVDS_BKLT max driving current is 1.5A

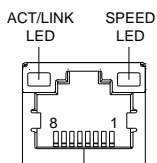
2.4.16 LAN (RJ-45) Port 2 (CN19)



| Pin | Pin Name | Signal Type | Signal level |
|-----|------------|-------------|--------------|
| 1 | LAN2_MDI0+ | DIFF | |
| 2 | LAN2_MDI0- | DIFF | |
| 3 | LAN2_MDI1+ | DIFF | |
| 4 | LAN2_MDI2+ | DIFF | |

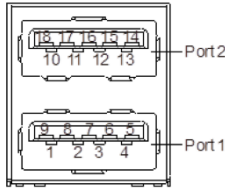
| Pin | Pin Name | Signal Type | Signal level |
|-----|------------|-------------|--------------|
| 5 | LAN2_MDI2- | DIFF | |
| 6 | LAN2_MDI1- | DIFF | |
| 7 | LAN2_MDI3+ | DIFF | |
| 8 | LAN2_MDI3- | DIFF | |

2.4.17 LAN (RJ-45) Port 2 (CN20)



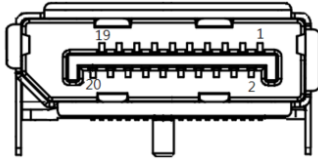
| Pin | Pin Name | Signal Type | Signal level |
|-----|------------|-------------|--------------|
| 1 | LAN1_MDI0+ | DIFF | |
| 2 | LAN1_MDI0- | DIFF | |
| 3 | LAN1_MDI1+ | DIFF | |
| 4 | LAN1_MDI2+ | DIFF | |
| 5 | LAN1_MDI2- | DIFF | |
| 6 | LAN1_MDI1- | DIFF | |
| 7 | LAN1_MDI3+ | DIFF | |
| 8 | LAN1_MDI3- | DIFF | |

2.4.18 USB 3.2 Gen 2 Port 1/ Port 2 (Dual Port) (CN21)



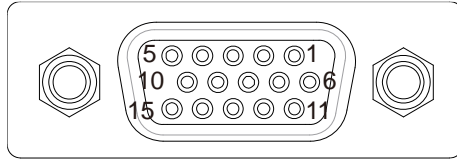
| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------------|-------------|--------------|
| 1 | +V5A_USB_1 | PWR | +5V |
| 2 | USBD2- | DIFF | |
| 3 | USBD2+ | DIFF | |
| 4 | GND | GND | |
| 5 | USB3_RX2_CON_N | DIFF | |
| 6 | USB3_RX2_CON_P | DIFF | |
| 7 | GND | GND | |
| 8 | USB3_TX2_CON_N | DIFF | |
| 9 | USB3_TX2_CON_P | DIFF | |
| 10 | +V5A_USB_0 | PWR | +5V |
| 11 | USBD1- | DIFF | |
| 12 | USBD1+ | DIFF | |
| 13 | GND | GND | |
| 14 | USB3_RX1_CON_N | DIFF | |
| 15 | USB3_RX1_CON_P | DIFF | |
| 16 | GND | GND | |
| 17 | USB3_TX1_CON_N | DIFF | |
| 18 | USB3_TX1_CON_P | DIFF | |

2.4.19 DP++ Port (CN22)



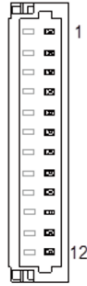
| Pin | Pin Name | Signal Type | Signal Level |
|-----|-------------------------|-------------|--------------|
| 1 | DDI1_TX0_DP | DIFF | |
| 2 | GND | GND | |
| 3 | DDI1_TX0_DN | DIFF | |
| 4 | DDI1_TX1_DP | DIFF | |
| 5 | GND | GND | |
| 6 | DDI1_TX1_DN | DIFF | |
| 7 | DDI1_TX2_DP | DIFF | |
| 8 | GND | GND | |
| 9 | DDI1_TX2_DN | DIFF | |
| 10 | DDI1_TX3_DP | DIFF | |
| 11 | GND | GND | |
| 12 | DDI1_TX3_DN | DIFF | |
| 13 | DDI1_AUX_EN | IO | |
| 14 | GND | GND | |
| 15 | DDI1_DP_CTRLCLK_AUX_DP | DIFF | |
| 16 | GND | GND | |
| 17 | DDI1_DP_CTRLDATA_AUX_DN | DIFF | |
| 18 | DDI1_DP_HPD | DDI1_DP_HPD | |
| 19 | GND | GND | |
| 20 | +V3P3S | PWR | |

2.4.20 VGA Port (CN23)



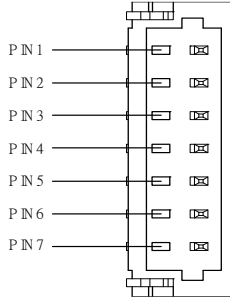
| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------------|-------------|--------------|
| 1 | VGA_RED_CON | OUT | |
| 2 | VGA_GREEN_CON | OUT | |
| 3 | VGA_BLUE_CON | OUT | |
| 4 | NC | | |
| 5 | GND | GND | |
| 6 | RED_GND_RTN | GND | |
| 7 | GREEN_GND_RTN | GND | |
| 8 | BLUE_GND_RTN | GND | |
| 9 | +5V | PWR | +5V |
| 10 | NC | | |
| 11 | NC | | |
| 12 | VGA_DDCDAT_CON | I/O | +5V |
| 13 | VGA_HSYNC_CON | OUT | |
| 14 | VGA_VSYNC_CON | OUT | |
| 15 | VGA_DDCCLK_CON | I/O | +5V |

2.4.21 LPC Port (CN24)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|--------------|-------------|--------------|
| 1 | LPC_AD0 | I/O | |
| 2 | LPC_AD1 | I/O | |
| 3 | LPC_AD2 | I/O | |
| 4 | LPC_AD3 | I/O | |
| 5 | +V3P3S | PWR | +3.3V |
| 6 | LPC_FRAME# | IN | |
| 7 | BUF_PLT_RST# | OUT | |
| 8 | GND | GND | |
| 9 | CLK_LPCC_25M | OUT | |
| 10 | I2C0_SDA | I/O | |
| 11 | I2C0_SCL | OUT | |
| 12 | INT_SERIRQ | GND | |

2.4.22 BIOS Debug Port (CN25)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|------------|-------------|--------------|
| 1 | SPI_SO_F | OUT | |
| 2 | GND | GND | |
| 3 | SPI_CLK_F | IN | |
| 4 | +V3P3A_SPI | PWR | +3.3V |
| 5 | SPI_SI_F | IN | |
| 6 | SPI_CE0#_F | IN | |
| 7 | NC | | |

2.4.23 M.2 M-Key 2280 (CN26)

| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------------|-------------|--------------|
| 1 | GND | GND | |
| 2 | +V3P3S | PWR | +3.3V |
| 3 | GND | GND | |
| 4 | +V3P3S | PWR | +3.3V |
| 5 | PCIE_8_RXN | DIFF | |
| 6 | CARD_PWR_OFF_R | IN | |
| 7 | PCIE_8_RXP | DIFF | |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|--------------|-------------|--------------|
| 8 | N.C | | |
| 9 | GND | GND | |
| 10 | SSD_LED# | OUT | |
| 11 | PCIE_8_TXN_C | DIFF | |
| 12 | +V3P3S | PWR | +3.3V |
| 13 | PCIE_8_TXP_C | DIFF | |
| 14 | +V3P3S | PWR | +3.3V |
| 15 | GND | GND | |
| 16 | +V3P3S | PWR | +3.3V |
| 17 | PCIE_7_RXN | DIFF | |
| 18 | +V3P3S | PWR | +3.3V |
| 19 | PCIE_7_RXP | DIFF | |
| 20 | N.C | | |
| 21 | GND | GND | |
| 22 | N.C | | |
| 23 | PCIE_7_TXN_C | DIFF | |
| 24 | N.C | | |
| 25 | PCIE_7_TXP_C | GND | |
| 26 | N.C | | |
| 27 | GND | GND | |
| 28 | N.C | | |
| 29 | PCIE_6_RXN | DIFF | |
| 30 | N.C | | |
| 31 | PCIE_6_RXP | DIFF | |
| 32 | N.C | | |
| 33 | GND | GND | |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|------------------|-------------|--------------|
| 34 | N.C | | |
| 35 | PCIE_6_TXN_C | DIFF | |
| 36 | N.C | | |
| 37 | PCIE_6_TXP_C | DIFF | |
| 38 | SATA_DEVSLP0 | IN | |
| 39 | GND | GND | |
| 40 | SMB_CLK_KMB | IN | |
| 41 | M2M_A_RXP | DIFF | |
| 42 | N.C | | |
| 43 | M2M_A_RXN | DIFF | |
| 44 | N.C | | |
| 45 | GND | GND | |
| 46 | N.C | | |
| 47 | M2M_A_TXN_C | DIFF | |
| 48 | N.C | | |
| 49 | M2M_A_TXP_C | DIFF | |
| 50 | BUF_PLT_RST# | IN | |
| 51 | GND | GND | |
| 52 | M2M_CLKREQ# | IN | |
| 53 | CLK_PCIE_M2M_N_R | | |
| 54 | PCIE_WAKE# | IN | |
| 55 | CLK_PCIE_M2M_P_R | | |
| 56 | N.C | | |
| 57 | GND | GND | |
| 58 | N.C | | |
| 67 | N.C | | |

