

GENE-APL7

3.5" Subcompact Board

User's Manual 5th Ed

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Packing List

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

Item	Quantity
● GENE-APL7 MB	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.**

FCC Statement

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 主板/子板/背板

QQ4-381 Rev.A2

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	×	○	○	○	○	○
本表格依据 SJ/T 11364 的规定编制。 ○：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GB/T 26572标准规定的限量要求以下。 ×：表示该有害物质的某一均质材料超出了GB/T 26572的限量要求，然而该部件仍符合欧盟指令2011/65/EU 的规范。 环保使用期限(EFUP (Environmental Friendly Use Period))：10年 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。						

China RoHS Requirement (EN)

Name and content of hazardous substances in product

AAEON Main Board/Daughter Board/Backplane

QO4-381 Rev.A2

Part Name	Hazardous Substances					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
PCB Assemblies	×	○	○	○	○	○
Connector and Cable	×	○	○	○	○	○
The table is prepared in accordance with the provisions of SJ/T 11364. ○: Indicates that said hazardous substance contained in all of the homogenous materials for this product is below the limit requirement of GB/T 26572. ×: Indicates that said hazardous substance contained in at least one of the homogenous materials used for this part is above the limit requirement of GB/T 26572. But this product still be compliance with 2011/65/EU Directive (allowed with 2011/65/EU Annex III of RoHS exemption with number 6(c),7(a),7(c)-1). EFUP (Environment Friendly Use Period) value: 10 years Notes: This product defined period of use is under normal condition.						

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Chapter 1

Product Specifications

1.1 Specifications

System	
Form Factor	3.5" Subcompact Board
CPU	Intel® Atom™/ Celeron® / Pentium® Processor: Pentium N4200 (4C/4T, 1.10 GHz, up to 2.50 GHz) Celeron N3350 (2C/2T, 1.10 GHz, up to 2.40 GHz) Atom E3950 (4C/4T, 1.60 GHz, up to 2.00GHz) Atom E3940 (4C/4T, 1.60GHz, up to 1.80GHz) Atom E3930 (2C/2T, 1.30GHz, up to 1.80GHz)
CPU TDP	6W: N4200, N3350 12W: E3950, E3940, E3930
Chipset	Integrated with Intel® SoC
Memory Type	DDR3L up to 1866MHz, SODIMM x 1
ECC Support	Non ECC
Max. Memory Capacity	Up to 8GB
BIOS	UEFI
Wake on LAN	Yes
Watchdog Timer	255 Levels
Security	—
RTC Battery	Lithium Battery 3V/240mAH

Power

Power Requirement	12V Only
Power Supply Type	AT/ATX
Connector	Phoenix 2-pin Connector
Power Consumption Typical	Intel® E3950, DDR3L 1866MHz 8GB, 4.15A at +12V
Power Consumption Max	Intel® E3950, DDR3L 1866MHz 8GB, 4.29A at +12V

Display

Controller	Intel® HD Graphics 500/505
LVDS/ eDP	LVDS1 Dual Channel 18/24bit x 1 (Optional: eDP1.3) LVDS2 Dual Channel 18/24bit x 1
Display Interface	VGA x 1
Multiple Display	3 Simultaneous Displays

Audio

Codec	Realtek ALC897/892
Audio Interface	Line In/ Line Out/ MIC
Speaker	2W Amplifier (optional)

External I/O

Ethernet	Realtek RTL8119-CG,10/100/1000Base, RJ-45 x 2
USB	USB3.2 Gen 1 x 2
Serial Port	COM1 (RS232) COM2 (RS232/422/485, supports 5V/12V/RI)
Video	VGA x 1

External I/O

Power Input	Phoenix 2-pin Connector
Others	—

Internal I/O

USB	USB2.0 x 8
Serial Port	COM3 ~ COM6 (RS232, COM3~COM5 support 5V/12V/RI) Optional: COM3 ~ COM12
Video	LVDS1/eDP (Default: LVDS1) LVDS2
SATA	SATA III x 1 +5V SATA Power Connector x 1
Audio	Audio Header x 1 Speaker Header x 2 (optional)
DIO/GPIO	8-bit
SMBus/I2C	I2C/SMBus x 1 (Default: SMBus)
Touch	—
Fan	3-pin DC Fan x 1
SIM	Micro SIM x 1 (Optional)
Front Panel	HDD LED, PWR LED, Power Button, Buzzer, Reset
Others	—

Expansion

Mini PCIe/ mSATA	Full-size mPCIe x 1 Full-size mSATA/mPCIe x 1 (Default mSATA, BOM option: mPCIe)
------------------	--

Expansion

M.2	—
BIO	—
Others	—

Mechanical

Dimensions	5.75" x 4" (146mm x 101.7mm)
------------	------------------------------

Environment

Operating Temperature	32°F ~ 140°F (0°C ~ 60°C)
Storage Temperature	-40°F ~ 176°F (-40°C ~ 80°C)
Operating Humidity	0% ~ 90% relative humidity, non-condensing
MTBF	409,108

Certification

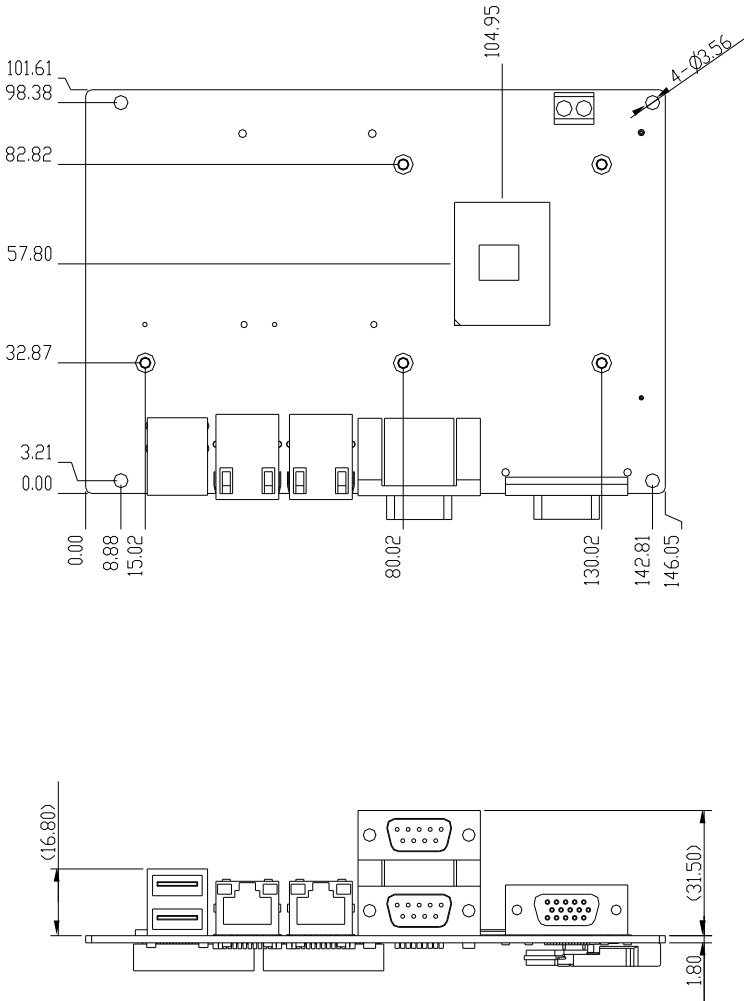
EMC	CE/FCC
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Chapter 2

