

# PICO-APL3

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PICO-ITX Board

User's Manual 8<sup>th</sup> Ed

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## Packing List

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

Item	Quantity
● PICO-APL3	1

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

## About this Document

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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](http://AAEON.com) for the latest version of this document.

## Safety Precautions

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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  $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ) OR ABOVE  $60^{\circ}\text{C}$  ( $140^{\circ}\text{F}$ ) 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>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><b>Note:</b> The Environment Friendly Use Period as labeled on this product is applicable under normal usage only</p>						

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# Chapter 1

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Product Specifications

## 1.1 Specifications

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### System

<b>Form Factor</b>	Pico-ITX
<b>CPU</b>	Intel® Atom®/Celeron®/Pentium® Processor: Pentium® N4200 (4C/4T,1.10GHz, up to 2.50GHz, TDP 6W) Celeron® N3350 (2C/2T,1.10GHz, up to 2.40GHz, TDP 6W) Atom® E3950 (4C/4T,1.60GHz, up to 2.00GHz, TDP 12W) Atom® E3940 (4C/4T,1.60GHz, up to 1.80GHz, TDP 9.5W) Atom® E3930 (2C/2T,1.30GHz, up to 1.80GHz, TDP 6.5W)
<b>Chipset</b>	Integrated with Intel® SoC
<b>Memory Type</b>	Onboard DDR3L 2GB (Optional up to 4GB)
<b>BIOS</b>	UEFI
<b>Wake On LAN</b>	Yes
<b>Watchdog Timer</b>	255 Levels
<b>Security</b>	TPM 2.0 (Optional)
<b>RTC Battery</b>	Lithium Battery 3V/240mAh
<b>Dimension</b>	3.94" x 2.84" (100mm x 72mm)
<b>Gross Weight</b>	0.18 lb. (0.08 kg)
<b>OS Support</b>	Windows® 10 (64 bit)

## Power

Power Requirement	+12V
Power Supply Type	AT/ATX
Connector	Phoenix 2-pin Connector (Default) Lockable DC Jack Connector (Colay)
Power Consumption	Intel® N4200 processor, DDR3L 4GB, 1.1A@12V

## Display

Controller	Intel® HD Graphics 500/505
LVDS/eDP	eDP x 1 (up to 3840 x 2160 @60Hz, Optional)
Display Interface	HDMI 1.4b x 1 (up to 3840 x 2160@30Hz) DDI (BIO, Optional)
Multiple Display	Up to 3 Simultaneous Displays

## Audio

Codec	Realtek ALC269
Audio Interface	Line-in/Line-out/MIC
Speaker	Amplifier Header

## External I/O

Ethernet	Realtek 8111 GbE 10/100/1000Base, RJ-45 x 1
USB	USB 3.2 Gen 1 x 2
Serial Port	—
Video	HDMI 1.4b x 1 (up to 3840 x 2160 @30Hz)



## Internal I/O

USB	USB 2.0 x 2
Serial Port	COM 1, COM 2 (RS-232)
Video	eDP x 1 (up to 3840 x 2160 @60Hz, Optional)
SATA	SATA III x 1 +5V SATA Power Connector x 1 eMMC 16GB (Optional, up to 32GB/64GB/128GB)
Audio	Audio Header x 1
DIO/GPIO	4-bit
SMBus/I2C	I2C/I2S x 1 (I2C as default)
Touch	—
FAN	—
SIM	—
Front Panel	HDD LED, PWR LED, Power Button, Buzzer, Reset
Others	—

## Expansion

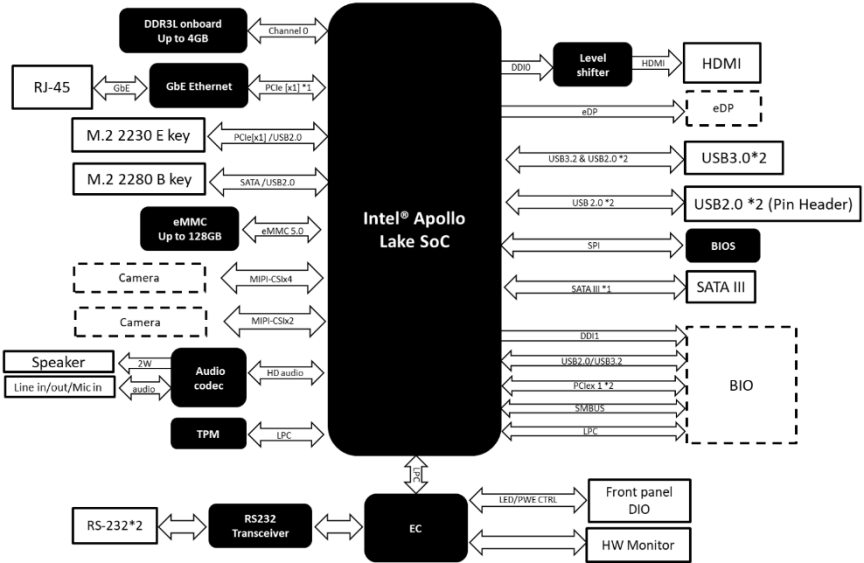
Mini PCI-E/mSATA	—
M.2	M.2 2230 E-Key x 1 (PCIe/USB) M.2 2280 B-Key x 1 (SATA/USB)
Others	MIPI-CSI x 2 Lanes (Optional) MIPI-CSI x 4 Lanes (Optional) BIO (Optional)

## Environment

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)	110,000
EMC	CE/FCC Class A

## 1.2 Block Diagram

### PICO-APL3 Block Diagram



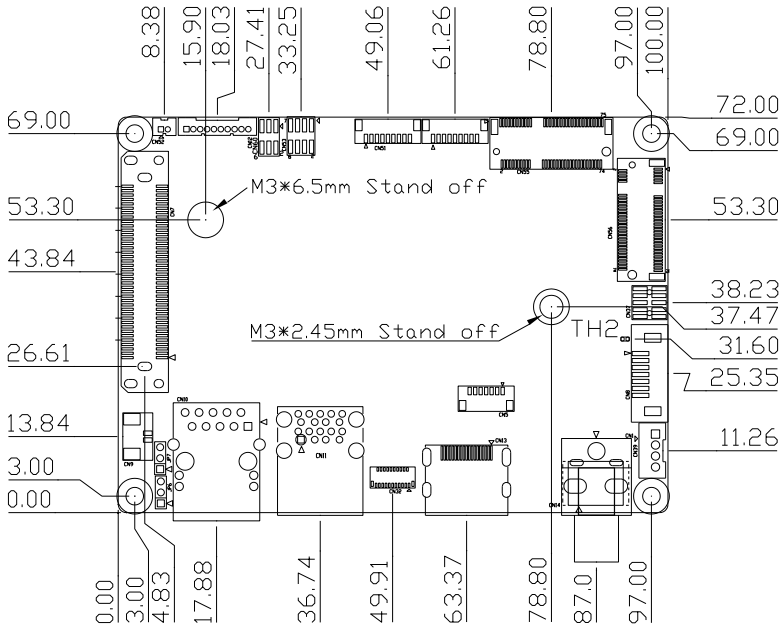
# Chapter 2

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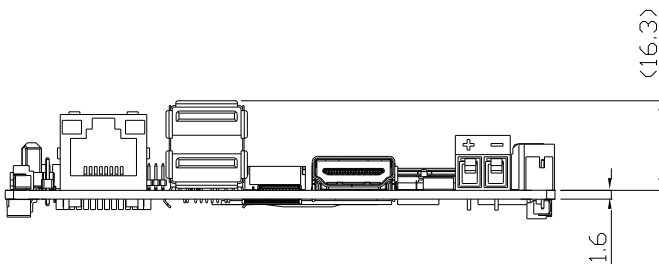
Hardware Information

## 2.1 Dimensions

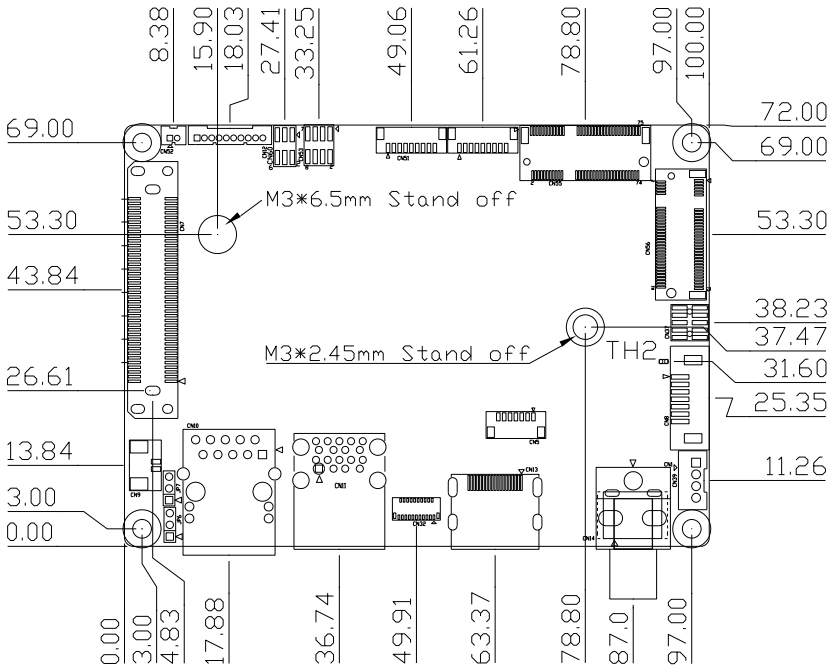
### Component Side (Phoenix Connector as default)



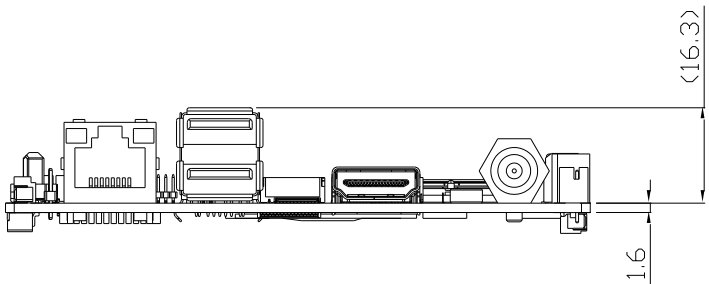
## Component Side



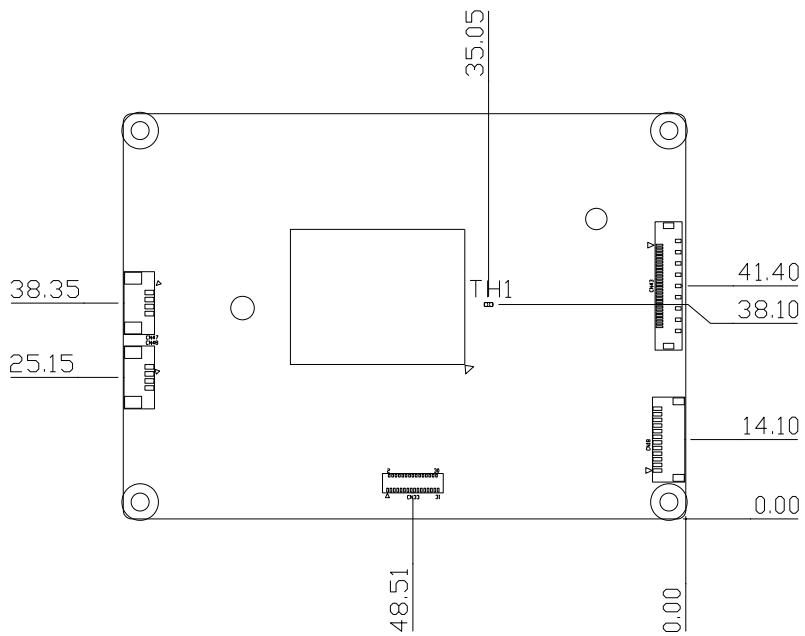
Component Side (DC Jack as optional)