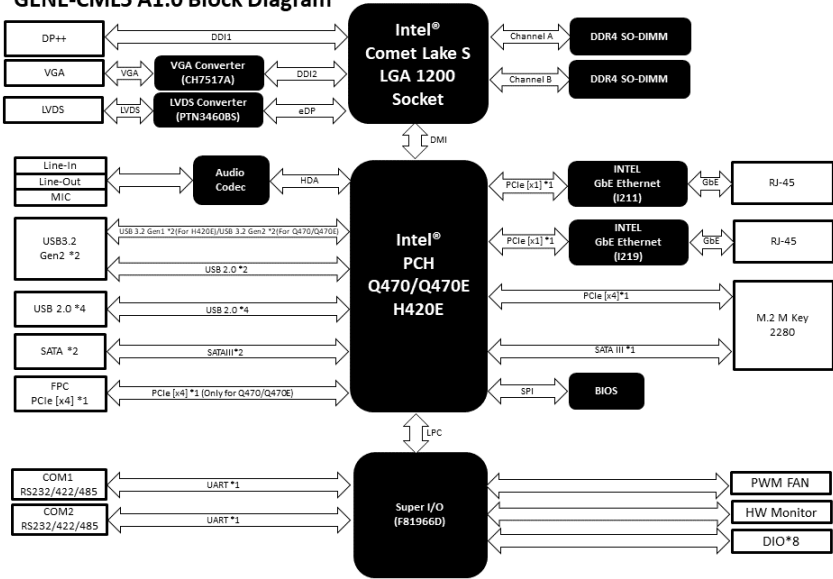
| Pin | Pin Name | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 68 | SUS_CLK_M2M | IN | |
| 69 | PEDET_R | OUT | |
| 70 | +V3P3S | PWR | +3.3V |
| 71 | GND | GND | |
| 72 | +V3P3S | PWR | +3.3V |
| 73 | GND | GND | |
| 74 | +V3P3S | PWR | +3.3V |
| 75 | GND | GND | |

2.4.24 DDR4 SO-DIMM Slot (DIMM1/ DIMM2)

Standard Specifications

2.5 Block Diagram

GENE-CML5 A1.0 Block Diagram



Chapter 3

AMI BIOS Setup

3.1 System Test and Initialization

The GENE-CML5 board uses certain routines to perform testing and initialization during the boot up sequence. If an error, fatal or non-fatal, is encountered, the module will output a few short beeps or display an error message. The module can usually continue the boot up sequence with non-fatal errors.

The system configuration verification routines check the current system configuration against the values stored in the CMOS memory and BIOS NVRAM. If a system configuration is not found or an error is detected, the module will load the default configuration and reboot 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 was reset by the Clear-CMOS jumper
4. The CMOS memory has lost power and the configuration information has been erased.

The system CMOS memory has an integral lithium battery backup for data retention.

You will need to replace the battery unit when it runs down.

3.2 AMI BIOS Setup

The AMI BIOS ROM has a pre-installed Setup program that allows users to modify basic system configurations, which is stored in the battery-backed CMOS RAM and BIOS NVRAM so that the information is retained when the power is turned off.

To enter BIOS Setup, press or <ESC> immediately while your computer is powering up.

The function for each interface can be found below.

Main – Date and time can be set here. Press <Tab> to switch between date elements

Advanced – Access hardware monitor and advanced board features, options

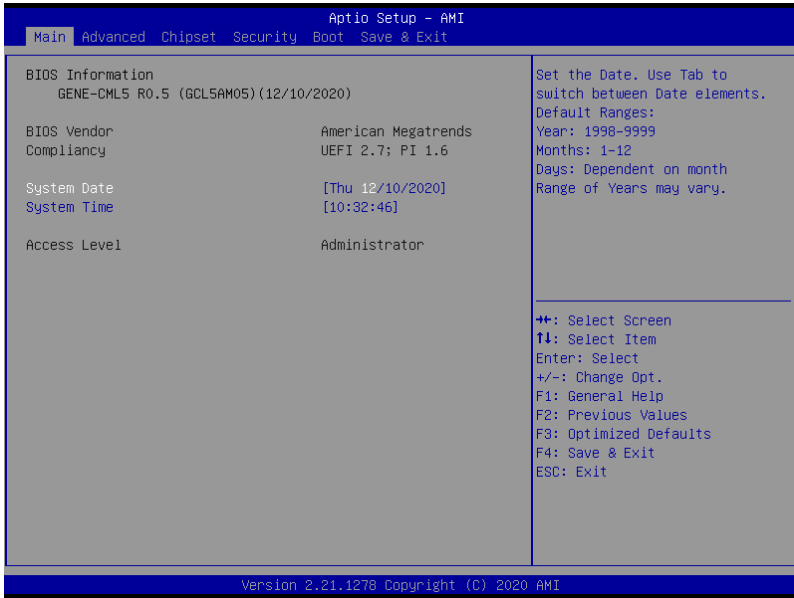
Chipset – Host bridge parameters

Security – The setup administrator password can be set here

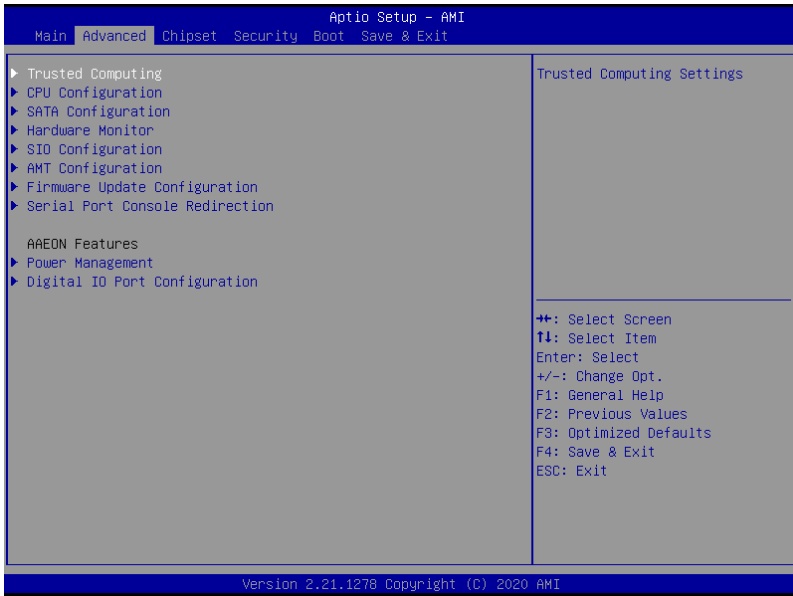
Boot – Enable/ Disable Quiet Boot option

Save & Exit – Save your changes and exit the program

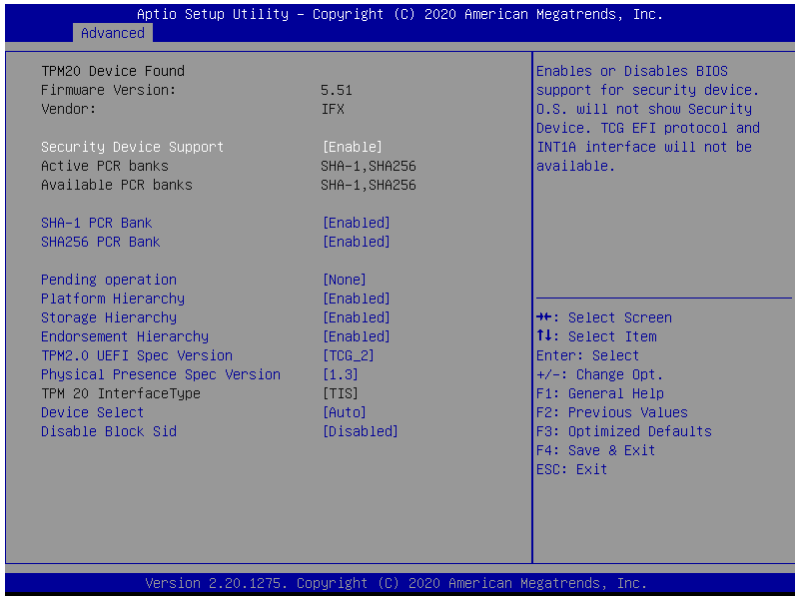
3.3 Setup Submenu: Main



3.4 Setup Submenu: Advanced



3.4.1 Trusted Computing

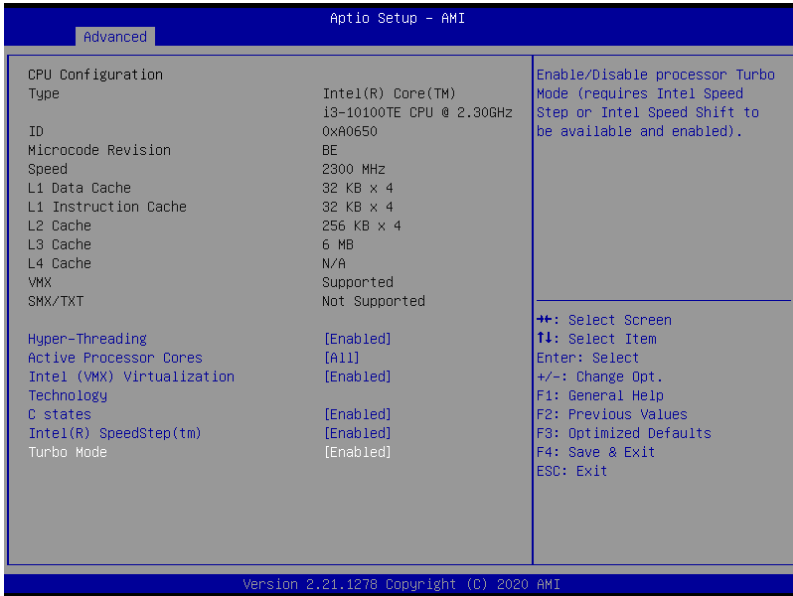


| Options Summary | | |
|---|-----------|-----------------------------------|
| Security Device Support | Disable | |
| | Enable | Optimal Default, Failsafe Default |
| Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available. | | |
| SHA-1 PCR Bank | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Enable or Disable SHA-1 PCR Bank | | |
| SHA256 PCR Bank | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable or Disable SHA256 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. | | |

Table Continues on next Page

| Options Summary | | |
|---|----------|-----------------------------------|
| Platform Hierarchy | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable or disable Platform Hierarchy | | |
| Storage Hierarchy | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable or Disable Storage Hierarchy | | |
| Endorsement Hierarchy | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable or Disable Endorsement Hierarchy | | |
| TPM2.0 UEFI Spec Version | TCG_1_2 | |
| | TCG_2 | Optimal Default, Failsafe Default |
| Select the TCG2 Spec Version Support, TCG_1_2: Compatible mode for Win8/Win10 TCG_2: Support new TCG2 protocol and event format for Win10 or later | | |
| Physical Presence Spec Version | 1.2 | |
| | 1.3 | Optimal Default, Failsafe Default |
| Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3. | | |
| Device Select | TPM 1.2 | |
| | TPM 2.0 | |
| | Auto | Optimal Default, Failsafe Default |
| 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 | | |