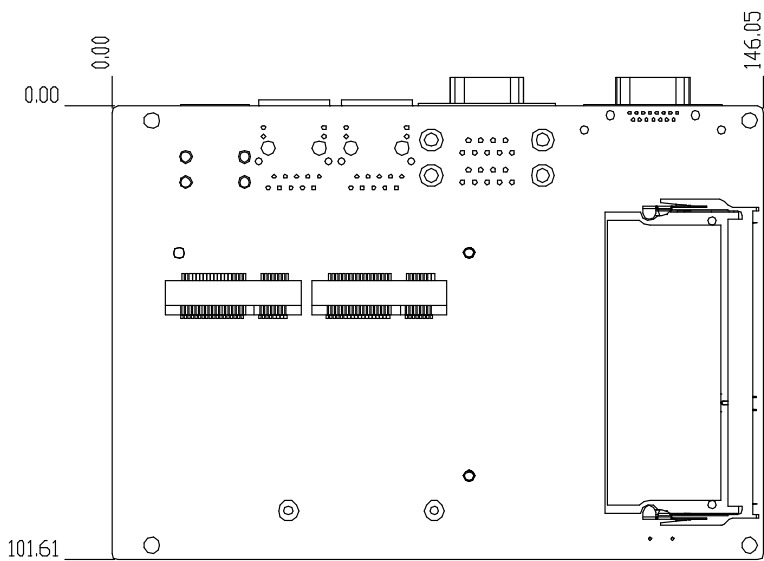
Hardware Information

2.1 Dimensions

Component Side

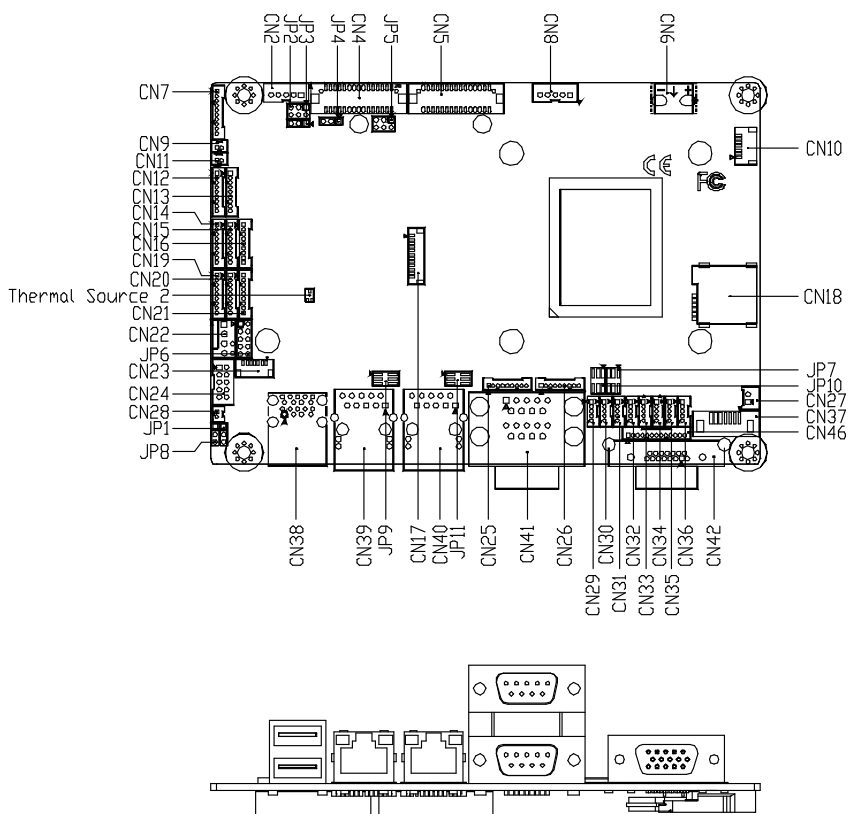


Solder Side

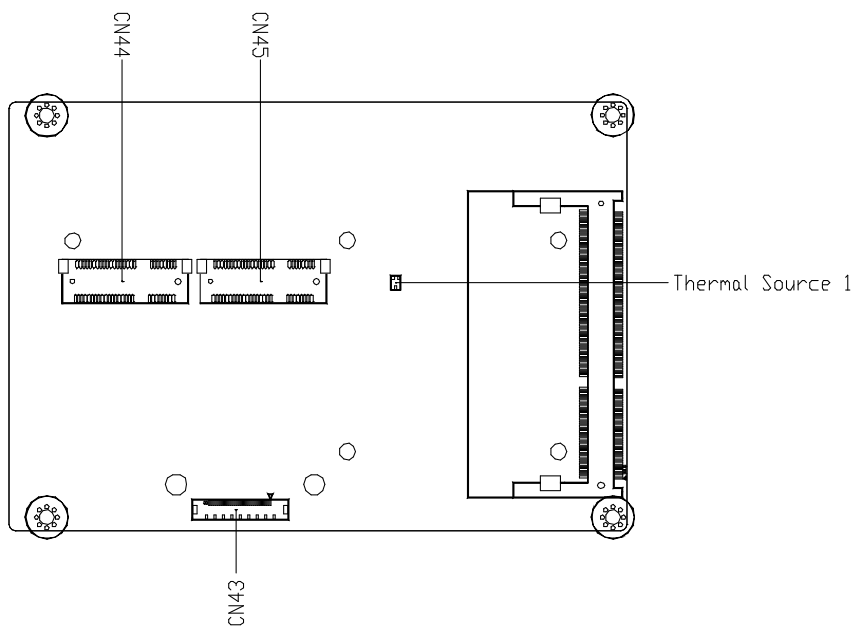


2.2 Jumpers and Connectors

Component Side

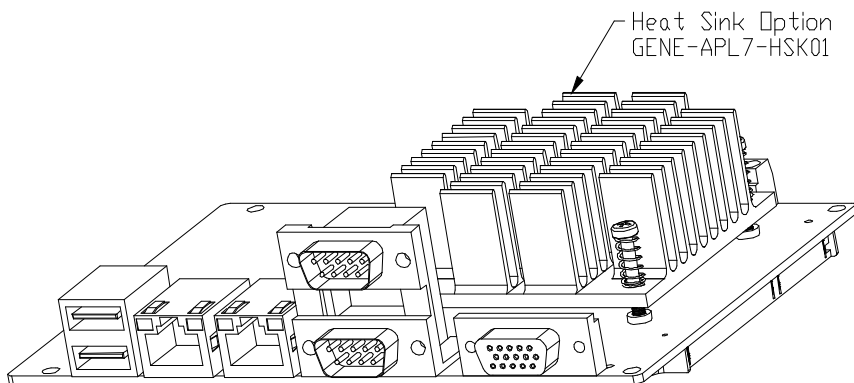


Solder Side

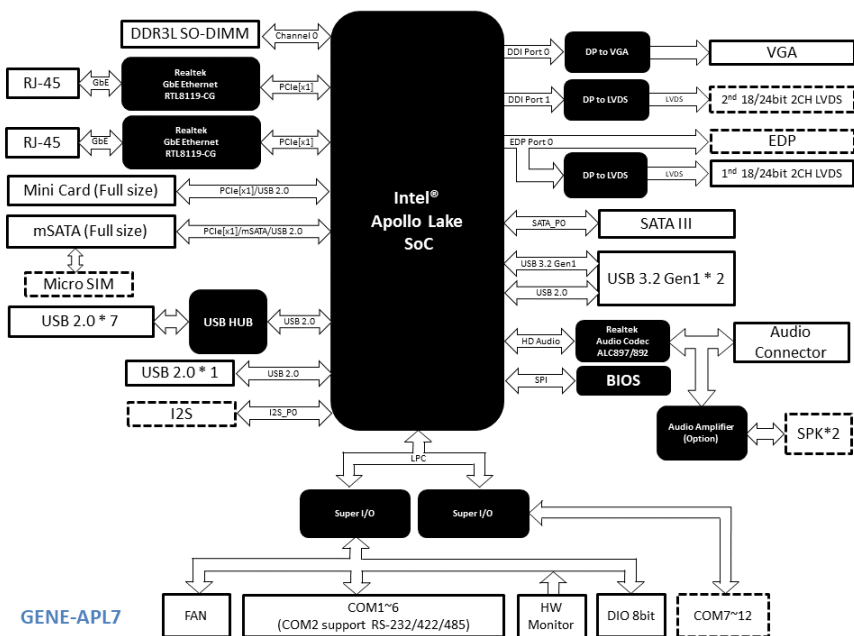


2.3 Assembly Options

Optional Accessory: GENE-APL7-HSK01



2.4 Block Diagram

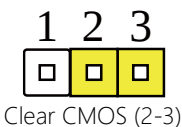
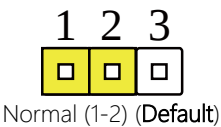


2.5 List of Jumpers

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

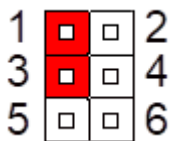
Label	Function
JP1	Clear CMOS Jumper
JP2	LVDS1/eDP VDD and BLKT VCC Selection
JP3	LVDS1/eDP BLKT Control Mode Selection
JP4	LVDS2 Port BLKT Control Mode Selection
JP5	LVDS2 Port VDD and BLKT VCC Selection
JP6	Front Panel Connector
JP7	COM2 Pin8 Function Selection
JP8	Auto Power Button Enable/Disable Selection
JP9	COM1 Pin8 Function Selection
JP10	COM3 Pin8 Function Selection
JP11	COM4 Pin8 Function Selection

2.5.1 Clear CMOS Jumper (JP1)

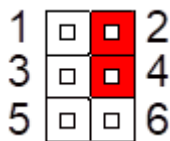


2.5.2 LVDS1 and eDP Port Operating VDD/BKLT Selection (JP2)

Backlight Power



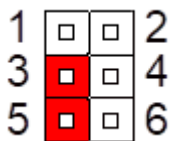
+12V LVDS / eDP BKLT (1-3)



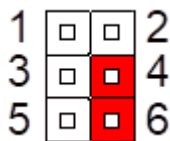
(Default)

+5V LVDS / eDP BKLT (3-5)

LCD Power



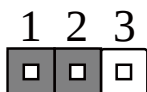
+5V LVDS / eDP VDD (2-4)



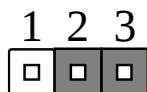
(Default)

+3.3V LVDS / eDP VDD (4-6)

2.5.3 LVDS and eDP Port BLKT Control Mode Selection (JP3)

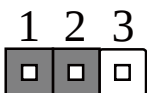


LVDS and eDP VR Mode (1-2) (Default)

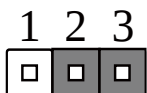


LVDS and eDP PWM Mode (2-3)

2.5.4 LVDS2 BLKT Control Mode Selection (JP4)



LVDS2VR Mode (1-2) (Default)



LVDS2PWM Mode (2-3)

2.5.5 LVDS2 Operating VDD/BKLT Selection (JP5)

Backlight Power

1

2

3

4

5

6

+12V LVDS2 BKLT (1-3)

1

2

3

4

5

6

(Default)

+5V LVDS2 BKLT (3-5)

LCD Power

1

2

3

4

5

6

+5V LVDS2 VDD (2-4)

1

2

3

4

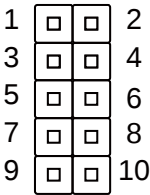
5

6

(Default)

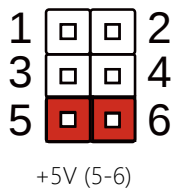
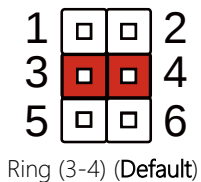
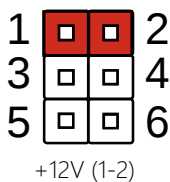
+3.3V LVDS2 VDD (4-6)

2.5.6 Front Panel Connector (JP6)

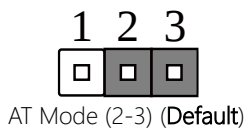
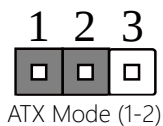


Pin	Pin Name	Pin	Pin Name
1	PWR_BTN-	2	PWR_BTN+
3	HDD_LED-	4	HDD_LED+
5	BUZZER-	6	BUZZER+
7	PWR_LED-	8	PWR_LED+
9	H/W RESET-	10	H/W RESET+

2.5.7 COM1~4 Function Selection (JP7, JP9, JP10, JP11)



2.5.8 Auto Power Button Enable/Disable Selection (JP8)



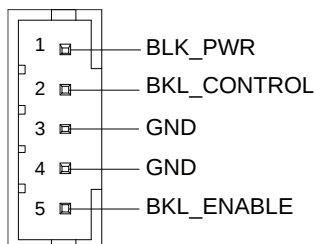
2.6 List of Connectors

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

Label	Function
CN2	LVDS/eDP Port Inverter / Backlight Connector
CN4	LVDS1/eDP Port
CN5	LVDS2 Port
CN6	External +12V Input
CN7	Audio I/O Port
CN8	LVDS2 Port Inverter / Backlight Connector
CN9	Speaker (Left)
CN10	I2S I/O Port
CN11	Speaker (Right)
CN12	COM Port 9
CN13	COM Port 10
CN14	COM Port 12
CN15	COM Port 11
CN16	COM Port 5
CN17	LPC and I2C Port
CN18	Micro SIM Card Socket
CN19	COM Port 8
CN20	COM Port 7
CN21	COM Port 6
CN22	CPU FAN (Optional)
CN23	SPI Debug Port
CN24	8-bit DIO Port
CN25	COM Port 1

Label	Function
CN26	COM Port 4
CN27	+5V Output for SATA Drive
CN28	RTC Battery
CN29	USB2.0 Port 5
CN30	USB2.0 Port 4
CN31	USB2.0 Port 3
CN32	USB2.0 Port 2
CN33	USB2.0 Port 6
CN34	USB2.0 Port 7
CN35	USB2.0 Port 8
CN36	USB2.0 Port 9
CN37	SATA III Port
CN38	Dual USB3.0 Connector Port 0 and Port 1
CN39	LAN (RJ-45) Port2
CN40	LAN (RJ-45) Port1
CN41A	COM Port 2
CN41B	COM Port 3
CN42	VGA Port
CN43	eDP Port
CN44	mSATA (Default) and Mini Card Slot (Full-Sized)
CN45	Mini Card Slot (Full-Sized)
CN46	VGA Pin Header
DIMM1	DDR3L SO-DIMM Slot

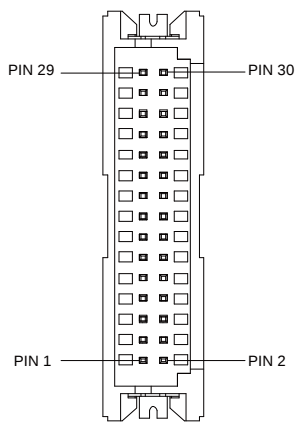
2.6.1 LVDS and eDP Port Inverter / Backlight Connector (CN2, CN8)



Pin	Pin Name	Signal Type	Signal level
1	BKL_PWR	PWR	+5V / +12V
2	BKL_CONTROL	OUT	
3	GND	GND	
4	GND	GND	
5	BKL_ENABLE	OUT	+3.3V

Note: BKL_PWR can be set to +5V or +12V by configuring JP2 and JP5 for dedicated port. Driving current supported up to 2A.