# Component Side



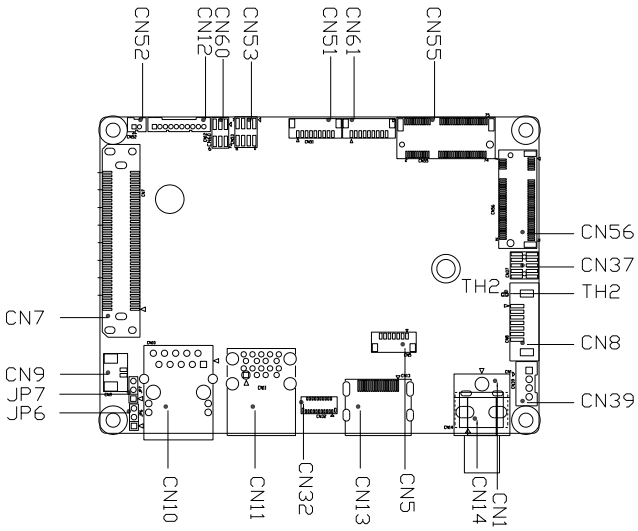
Solder Side



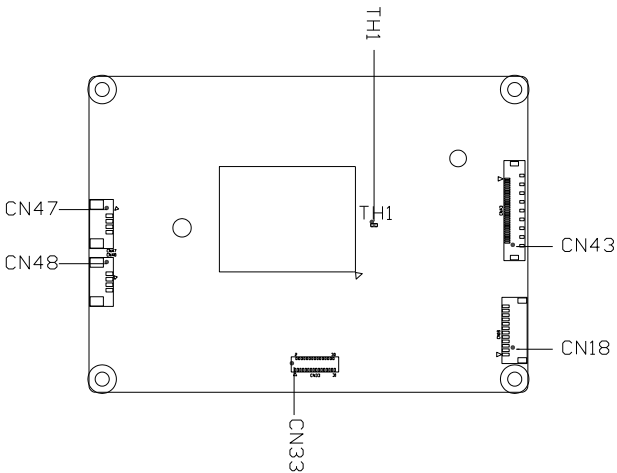
Solder Side

## 2.2 Jumpers and Connectors

### Component Side



### Solder Side





## 2.3 List of Jumpers

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

Label	Function
JP6	Auto Power Button Enable/Disable Selection
JP7	Clear CMOS Jumper

### 2.3.1 Auto Power Button Enable/Disable Selection (JP6)

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Disable

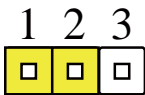


Enable (Default)

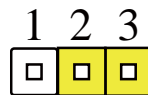
Disable Auto Power Button JP6 (1-2): Need to use power button JP6(1-2) to power on the system.

### 2.3.2 Clear CMOS Jumper (JP7)

---



Normal (Default)



Clear CMOS

## 2.4 List of Connectors

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Please refer to the table below for all of the board's connectors and their functions.

Label	Function
CN1/CN14	External +12V Input
CN5	SPI Debug Port
CN7	BIO Connector
CN8	SATA Port
CN9	RTC Battery
CN10	LAN (RJ-45)
CN11	USB 3.2 Gen 1 Ports 0 and 1
CN12	Line In/ Line Out/ Mic In
CN13	HDMI Port
CN18	LPC Port
CN32	MIPI-CSI x 2
CN33	MIPI-CSI x 4
CN37	I2S/I2C Connector
CN39	SATA Power
CN43	eDP
CN47	USB 2.0 Connector
CN48	USB 2.0 Connector
CN51	COM Port (RS-232)
CN52	Speaker
CN53	Front Panel Header
CN55	M.2 2230 E-Key
CN56	M.2 2280 B-Key
CN60	DIO
CN61	COM port (RS-232)

## 2.4.1 SPI Debug Port (CN5)

Pin	Pin Name	Signal Type	Signal Level
1	SPI_MISO	OUT	
2	GND	GND	
3	SPI_CLK	IN	
4	+3.3VSB	PWR	
5	SPI_MOSI	IN	
6	SPI_CS	IN	
7	NC	NC	
8	GND	GND	
9	GND	GND	

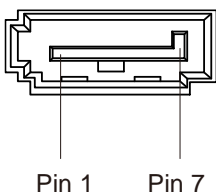
## 2.4.2 BIO Connector (CN7)

Pin	Pin Name	Pin	Pin Name
1	+12VSB	2	GND
3	GND	4	PCIE_TXN0
5	PCIE_RXN0	6	PCIE_TXP0
7	PCIE_RXP0	8	GND
9	GND	10	PCIE_TXN4
11	PCIE_RXN4	12	PCIE_TXP4
13	PCIE_RXP4	14	GND
15	GND	16	PS_ON#
17	DDIO_DDCCLK_3P3	18	DDIO_DDCDATA_3P3
19	+5VSB	20	+5VSB
21	+5VSB	22	+5VSB
23	PCIE_REF_CLK0	24	RESET#

Pin	Pin Name	Pin	Pin Name
25	PCIE_REF_CLK0#	26	GND
27	GND	28	DDIO_TXN1
29	DDIO_TXN0	30	DDIO_TXP1
31	DDIO_TXP0	32	GND
33	GND	34	DDIO_TXN3
35	DDIO_TXN2	36	DDIO_TXP3
37	DDIO_TXP2	38	GND
39	GND	40	BIO_DDIO_HPDI
41	DDIO_AUXN	42	GND
43	DDIO_AUXP	44	USB3_TX2_N
45	GND	46	USB3_TX2_P
47	USBN4	48	GND
49	USBP4	50	USB3_RX2_N
51	GND	52	USB3_RX2_P
53	SMB_CLK	54	GND
55	SMB_DATA	56	WAKE#
57	GND	58	USB_OC0#
59	+5V	60	USB_OC1#
61	+5V	62	+5V
63	+5V	64	+5V
65	LPC_AD0	66	LPC_FRAME#
67	LPC_AD1	68	SERIRQ
69	LPC_AD2	70	LPC_DRQ
71	LPC_AD3	72	GPIO0/BIO-POWEROK
73	GND	74	NC
75	LPC_CLK	76	NC

Pin	Pin Name	Pin	Pin Name
77	PME#	78	NC
79	GND	80	GND

### 2.4.3 SATA Port (CN8)

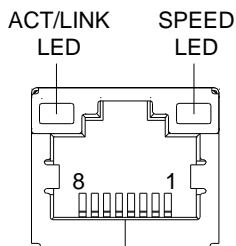


Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	SATA_TX-	DIFF	
3	SATA_TX-	DIFF	
4	GND	GND	
5	SATA_RX-	DIFF	
6	SATA_RX+	DIFF	
7	GND	GND	

### 2.4.4 RTC Battery (CN9)

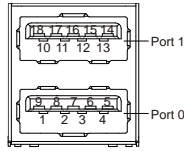
Pin	Pin Name	Signal Type	Signal Level
1	+BAT_RTC	PWR	3.3V
2	GND	GND	

## 2.4.5 LAN (RJ-45) Port (CN10)



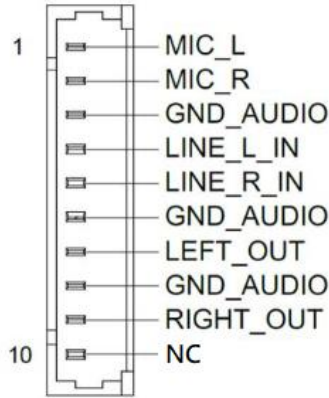
Pin	Pin Name	Signal Type	Signal Level
1	MDI0+	DIFF	
2	MDI0-	DIFF	
3	MDI1+	DIFF	
4	MDI2+	DIFF	
5	MDI2-	DIFF	
6	MDI1-	DIFF	
7	MDI3+	DIFF	
8	MDI3-	DIFF	

## 2.4.6 USB 3.2 Gen 1 Ports 0 and 1 (CN11)



Pin	Pin Name	Signal Type	Signal Level
1	+5VA	PWR	+5V
2	USB0_D-	DIFF	
3	USB0_D+	DIFF	
4	GND	GND	
5	USB0_SSRX-	DIFF	
6	USB0_SSRX+	DIFF	
7	GND	GND	
8	USB0_SSTX-	DIFF	
9	USB0_SSTX+	DIFF	
10	+5VA	PWR	+5V
11	USB1_D-	DIFF	
12	USB1_D+	DIFF	
13	GND	GND	
14	USB1_SSRX-		
15	USB1_SSRX+		
16	GND	GND	
17	USB1_SSTX-		
18	USB1_SSTX+		

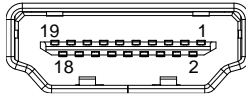
## 2.4.7 Audio I/O Port (CN12)



Pin	Pin Name	Signal Type	Signal Level
1	MIC_L	Audio	
2	MIC_R	Audio	
3	GND_AUDIO	AGND	
4	LINE_L_IN	Audio	
5	LINE_R_IN	Audio	
6	GND_AUDIO	AGND	
7	LEFT_OUT	Audio	
8	GND_AUDIO	AGND	
9	RIGHT_OUT	Audio	
10	NC	NC	

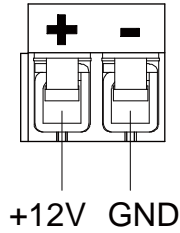


## 2.4.8 HDMI Port (CN13)



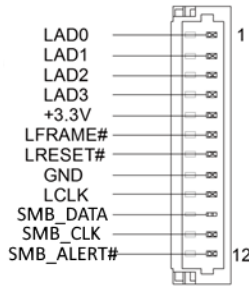
Pin	Pin Name	Signal Type	Signal Level
1	TMDS_DAT2+	DIFF	
2	GND	GND	
3	TMDS_DAT2-	DIFF	
4	TMDS_DAT1+	DIFF	
5	GND	GND	
6	TMDS_DAT1-	DIFF	
7	TMDS_DAT0+	DIFF	
8	GND	GND	
9	TMDS_DAT0-	DIFF	
10	TMDS_CLK+	DIFF	
11	GND	GND	
12	TMDS_CLK-	DIFF	
13	NC		
14	NC		
15	DDC_CLK	I/O	+5V
16	DDC_DATA	I/O	+5V
17	GND	GND	
18	+5V	I/O	+5V
19	HPLG_DETECT	IN	

### 2.4.9 External +12V Input (CN14)



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

### 2.4.10 LPC Port (CN18)



Pin	Pin Name	Signal Type	Signal Level
1	LAD0	I/O	+3.3V
2	LAD1	I/O	+3.3V
3	LAD2	I/O	+3.3V
4	LAD3	I/O	+3.3V
5	+3.3V	PWR	+3.3V
6	LFRAME#	IN	

Pin	Pin Name	Signal Type	Signal Level
7	LRESET#	OUT	+3.3V
8	GND	GND	
9	LCLK	OUT	
10	RSVD1: I2C0_SDA/ SMB_DATA (Default)	I/O	+3.3V
11	RSVD1: I2C0_SCL/ SMB_CLK (Default)	I/O	+3.3V
12	INT_SERIRQ/ SMB_ALERT# (Default)	I/O	+3.3V

### 2.4.11 MIPI-CSI x 2 (CN32)

Pin	Pin Name	Pin	Pin Name
1	GND	2	MCSI_DN_1
3	MCSI_DP_1	4	GND
5	MCSI_CLKN	6	MCSI_CLKP
7	GND	8	MCSI_DN_0
9	MCSI_DP_0	10	GND
11	+1.2V	12	+1.8V
13	GND	14	OSC_CLK
15	GND	16	I2C_CLK
17	I2C_DAT	18	Reset#
19	Reserved	20	+2.8V
21	GND		