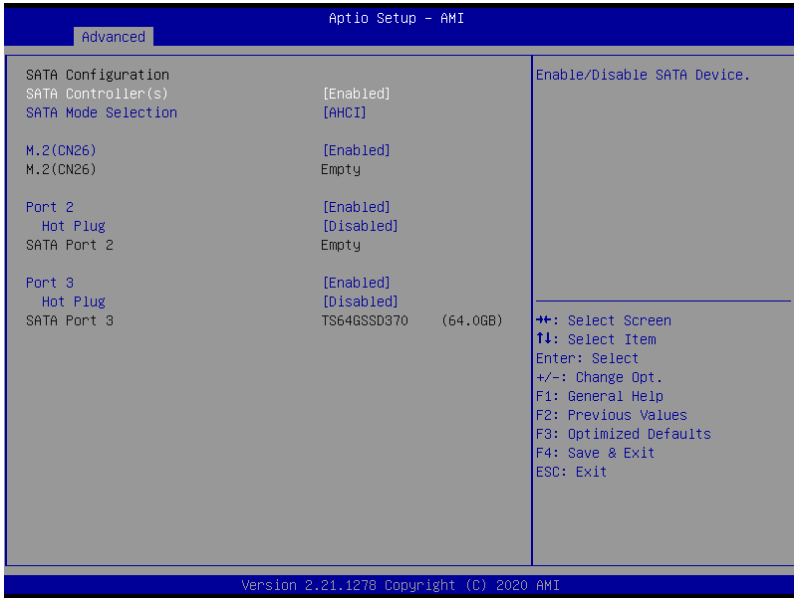
3.4.2 CPU Configuration



| Options Summary | | |
|---|----------|-----------------------------------|
| Hyper-Threading | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enabled or Disabled Hyper-Threading Technology | | |
| Active Processor Cores | All | Optimal Default, Failsafe Default |
| | 1 | |
| 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. | | |
| C-States | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized. | | |
| Intel(R) SpeedStep(tm) | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Allows more than two frequency ranges to be supported. | | |

| Options Summary | | |
|---|----------|-----------------------------------|
| Turbo Mode | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable/Disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled). | | |

3.4.3 SATA Configuration

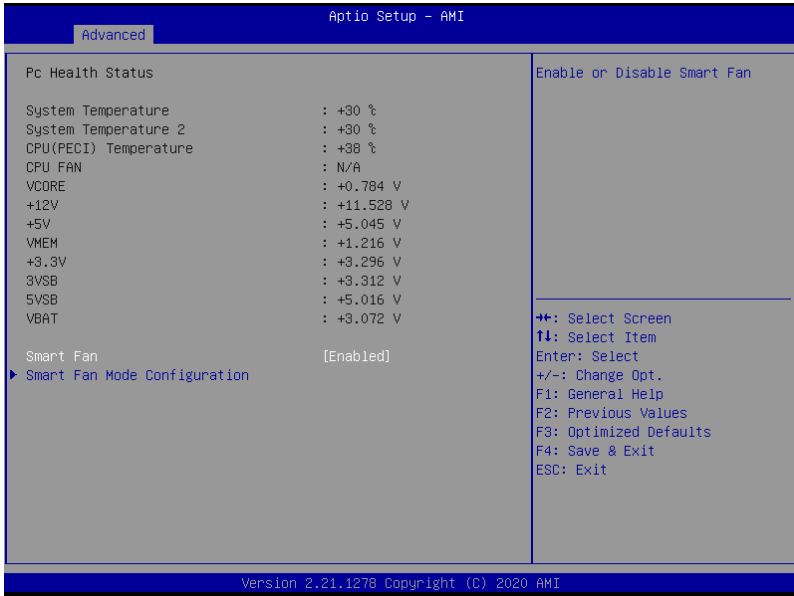


| Options Summary | | |
|---|---|-----------------------------------|
| SATA Controller(s) | Enabled | Optimal Default, Failsafe Default |
| | | |
| Enable/Disable SATA Device. | | |
| SATA Mode Selection | AHCI | Optimal Default, Failsafe Default |
| | Intel RST Premium With Intel Optane System Acceleration | |
| Determines how SATA controller(s) operate | | |
| M.2(CN26) | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable or Disable SATA Port | | |
| Port 2 | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable or Disable SATA Port | | |

Table Continues on Next Page...

| Options Summary | | |
|---------------------------------------|----------|-----------------------------------|
| Hot Plug | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Designates this port as Hot Pluggable | | |
| Port 3 | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable or Disable SATA Port | | |
| Hot Plug | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Designates this port as Hot Pluggable | | |

3.4.4 Hardware Monitor



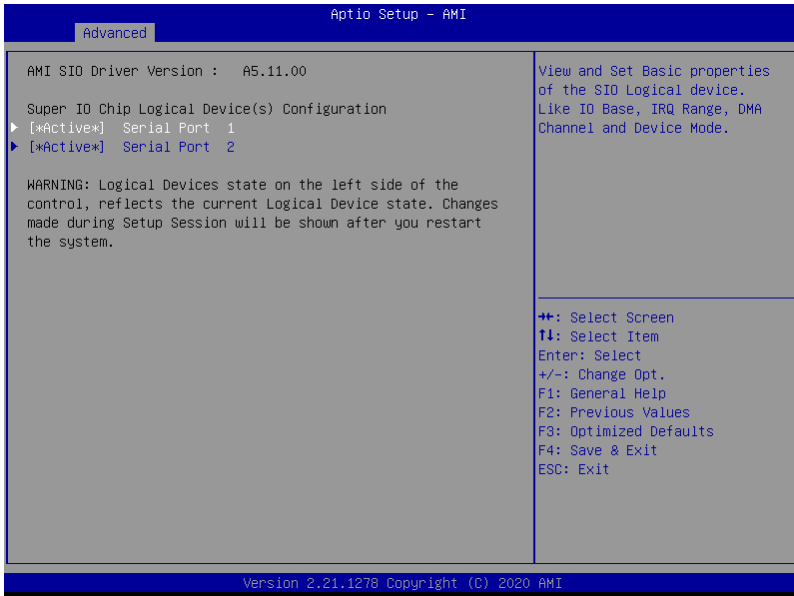
| Options Summary | | |
|--------------------------------|----------|-----------------------------------|
| Smart Fan | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enables or Disables Smart Fan. | | |

3.4.4.1 Smart Fan Mode Configuration

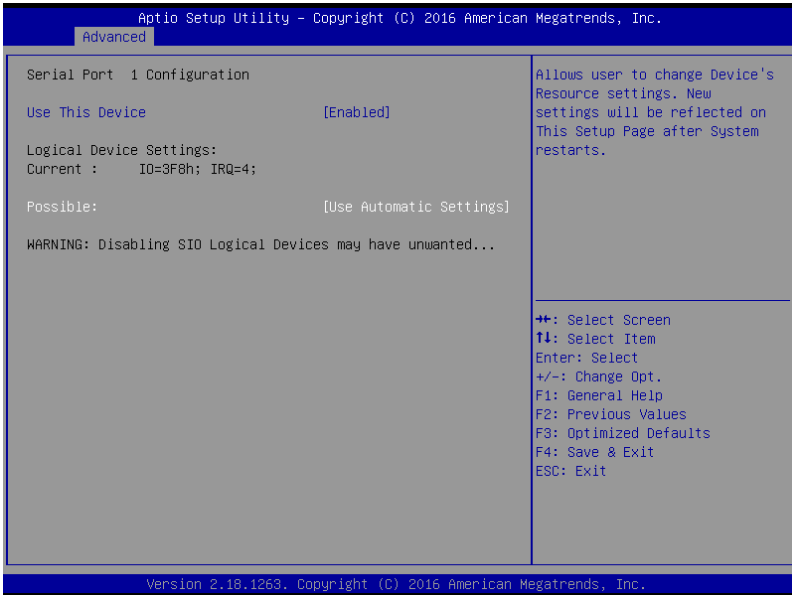


| Options Summary | | |
|---|------------------------------|-----------------------------------|
| FAN1 Output Mode | Output PWM mode (open drain) | |
| | Linear Fan Application | |
| | Output PWM mode (push pull) | Optimal Default, Failsafe Default |
| Fan 1 Smart Fan Control | Manual Duty Mode | |
| | Auto Duty-Cycle Mode | Optimal Default, Failsafe Default |
| Smart Fan Mode Select | | |
| Temperature Source | CPU(PECI) Temperature | |
| | System Temperature | Optimal Default, Failsafe Default |
| | System Temperature 2 | |
| Select the monitored temperature source for this fan. | | |
| Temperature 1 | 60 | |
| Duty Cycle 1 | 85 | |
| Auto fan speed control. Fan speed will follow different temperature by different duty cycle 1-100 | | |