2.6.2 LVDS Port (CN4, CN5)

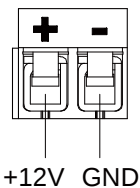


Pin	Pin Name	Signal Type	Signal Level
1	BKL_ENABLE	OUT	
2	BKL_CONTROL	OUT	
3	LCD_PWR	PWR	+3.3V/+5V
4	GND	GND	
5	LVDS_A_CLK-	DIFF	
6	LVDS_A_CLK+	DIFF	
7	LCD_PWR	PWR	+3.3V/+5V
8	GND	GND	
9	LVDS_DA0-	DIFF	
10	LVDS_DA0+	DIFF	
11	LVDS_DA1-	DIFF	
12	LVDS_DA1+	DIFF	
13	LVDS_DA2-	DIFF	

Pin	Pin Name	Signal Type	Signal Level
14	LVDS_DA2+	DIFF	
15	LVDS_DA3-	DIFF	
16	LVDS_DA3+	DIFF	
17	DDC_DATA	I/O	+3.3V
18	DDC_CLK	I/O	+3.3V
19	LVDS_DB0-	DIFF	
20	LVDS_DB0+	DIFF	
21	LVDS_DB1-	DIFF	
22	LVDS_DB1+	DIFF	
23	LVDS_DB2-	DIFF	
24	LVDS_DB2+	DIFF	
25	LVDS_DB3-	DIFF	
26	LVDS_DB3+	DIFF	
27	LCD_PWR	PWR	+3.3V/+5V
28	GND	GND	
29	LVDS_B_CLK-	DIFF	
30	LVDS_B_CLK+	DIFF	

Note: LCD_PWR can be set to +3.3V or +5V by configuring JP2 and JP5 for dedicated port. Driving current supports up to 2A.

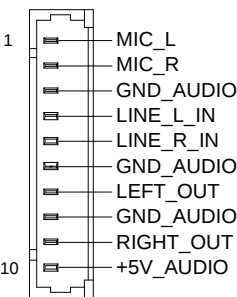
2.6.3 External +12V Input (CN6)



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

Note: The maximum current rating of Pin #1/+12V is 7A.

2.6.4 Audio I/O Port (CN7)



Pin	Pin Name	Signal Type	Signal Level
1	MIC_L	IN	
2	MIC_R	IN	
3	GND_AUDIO	GND	
4	LINE_L_IN	IN	

Pin	Pin Name	Signal Type	Signal Level
5	LINE_R_IN	IN	
6	GND_AUDIO	GND	
7	LEFT_OUT	OUT	
8	GND_AUDIO	GND	
9	RIGHT_OUT	OUT	
10	+5V_AUDIO	PWR	+5V

2.6.5 Speaker (Left) (CN9)

Pin	Pin Name	Signal Type	Signal Level
1	SPK_L+	OUT	
2	SPK_L-	OUT	

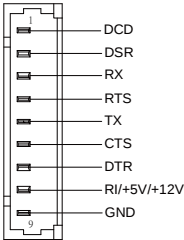
2.6.6 I2S I/O Port (CN10)

Pin	Pin Name	Signal Type	Signal Level
1	I2S_MCLK	OUT	
2	GND	GND	
3	I2S_BCLK	OUT	
4	+V1.8A	PWR	+1.8V
5	I2S_SDI	IN	
6	I2S_SDO	OUT	
7	I2S_WS_SYNC	IN	

2.6.7 Speaker (Right) (CN11)

Pin	Pin Name	Signal Type	Signal Level
1	SPK_R+	OUT	
2	SPK_R-	OUT	

2.6.8 COM Port (CN12, CN13, CN14, CN15, CN16, CN19, CN20, CN21, CN25, CN26)

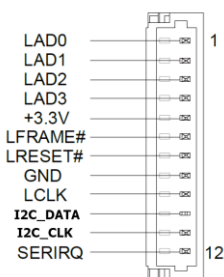


Note: Pin#8 function can be set by configuring JP9 and JP11 for dedicated COM port (COM1 on CN25 and COM4 on CN26). The maximum driving current in power supply mode is 0.5A.

RS-232			
Pin	Pin Name	Signal Type	Signal Level
1	DCD	IN	
2	DSR	IN	
3	RX	IN	
4	RTS	OUT	±9V
5	TX	OUT	±9V
6	CTS	IN	

RS-232			
Pin	Pin Name	Signal Type	Signal Level
7	DTR	OUT	±9V
8	RI/+5V/+12V	IN/ PWR	+5V/+12V
9	GND	GND	

2.6.9 LPC and I2C Port (CN17)



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	
7	LRESET#	OUT	+3.3V
8	GND	GND	
9	LCLK	OUT	
10	I2C DATA	I/O	
11	I2C CLK	I/O	
12	SERIRQ	I/O	+3.3V

2.6.10 Micro SIM Card Socket (CN18)

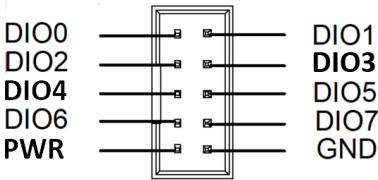
Pin	Pin Name	Signal Type	Signal Level
1	UIM_PWR	PWR	
2	UIM_RST	IN	
3	UIM_CLK	IN	
4	GND	GND	
5	UIM_VPP	PWR	
6	UIM_DATA	I/O	

2.6.11 CPU FAN (Optional) (CN22)

Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	FAN_POWER	PWR	+12V
3	FAN_TAC	IN	

Note: The maximum current rating of Pin#2/FAN_POWER is 0.5A.

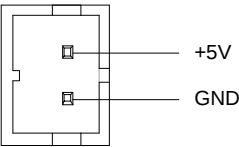
2.6.12 8-bit DIO Port (CN24)



Pin	Pin Name	Signal Type	Signal Level
1	GPIO0	I/O	+5V
2	GPIO1	I/O	+5V
3	GPIO2	I/O	+5V
4	GPIO3	I/O	+5V
5	GPIO4	I/O	+5V
6	GPIO5	I/O	+5V
7	GPIO6	I/O	+5V
8	GPIO7	I/O	+5V
9	+5V	PWR	+5V
10	GND	GND	

Note: The maximum current rating of Pin#9/+5V is 1A.

2.6.13 +5V Output for SATA Drive (CN27)



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

Note: The maximum current rating of Pin#1/+5V is 1A.

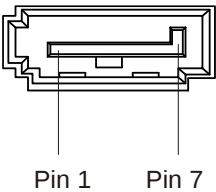
2.6.14 RTC Battery (CN28)

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

2.6.15 USB 2.0 Port (CN29-36)

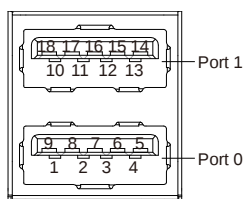
Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USB_D-	DIFF	
3	USB_D+	DIFF	
4	GND	GND	
5	GND	GND	

2.6.16 SATA III Port (CN37)



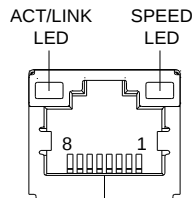
Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	SATA_TX+	DIFF	
3	SATA_TX-	DIFF	
4	GND	GND	
5	SATA_RX-	DIFF	
6	SATA_RX+	DIFF	
7	GND	GND	

2.6.17 Dual USB3.0 Connector Port 0 and Port 1 (CN38)



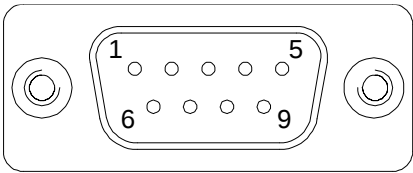
Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USB0_D-	DIFF	
3	USB0_D+	DIFF	
4	GND	GND	
5	USB0_SSRX-	DIFF	
6	USB0_SSRX+	DIFF	
7	GND	GND	
8	USB0_SSTX-	DIFF	
9	USB0_SSTX+	DIFF	
10	+5VSB	PWR	+5V
11	USB1_D-	DIFF	
12	USB1_D+	DIFF	
13	GND	GND	
14	USB1_SSRX-		
15	USB1_SSRX+		
16	GND	GND	
17	USB1_SSTX-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

2.6.18 LAN (RJ-45) (CN39, CN40)



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	

2.6.19 COM Port 2 and COM Port 3 (CN41)



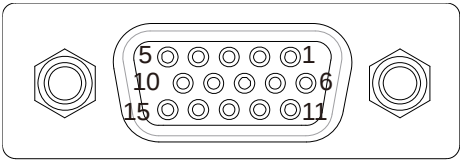
RS-232			
Pin	Pin Name	Signal Type	Signal Level
1	DCD	IN	
2	RX	IN	
3	TX	OUT	±9V
4	DTR	OUT	±9V
5	GND	GND	
6	DSR	IN	
7	RTS	OUT	±9V
8	CTS	IN	
9	RI/+5V/+12V	IN/ PWR	RI/+5V/+12V

Note: The maximum current rating of Pin#9 is 1A.

RS-422 (COM2 Only)			
Pin	Pin Name	Signal Type	Signal Level
1	RS422_TX-	OUT	±5V
2	RS422_TX+	OUT	±5V
3	RS422_RX+	IN	
4	RS422_RX-	IN	
5	GND	GND	
6			
7			
8			
9	NC/+5V/+12V	PWR	+5V/+12V

RS-485 (COM2 Only)			
Pin	Pin Name	Signal Type	Signal Level
1	RS485_D-	I/O	±5V
2	RS485_D+	I/O	±5V
3			
4			
5	GND	GND	
6			
7			
8			
9	NC/+5V/+12V	PWR	+5V/+12V

2.6.20 VGA Port (CN42)



Pin	Pin Name	Signal Type	Signal Level
1	RED	OUT	Analog
2	GREEN	OUT	Analog
3	BLUE	OUT	Analog
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	CRT_PLUG#		
11	NC		
12	DDC_DATA	I/O	+5V
13	HSYNC	OUT	
14	VSYNC	OUT	
15	DDC_CLK	I/O	+5V

2.6.21 eDP Port (CN43)

Note 1: LCD_PWR can be set to +3.3V or +5V by configuring JP2 for eDP Port. Driving current supports up to 1A.

Note 2: +VCC_BKLT_eDP can be set to +5V or +12V by configuring JP2 for eDP Port. Driving current supports up to 2A.

Pin	Pin Name	Signal Type	Signal Level
1	LCD_PWR	PWR	+3.3V/+5V
2	LCD_PWR	PWR	+3.3V/+5V
3	GND	GND	
4	GND	GND	
5	EDP_TX2_N	DIFF	
6	EDP_TX2_P	DIFF	
7	GND	GND	
8	EDP_TX1_N		
9	EDP_TX1_P		
10	GND	GND	
11	EDP_TX0_N		
12	EDP_TX0_P		
13	GND	GND	
14	EDP_TX3_N		
15	EDP_TX3_P		
16	GND	GND	
17	EDP_AUXN		
18	EDP_AUXP		
19	GND	GND	

Pin	Pin Name	Signal Type	Signal Level
20	BKLTNESS		
21	NC	NC	
22	BKLTEN		
23	eDP_HPD		
24	GND	GND	
25	GND	GND	
26	GND	GND	
27	+VCC_BKLT_eDP	PWR	+12V/5V
28	+VCC_BKLT_eDP	PWR	+12V/5V
29	+VCC_BKLT_eDP	PWR	+12V/5V
30	+VCC_BKLT_eDP	PWR	+12V/5V

2.6.22 mSATA/ Mini Card Slot (Full-Sized) (CN44)

Note: Default setting is mSATA. Select mode in BIOS.