## 2.4.12 MIPI-CSI x 4 (CN33)

Pin	Pin Name	Pin	Pin Name
1	GND	2	Reset#
3	NC	4	I2C_DAT
5	I2C_CLK	6	GND
7	OSC_CLK	8	GND
9	MCSI_DN_0	10	MCSI_DP_0
11	GND	12	MCSI_DN_1
13	MCSI_DP_1	14	GND
15	MCSI_CLKN	16	MCSI_CLKP
17	GND	18	MCSI_DN_2
19	MCSI_DP_2	20	GND
21	MCSI_DN_3	22	MCSI_DP_3
23	GND	24	+2.8V
25	GND	26	+1.2V
27	+1.8V	28	GND
29	+2.8V	30	+2.8V
31	GND		

## 2.4.13 I2S/I2C Connector (CN37)

Pin	Pin Name	Signal Type	Signal level
1	+V3.3A	VDD	3.3V
2	I2S1_SYNC	Signal	
3	I2S1_SDI	Signal	
4	I2S1_SDO	Signal	

Pin	Pin Name	Signal Type	Signal level
5	I2S1_MCLK	Signal	
6	I2S1_BCLK	Signal	
7	I2C2_SCL	Signal	
8	I2C2_SDA	Signal	
9	GND	GND	
10	NC	NC	

#### 2.4.14 SATA Power (CN39)



Pin	Pin Name	Signal Type	Signal Level
1	+12V	PWR	+12V
2	GND	GND	
3	GND	GND	
4	+5V	PWR	+5V

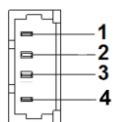
## 2.4.15 eDP (CN43)

---

Pin	Pin Name	Signal Type	Signal Level
1	VCC_PWR	PWR	3.3V
2	VCC_PWR	PWR	3.3V
3	GND	GND	
4	GND	GND	
5	EDP_TX2_N	Diff	
6	EDP_TX2_P	Diff	
7	GND	GND	
8	EDP_TX1_N	Diff	
9	EDP_TX1_P	Diff	
10	GND	GND	
11	EDP_TX0_N	Diff	
12	EDP_TX0_P	Diff	
13	GND	GND	
14	EDP_TX3_N	Diff	
15	EDP_TX3_P	Diff	
16	GND	GND	
17	EDP_AUXN	Diff	
18	EDP_AUXP	Diff	
19	GND	GND	
20	Backlight Brightness	OUT	3.3V
21	NC	NC	
22	Backlight Enable	OUT	3.3V
23	Hot Plug Detect	IN	3.3V
24	GND	GND	

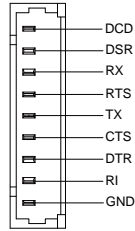
Pin	Pin Name	Signal Type	Signal Level
25	GND	GND	
26	GND	GND	
27	VCC_Backlight	PWR	12V
28	VCC_Backlight	PWR	12V
29	VCC_Backlight	PWR	12V
30	VCC_Backlight	PWR	12V

### 2.4.16 USB (CN47, CN48)



Pin	Pin Name	Signal Type	Signal Level
1	+USB_PWR	PWR	5V
2	USB-	Diff	
3	USB+	Diff	
4	GND	GND	

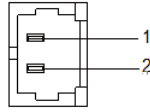
## 2.4.17 COM Port (CN51, CN61)



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/ PWR	
9	GND	GND	

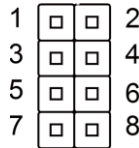


### 2.4.18 Speaker (CN52)



Pin	Pin Name	Signal Type	Signal Level
1	SPK+	Audio	
2	SPK-	Audio	

### 2.4.19 Front Panel Header (CN53)



Pin	Pin Name	Pin	Pin Name
1	GND	2	PWR Button
3	FP_IDELED#	4	+3.3V
5	FP_BUZZER	6	+5V
7	GND	8	RESET Button

## 2.4.20 M.2 2230 E-Key (CN55)

---

Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	+3.3VA	PWR	3.3V
3	USB+	DIFF	
4	+3.3VA	PWR	3.3V
5	USB-	DIFF	
6			
7	GND	GND	
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

Pin	Pin Name	Signal Type	Signal Level
25			
26			
27			
28			
29			
30			
31			
32			
33	GND	GND	
34			
35	PCIE_TXP	DIFF	
36			
37	PCIE_TXN	DIFF	
38			
39	GND	GND	
40			
41	PCIE_RXP	DIFF	
42			
43	PCIE_RXN	DIFF	
44			
45	GND	GND	
46			
47	CLK_PCIE_P	DIFF	
48			
49	CLK_PCIE_N	DIFF	
50			

Pin	Pin Name	Signal Type	Signal Level
51	GND	GND	
52	RST#	OUT	
53	PCIE_CLKREQ#	IN	
54	BT_DISABLE#	OUT	
55	PCIE_WAKE#	IN	
56	WIFI_DISABLE#	OUT	
57	GND	GND	
58			
59			
60			
61			
62			
63	GND	GND	
64			
65			
66			
67			
68			
69	GND	GND	
70			
71			
72	+3.3VA	PWR	3.3V
73			
74	+3.3VA	PWR	3.3V
75	GND	GND	

## 2.4.21 M.2 2280 B-Key (CN56)

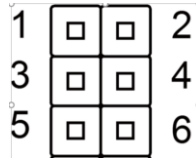
Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	+3.3V	PWR	3.3V
3	GND	GND	
4	+3.3V	PWR	3.3V
5	GND	GND	
6			
7	USB_DP	DIFF	
8			
9	USB_DN	DIFF	
10	DAS	IN	3.3V
11	GND	GND	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21	GND	GND	
22			
23			
24			

Pin	Pin Name	Signal Type	Signal Level
25			
26			
27			
28			
29	USB3_RX_N (Reserved)	Diff	
30			
31	USB3_RX_P (Reserved)	Diff	
32			
33	GND	GND	
34			
35	USB3_TX_N (Reserved)	Diff	
36			
37	USB3_TX_P (Reserved)	Diff	
38			
39	GND	GND	
40			
41	SATA_RXP	DIFF	
42			
43	SATA_RXN	DIFF	
44			
45	GND	GND	
46			
47	SATA_TXN	DIFF	
48			
49	SATA_TXP	DIFF	
50			

Pin	Pin Name	Signal Type	Signal Level
51	GND	GND	
52			
53			
54			
55			
56			
57	GND	GND	
58			
59			
60			
61			
62			
63			
64			
65			
66			
67			
68			
69	GND	GND	
70	+3.3V	PWR	3.3V
71	GND	GND	
72	+3.3V	PWR	3.3V
73	GND	GND	
74	+3.3V	PWR	3.3V
75	GND	GND	

## 2.4.22 DIO (CN60)

---



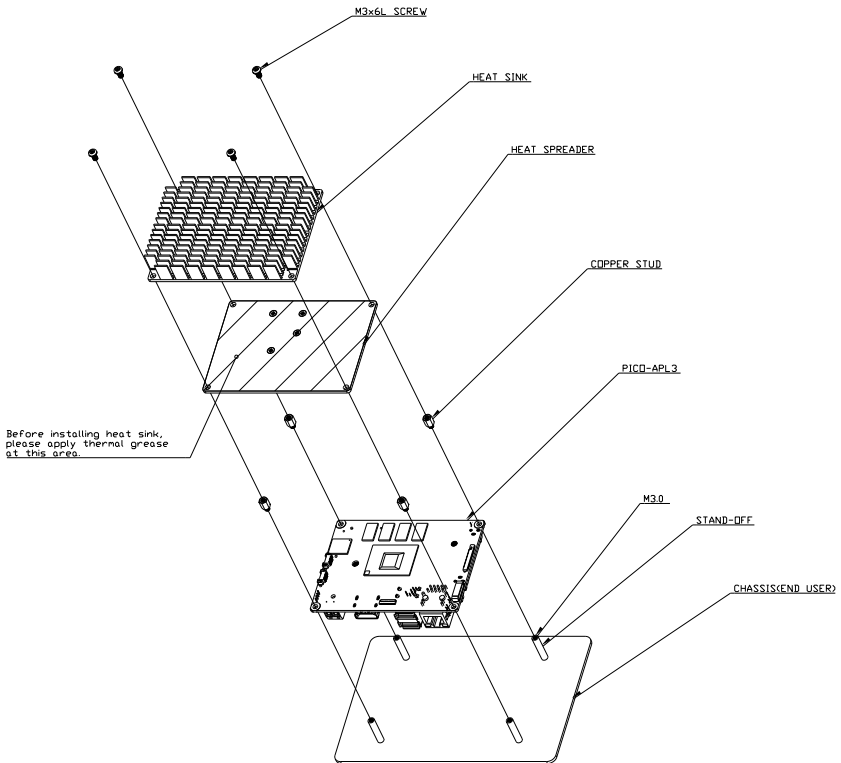
Pin	Pin Name	Pin	Pin Name
1	DIO_PWR (+3.3V or 5V)	2	GPO0
3	GPI0	4	GPO1
5	GPI1	6	GND



## 2.5 Hardware Assembly

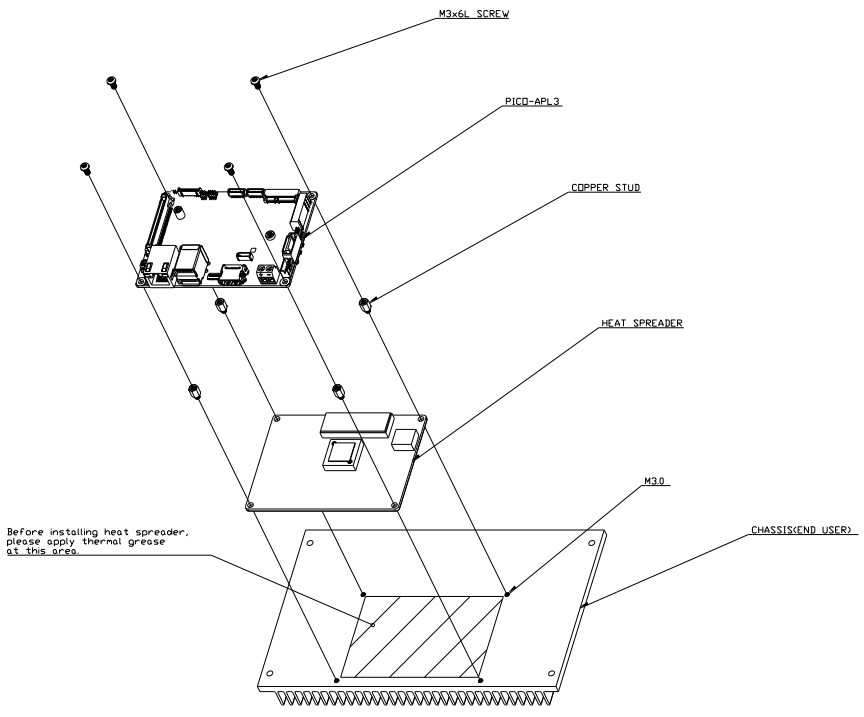
### Heat Sink Assembly

AAEON provides a heat spreader and heatsink, in which a stud and screws are included as options. We suggest the users have both for assembly.



## Heat Spreader Chassis Assembly

If you only have AAEON's heat spreader and need to fix it onto the chassis, please remember to put thermal grease between the chassis and heat spreader to ensure cooling efficiency.



# 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 system configuration data error is detected, 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-APL3 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 <Del> 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.

### Security

Set setup administrator password.