3.4.5 SIO Configuration



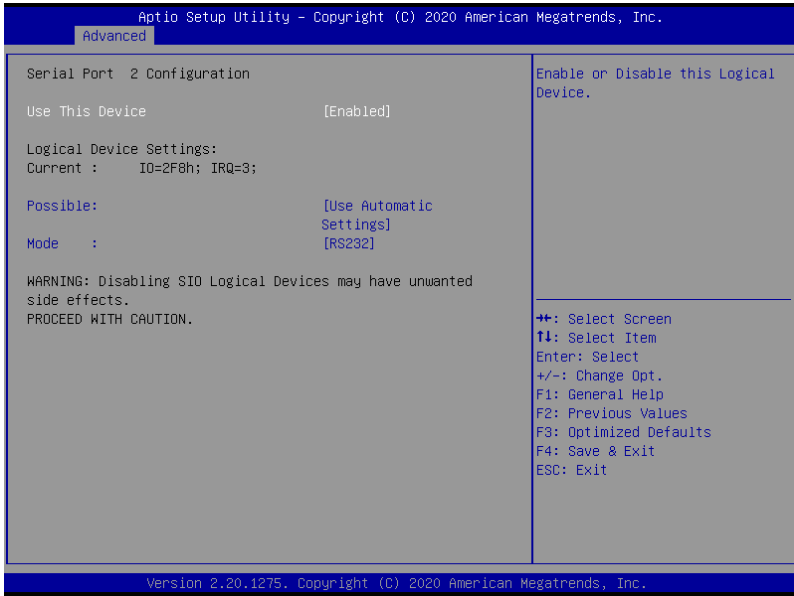
3.4.5.1 Serial Port 1 Configuration



Options Summary

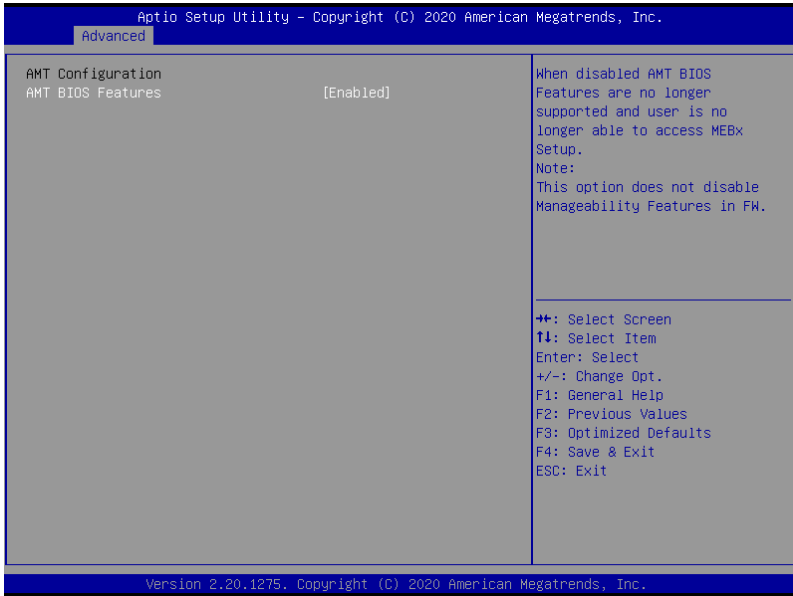
| | | |
|--|------------------------|-----------------------------------|
| Use This Device | Disable | |
| | Enable | Optimal Default, Failsafe Default |
| Enable or Disable this Logical Device. | | |
| Possible: | Use Automatic Settings | Optimal Default, Failsafe Default |
| | IO=3F8h; IRQ=4 | |
| | IO=2F8h; IRQ=3 | |
| Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts. | | |

3.4.5.2 Serial Port 2 Configuration



| Options Summary | | |
|--|------------------------|-----------------------------------|
| Use This Device | Disable | |
| | Enable | Optimal Default, Failsafe Default |
| Enable or Disable this Logical Device. | | |
| Possible: | Use Automatic Settings | Optimal Default, Failsafe Default |
| | IO=2F8h; IRQ=3 | |
| | IO=3F8h; IRQ=4 | |
| 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. | | |

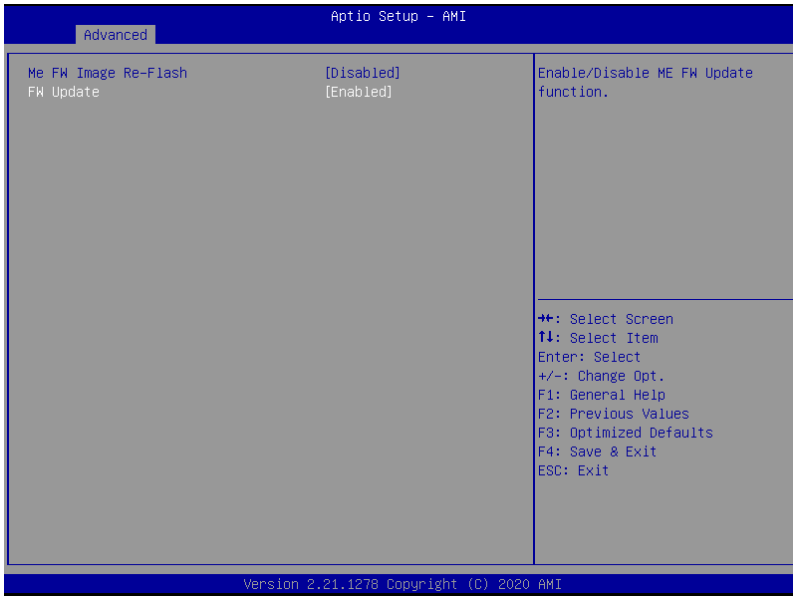
3.4.6 AMT Configuration



Options Summary

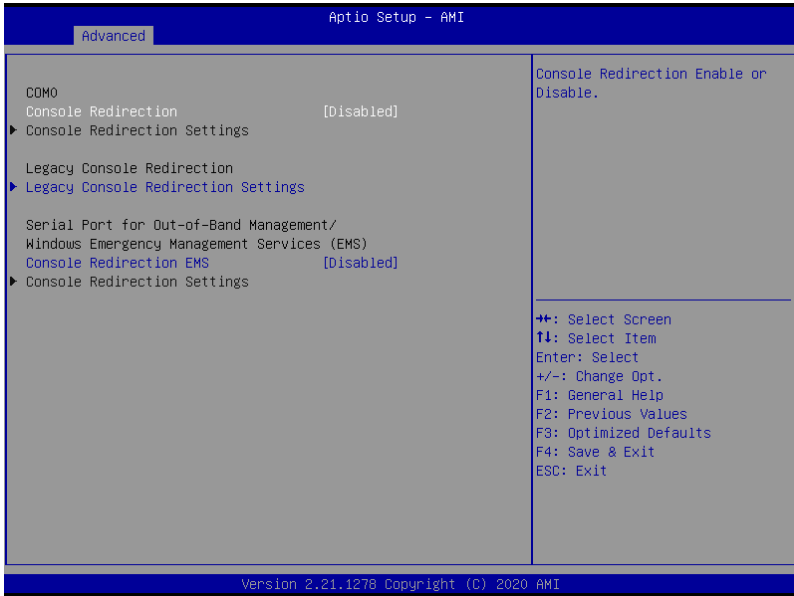
| | | |
|--|---------|-----------------------------------|
| AMT BIOS Features | Disable | |
| | Enable | Optimal Default, Failsafe Default |
| When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup. | | |
| Note: This option does not disable Manageability Features in FW | | |

3.4.7 Firmware Update Configuration



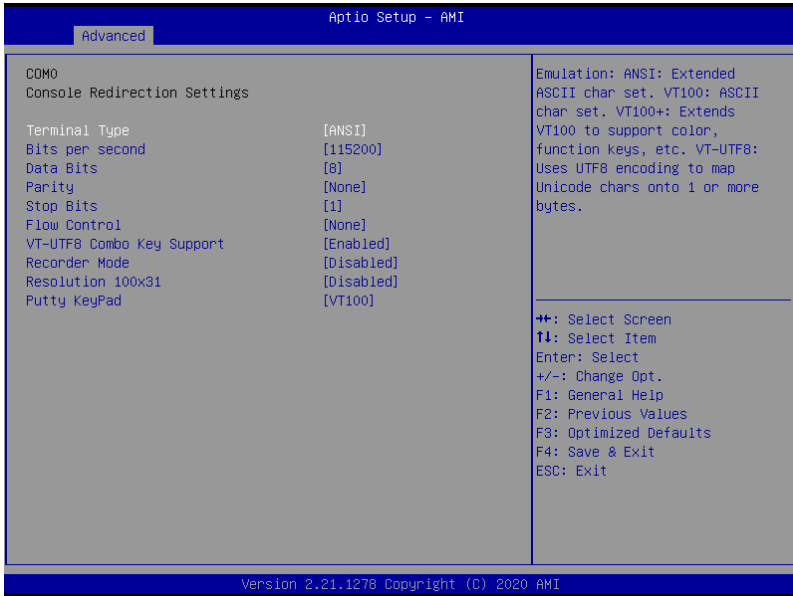
| Options Summary | | |
|---|----------|-----------------------------------|
| Me FW Image Re-Flash | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Enable/Disable Me FW Image Re-Flash function. | | |
| FW Update | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable/Disable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

3.4.8 Serial Port Console Redirection



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

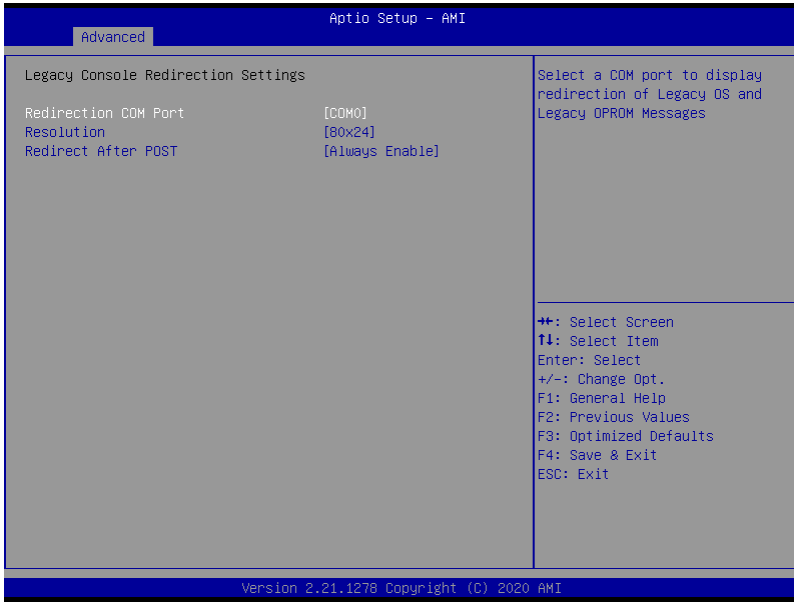
3.4.8.1 COM0 Console Redirection Settings



| Options Summary | | |
|---|---------|-----------------------------------|
| Terminal Type | VT100 | |
| | VT100+ | |
| | VT-UTF8 | |
| | ANSI | Optimal Default, Failsafe Default |
| Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes. | | |
| Bits Per second | 9600 | |
| | 19200 | |
| | 38400 | |
| | 57600 | |
| | 115200 | Optimal Default, Failsafe Default |
| Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds. | | |
| Data Bits | 7 | |
| | 8 | Optimal Default, Failsafe Default |
| Parity | None | Optimal Default, Failsafe Default |