Pin	Pin Name	Signal Type	Signal Level
1	PCIE_WAKE#	IN	
2	+3.3VSB	PWR	+3.3V
3	NC		
4	GND	GND	
5	NC		
6	+1.5V	PWR	+1.5V
7	PCIE_CLK_REQ#	IN	
8	NC	PWR	
9	GND	GND	

Pin	Pin Name	Signal Type	Signal Level
10	NC	I/O	
11	PCIE_REF_CLK-	DIFF	
12	NC	IN	
13	PCIE_REF_CLK+	DIFF	
14	NC		
15	GND	GND	
16	NC	PWR	
17	NC		
18	GND	GND	
19	NC		
20	W_DISABLE#	OUT	+3.3V
21	GND	GND	
22	PCIE_RST#	OUT	+3.3V
23	SATA_RX-	DIFF	
24	+3.3VSB	PWR	+3.3V
25	SATA_RX+	DIFF	
26	GND	GND	
27	GND	GND	
28	+1.5V	PWR	+1.5V
29	GND	GND	
30	SMB_CLK	I/O	+3.3V
31	SATA_TX-	DIFF	
32	SMB_DATA	I/O	+3.3V
33	SATA_TX+	DIFF	
34	GND	GND	
35	GND	GND	

Pin	Pin Name	Signal Type	Signal Level
36	USB_D-	DIFF	
37	GND	GND	
38	USB_D+	DIFF	
39	+3.3VSB	PWR	+3.3V
40	GND	GND	
41	+3.3VSB	PWR	+3.3V
42	NC		
43	GND	GND	
44	NC		
45	NC		
46	NC		
47	NC		
48	+1.5V	PWR	+1.5V
49	NC		
50	GND	GND	
51	NC		
52	+3.3VSB	PWR	+3.3V

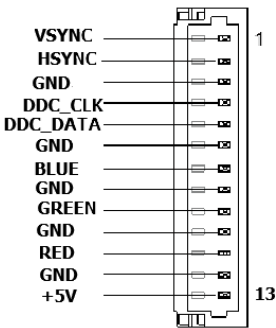
2.6.23 Mini Card Slot (Full-Sized) (CN45)

Pin	Pin Name	Signal Type	Signal Level
1	PCIE_WAKE#	IN	
2	+3.3VSB	PWR	+3.3V
3	NC		
4	GND	GND	
5	NC		

Pin	Pin Name	Signal Type	Signal Level
6	+1.5V	PWR	+1.5V
7	PCIE_CLK_REQ#	IN	
8	NC	PWR	
9	GND	GND	
10	NC	I/O	
11	PCIE_REF_CLK-	DIFF	
12	NC	IN	
13	PCIE_REF_CLK+	DIFF	
14	NC		
15	GND	GND	
16	NC	PWR	
17	NC		
18	GND	GND	
19	NC		
20	W_DISABLE#	OUT	+3.3V
21	GND	GND	
22	PCIE_RST#	OUT	+3.3V
23	PCIE_RX-	DIFF	
24	+3.3VSB	PWR	+3.3V
25	PCIE_RX+	DIFF	
26	GND	GND	
27	GND	GND	
28	+1.5V	PWR	+1.5V
29	GND	GND	
30	SMB_CLK	I/O	+3.3V
31	PCIE_TX-	DIFF	

Pin	Pin Name	Signal Type	Signal Level
32	SMB_DATA	I/O	+3.3V
33	PCIE_TX+	DIFF	
34	GND	GND	
35	GND	GND	
36	USB_D-	DIFF	
37	GND	GND	
38	USB_D+	DIFF	
39	+3.3VSB	PWR	+3.3V
40	GND	GND	
41	+3.3VSB	PWR	+3.3V
42	NC		
43	GND	GND	
44	NC		
45	NC		
46	NC		
47	NC		
48	+1.5V	PWR	+1.5V
49	NC		
50	GND	GND	
51	NC		
52	+3.3VSB	PWR	+3.3V

2.6.24 VGA connector (CN46)



Pin	Pin Name	Signal Type	Signal Level
1	VSYNC	OUT	
2	HSYNC	OUT	
3	GND	GND	
4	DDC_CLK	I/O	
5	DDC_DAT	I/O	
6	GND	GND	
7	BLUE	Out	Analog
8	GND	GND	
9	GREEN	Out	Analog
10	GND	GND	
11	RED	Out	Analog
12	GND	GND	
13	+5V	PWR	

2.6.25 DDR3L SO-DIMM Slot (DIMM1)

Standard Specifications

Chapter 3

AMI BIOS Setup

3.1 System Test and Initialization

The system uses certain routines to perform testing and initialization during the boot up sequence. If an error, fatal or non-fatal, is encountered, the system will output a few short beeps or an error message. The board 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. If they do not match, an error message will be output, and the BIOS setup program will need to be run to set the configuration information in memory.

There are three situations in which the CMOS settings will need to be set or changed:

- Starting the system for the first time
- The system hardware has been changed
- The CMOS memory has lost power and the configuration information is erased

The system's CMOS memory uses a backup battery for data retention. The battery must be replaced 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 <F2> 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 advanced hardware settings and options

Chipset – Chipset settings and options

Security – The setup administrator password can be set here

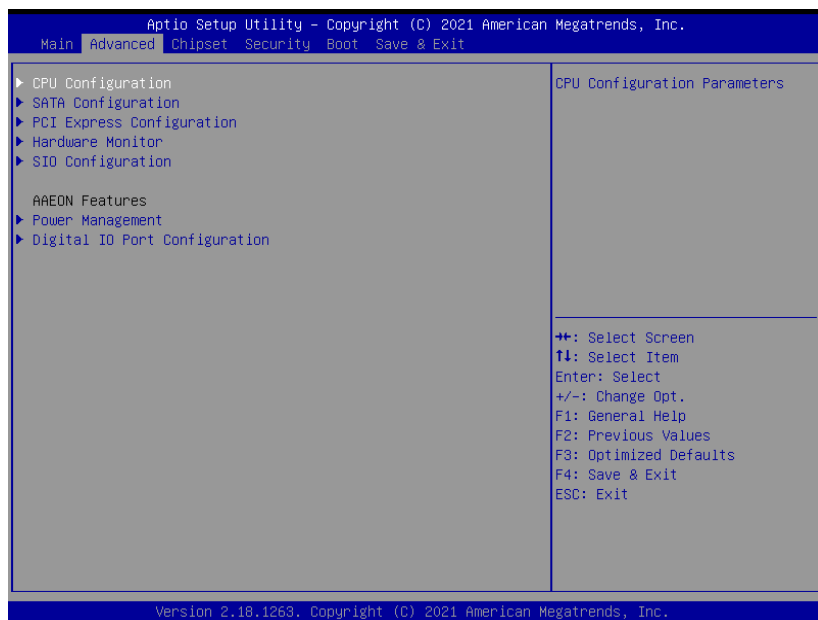
Boot – Boot options including BBS priority and Quiet Boot options

Save & Exit – Save changes and exit the program

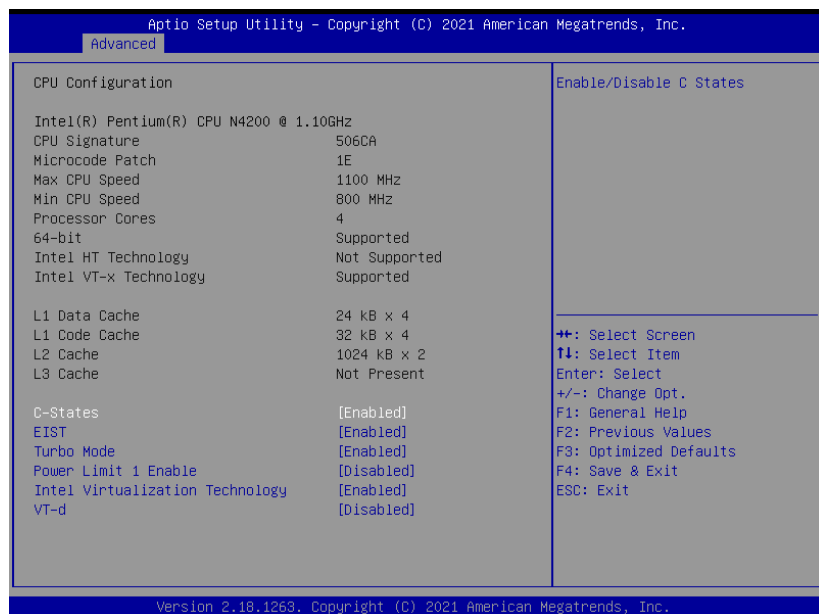
3.3 Setup Submenu: Main



3.4 Setup Submenu: Advanced



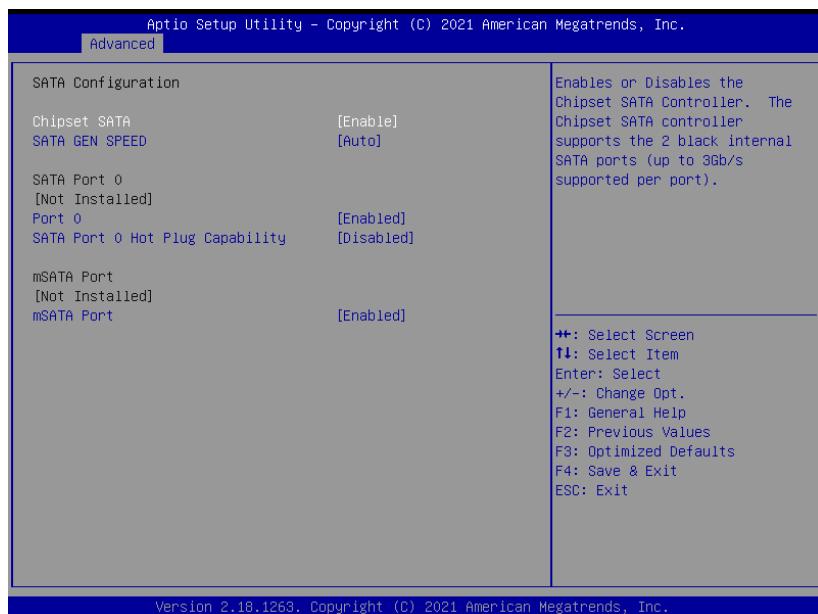
3.4.1 CPU Configuration



Options Summary		
C-States	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disable C States.		
EIST	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disable Intel SpeedStep.		
Turbo Mode	Disabled	Optimal Default, Failsafe Default
	Enabled	
Turbo Mode		
Power Limit 1 Enable	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disable Power Limit 1		
Intel Virtualization Technology	Disabled	Optimal Default, Failsafe Default
	Enabled	
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.		

Options Summary		
VT-d	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disable CP VT-d		

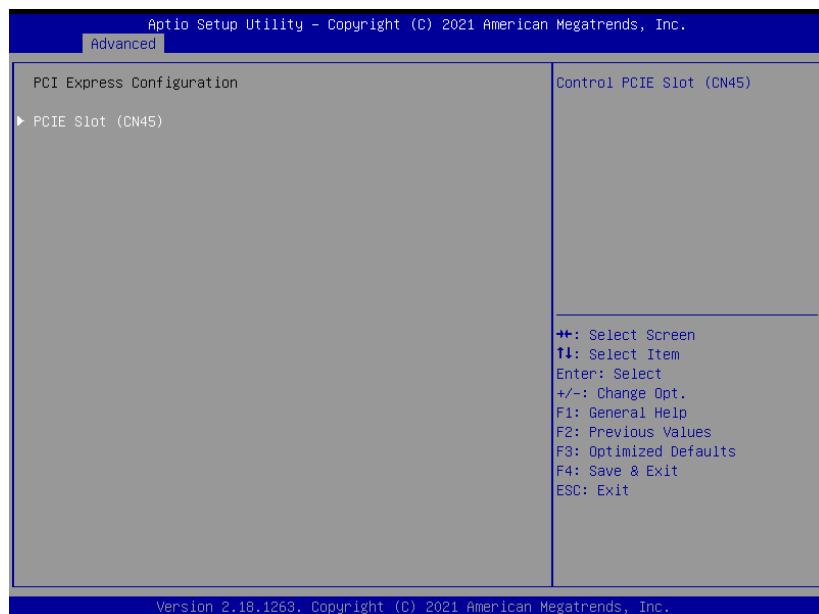
3.4.2 SATA Configuration



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).		
SATA GEN SPEED	Auto	Optimal Default; Failsafe Default
	GEN1	
	GEN2	
	GEN3	
SATA GEN Speed Selection		
Port 0	Disabled	Optimal Default, Failsafe Default
	Enabled	
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.		