### Boot

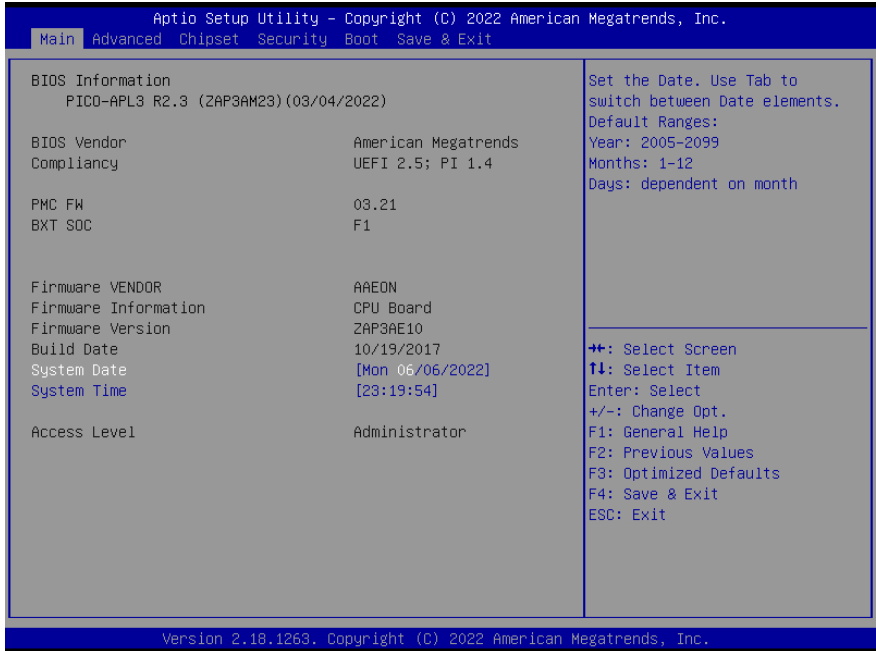
Enables/disables quiet boot option.

### Save & Exit

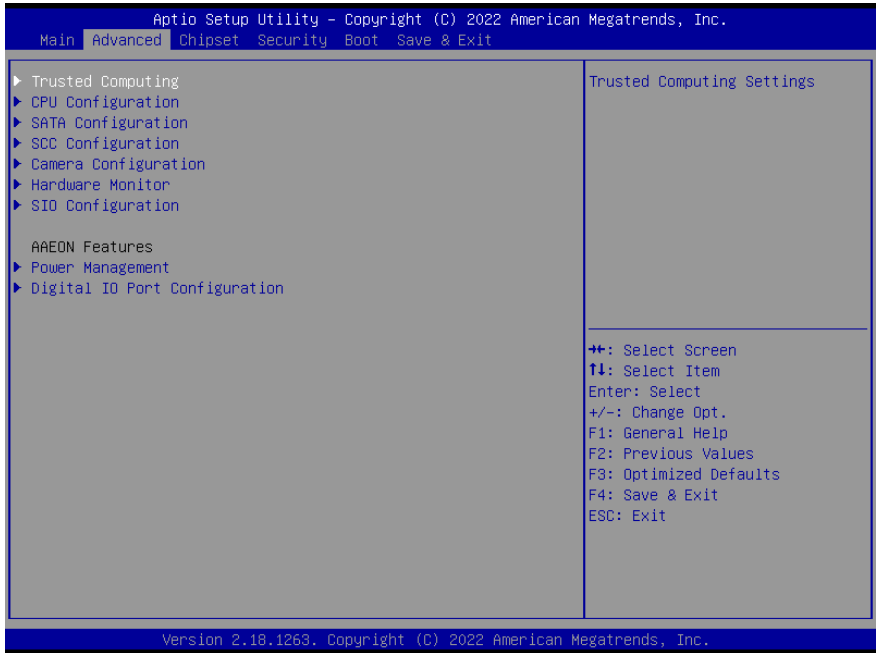
Exit system setup after saving the changes.

### 3.3 Setup Submenu: Main

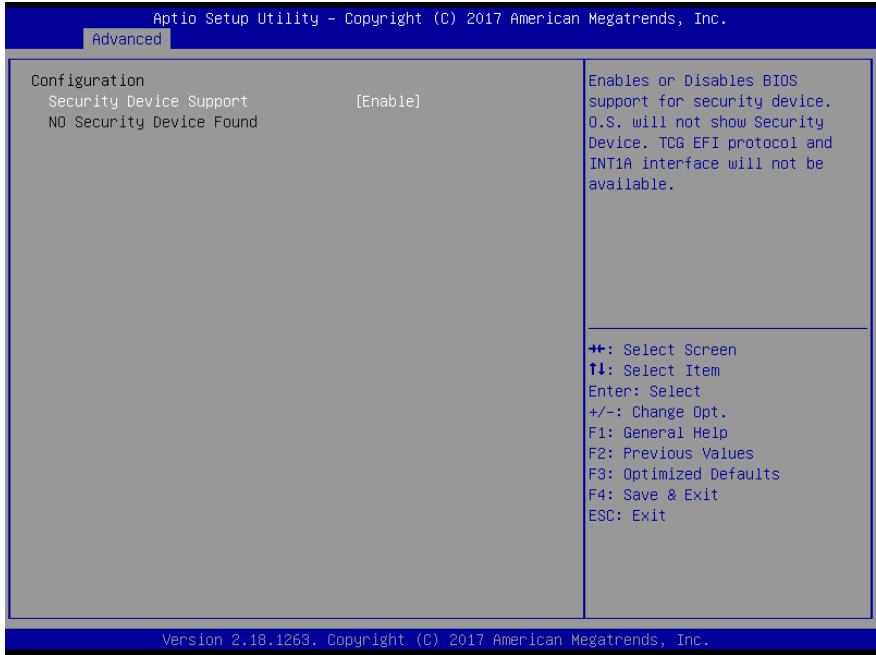
Press "Delete" to enter Setup.



### 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	Disable	
	Enable	Optimal Default, Failsafe Default
Enable or Disable SHA-1 PCR Bank		
SHA256 PCR Bank	Disable	
	Enable	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.		



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	TCG_1_2	
Version	TCG_2	Optimal Default, Failsafe Default
Select the TCG2 Spec Version Support, TCG_1_2: The Compatible mode for Win8/Win10 TCG_2: Support new TCG2 protocol and event format for Win10 or later		
Physical Presence Spec	1.2	
Version	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.		

### 3.4.2 CPU configuration

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Advanced

CPU Configuration		Enable/Disable C States
Intel(R) Atom(TM) Processor E3950 @ 1.60GHz		
CPU Signature	506CA	
Microcode Patch	6	
Max CPU Speed	1600 MHz	
Min CPU Speed	800 MHz	
Processor Cores	4	
64-bit	Supported	
Intel HT Technology	Not Supported	
Intel VT-x Technology	Supported	
L1 Data Cache	24 kB x 4	
L1 Code Cache	32 kB x 4	
L2 Cache	1024 kB x 2	
L3 Cache	Not Present	
C-States	[Enabled]	
EIST	[Enabled]	
Turbo Mode	[Enabled]	
Power Limit 1 Enable	[Disabled]	
Intel Virtualization Technology	[Enabled]	
VT-d	[Disabled]	
		++: Select Screen !!: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Version 2.16.1263. Copyright (C) 2017 American Megatrends, Inc.

Options Summary		
C-States	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable C States.		
EIST™	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable Intel SpeedStep.		
Turbo Mode	Disabled	
	Enabled	Optimal Default, Failsafe Default
Turbo Mode		
Power Limit 1 Enable	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disable Power Limit 1		
Intel Virtualization Technology	Disabled	
	Enabled	Optimal Default, Failsafe Default

## Options Summary

When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

VT-d	Disabled	Optimal Default, Failsafe Default
	Enabled	

Enable/Disable CPU VT-d

### 3.4.3 SATA Configuration

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Advanced

SATA Configuration		Enables or Disables the Chipset SATA Controller. The Chipset SATA controller supports the 2 black internal SATA ports (up to 3Gb/s supported per port).
Chipset SATA	[Enable]	
SATA Port 0		
HGST HTE725032 (320.0GB)		
Port 0	[Enabled]	
SATA Port 0 Hot Plug Capability	[Disabled]	
SATA Port 1		
[Not Installed]		
Port 1	[Enabled]	
SATA Port 1 Hot Plug Capability	[Disabled]	

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

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## Options Summary

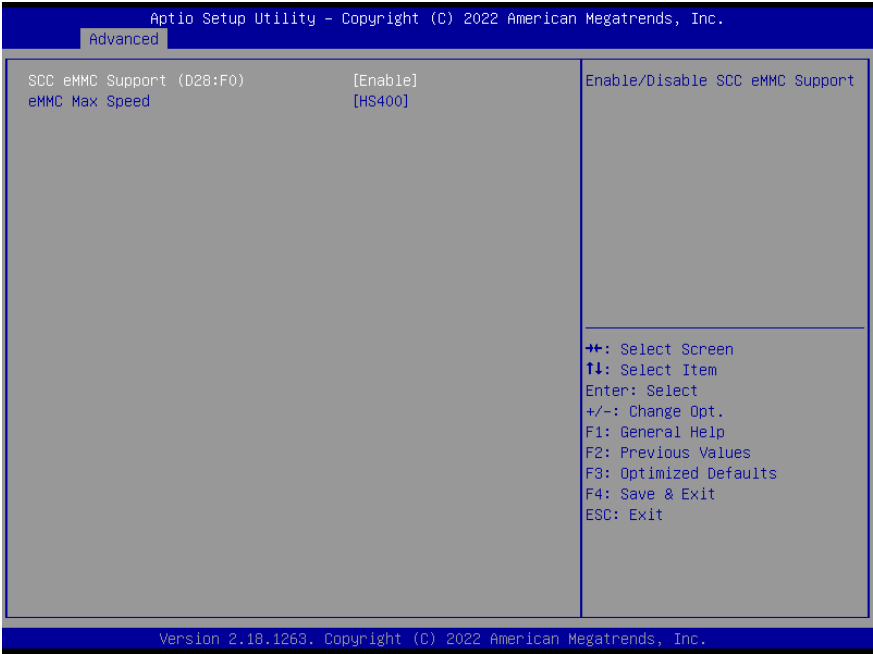
Chipset SATA	Disabled	Optimal Default, Failsafe Default
	Enabled	

Enables or Disables the Chipset SATA Controller. The Chipset SATA controller supports the 2 black internal SATA ports (up to 3Gb/s supported per port).

Port 0	Disabled	Optimal Default, Failsafe Default
	Enabled	

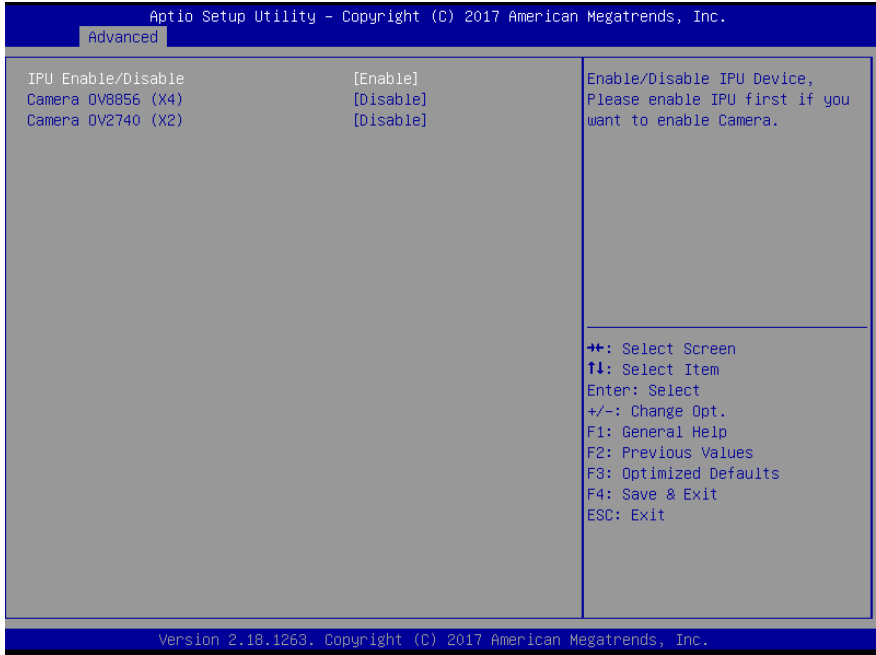
Enable or Disable SATA Port

Options Summary		
SATA Port 0 Hot Plug Capability	Disabled	Optimal Default, Failsafe Default
	Enabled	
If enabled, SATA port will be reported as Hot Plug capable.		
Port 1	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable SATA Port		
SATA Port 0 Hot Plug Capability	Disabled	Optimal Default, Failsafe Default
	Enabled	
If enabled, SATA port will be reported as Hot Plug capable.		
Port 0/1	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable SATA port		