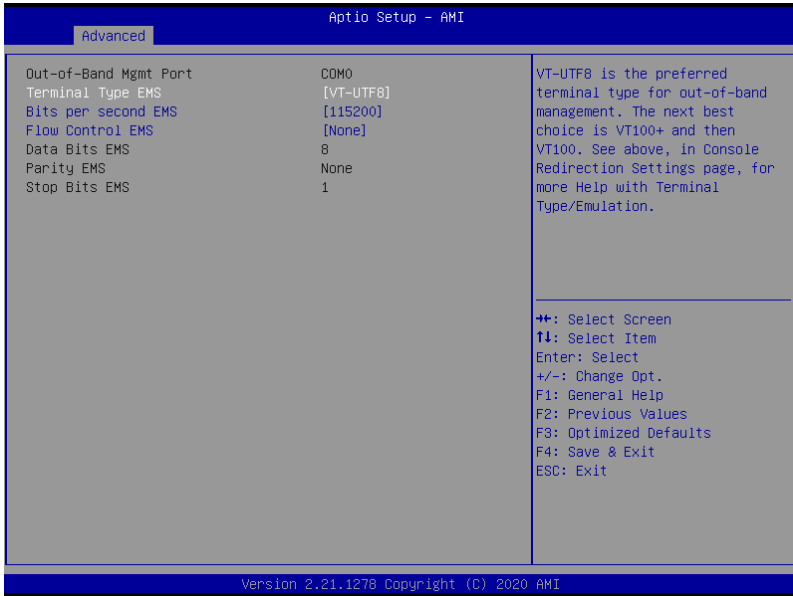
| Options Summary | | |
|--|---------------------|-----------------------------------|
| | Even | |
| | Odd | |
| | Mark | |
| | Space | |
| A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit. | | |
| Stop Bits | 1 | Optimal Default, Failsafe Default |
| | 2 | |
| Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit. | | |
| Flow Control | None | Optimal Default, Failsafe Default |
| | Hardware RTS/CTS | |
| Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals. | | |
| VT-UTF8 Combo Key Support | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals | | |
| Recorder Mode | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| With this mode enabled only text will be sent. This is to capture Terminal data. | | |
| Resolution 100x31 | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Enables or disables extended terminal resolution | | |
| Putty KeyPad | VT100 | Optimal Default, Failsafe Default |
| | LINUX | |
| | XTERMR6 | |
| | SCO | |
| | ESCN | |
| | VT400 | |
| Select FunctionKey and KeyPad on Putty. | | |

3.4.8.2 Legacy Console Redirection Settings



| Options Summary | | |
|--|---------------|-----------------------------------|
| Redirection Console COM Port | COM0 | Optimal Default, Failsafe Default |
| Console Redirection Enable or Disable. | | |
| Resolution | 80x24 | Optimal Default, Failsafe Default |
| | 80x25 | |
| On Legacy OS, the Number of Rows and Columns supported redirection | | |
| Redirect After POST | Always Enable | Optimal Default, Failsafe Default |
| | BootLoader | |
| When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable. | | |

3.4.8.3 Out-of-Band Mgmt Console Redirection Settings

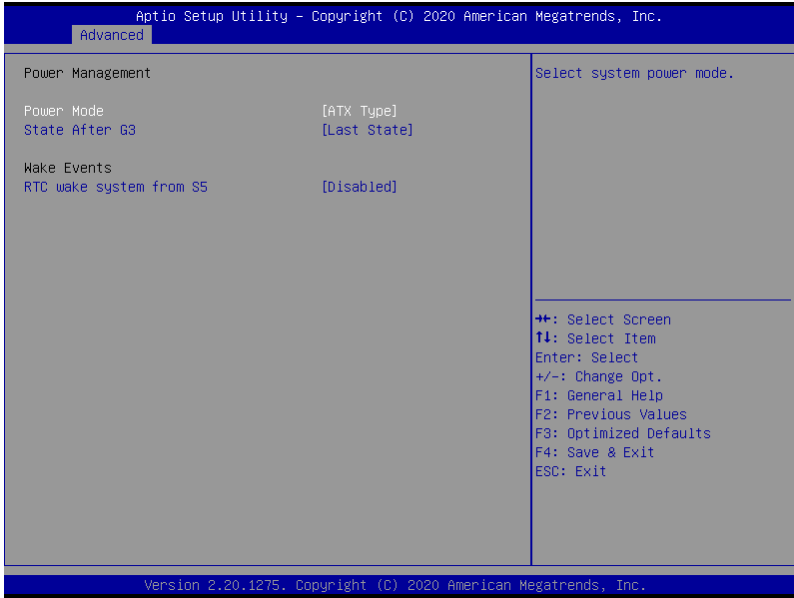


| Options Summary | | |
|--|-------------------|-----------------------------------|
| Terminal Type EMS | VT100 | |
| | VT100+ | |
| | VT-UTF8 | Optimal Default, Failsafe Default |
| | ANSI | |
| VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation. | | |
| Bits Per second EMS | 9600 | |
| | 19200 | |
| | 57600 | |
| | 115200 | Optimal Default, Failsafe Default |
| Flow Control EMS | None | Optimal Default, Failsafe Default |
| | Hardware RTS/CTS | |
| | Software xon/xoff | |
| Continued on Next Page... | | |

Options Summary

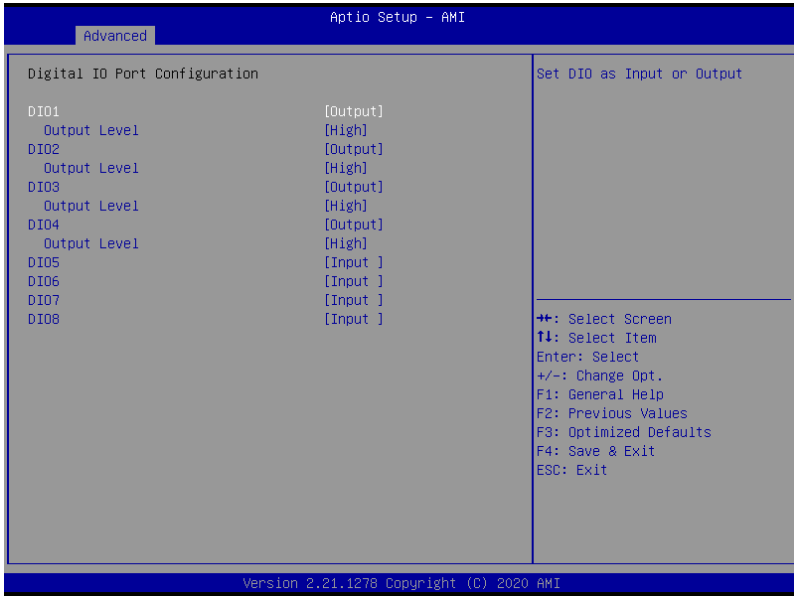
Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

3.4.9 Power Management



| Options Summary | | |
|---|------------|-----------------------------------|
| Power Mode | ATX Type | Optimal Default, Failsafe Default |
| | AT Type | |
| Select system power mode | | |
| State After G3 | Always On | |
| | Always Off | |
| | Last State | Optimal Default, Failsafe Default |
| Specify what state to go to when power is re-applied after a power failure (G3 state). | | |
| RTC wake system from S5 | Disable | Optimal Default, Failsafe Default |
| | Fixed Time | |
| Fixed Time: System will wake on the hr::min::sec specified./n Dynamic Time: System will wake on the current time + Increase minute(s) | | |

3.4.10 Digital IO Port Configuration



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

3.5 Setup Submenu: Chipset



3.5.1 North Bridge

The screenshot displays the 'Aptio Setup - AMI' BIOS interface, specifically the 'Chipset' menu. The 'North Bridge' section is expanded, showing various configuration options. The 'Memory Configuration' section includes 'Memory Frequency' set to 2133 MHz. The 'Channel 0 Slot 0' is 'Not Populated / Disabled', while 'Channel 1 Slot 0' is 'Populated & Enabled'. Under 'Channel 1 Slot 0', the 'Size' is 16384 MB (DDR4), 'Number of Ranks' is 2, and the 'Manufacturer' is Transcend. A 'LVDS Panel Configuration' option is visible with a right-pointing arrow. A legend on the right side of the screen lists navigation keys: '+' for 'Select Screen', '↓' for 'Select Item', 'Enter' for 'Select', '+/-' for 'Change Opt.', 'F1' for 'General Help', 'F2' for 'Previous Values', 'F3' for 'Optimized Defaults', 'F4' for 'Save & Exit', and 'ESC' for 'Exit'. The bottom of the screen shows the version 'Version 2.21.1278 Copyright (C) 2020 AMI'.

| North Bridge | | Configure LVDS panel parameters. |
|----------------------------|--------------------------|----------------------------------|
| Memory Configuration | | |
| Memory Frequency | 2133 MHz | |
| Channel 0 Slot 0 | Not Populated / Disabled | |
| Channel 1 Slot 0 | Populated & Enabled | |
| Size | 16384 MB (DDR4) | |
| Number of Ranks | 2 | |
| Manufacturer | Transcend | |
| ▶ LVDS Panel Configuration | | |

Legend:

- + : 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) 2020 AMI

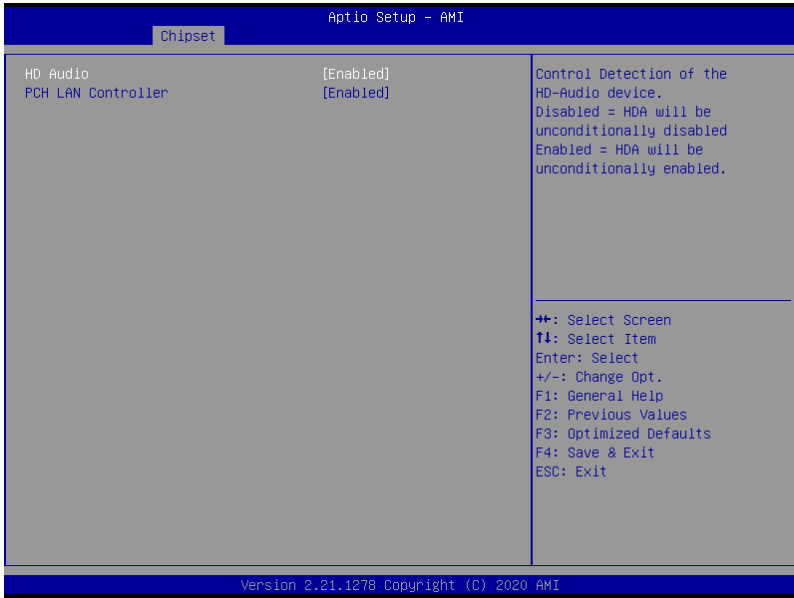
3.5.1.1 LVDS Panel Configuration



| Options Summary | | |
|--|----------------------|-----------------------------------|
| LVDS | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable/Disabled 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 | |
| Select LCD panel used by Internal Graphics Device by selecting the appropriate setup item. | | |

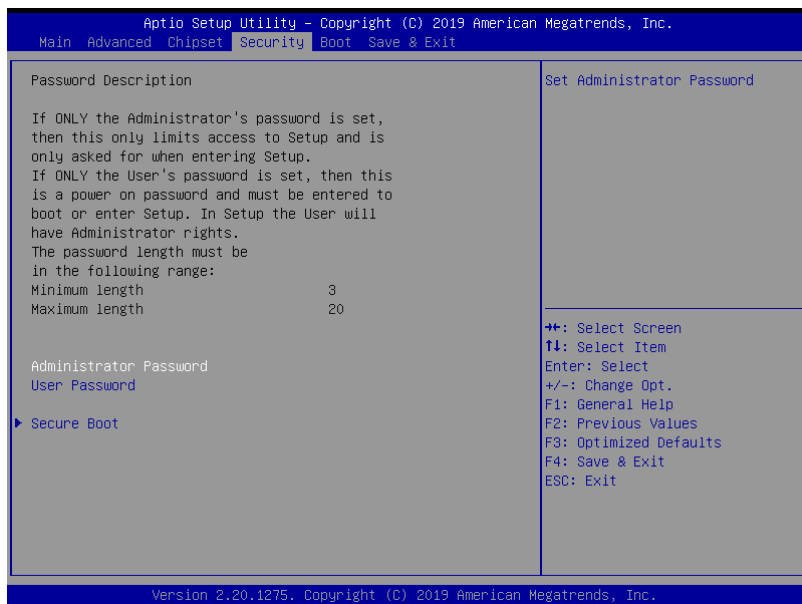
| Options Summary | | |
|--|----------|-----------------------------------|
| Color Depth | 18-bit | Optimal Default, Failsafe Default |
| | 24-bit | |
| | 36-bit | |
| | 48-bit | |
| Select panel type | | |
| Backlight Type | Normal | Optimal Default, Failsafe Default |
| | Inverted | |
| Select backlight control signal type | | |
| Backlight Level | 0% | |
| | 10% | |
| | 20% | |
| | 30% | |
| | 40% | |
| | 50% | |
| | 60% | |
| | 70% | |
| | 80% | Optimal Default, Failsafe Default |
| | 90% | |
| 100% | | |
| Select backlight control level | | |
| Backlight PWM Freq | 100Hz | |
| | 200Hz | |
| | 220Hz | Optimal Default, Failsafe Default |
| | 500Hz | |
| | 1KHz | |
| | 2.2KHz | |
| | 6.5KHz | |
| Select PWM frequency of backlight control signal | | |

3.5.2 PCH IO Configuration



| Options Summary | | |
|--|----------|-----------------------------------|
| HD Audio | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled. | | |
| PCH Lan Controller | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable/Disable onboard NIC | | |

3.6 Setup Submenu: Security



Change User/Administrator Password

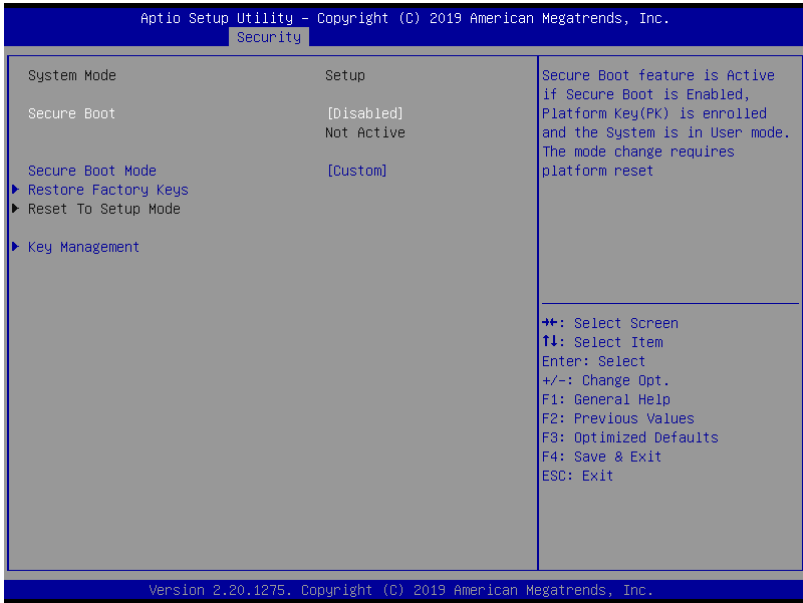
You can set an Administrator Password or User Password. An Administrator Password must be set before you can set a User Password. The password will be required during boot up, or when the user enters the Setup utility. A User Password does not provide access to many of the features in the Setup utility.

Select the password you wish to set, and press Enter. In the dialog box, enter your password (must be between 3 and 20 letters or numbers). Press Enter and retype your password to confirm. Press Enter again to set the password.

Removing the Password

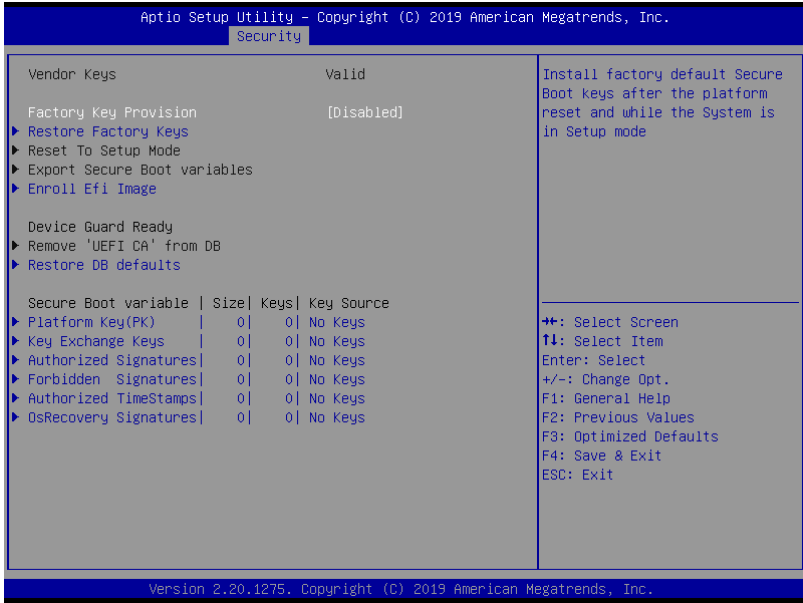
Select the password you want to remove and enter the current password. At the next dialog box press Enter to disable password protection.

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

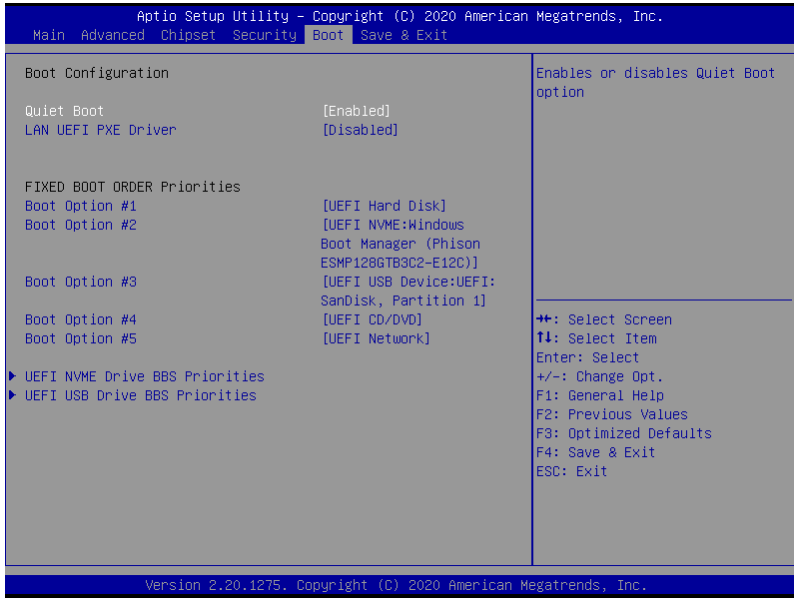


| Options Summary | | |
|--|----------|-----------------------------------|
| Factory Key Provision | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode. The mode change 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) | | |

Table Continues on Next Page...

| Options Summary | |
|---|---------|
| Remove 'UEFI CA' from DB | |
| 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 |
| | Delete |
| Authorized Signatures | Details |
| | Export |
| | Update |
| | Delete |
| Forbidden Signatures | Details |
| | Export |
| | Update |
| | Delete |
| Authorized TimeStamps | Update |
| | Append |
| OsRecovery Signatures | Update |
| | Append |
| <p>Enroll Factory Defaults or load certificates from a file:</p> <ol style="list-style-type: none"> Public Key Certificate: <ol style="list-style-type: none"> EFI_SIGNATURE_LIST EFI_CERT_X509 (DER) EFI_CERT_RSA2048 (bin) EFI_CERT_SHAXXX Authenticated UEFI Variable EFI PE/COFF Image (SHA256) <p>Key Source: Factory, External, Mixed</p> | |