Options Summary		
mSATA Port	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable or Disable SATA Port		

3.4.3 PCI Express Configuration

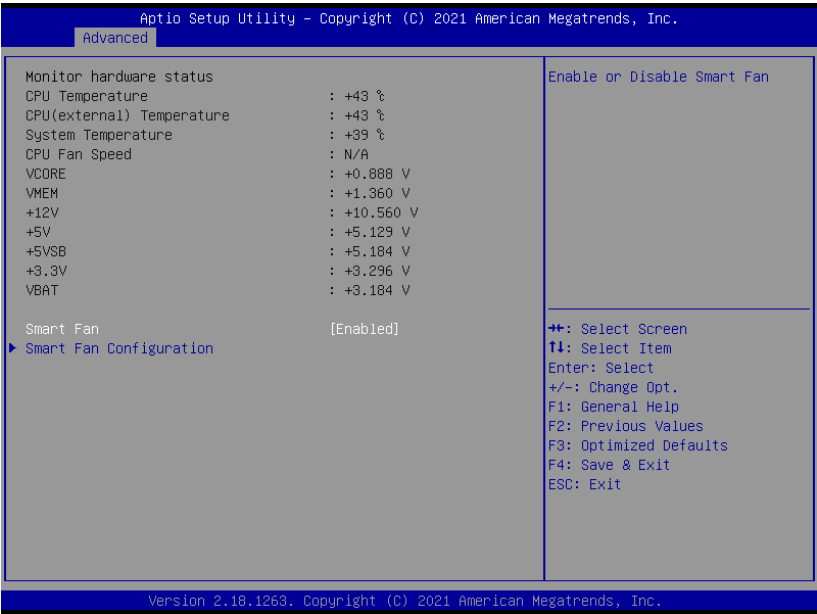


3.4.3.1 PCIE Slot (CN45)



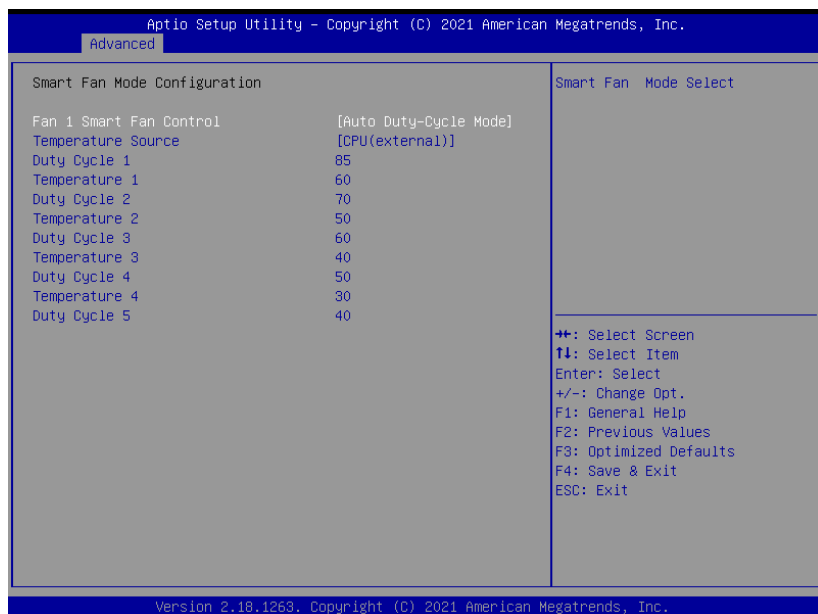
Options Summary		
PCIe Slot (CN45)	Disabled	Optimal Default, Failsafe Default
	Enabled	
Control PCIe Slot (CN45)		
Hot Plug	Disabled	Optimal Default, Failsafe Default
	Enabled	
PCI Express Hot Plug Enable/Disable		
PCIe Speed	Auto	Optimal Default, Failsafe Default
	Gen1	
	Gen2	
Configure PCIe Speed (CN45)		

3.4.4 Hardware Monitor



Options Summary		
Smart Fan	Disable	Optimal Default, Failsafe Default
	Enable	
Enables or Disables Smart Fan.		

3.4.4.1 CPU Smart Fan Mode Configuration

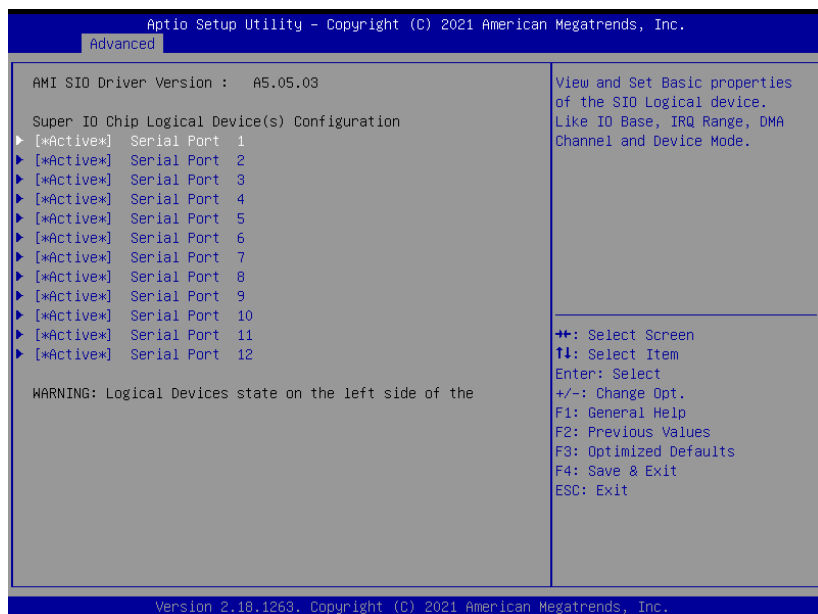


Options Summary		
Fan 1 Smart Fan Control	Manual Duty Mode	Optimal Default, Failsafe Default
	Auto Duty-Cycle Mode	
Smart Fan Mode Select		
Temperature Source	CPU (external)	Optimal Default, Failsafe Default
	System	
Select the monitored temperature source for this fan.		
Duty Cycle 1	85	
Temperature 1	60	
Duty Cycle 2	70	
Temperature 2	50	
Duty Cycle 3	60	
Temperature 3	40	
Duty Cycle 4	50	
Temperature 4	30	
Duty Cycle 5	40	

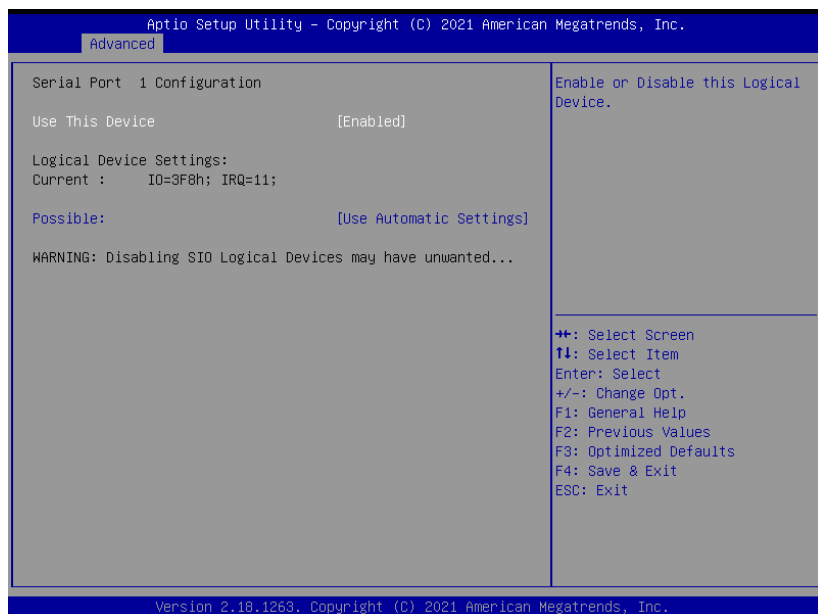
Options Summary

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	Optimal Default, Failsafe Default
	Enable	
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=3F8h; IRQ=11	
	IO=2F8h; IRQ=11	
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

Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.

Advanced

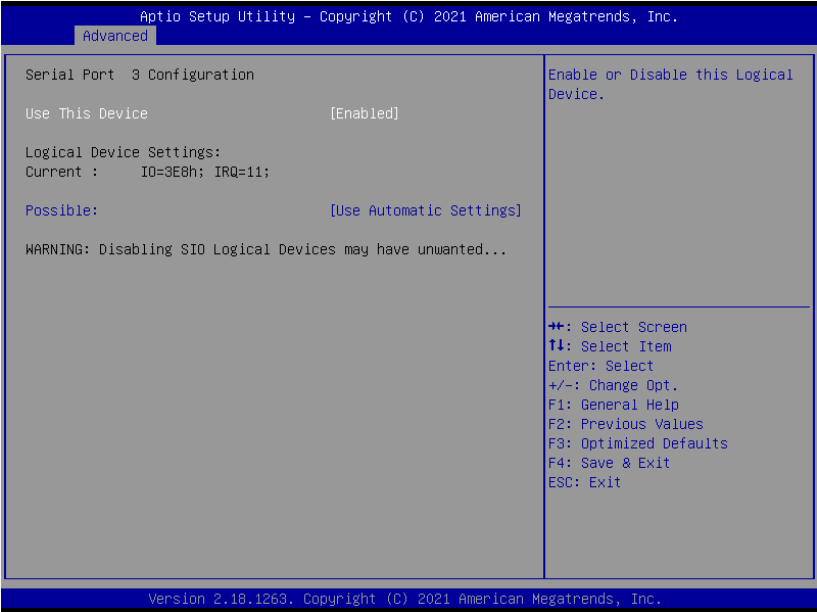
Serial Port 2 Configuration Use This Device [Enabled] Logical Device Settings: Current : IO=2F8h; IRQ=11; Possible: [Use Automatic Settings] Mode : [RS232] WARNING: Disabling SIO Logical Devices may have unwanted...	Enable or Disable this Logical Device.
--	---

++: 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		
Use This Device	Disable	Optimal Default, Failsafe Default
	Enable	
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2F8h; IRQ=11	
	IO=3F8h; IRQ=11	
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.		

3.4.5.3 Serial Port 3 Configuration



Options Summary		
Use This Device	Disable	Optimal Default, Failsafe Default
	Enable	
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=3E8h; IRQ=11	
	IO=2E8h; IRQ=11	
Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts.		

3.4.5.4 Serial Port 4 Configuration

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Advanced

Serial Port 4 Configuration Use This Device [Enabled] Logical Device Settings: Current : IO=2E8h; IRQ=11; Possible: [Use Automatic Settings] WARNING: Disabling SIO Logical Devices may have unwanted...	Enable or Disable this Logical Device.
---	---

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

Version 2.18.1263. Copyright (C) 2021 American Megatrends, Inc.

Options Summary		
Use This Device	Disable	Optimal Default, Failsafe Default
	Enable	
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2E8h; IRQ=11	
	IO=3E8h; IRQ=11	
Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts.		