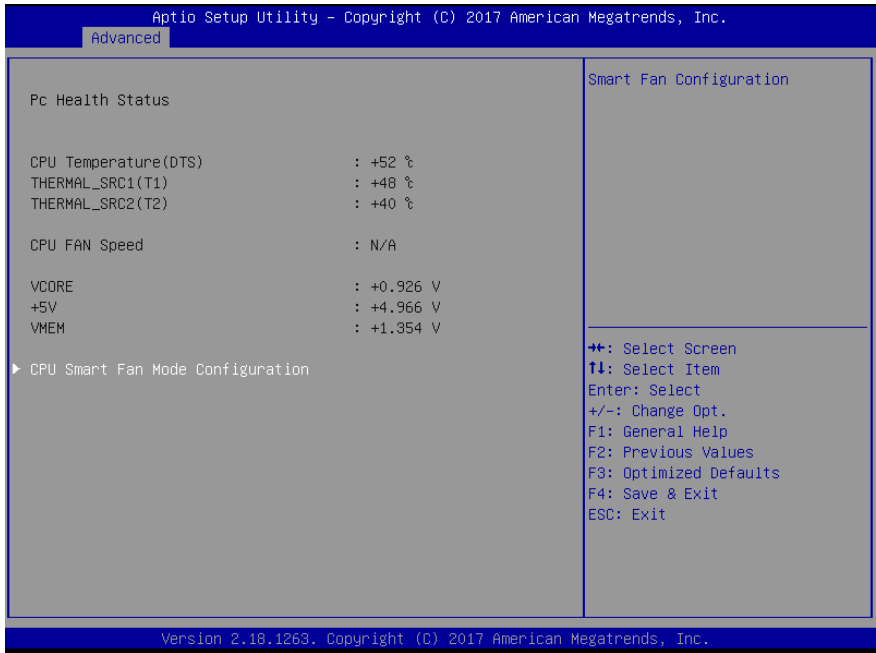
Options Summary		
SCC eMMC Support	Disabled	
	Enabled	Optimal Default, Failsafe Default
En\Disable SCC eMMC support		
eMMC Max Speed	HS400	Optimal Default, Failsafe Default
	HS200	
	DDR50	
eMMC Max speed select		

### 3.4.4 Camera Configuration (Optional)

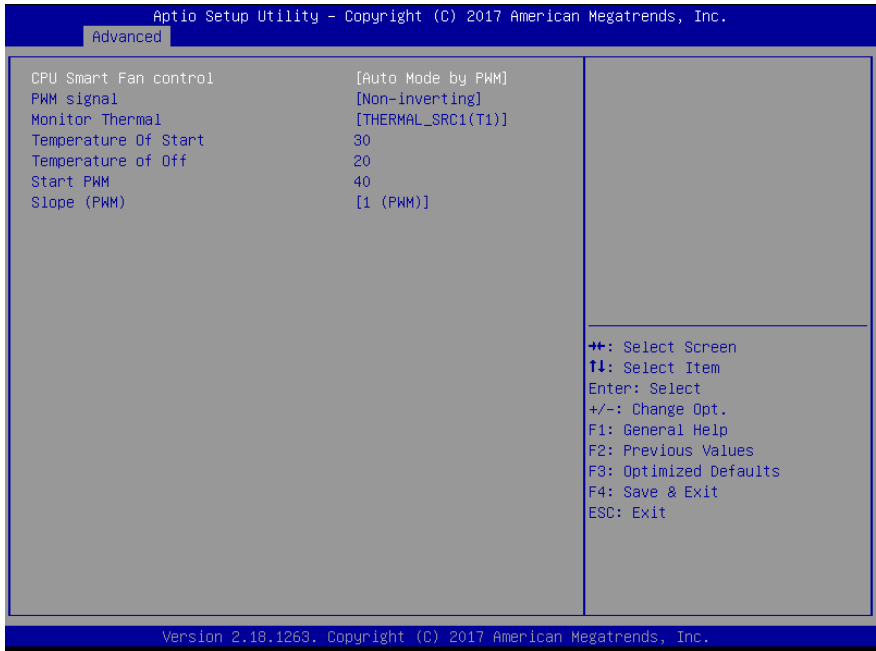


Options Summary		
IPU Enable/Disable	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disable IPU Device, please enable IPU first if you want to enable Camera.		
Camera OV8856(X4)	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disable Camera OV8856		
Camera OV8856(X2)	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disable Camera OV2740		

### 3.4.5 Hardware Monitor



### 3.4.5.1 CPU Smart Fan Mode Configuration



Options Summary		
CPU Smart Fan Control	Full Mode	Optimal Default, Failsafe Default
	Manual Mode by PWM	
	Auto Mode by PWM	
PWM signal	Non-inverting	
	Inverting	Optimal Default, Failsafe Default
Select output PWM of inverting or non-inverting signal		
Monitor Thermal	THERMAL_SRC1(T1)	Optimal Default, Failsafe Default
	THERMAL_SRC2(T2)	
Select monitor thermal source		
Temperature of Start	30	Optimal Default, Failsafe Default
Temperature Of Start		
Temperature of Off	20	Optimal Default, Failsafe Default
Temperature Of Off		
Start of PWM	40	Optimal Default, Failsafe Default
Start PWM		



## Options Summary

Slope (PWM)	1 (PWM)	Optimal Default, Failsafe Default
Slope (PWM)		

### 3.4.6 SIO Configuration

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Advanced

```

AMI SIO Driver Version : A5.05.03

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

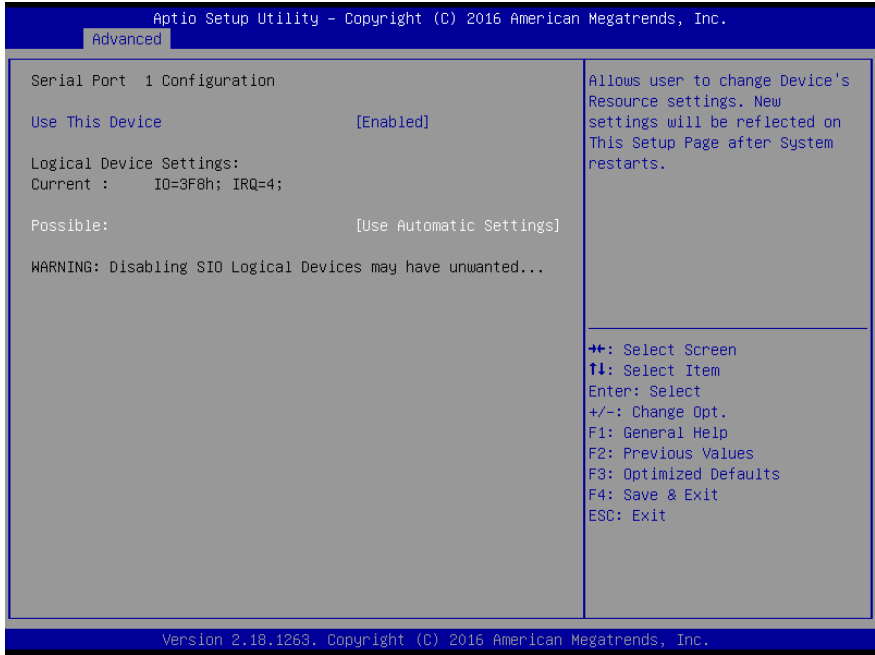
WARNING: Logical Devices state on the left side of the
  
```

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

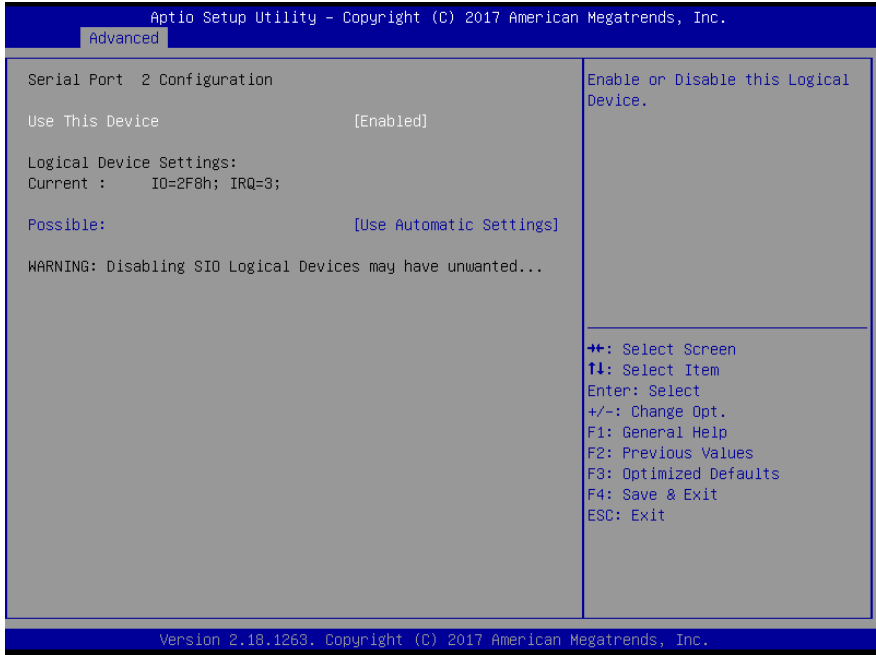
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### 3.4.6.1 Serial Port 1 Configuration



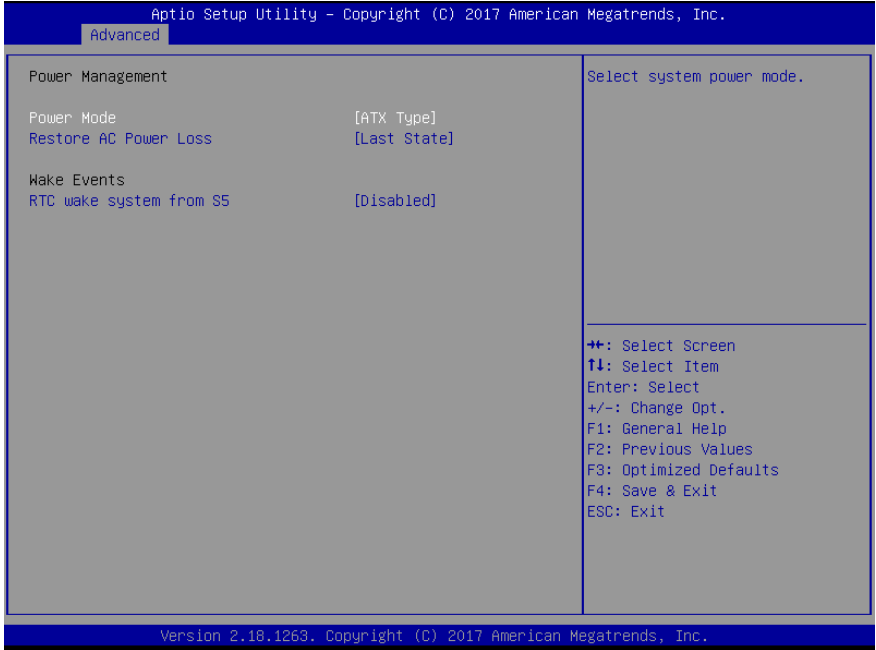
Options Summary		
Use This Device	Disable	
	Enable	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=3F8h; IRQ=4	
Allows user to change Device's Resource settings. New settings will be reflected on This Setup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