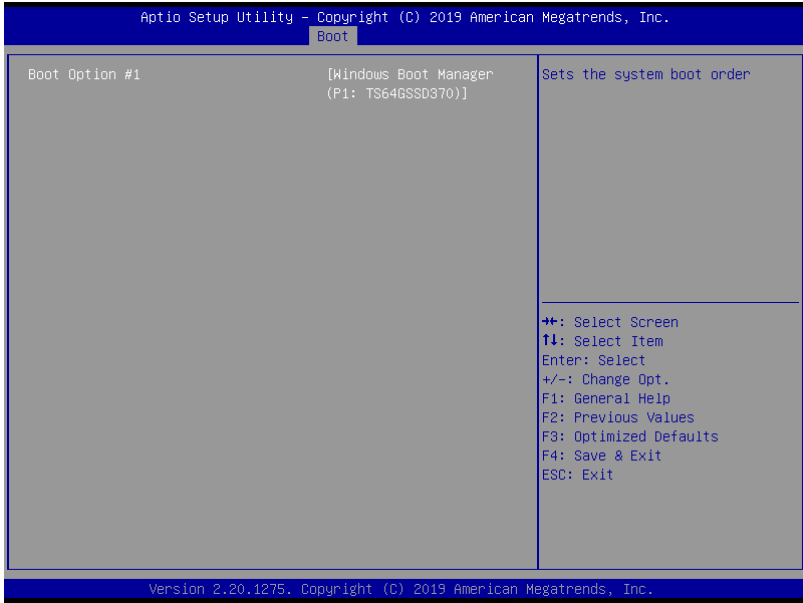
3.7 Setup Submenu: Boot



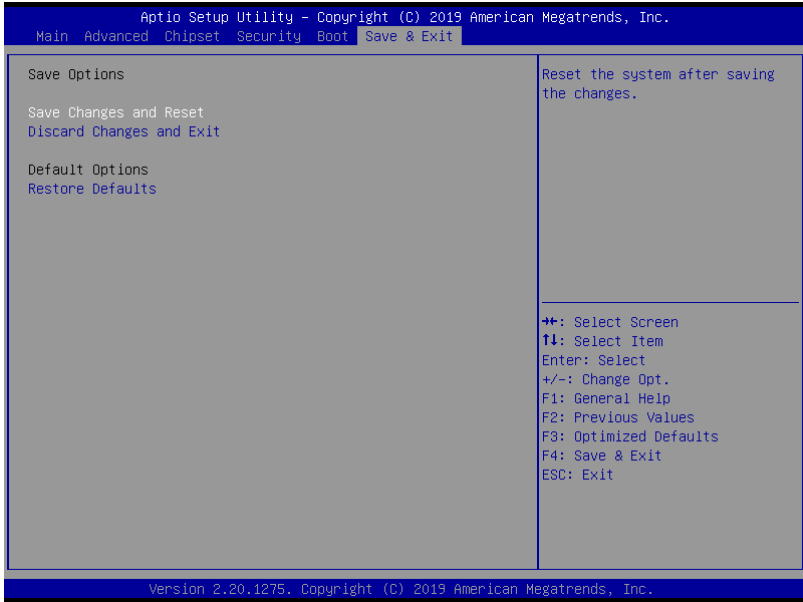
Options Summary

| | | |
|--------------------------------------|----------|-----------------------------------|
| Quiet Boot | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable or Disable showing boot logo. | | |
| LAN UEFI Pxe Driver | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Enabled/Disable LAN UEFI PXE Driver | | |

3.7.1 BBS Priorities



3.8 Setup Submenu: Save & Exit



Chapter 4

Driver Installation

4.1 Driver Download/Installation

Drivers for the GENE-CML5 can be downloaded from the product page on the AAEON website by following this link:

<https://www.aaeon.com/en/p/subcompact-boards-gene-cml5>

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

Step 1 – Install Chipset Drivers

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

Step 2 – Install Graphics Drivers

1. Open the **Step 2 – Graphic** folder
2. Run the **igxpin.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 3 – Install Network Driver

1. Open the **Step 3 – Network** folder
2. Run the **PROWinx64.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 4 – Install Audio Driver

1. Open the **Step 4 – Audio** folder
2. Run the **Win10_R281.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 5 – Install Serial IO Drivers

1. Open the **Step 5 – SerialIO** folder
2. Run the **SetupSerialIO.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 6 – Install ME Drivers

1. Click on the **Step 6 – ME** folder
2. Run the **SetupME.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically










Appendix A

I/O Information

A.1 I/O Address Map

3.5" Subcompact Board
GENE-CML5

| | |
|---------------------------------------|-----------------------------------|
| 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 |
| [00000000000000F0 - 00000000000000F0] | Numeric data processor |
| [00000000000002F8 - 00000000000002FF] | Communications Port (COM2) |
| [00000000000003F8 - 00000000000003FF] | Communications Port (COM1) |
| [00000000000004D0 - 00000000000004D1] | Programmable interrupt controller |
| [0000000000000680 - 000000000000069F] | Motherboard resources |
| [0000000000000A00 - 0000000000000A0F] | Motherboard resources |
| [0000000000000A10 - 0000000000000A1F] | Motherboard resources |
| [0000000000000A20 - 0000000000000A2F] | Motherboard resources |
| [0000000000000D00 - 0000000000000FFF] | PCI Express Root Complex |
| [000000000000164E - 000000000000164F] | Motherboard resources |
| [0000000000001800 - 00000000000018FE] | Motherboard resources |








































| | |
|---|--|
|  | [0000000000001854 - 0000000000001857] Motherboard resources |
|  | [0000000000002000 - 00000000000020FE] Motherboard resources |
|  | [0000000000003000 - 0000000000003FFF] Intel(R) PCI Express Root Port #11 - 06B2 |
|  | [0000000000004000 - 000000000000403F] Intel(R) UHD Graphics 630 |
|  | [0000000000004060 - 000000000000407F] Standard SATA AHCI Controller |
|  | [0000000000004080 - 0000000000004083] Standard SATA AHCI Controller |
|  | [0000000000004090 - 0000000000004097] Standard SATA AHCI Controller |
|  | [000000000000EFA0 - 000000000000EFBF] Intel(R) SMBus - 06A3 |
|  | [000000000000FFF8 - 000000000000FFFF] Intel(R) Active Management Technology - SOL (COM3) |











































3 Internet request (IPQ)










































A.2 Memory Address Map

| Address Range | Device Name |
|---------------------------------------|--|
| [0000000000A0000 - 0000000000BFFFFF] | PCI Express Root Complex |
| [000000009F80000 - 00000000DFFFFFFF] | PCI Express Root Complex |
| [00000000A000000 - 00000000AFFFFFFF] | Intel(R) UHD Graphics 630 |
| [00000000B000000 - 00000000B0FFFFFF] | Intel(R) UHD Graphics 630 |
| [00000000B110000 - 00000000B11FFFFF] | Intel(R) I211 Gigabit Network Connection |
| [00000000B110000 - 00000000B11FFFFF] | Intel(R) PCI Express Root Port #11 - 06B2 |
| [00000000B112000 - 00000000B123FFFF] | Intel(R) I211 Gigabit Network Connection |
| [00000000B122000 - 00000000B122FFFF] | Intel(R) USB 3.1 eXtensible Host Controller - 1.10 (Microsoft) |
| [00000000B123400 - 00000000B1235FFF] | Standard SATA AHCI Controller |
| [00000000B123800 - 00000000B12380FF] | Intel(R) SMBus - 06A3 |
| [00000000B123900 - 00000000B12397FF] | Standard SATA AHCI Controller |
| [00000000B123A00 - 00000000B123A0FF] | Standard SATA AHCI Controller |
| [00000000E000000 - 00000000EFFFFFFF] | Motherboard resources |
| [00000000FC80000 - 00000000FE7FFFFF] | PCI Express Root Complex |
| [00000000FCF0000 - 00000000FCFFFFFF] | High Definition Audio Controller |
| [00000000FD00000 - 00000000FD69FFFF] | Motherboard resources |
| [00000000FD6A000 - 00000000FD6AFFFF] | Intel(R) Serial IO GPIO Host Controller - INT3450 |
| [00000000FD6B000 - 00000000FD6BFFFF] | Intel(R) Serial IO GPIO Host Controller - INT3450 |
| [00000000FD6C000 - 00000000FD6CFFFF] | Motherboard resources |
| [00000000FD6D000 - 00000000FD6DFFFF] | Intel(R) Serial IO GPIO Host Controller - INT3450 |
| [00000000FD6E000 - 00000000FD6EFFFF] | Intel(R) Serial IO GPIO Host Controller - INT3450 |
| [00000000FD6F000 - 00000000FDFFFFFF] | Motherboard resources |
| [00000000FE00000 - 00000000FE01FFFF] | Motherboard resources |
| [00000000FE01000 - 00000000FE010FFF] | Intel(R) SPI (flash) Controller - 06A4 |
| [00000000FE03800 - 00000000FE038FFF] | Motherboard resources |
| [00000000FE1D800 - 00000000FE1D8FFF] | High Definition Audio Controller |
| [00000000FE1DC00 - 00000000FE1DCFFF] | Intel(R) Management Engine Interface #1 |
| [00000000FE1DD00 - 00000000FE1DDFFF] | Intel(R) Serial IO I2C Host Controller - 06E9 |
| [00000000FE1DE00 - 00000000FE1DEFFF] | Intel(R) Serial IO I2C Host Controller - 06E8 |
| [00000000FE1DF00 - 00000000FE1DFFFF] | Intel(R) Active Management Technology - SOL (COM3) |
| [00000000FE1E000 - 00000000FE1FFFFFF] | Intel(R) Ethernet Connection (11) I219-LM |
| [00000000FE20000 - 00000000FE7FFFFFF] | Motherboard resources |
| [00000000FED0000 - 00000000FED003FF] | High precision event timer |
| [00000000FED1000 - 00000000FED17FFF] | Motherboard resources |
| [00000000FED1800 - 00000000FED18FFF] | Motherboard resources |
| [00000000FED1900 - 00000000FED19FFF] | Motherboard resources |
| [00000000FED2000 - 00000000FED3FFFF] | Motherboard resources |
| [00000000FED4000 - 00000000FED44FFF] | Trusted Platform Module 2.0 |
| [00000000FED4500 - 00000000FED8FFFF] | Motherboard resources |
| [00000000FED9000 - 00000000FED93FFF] | Motherboard resources |
| [00000000FEE0000 - 00000000FEEFFFFFF] | Motherboard resources |