3.4.5.5 Serial Port 5 Configuration

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Advanced

Serial Port 5 Configuration Use This Device [Enabled] Logical Device Settings: Current : IO=2D0h; IRQ=11; Possible: [Use Automatic Settings] WARNING: Disabling SIO Logical Devices may have unwanted...	Enable or Disable this Logical Device.
---	---

++: 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		
Use This Device	Disable	Optimal Default, Failsafe Default
	Enable	
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2D0h; IRQ=11	
	IO=2C0h; IRQ=11	
Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts.		

3.4.5.6 Serial Port 6 Configuration

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Advanced

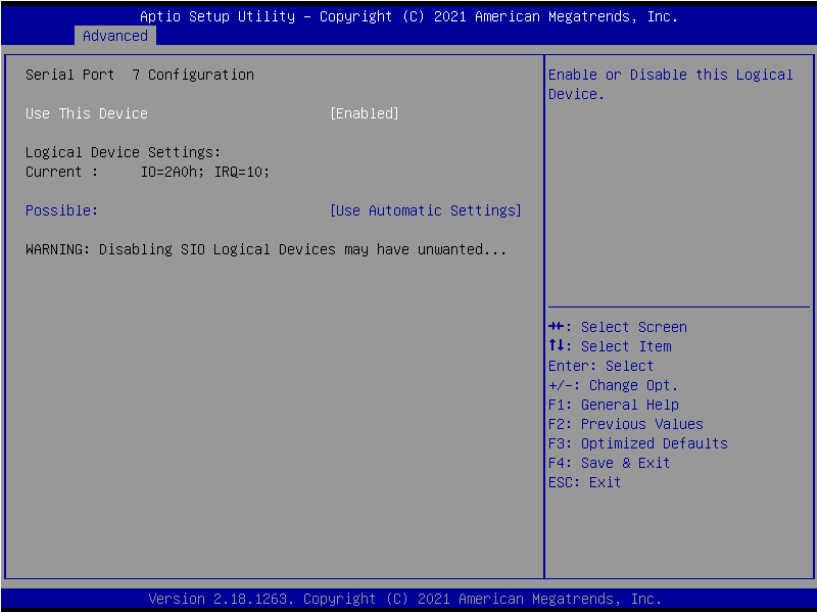
Serial Port 6 Configuration Use This Device [Enabled] Logical Device Settings: Current : IO=2C0h; IRQ=11; Possible: [Use Automatic Settings] WARNING: Disabling SIO Logical Devices may have unwanted...	Enable or Disable this Logical Device.
---	---

++: 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		
Use This Device	Disable	Optimal Default, Failsafe Default
	Enable	
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2C0h; IRQ=11	
	IO=2D0h; IRQ=11	
Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts.		

3.4.5.7 Serial Port 7 Configuration



Options Summary		
Use This Device	Disable	Optimal Default, Failsafe Default
	Enable	
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2A0h; IRQ=10	
	IO=2A8h; IRQ=10	
Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts.		

3.4.5.8 Serial Port 8 Configuration

Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.

Advanced

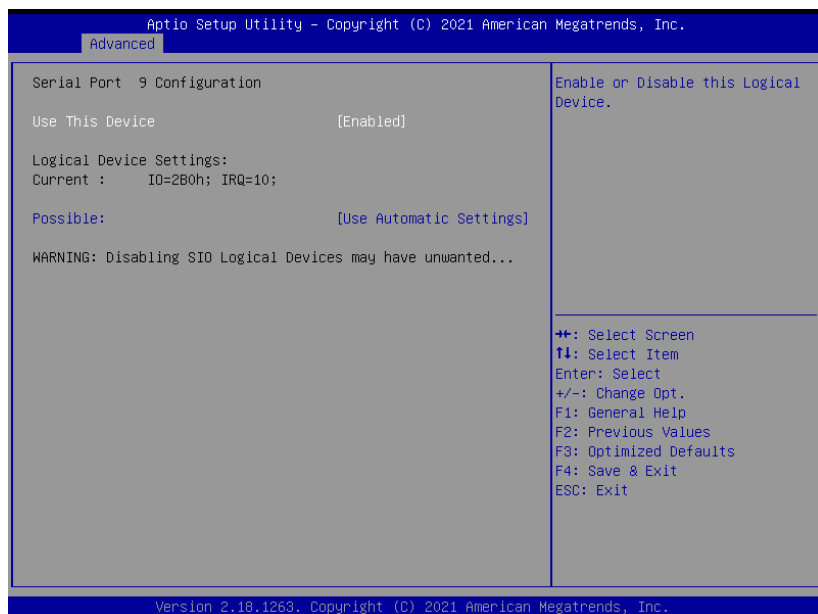
Serial Port 8 Configuration Use This Device [Enabled] Logical Device Settings: Current : IO=2A8h; IRQ=10; Possible: [Use Automatic Settings] WARNING: Disabling SIO Logical Devices may have unwanted...	Enable or Disable this Logical Device.
---	---

++: 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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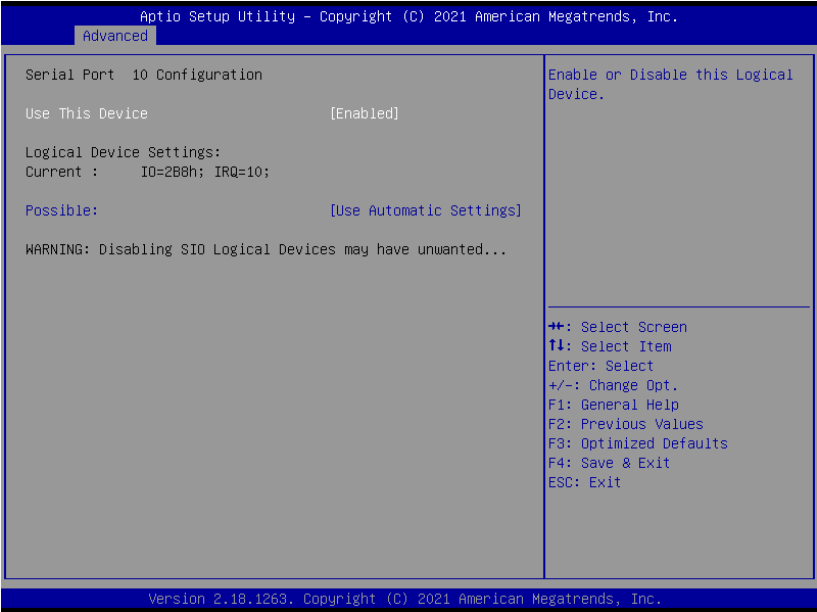
Options Summary		
Use This Device	Disable	Optimal Default, Failsafe Default
	Enable	
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2A8h; IRQ=10	
	IO=2A0h; IRQ=10	
Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts.		

3.4.5.9 Serial Port 9 Configuration



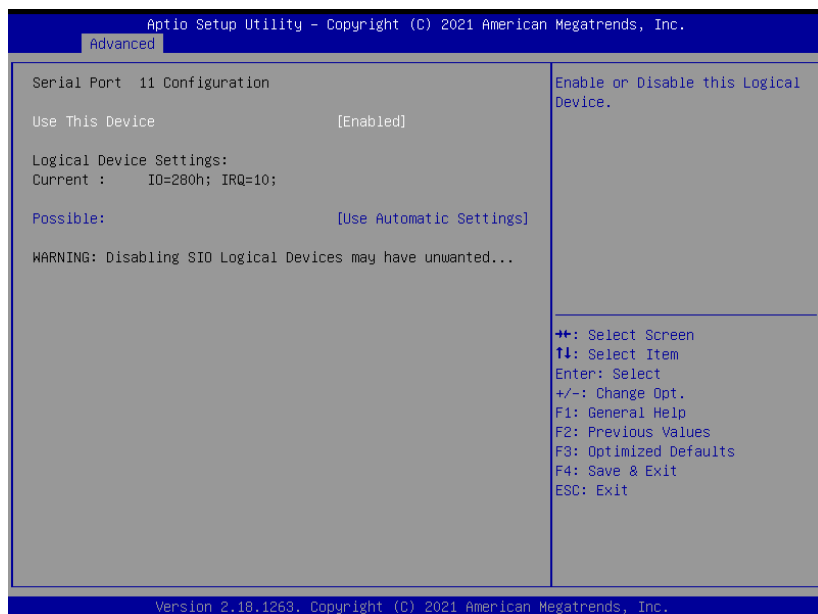
Options Summary		
Use This Device	Disable	Optimal Default, Failsafe Default
	Enable	
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2B0h; IRQ=10	
	IO=2B8h; IRQ=10	
Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts.		

3.4.5.10 Serial Port 10 Configuration



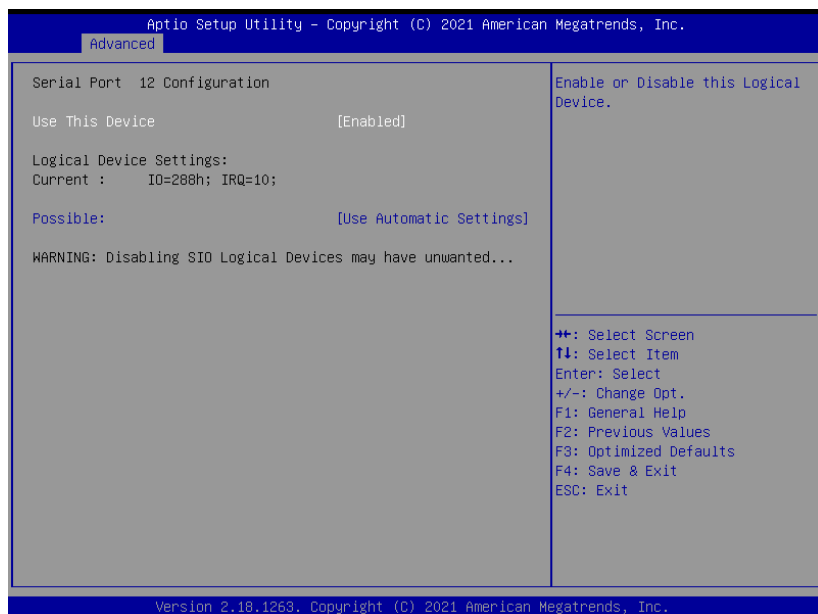
Options Summary		
Use This Device	Disable	Optimal Default, Failsafe Default
	Enable	
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2B8h; IRQ=10	
	IO=2B0h; IRQ=10	
Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts.		

3.4.5.11 Serial Port 11 Configuration



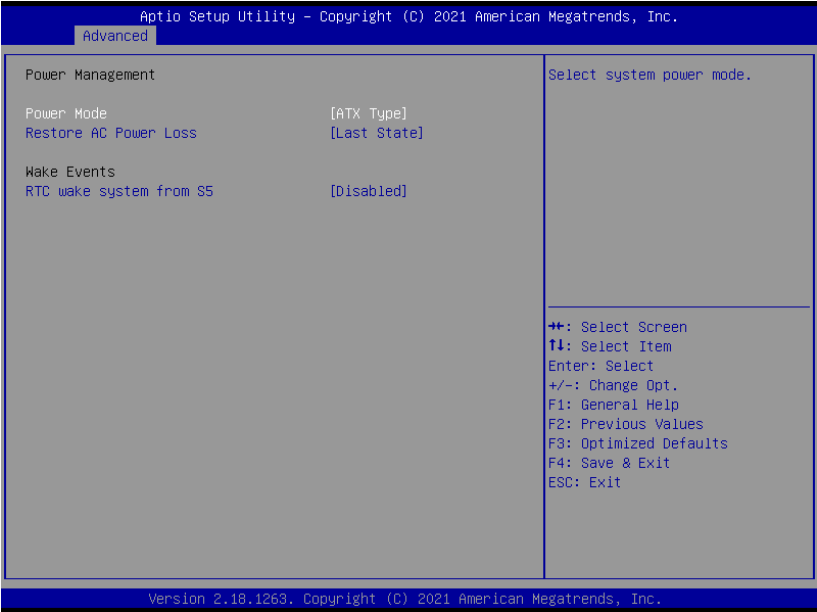
Options Summary		
Use This Device	Disable	Optimal Default, Failsafe Default
	Enable	
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=280h; IRQ=10	
	IO=288h; IRQ=10	
Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts.		