### 3.4.6.2 Serial Port 2 Configuration



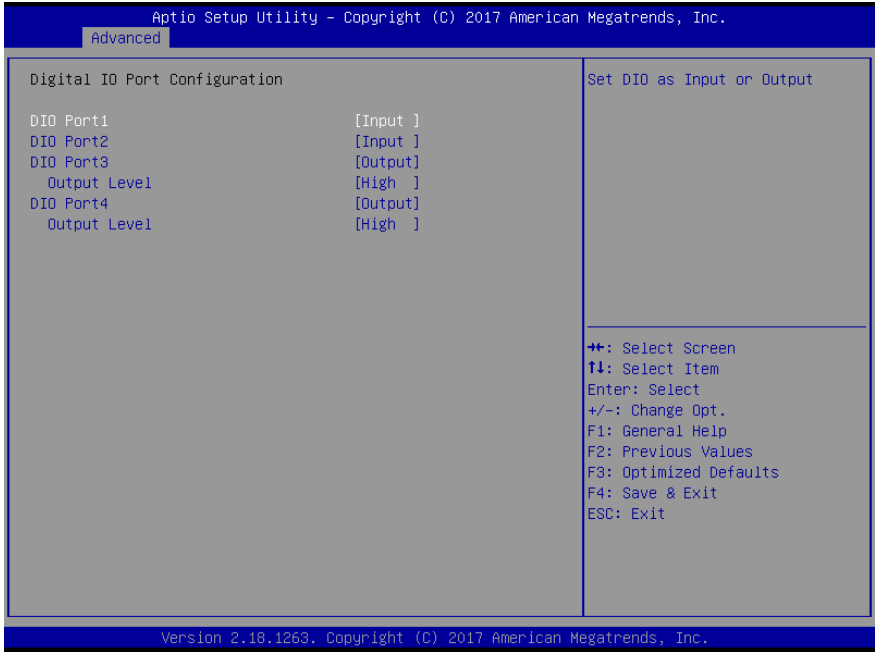
Options Summary		
Use This Device	Disable	
	Enable	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2F8h; IRQ=3	
Allows user to change Device's Resource settings. New settings will be reflected on This Setup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

### 3.4.7 Power Management



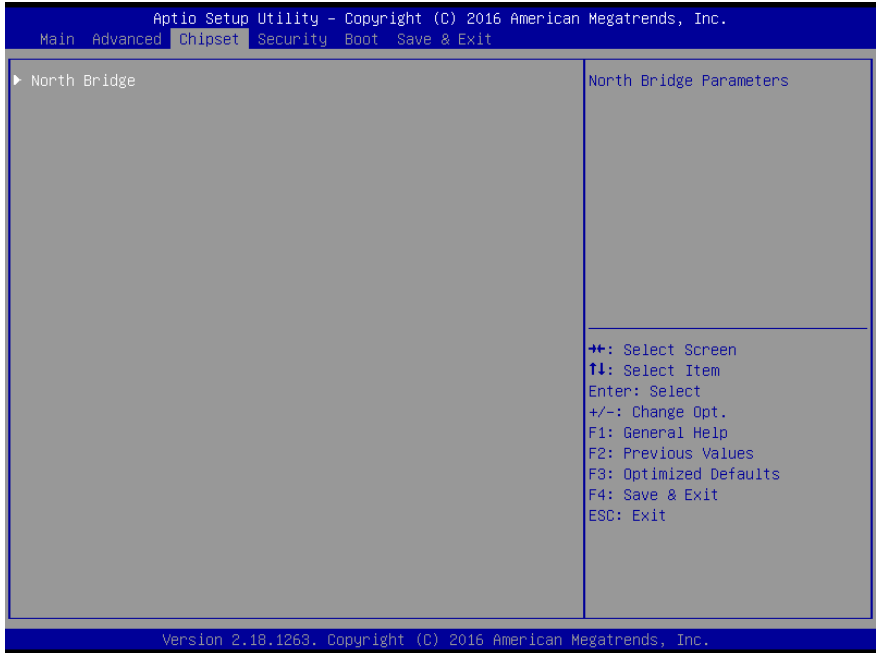
Options Summary		
Power Mode	ATX Type	Optimal Default, Failsafe Default
	AT Type	
Select system power mode		
Restore AC Power Loss	Last State	Optimal Default, Failsafe Default
	Always On	
	Always Off	
RTC wake system from S5	Disabled	Optimal Default, Failsafe Default
	Fixed Time	
	Bypass	
Fixed Time: system will wake on the day::hr::min::sec specified. Bypass: BIOS will not control RTC wake function during system shutdown.		

### 3.4.8 Digital IO Port Configuration

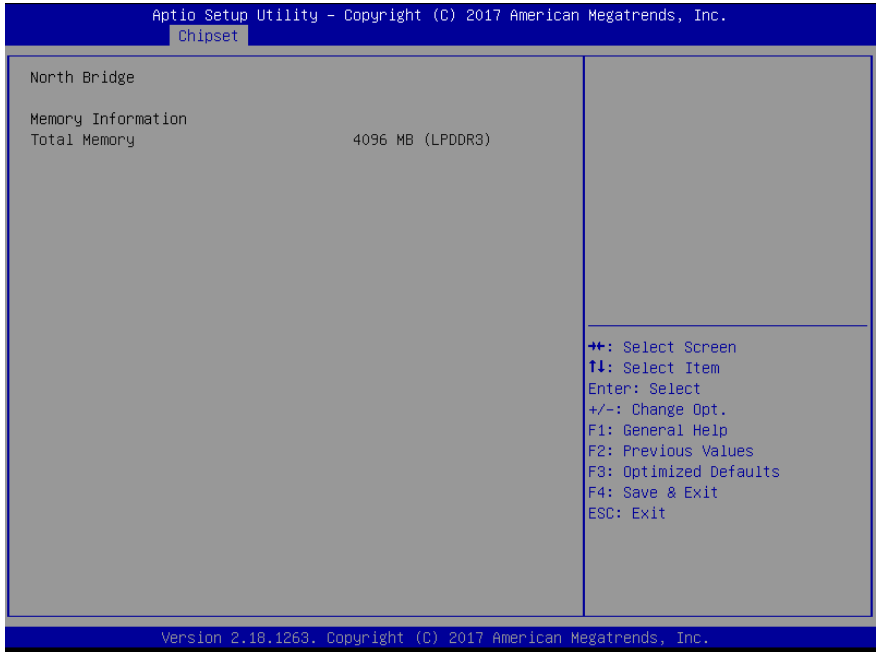


Options Summary		
DIO Port*	Output	
	Input	
Set DIO as Input or Output		
Output Level	High	Optimal Default, Failsafe Default
	Low	
Set output level when DIO pin is output		

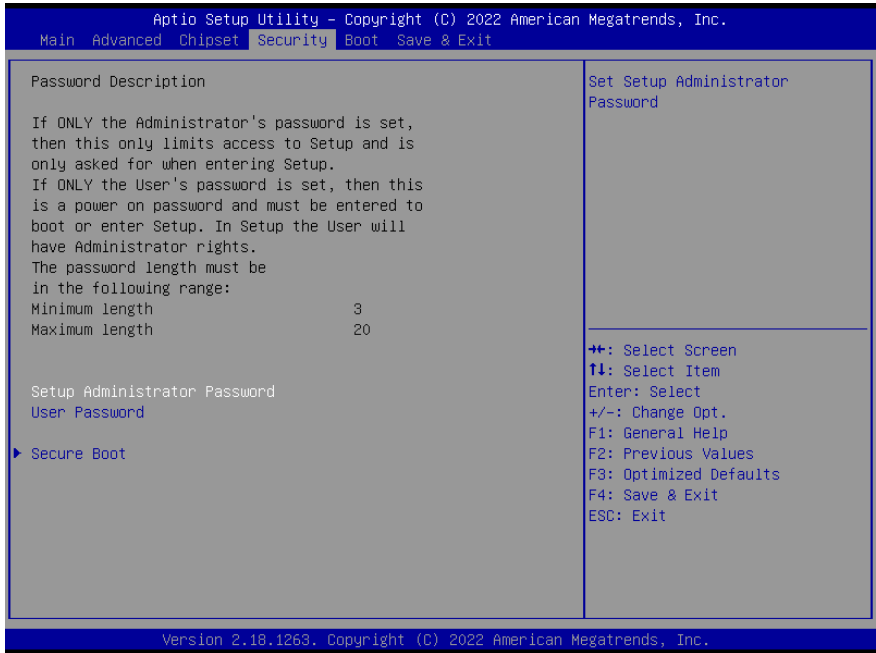
### 3.5 Setup Submenu: Chipset



### 3.5.1 North Bridge



## 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.

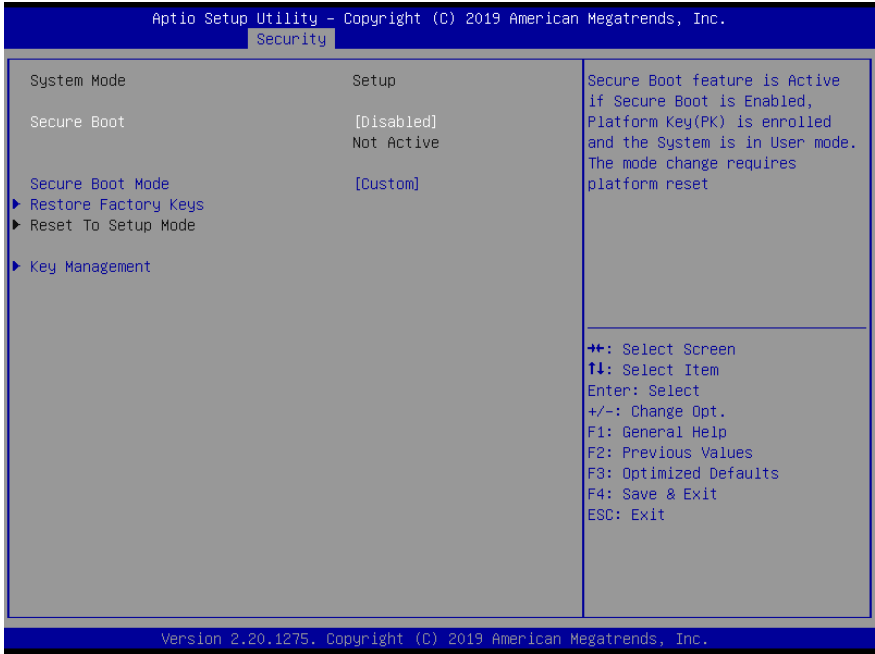
If you highlight these items and press Enter, a dialog box appears which lets you enter a password. You can enter no more than six letters or numbers. Press Enter after you have typed in the password. A second dialog box asks you to retype the password for confirmation. Press Enter after you have retyped 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.