A.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) 0x0000000D (13) | Numeric data processor |
|  | (ISA) 0x0000000E (14) | Intel(R) Serial IO GPIO Host Controller - INT3450 |
|  | (ISA) 0x0000002D (45) | Trusted Platform Module 2.0 |
|  | (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) 0x00000057 (87) | Microsoft ACPI-Compliant System |

| | | |
|---|------------------------|---------------------------------|
|  | (ISA) 0x00000058 (88) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000059 (89) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000005A (90) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000005B (91) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000005C (92) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000005D (93) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000005E (94) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000005F (95) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000060 (96) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000061 (97) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000062 (98) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000063 (99) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000064 (100) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000065 (101) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000066 (102) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000067 (103) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000068 (104) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000069 (105) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000006A (106) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000006B (107) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000006C (108) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000006D (109) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000006E (110) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000006F (111) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000070 (112) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000071 (113) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000072 (114) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000073 (115) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000074 (116) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000075 (117) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000076 (118) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000077 (119) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000078 (120) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000079 (121) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000007A (122) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000007B (123) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000007C (124) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000007D (125) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000007E (126) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x0000007F (127) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000080 (128) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x00000081 (129) | 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) | Intel(R) Serial IO I2C Host Controller - 06E8 |
|  (PCI) 0x00000011 (17) | Intel(R) Serial IO I2C Host Controller - 06E9 |
|  (PCI) 0x00000013 (19) | Intel(R) Active Management Technology - SOL (COM3) |
|  (PCI) 0xFFFFFFF2 (-14) | Intel(R) Management Engine Interface #1 |
|  (PCI) 0xFFFFFFF3 (-13) | Intel(R) Ethernet Connection (11) I219-LM |
|  (PCI) 0xFFFFFFF4 (-12) | Intel(R) UHD Graphics 630 |
|  (PCI) 0xFFFFFFF5 (-11) | Intel(R) USB 3.1 eXtensible Host Controller - 1.10 (Microsoft) |
|  (PCI) 0xFFFFFFF6 (-10) | Intel(R) I211 Gigabit Network Connection |
|  (PCI) 0xFFFFFFF7 (-9) | Intel(R) I211 Gigabit Network Connection |
|  (PCI) 0xFFFFFFF8 (-8) | Intel(R) I211 Gigabit Network Connection |
|  (PCI) 0xFFFFFFF9 (-7) | Intel(R) I211 Gigabit Network Connection |
|  (PCI) 0xFFFFFFFA (-6) | Intel(R) I211 Gigabit Network Connection |
|  (PCI) 0xFFFFFFF8 (-5) | Intel(R) I211 Gigabit Network Connection |
|  (PCI) 0xFFFFFFF4 (-4) | Standard SATA AHCI Controller |
|  (PCI) 0xFFFFFFF3 (-3) | Intel(R) PCI Express Root Port #9 - 06B0 |
|  (PCI) 0xFFFFFFF2 (-2) | Intel(R) PCI Express Root Port #11 - 06B2 |

Appendix B

Mating Connectors and Cables

B.1 Mating Connectors and Cables

| Connector Label | Function | Mating Connector | | Available Cable | Cable P/N |
|-----------------|-----------------------|------------------|---------------------|-------------------|------------|
| | | Vendor | Model no | | |
| CN1 | COM Port Connector | PINREX | 710-H73-095 WE1 | Serial Port Cable | 1701090122 |
| CN2 | COM Port Connector | PINREX | 710-H73-095 WE1 | Serial Port Cable | 1701090122 |
| CN3 | ATX Connector | PINREX | 753-71-03TW 01 | ATX Cable | 170220020B |
| CN6 | Audio Connector | PINREX | 712-71-10TW 01 | Audio Cable | 1709100254 |
| CN8 | SATA Connector | TechBest | 007-01-00757 | SATA Cable | 1709070460 |
| CN9 | SATA Connector | TechBest | 007-01-00757 | SATA Cable | 1709070460 |
| CN10 | SATA Power Connector | PINREX | 721-81-02TW 00 | SATA Power Cable | 1702150155 |
| CN12 | USB2.0 Connector | Aces | 50238-01041- 003 | USB2.0 Cable | 170010010D |
| CN13 | USB2.0 Connector | Aces | 50238-01041- 003 | USB2.0 Cable | 170010010D |
| CN14 | FPC Connector | Panasonic | AYF534035 | FPC Cable | 1706400601 |
| CN16 | Front Panel Connector | Aces | 50238-01041- 001 | Front Panel cable | 1709100108 |
| CN17 | LVDS Connector | CATCH | 1204-710-30S MP | LVDS Cable | 1704300311 |
| CN18 | Inverter Connector | Aces | 50228-00671 -001 | Inverter Cable | 170X000152 |

Appendix C

Digital I/O Ports

C.1 Digital I/O Register

7.1.2 Logic Device Number Register (LDN) — Index 07h

| Bit | Name | R/W | Reset | Default | Description |
|-----|------|-----|---------|---------|---|
| 7-0 | LDN | R/W | LRESET# | 00h | 00h: Select FDC device configuration registers. 03h: Select Parallel Port device configuration registers. 04h: Select Hardware Monitor device configuration registers. 05h: Select KBC device configuration registers. 06h: Select GPIO device configuration registers. 07h: Select WDT device configuration registers. 0Ah: Select PME, ACPI and ERP device configuration registers. 10h: Select UART1 device configuration registers. 11h: Select UART2 device configuration registers. 12h: Select UART3 device configuration registers. 13h: Select UART4 device configuration registers. 14h: Select UART5 device configuration registers. 15h: Select UART6 device configuration registers. Otherwise: Reserved. |

GPIO8 Output Enable Register — Index 88h

| Bit | Name | R/W | Reset | Default | Description |
|-----|-----------|-----|---------|---------|---|
| 7 | GPIO87_OE | R/W | LRESET# | 0 | 0: GPIO87 is in input mode. 1: GPIO87 is in output mode. |
| 6 | GPIO86_OE | R/W | LRESET# | 0 | 0: GPIO86 is in input mode. 1: GPIO85 is in output mode. |
| 5 | GPIO85_OE | R/W | LRESET# | 0 | 0: GPIO85 is in input mode. 1: GPIO85 is in output mode. |
| 4 | GPIO84_OE | R/W | LRESET# | 0 | 0: GPIO84 is in input mode. 1: GPIO84 is in output mode. |
| 3 | GPIO83_OE | R/W | LRESET# | 0 | 0: GPIO83 is in input mode. 1: GPIO83 is in output mode. |
| 2 | GPIO82_OE | R/W | LRESET# | 0 | 0: GPIO82 is in input mode. 1: GPIO82 is in output mode. |
| 1 | GPIO81_OE | R/W | LRESET# | 0 | 0: GPIO81 is in input mode. 1: GPIO81 is in output mode. |
| 0 | GPIO80_OE | R/W | LRESET# | 0 | 0: GPIO80 is in input mode. 1: GPIO80 is in output mode. |

GPIO8 Output Data Register — Index 89h (This byte could be also written by base address + 2)

| Bit | Name | R/W | Reset | Default | Description |
|-----|------------|-----|---------|---------|--|
| 7 | GPIO87_VAL | R/W | LRESET# | 1 | 0: GPIO87 outputs 0 when in output mode. 1: GPIO87 outputs 1 when in output mode. |
| 6 | GPIO86_VAL | R/W | LRESET# | 1 | 0: GPIO86 outputs 0 when in output mode. 1: GPIO86 outputs 1 when in output mode. |
| 5 | GPIO85_VAL | R/W | LRESET# | 1 | 0: GPIO85 outputs 0 when in output mode. 1: GPIO85 outputs 1 when in output mode. |
| 4 | GPIO84_VAL | R/W | LRESET# | 1 | 0: GPIO84 outputs 0 when in output mode. 1: GPIO84 outputs 1 when in output mode. |
| 3 | GPIO83_VAL | R/W | LRESET# | 1 | 0: GPIO83 outputs 0 when in output mode. 1: GPIO83 outputs 1 when in output mode. |
| 2 | GPIO82_VAL | R/W | LRESET# | 1 | 0: GPIO82 outputs 0 when in output mode. 1: GPIO82 outputs 1 when in output mode. |
| 1 | GPIO81_VAL | R/W | LRESET# | 1 | 0: GPIO81 outputs 0 when in output mode. 1: GPIO81 outputs 1 when in output mode. |
| 0 | GPIO80_VAL | R/W | LRESET# | 1 | 0: GPIO80 outputs 0 when in output mode. 1: GPIO80 outputs 1 when in output mode. |

GPIO8 Pin Status Register — Index 8Ah (This byte could be also read by base address + 2)

| Bit | Name | R/W | Reset | Default | Description |
|-----|-----------|-----|-------|---------|-------------------------------|
| 7 | GPIO87_IN | R | - | - | The pin status of GPIO87/PD7. |
| 6 | GPIO86_IN | R | - | - | The pin status of GPIO86/PD6. |
| 5 | GPIO85_IN | R | - | - | The pin status of GPIO85/PD5. |
| 4 | GPIO84_IN | R | - | - | The pin status of GPIO84/PD4. |
| 3 | GPIO83_IN | R | - | - | The pin status of GPIO83/PD3. |
| 2 | GPIO82_IN | R | - | - | The pin status of GPIO82/PD2. |
| 1 | GPIO81_IN | R | - | - | The pin status of GPIO81/PD1. |
| 0 | GPIO80_IN | R | - | - | The pin status of GPIO80/PD0. |

C.2 Digital I/O Sample Code (4 in 4 out, 2 low 2 high)

```
Outportb(0x2E,0x87); //enter configuration Outportb(0x2E,0x87);
Outportb(0x2E,0x07); //set LDN
Outportb(0x2F,0x06);
Outportb(0x2E,0x88); //GPIO set 8x Output enable register
Outportb(0x2F,0xF0);
Outportb(0x2E,0x89); //GPIO 8x output data register
Outportb(0x2F,0x30);
Outportb(0x2E,0xAA); //exit configuration
```