3.4.5.12 Serial Port 12 Configuration



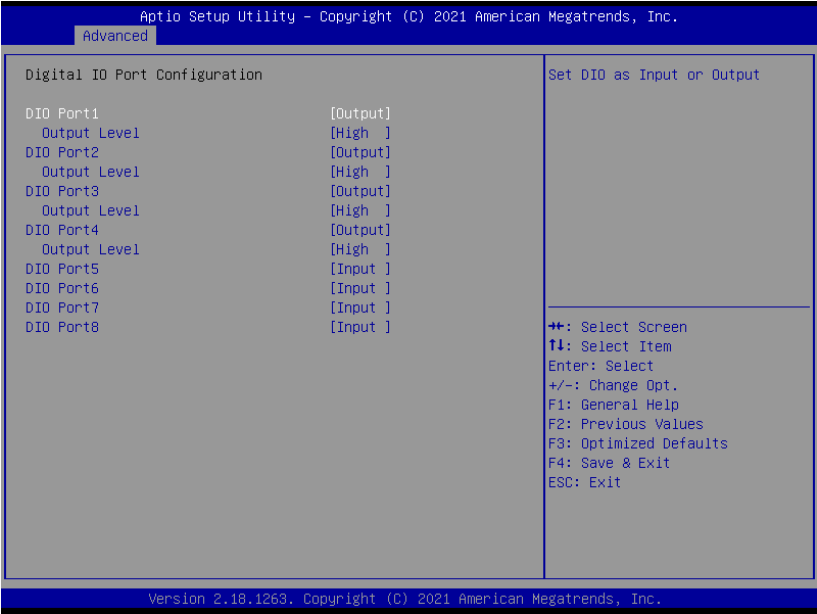
Options Summary		
Use This Device	Disable	Optimal Default, Failsafe Default
	Enable	
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=288h; IRQ=10	
	IO=280h; IRQ=10	
Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts.		

3.4.6 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	Disable	Optimal Default, Failsafe Default
	Fixed Time	
Fixed Time: System will wake on the hr::min::sec specified.		

3.4.7 Digital IO Port Configuration

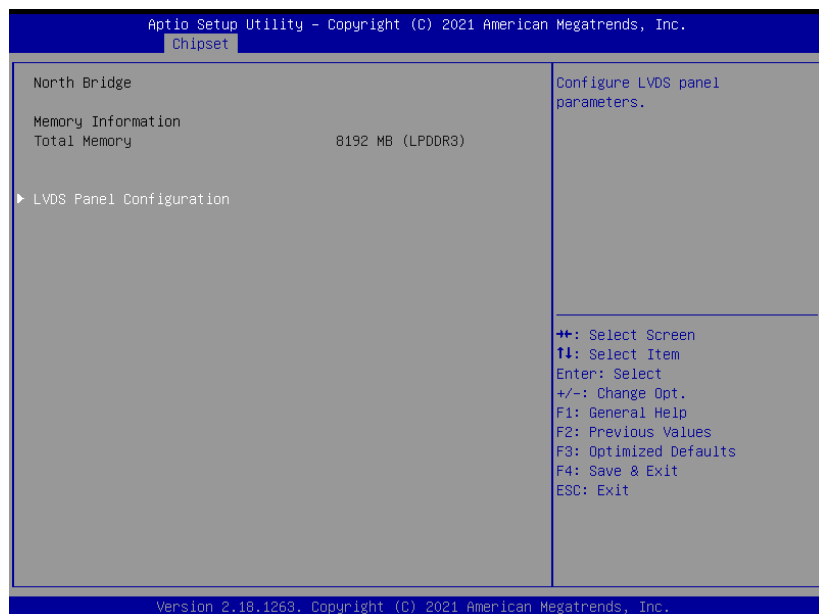


Options Summary		
DIO Port #	Output	
	Input	
Set DIO as Input or Output		
Output Level	High	Optimal Default, Failsafe Default
	Low	
Set output level when DIO pin is output		

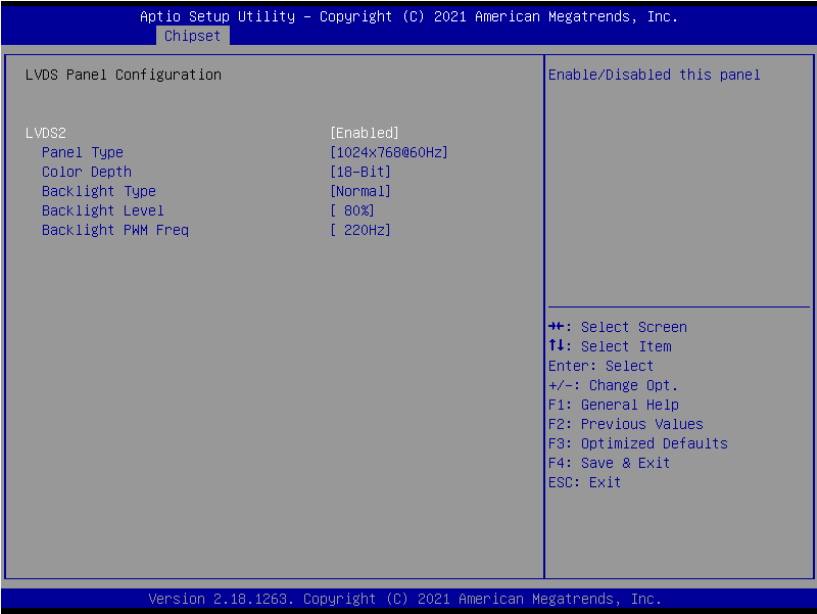
3.5 Setup Submenu: Chipset



3.5.1 North Bridge



3.5.1.1 LVDS Panel Configuration

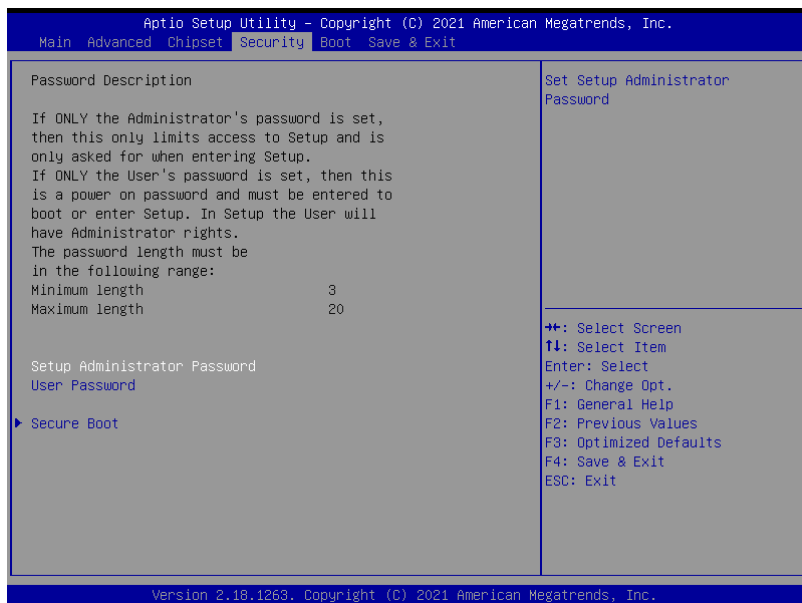


Note: LVDS2 only available for 2 LVDS SKU

Options Summary		
LVDS	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disabled this panel.		
LVDS Panel Type	640x480@60Hz	Optimal Default, Failsafe Default
	800x480@60Hz	
	800x600@60Hz	
	1024x600@60Hz	
	1024x768@60Hz	
	1280x768@60Hz	
	1280x800@60Hz	
	1280x1024@60Hz	
	1366x768@60Hz	
	1440x900@60Hz	

Options Summary		
LVDS Panel Type	1600x1200@60Hz	
	1920x1080@60Hz	
	1920x1200@60Hz	
Select panel type		
Color Depth	18-bit	Optimal Default, Failsafe Default
	24-bit	
	36-bit	
	48-bit	
Select Color Depth		
Backlight Type	Normal	Optimal Default, Failsafe Default
	Inverted	
Select backlight control signal type		
Backlight Level	0%	Optimal Default, Failsafe Default
	10%	
	20%	
	30%	
	40%	
	50%	
	60%	
	70%	
	80%	
	90%	
100%		
Select backlight control level		
Backlight PWM Freq	100Hz	Optimal Default, Failsafe Default
	200Hz	
	220Hz	
	500Hz	
	1KHz	
	2.2KHz	
	6.5KHz	
Select PWM frequency of backlight control signal		

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

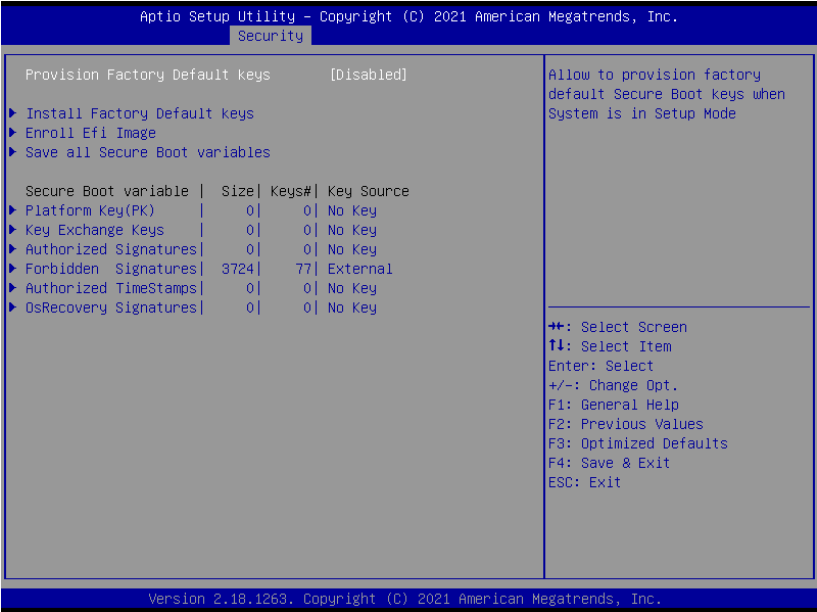
Select the password you want to remove and enter the current password. At the next dialog box press Enter to disable password protection.