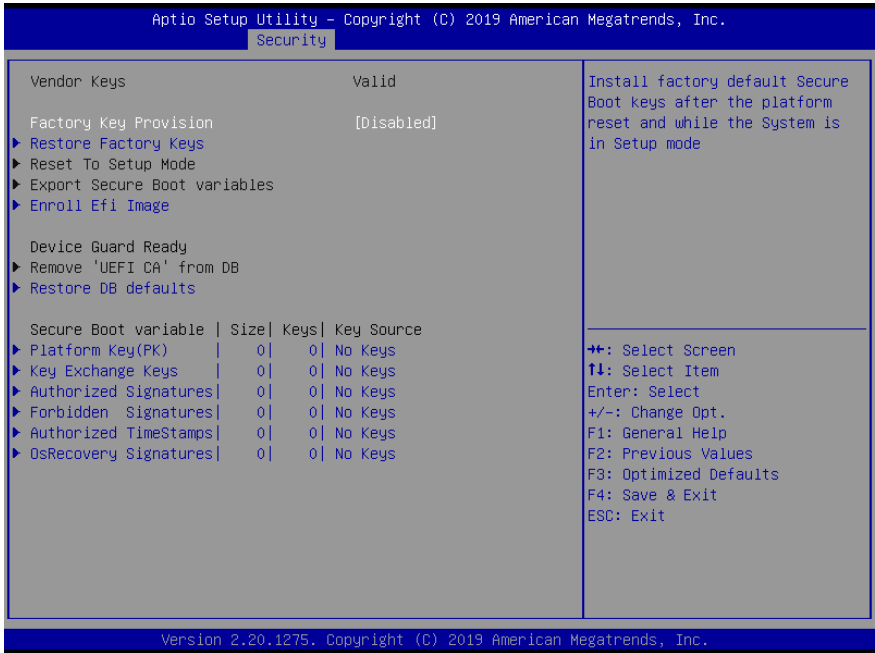


### 3.6.1 Secure Boot



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		

## 3.6.2 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:

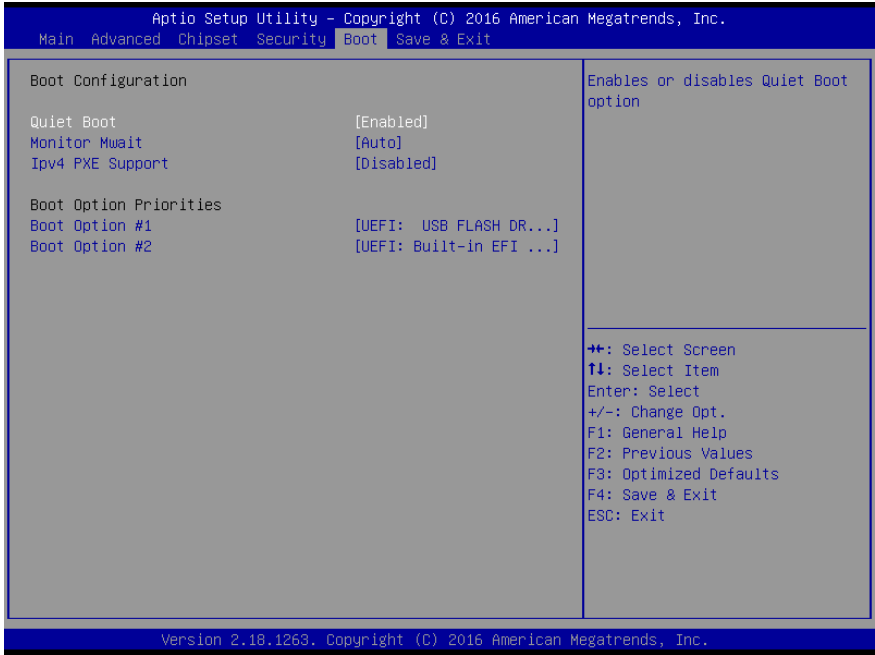
- a) EFI\_SIGNATURE\_LIST
- b) EFI\_CERT\_X509 (DER)
- c)EFI\_CERT\_RSA2048 (bin)
- d)EFI\_CERT\_SHAXXX

2.Authenticated UEFI Variable

3.EFI PE/COFF Image (SHA256)

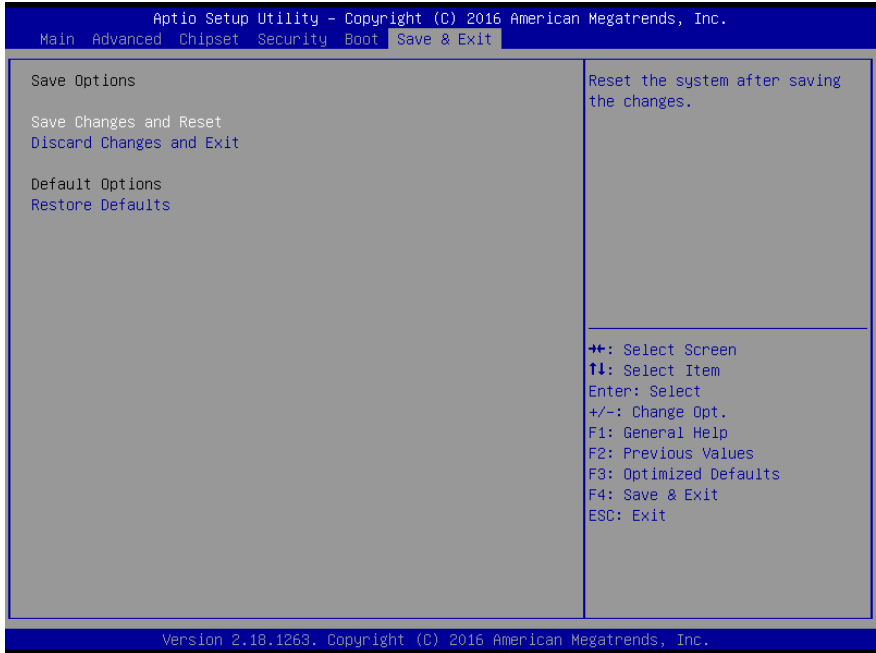
Key Source: Factory, External, Mixed

### 3.7 Setup Submenu: Boot



Options Summary		
Quiet Boot	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable showing boot logo.		
Monitor Mwait	Disable	
	Enabled	
	Auto	Optimal Default, Failsafe Default
Enable/Disable Monitor Mwait. To install Linux OS, please set this item to disable.		
Ipv4 PXE Support	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable Ipv4 PXE Boot Support. If disabled IPV4 PXE boot option will not be created.		

### 3.8 Setup Submenu: Exit



# Chapter 4

---

Drivers Installation

## 4.1 Driver Download/Installation

---

Drivers for the PICO-APL3 can be downloaded from the product page on the AAEON website by following this link:

<https://www.aaeon.com/en/p/pico-itx-boards-pico-apl3#downloads>

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

### Step 1 – Install Chipset Driver

1. Open the **STEP1 - CHIPSET** folder and open the **SetupChipset.exe** file
2. Follow the instructions
3. Drivers will be installed automatically

### Step 2 – Install Graphic Driver

1. Open the **STEP2 - VGA** folder and open the **Setup.exe** file
2. Follow the instructions
3. Driver will be installed automatically

### Step 3 – Install LAN Driver

1. Open the **STEP3 - LAN** folder and open the **Setup.exe** file
2. Follow the instructions
3. Driver will be installed automatically

#### Step 4 – Install Audio Driver

1. Open the **STEP4 - AUDIO** folder and open the **0006-64bit\_Win7\_Win8\_Win81\_Win10\_R279.exe** file
2. Follow the instructions
3. Driver will be installed automatically

#### Step 5 – Install TXE Driver

1. Open the **STEP5 - TXE** folder and open the **SetupTXE.exe** file
2. Follow the instructions
3. Driver will be installed automatically

#### Step 6 – Install Serial IO Driver

1. Open the **STEP6-Serial IO** folder and open the **SetupSerialIO.exe** file
2. Follow the instructions
3. Driver will be installed automatically



### Step 7 – CSI CAMERA test SOP

1. Install the camera

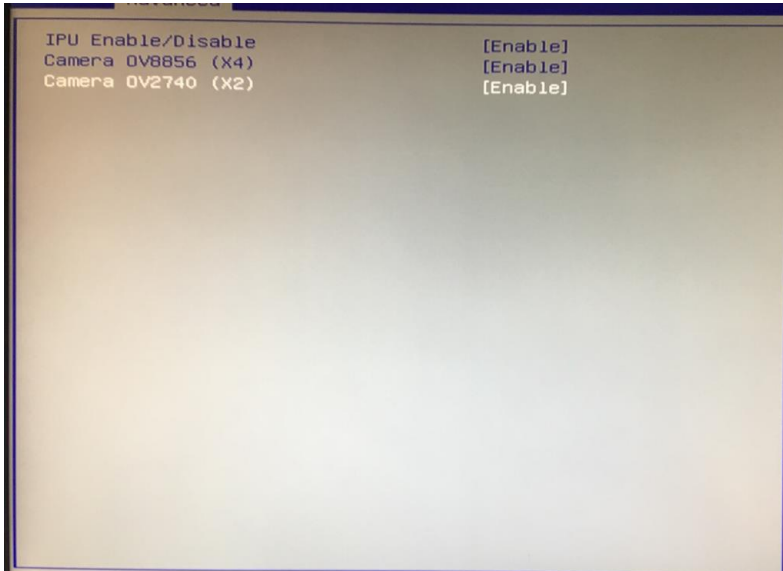
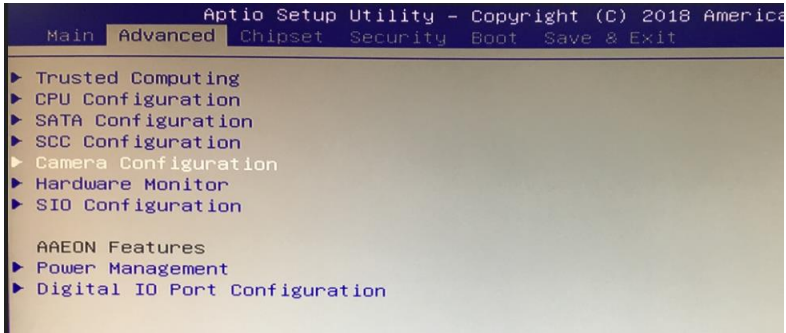
9689FG1800 to PICO-APL3 CN32



9689AG2400 to PICO-APL3 CN33



## 2. BIOS enable



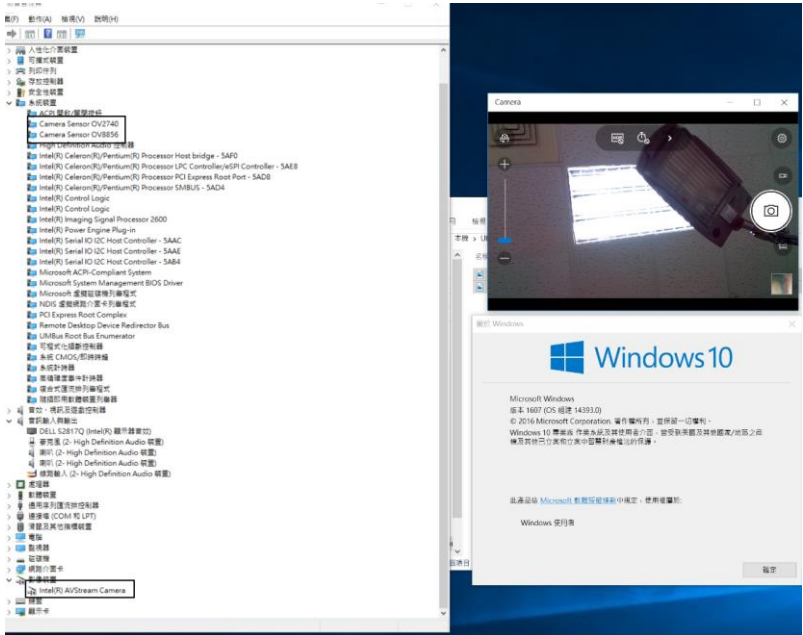
## 3. Install drivers manually

▶ APL - OV2740 driver for RS1	<b>step3</b>	2018/4/11 上午 10:59	檔案資料夾
▶ APL - OV8856 driver for RS1	<b>step2</b>	2018/4/11 上午 10:59	檔案資料夾
▶ Camera-40.14393.9780.3468-Rx64-APL	<b>step1</b>	2018/4/11 上午 11:00	檔案資料夾

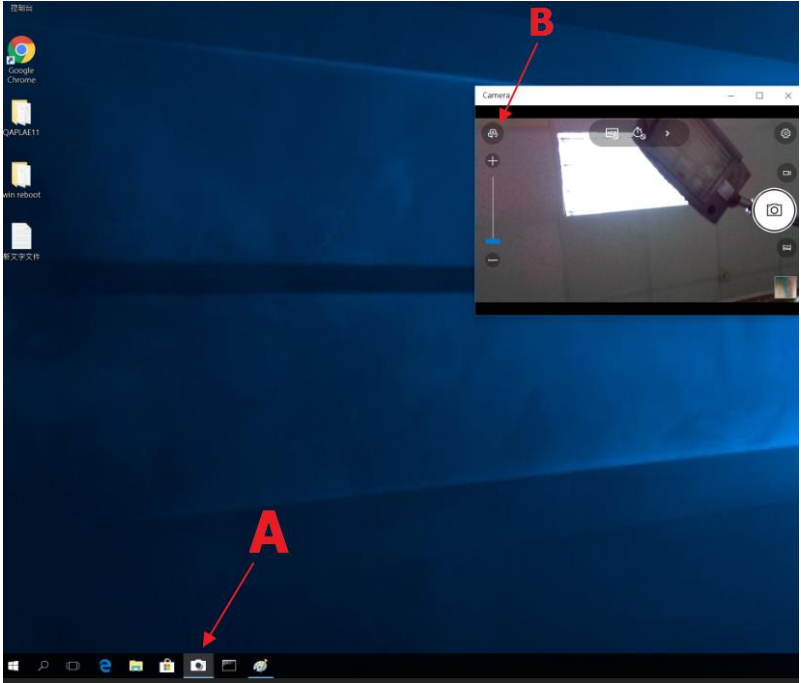
3a. Install Driver : Avstream Camera (VENID: 8086 DEVID: 5A85)