3.6.1 Secure Boot



Options Summary		
Attempt Secure Boot	Disabled	Optimal Default, Failsafe Default
	Enabled	
Secure Boot activated when Platform Key (PK) is enrolled, System mode is User/Deployed, and CSM function is disable		
Secure Boot Mode	Standard	Optimal Default, Failsafe Default
	Customized	
Secure Boot Mode - Custom & Standard, Set UEFI Secure Boot Mode to STANDARD mode or CUSTOM mode, this change is effect after save. And after reset, the mode will return to STANDARD mode		

3.6.1.1 Key Management



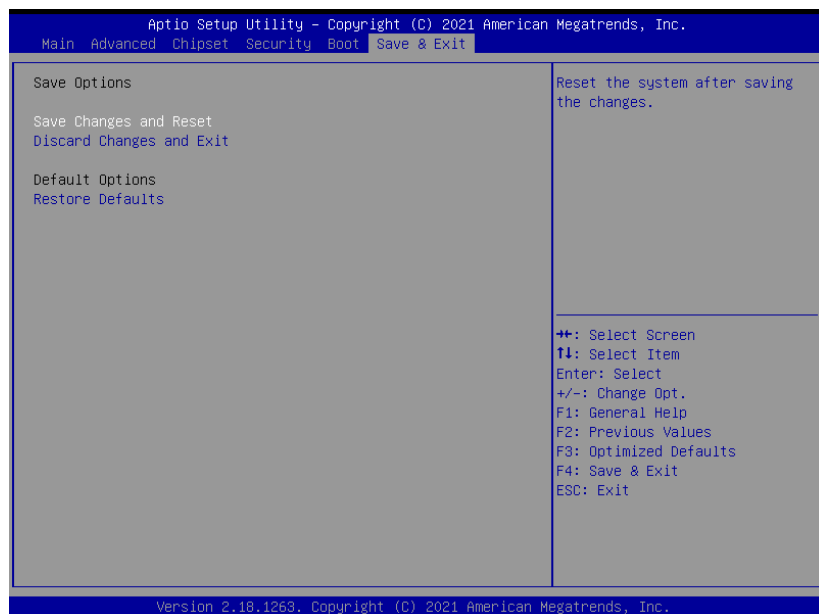
Options Summary		
Provision Factory Default keys	Disabled	Optimal Default, Failsafe Default
	Enabled	
Allow to provision factory default Secure Boot keys when System is in Setup Mode		

3.7 Setup Submenu: Boot



Options Summary		
Quiet Boot	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enables or Disables showing boot logo.		
Monitor Mwait	Disable	Optimal Default, Failsafe Default
	Enabled	
	Auto	
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: Save & Exit



Chapter 4

Drivers Installation

4.1 Driver Download/Installation

Drivers for the GENE-APL7 A11 can be downloaded from the product page on the AAEON website by following this link:

<https://www.aaeon.com/en/p/embedded-single-board-computers-gene-APL7>

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

Step 1 – Install Chipset Drivers

1. Open the **Step1 - Chipset** folder followed by **SetupChipset.exe**
2. Follow the instructions
3. Drivers will be installed automatically

Step 2 – Install Graphics Drivers

1. Open the **Step2 - VGA** folder followed by **Setup.exe**
2. Follow the instructions
3. Drivers will be installed automatically

Step 3 – Install LAN Drivers

1. Click on the **Step3 - LAN** folder and select your OS
2. Open the **.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 4 – Install Audio Drivers

1. Open the **Step4 - Audio** folder followed by **0006-64bit_Win7_Win8_Win81_Win10_R279.exe**
2. Follow the instructions
3. Drivers will be installed automatically

Step 5 – Install TXE Driver

1. Open the **Step5 - TXE** folder followed by **SetupTXE.exe**
2. Follow the instructions
3. Drivers will be installed automatically

Step 6 – Install SerialPort_Patch Driver

1. Open the **Step6 - SerialPort_Patch** folder followed by **Setup.exe**
2. Follow the instructions
3. Drivers will be installed automatically

Step 7 – Install GPIO Driver

1. Open the **Step6 - GPIO** folder followed by **SetupSerialIO.exe**
2. Follow the instructions
3. Drivers will be installed automatically

Appendix A

I/O Information

A.1 I/O Address Map

▼	DESKTOP-TOBCN2G
▼	Input/output (I/O)
	[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
	[0000000000000060 - 0000000000000060] Standard PS/2 Keyboard
	[0000000000000061 - 0000000000000061] Motherboard resources
	[0000000000000063 - 0000000000000063] Motherboard resources
	[0000000000000064 - 0000000000000064] Standard PS/2 Keyboard
	[0000000000000065 - 0000000000000065] Motherboard resources
	[0000000000000067 - 0000000000000067] Motherboard resources
	[0000000000000070 - 0000000000000070] Motherboard resources
	[0000000000000070 - 0000000000000077] System CMOS/real time clock
	[0000000000000078 - 00000000000000CF7] 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
	[0000000000000280 - 0000000000000287] Communications Port (COM11)
	[0000000000000288 - 000000000000028F] Communications Port (COM12)
	[00000000000002A0 - 00000000000002A7] Communications Port (COM7)
	[00000000000002A8 - 00000000000002AF] Communications Port (COM8)
	[00000000000002B0 - 00000000000002B7] Communications Port (COM9)
	[00000000000002B8 - 00000000000002BF] Communications Port (COM10)

	[00000000000002B8 - 0000000000002BF]	Communications Port (COM10)
	[0000000000002C0 - 0000000000002C7]	Communications Port (COM6)
	[0000000000002D0 - 0000000000002D7]	Communications Port (COM5)
	[0000000000002E8 - 0000000000002EF]	Communications Port (COM4)
	[0000000000002F8 - 0000000000002FF]	Communications Port (COM2)
	[0000000000003E8 - 0000000000003EF]	Communications Port (COM3)
	[0000000000003F8 - 0000000000003FF]	Communications Port (COM1)
	[000000000000400 - 00000000000047F]	Motherboard resources
	[0000000000004D0 - 0000000000004D1]	Programmable interrupt controller
	[000000000000500 - 0000000000005FE]	Motherboard resources
	[000000000000680 - 00000000000069F]	Motherboard resources
	[000000000000A00 - 000000000000A0F]	Motherboard resources
	[000000000000A10 - 000000000000A1F]	Motherboard resources
	[000000000000A20 - 000000000000A2F]	Motherboard resources
	[000000000000D00 - 000000000000FFFF]	PCI Express Root Complex
	[000000000000D000 - 000000000000DFFF]	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD9
	[000000000000DF00 - 000000000000DFFF]	Realtek PCIe GBE Family Controller
	[000000000000E000 - 000000000000EFFF]	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD8
	[000000000000EF00 - 000000000000EFFF]	Realtek PCIe GBE Family Controller #2
	[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 - 000000007FFFFFFF] 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 - 5AD9
	[00000000911FF000 - 00000000911FFFFFFF] Realtek PCIe GBE Family Controller
	[0000000091200000 - 00000000912FFFFFFF] Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD8
	[00000000912FF000 - 00000000912FFFFFFF] Realtek PCIe GBE Family Controller #2
	[0000000091300000 - 000000009130FFFF] Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
	[0000000091310000 - 0000000091313FFF] High Definition Audio Controller
	[0000000091314000 - 0000000091315FFF] Standard SATA AHCI Controller
	[0000000091318000 - 00000000913180FF] Intel(R) Celeron(R)/Pentium(R) Processor SMBUS - 5AD4
	[0000000091319000 - 0000000091319FFF] Intel(R) Serial IO I2C Host Controller - 5AAC
	[000000009131A000 - 000000009131AFFF] Intel(R) Serial IO I2C Host Controller - 5AAC
	[000000009131B000 - 000000009131B7FF] Standard SATA AHCI Controller
	[000000009131C000 - 000000009131C0FF] Standard SATA AHCI Controller
	[0000000091320000 - 0000000091320FFF] Intel(R) Trusted Execution Engine Interface
	[0000000091320000 - 0000000091320FFF] Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD9
	[0000000091320000 - 0000000091320FFF] Realtek PCIe GBE Family Controller
	[0000000091320000 - 0000000091320FFF] Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD8
	[0000000091320000 - 0000000091320FFF] Realtek PCIe GBE Family Controller #2
	[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 - 00000000FED01FFF] Motherboard resources
	[00000000FED03000 - 00000000FED03FFF] Motherboard resources
	[00000000FED06000 - 00000000FED06FFF] Motherboard resources
	[00000000FED08000 - 00000000FED09FFF] Motherboard resources
	[00000000FED1C000 - 00000000FED1CFFF] Motherboard resources
	[00000000FED80000 - 00000000FED8BFFF] Motherboard resources
	[00000000FEE00000 - 00000000FEEFFFFFFF] Motherboard resources

A.3 IRQ Mapping Chart

▼	Interrupt request (IRQ)	
	(ISA) 0x00000000 (00)	System timer
	(ISA) 0x00000001 (01)	Standard PS/2 Keyboard
	(ISA) 0x00000008 (08)	High precision event timer
	(ISA) 0x0000000A (10)	Communications Port (COM10)
	(ISA) 0x0000000A (10)	Communications Port (COM11)
	(ISA) 0x0000000A (10)	Communications Port (COM12)
	(ISA) 0x0000000A (10)	Communications Port (COM7)
	(ISA) 0x0000000A (10)	Communications Port (COM8)
	(ISA) 0x0000000A (10)	Communications Port (COM9)
	(ISA) 0x0000000B (11)	Communications Port (COM1)
	(ISA) 0x0000000B (11)	Communications Port (COM2)
	(ISA) 0x0000000B (11)	Communications Port (COM3)
	(ISA) 0x0000000B (11)	Communications Port (COM4)
	(ISA) 0x0000000B (11)	Communications Port (COM5)
	(ISA) 0x0000000B (11)	Communications Port (COM6)
	(ISA) 0x0000000C (12)	PS/2 Compatible Mouse
	(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) 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) 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
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	(PCI) 0x00000019 (25)	High Definition Audio Controller
	(PCI) 0x0000001B (27)	Intel(R) Serial IO I2C Host Controller - 5AAC
	(PCI) 0xFFFFFFF3 (-13)	Realtek PCIe GBE Family Controller #2
	(PCI) 0xFFFFFFF4 (-12)	Realtek PCIe GBE Family Controller
	(PCI) 0xFFFFFFF5 (-11)	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
	(PCI) 0xFFFFFFF6 (-10)	Intel(R) Trusted Execution Engine Interface
	(PCI) 0xFFFFFFF7 (-9)	Intel(R) HD Graphics
	(PCI) 0xFFFFFFF8 (-8)	Standard SATA AHCI Controller
	(PCI) 0xFFFFFFF9 (-7)	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD7
	(PCI) 0xFFFFFFFA (-6)	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD6
	(PCI) 0xFFFFFFFB (-5)	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5ADB
	(PCI) 0xFFFFFFFC (-4)	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5ADA
	(PCI) 0xFFFFFFFD (-3)	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD9
	(PCI) 0xFFFFFFE (-2)	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD8

Appendix B

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		
CN8, CN2	LVDS Port Inverter	JST	PHR-5	N/A	N/A
CN4, CN5	LVDS	HIROSE	DF13-30DS-1.25C	N/A	N/A
CN7	Audio	Molex	51021-1000	Audio Cable	1709100254
CN9, CN11	Speaker	Molex	51021-0200	N/A	N/A
CN12, CN13, CN14, CN15, CN16, CN19, CN20, CN21, CN25, CN26	COM	Molex	51021-0900	UART Wafer Cable	1701090150
JP6	Front Panel	Molex	51110-1050	N/A	N/A
CN24	DIO	Molex	51110-1050	N/A	N/A
CN28	RTC Battery	Molex	51021-0200	Battery Cable	175011901C
CN29 ~ CN36	USB	Molex	51021-0500	USB Wafer Cable	1700050207
CN27	SATA PWR	JST	PHR-2	2 Pins for SATA Power	1702150155
CN43	eDP (optional)	KEL	SSL20-30S	N/A	170430030W
CN17	LPC Port	JST	SHR-12V-S-B	AAEON LPC Cable	1703120130
CN1	External +12V Input	Molex	19211-0003	Power Cable	170204010R