3b. Install Driver: Imaging Signal Processor 2600 (VENID: 8086 DEVID: 5A88)

3c. Install Driver: Control Logic (ACPI\_HID : INT3472)



#### 4. Test



A: Start camera app

B: Front and rear camera switch

# Appendix A

---

I/O Information































# A.1 I/O Address Map

Address Range	Device Name
[0000000000000000 - 000000000000006F]	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
[0000000000000070 - 0000000000000077]	System CMOS/real time clock
[0000000000000078 - 00000000000000CF]	PCI Express Root Complex
[0000000000000080 - 000000000000008F]	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
[0000000000002F8 - 0000000000002FF]	Communications Port (COM2)
[00000000000003F8 - 0000000000003FF]	Communications Port (COM1)
[0000000000000400 - 000000000000047F]	Motherboard resources
[00000000000004D0 - 00000000000004D1]	Programmable interrupt controller
[0000000000000500 - 00000000000005FE]	Motherboard resources
[0000000000000680 - 000000000000069F]	Motherboard resources
[0000000000000D00 - 000000000000FFFF]	PCI Express Root Complex
[000000000000E000 - 000000000000EFFF]	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD8
[000000000000EF00 - 000000000000EFFF]	Realtek PCIe GBE Family Controller
[000000000000F000 - 000000000000F03F]	Intel(R) HD Graphics
[000000000000F040 - 000000000000F05F]	Intel(R) Celeron(R)/Pentium(R) Processor SMBUS - 5AD4
[000000000000F060 - 000000000000F07F]	Standard SATA AHCI Controller
[000000000000F080 - 000000000000F083]	Standard SATA AHCI Controller
[000000000000F090 - 000000000000F097]	Standard SATA AHCI Controller

## A.2 Memory Address Map



































- ▼ Memory
  - [000000007B800001 - 000000007BFFFFFF] PCI Express Root Complex
  - [000000007C000001 - 000000007CFFFFFF] PCI Express Root Complex
  - [0000000080000000 - 000000008FFFFFFF] Intel(R) HD Graphics
  - [0000000080000000 - 00000000CFFFFFFF] PCI Express Root Complex
  - [0000000090000000 - 0000000090FFFFFF] Intel(R) HD Graphics
  - [0000000091000000 - 00000000910FFFFFFF] High Definition Audio Controller
  - [0000000091100000 - 00000000911FFFFFFF] Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD8
  - [00000000911FF000 - 00000000911FFFFFFF] Realtek PCIe GBE Family Controller
  - [0000000091200000 - 000000009120FFFFFF] Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
  - [0000000091210000 - 0000000091213FFF] High Definition Audio Controller
  - [0000000091214000 - 0000000091215FFF] Standard SATA AHCI Controller
  - [0000000091218000 - 00000000912180FF] Intel(R) Celeron(R)/Pentium(R) Processor SMBUS - 5AD4
  - [0000000091219000 - 0000000091219FFF] Intel SD Host Controller
  - [000000009121A000 - 000000009121AFFF] Intel SD Host Controller
  - [000000009121B000 - 000000009121BFFF] Intel(R) Serial IO I2C Host Controller - 5AB4
  - [000000009121C000 - 000000009121CFFF] Intel(R) Serial IO I2C Host Controller - 5AB4
  - [000000009121D000 - 000000009121DFFF] Intel(R) Serial IO I2C Host Controller - 5AAE
  - [000000009121E000 - 000000009121EFFF] Intel(R) Serial IO I2C Host Controller - 5AAE
  - [000000009121F000 - 000000009121FFFF] Intel(R) Serial IO I2C Host Controller - 5AAC
  - [0000000091220000 - 0000000091220FFF] Intel(R) Serial IO I2C Host Controller - 5AAC
  - [0000000091221000 - 00000000912217FF] Standard SATA AHCI Controller
  - [0000000091222000 - 00000000912220FF] Standard SATA AHCI Controller
  - [0000000091226000 - 0000000091226FFF] Intel(R) Trusted Execution Engine Interface
  - [00000000CFF00000 - 00000000CFFFFFFF] Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD8
  - [00000000CFFF0000 - 00000000CFFFFFFF] Realtek PCIe GBE Family Controller
  - [00000000D0C00000 - 00000000D0C00653] Intel(R) Serial IO GPIO Host Controller - INT3452
  - [00000000D0C40000 - 00000000D0C40763] Intel(R) Serial IO GPIO Host Controller - INT3452
  - [00000000D0C50000 - 00000000D0C5076B] Intel(R) Serial IO GPIO Host Controller - INT3452
  - [00000000D0C70000 - 00000000D0C70673] Intel(R) Serial IO GPIO Host Controller - INT3452
  - [00000000E0000000 - 00000000EFFFFFFF] Motherboard resources
  - [00000000E0000000 - 00000000EFFFFFFF] PCI Express Root Complex
  - [00000000FEA00000 - 00000000FEAFFFFFFF] Motherboard resources
  - [00000000FED00000 - 00000000FED003FF] High precision event timer
  - [00000000FED01000 - 00000000FED011FF] Motherboard resources
  - [00000000FED03000 - 00000000FED03FFF] Motherboard resources
  - [00000000FED06000 - 00000000FED06FFF] Motherboard resources
  - [00000000FED08000 - 00000000FED09FFF] Motherboard resources
  - [00000000FED1C000 - 00000000FED1CFFF] Motherboard resources
  - [00000000FED40000 - 00000000FED44FFF] Trusted Platform Module 2.0
  - [00000000FED40000 - 00000000FED44FFF] Trusted Platform Module 2.0
  - [00000000FED80000 - 00000000FED8BFFF] Motherboard resources
  - [00000000FEE00000 - 00000000FEEFFFFFFF] 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) 0x00000008 (08)	High precision event timer
		(ISA) 0x0000000E (14)	Intel(R) Serial IO GPIO Host Controller - INT3452
		(ISA) 0x0000000E (14)	Intel(R) Serial IO GPIO Host Controller - INT3452
		(ISA) 0x0000000E (14)	Intel(R) Serial IO GPIO Host Controller - INT3452
		(ISA) 0x0000000E (14)	Intel(R) Serial IO GPIO Host Controller - INT3452
		(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











































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	(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

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	(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) 0x00000082 (130)	Microsoft ACPI-Compliant System
	(ISA) 0x00000083 (131)	Microsoft ACPI-Compliant System
	(ISA) 0x00000084 (132)	Microsoft ACPI-Compliant System
	(ISA) 0x00000085 (133)	Microsoft ACPI-Compliant System
	(ISA) 0x00000086 (134)	Microsoft ACPI-Compliant System
	(ISA) 0x00000087 (135)	Microsoft ACPI-Compliant System
	(ISA) 0x00000088 (136)	Microsoft ACPI-Compliant System
	(ISA) 0x00000089 (137)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008A (138)	Microsoft ACPI-Compliant System

 (ISA) 0x00001E3 (483)	Microsoft ACPI-Compliant System
 (ISA) 0x00001E4 (484)	Microsoft ACPI-Compliant System
 (ISA) 0x00001E5 (485)	Microsoft ACPI-Compliant System
 (ISA) 0x00001E6 (486)	Microsoft ACPI-Compliant System
 (ISA) 0x00001E7 (487)	Microsoft ACPI-Compliant System
 (ISA) 0x00001E8 (488)	Microsoft ACPI-Compliant System
 (ISA) 0x00001E9 (489)	Microsoft ACPI-Compliant System
 (ISA) 0x00001EA (490)	Microsoft ACPI-Compliant System
 (ISA) 0x00001EB (491)	Microsoft ACPI-Compliant System
 (ISA) 0x00001EC (492)	Microsoft ACPI-Compliant System
 (ISA) 0x00001ED (493)	Microsoft ACPI-Compliant System
 (ISA) 0x00001EE (494)	Microsoft ACPI-Compliant System
 (ISA) 0x00001EF (495)	Microsoft ACPI-Compliant System
 (ISA) 0x00001F0 (496)	Microsoft ACPI-Compliant System
 (ISA) 0x00001F1 (497)	Microsoft ACPI-Compliant System
 (ISA) 0x00001F2 (498)	Microsoft ACPI-Compliant System
 (ISA) 0x00001F3 (499)	Microsoft ACPI-Compliant System
 (ISA) 0x00001F4 (500)	Microsoft ACPI-Compliant System
 (ISA) 0x00001F5 (501)	Microsoft ACPI-Compliant System
 (ISA) 0x00001F6 (502)	Microsoft ACPI-Compliant System
 (ISA) 0x00001F7 (503)	Microsoft ACPI-Compliant System
 (ISA) 0x00001F8 (504)	Microsoft ACPI-Compliant System
 (ISA) 0x00001F9 (505)	Microsoft ACPI-Compliant System
 (ISA) 0x00001FA (506)	Microsoft ACPI-Compliant System
 (ISA) 0x00001FB (507)	Microsoft ACPI-Compliant System
 (ISA) 0x00001FC (508)	Microsoft ACPI-Compliant System
 (ISA) 0x00001FD (509)	Microsoft ACPI-Compliant System
 (ISA) 0x00001FE (510)	Microsoft ACPI-Compliant System
 (ISA) 0x00001FF (511)	Microsoft ACPI-Compliant System
 (PCI) 0x00000016 (22)	Realtek PCIe GBE Family Controller
 (PCI) 0x00000019 (25)	High Definition Audio Controller
 (PCI) 0x0000001B (27)	Intel(R) Serial IO I2C Host Controller - 5AAC
 (PCI) 0x0000001C (28)	Intel(R) Serial IO I2C Host Controller - 5AAE
 (PCI) 0x0000001F (31)	Intel(R) Serial IO I2C Host Controller - 5AB4
 (PCI) 0x00000027 (39)	Intel SD Host Controller
 (PCI) 0xFFFFF0FA (-6)	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
 (PCI) 0xFFFFF0FB (-5)	Intel(R) Trusted Execution Engine Interface
 (PCI) 0xFFFFF0FC (-4)	Intel(R) HD Graphics
 (PCI) 0xFFFFF0FD (-3)	Standard SATA AHCI Controller
 (PCI) 0xFFFFF0FE (-2)	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD8

# Appendix B

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Mating Connectors

## B.1 List of Mating Connectors and Cables

The table notes mating connectors and available cables.

Connector Label	Function	Mating Connector		Available Cable	Cable P/N
		Vendor	Model no		
CN7	BIO Connector	Hirose	FX18-80S-0.8SV20	N/A	N/A
CN9	Battery	Molex	51021-0200	Battery Cable	175011301C
CN12	Audio	Molex	51021-1000	Audio Cable	1709100254
CN14	External +12V Input	Molex	19211-0003	Power Cable	170204010R
CN18	LPC Port	JST	SHR-12V-S-B	AAEON LPC Cable	1703120130
CN39	SATA PWR	JST	PHR-4	SATA power cable	1702150121
CN43	eDP	KEL	SSL20-30S	N/A	170430030W
CN47, CN48	USB	Molex	51021-0400	USB Cable	1700040151
CN51, CN61	COM	JCTC	11002H00-9P	COM Port Cable	1701090154
CN52	Speaker	Molex	51021-0200	N/A	N/A
CN53	Front Panel	PINREX	633-92-04GB00	N/A	N/A
CN60	DIO	PINREX	633-92-03GB00	N/A	N/A