GENE-APL5

3.5" Subcompact Board

User's Manual 5th Ed

Last Updated: February 10, 2025

Copyright Notice

Acknowledgements

Packing List

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

Item	Quantity
● GENE-APL5 MB	1
● Heatsink	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

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 QO4-381 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	×	O	O	O	O	O
Connector and Cable	×	O	O	O	O	O

The table is prepared in accordance with the provisions of SJ/T 11364.

O：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.

Table of Contents

Chapter 1

Product Specifications

1.1 Specifications

System	
Form Factor	3.5'' Subcompact Board
CPU	Intel® Atom™/ Celeron®/ Pentium® Processor: Pentium® N4200 (4C/4T, 1.10GHz, up to 2.50GHz) Celeron® N3350 (2C/2T, 1.10GHz, up to 2.40GHz) Atom® E3950 (4C/4T, 1.60GHz, up to 2.00GHz) Atom® E3940 (4C/4T, 1.60GHz, up to 1.80GHz) Atom® E3930 (2C/2T, 1.30GH, up to 1.80GHz)
CPU TDP	Pentium® N4200, Celeron® N3350: 6W Atom® E3950: 12W Atom® E3940 9.5W Atom® E3930 6.5W
Chipset	Integrated with Intel® SoC
Memory Type	DDR3L up to 1866MHz, SODIMM x 1
Max. Memory Capacity	8GB
BIOS	UEFI
Wake on LAN	Yes
Watchdog Timer	255 Levels
Security	TPM 2.0 (Optional)
RTC Battery	Lithium Battery 3V/240mAh

Power

Power Requirement	+12V (Optional: +9~19V)
Power Supply Type	AT/ATX
Connector	Phoenix 2-pin Connector
Power Consumption (Typical)	2.03A at +12V with Intel® E3950, DDR3L 1866MHz 8GB memory
Power Consumption (Max)	2.45A at +12V with Intel® E3950, DDR3L 1866MHz 8GB memory

Display

Controller	Intel® HD Graphics 500/505
LVDS/eDP	LVDS1 Dual Channel 18/24-bit x 1 LVDS2 Dual Channel 18/24-bit x 1 (Optional: HDMI 1.4b)
Display Interface	VGA x 1
Multiple Display	3 Simultaneous Displays

Audio

Codec	Realtek ALC897/892
Audio Interface	Line-in/Line-out/MIC
Speaker	—

External I/O

Ethernet	Intel® i210/I211, 10/100/1000Base-TX, RJ-45 x 2
USB	USB3.2 Gen 1 x 2
Serial Port	COM1 (RS232, supports RI)
Video	VGA x 1
Power Input	Phoenix 2-pin Connector

Internal I/O

USB	USB2.0 x 4
Serial Port	COM2, COM3 (RS232/422/485, supports 5V/12V/RI)
	COM4 (RS232, supports RI)
Video	LVDS1 Dual Channel 18/24-bit x 1
	LVDS2 Dual Channel 18/24-bit x 1 (Optional: HDMI 1.4b)
SATA	SATA III x 1
	+5V SATA Power Connector x 1
Audio	Audio Header x 1
DIO/GPIO	8-bit
SMBus/ I2C	I2C x 1
	SMBus x 1
Touch	4/5/8-wire Touch Controller x 1 (Optional)
Fan	DC Fan x 1 (Optional: Smart Fan)
SIM	Micro SIM x 1 (Optional)
Front Panel	HDD LED, PWR LED, Power Button, Buzzer, Reset
Others	Parallel Port(SPP/EPP/ECP) x 1 (optional, select by BIOS)

Expansion

Mini PCIe/ mSATA	mSATA x 1 (Full-Size)
	Mini Card x 1 (Half-Size)
M.2	—
BIO	—

Mechanical

Dimensions (L x W)	5.75" x 4" (146mm x 101.7mm)

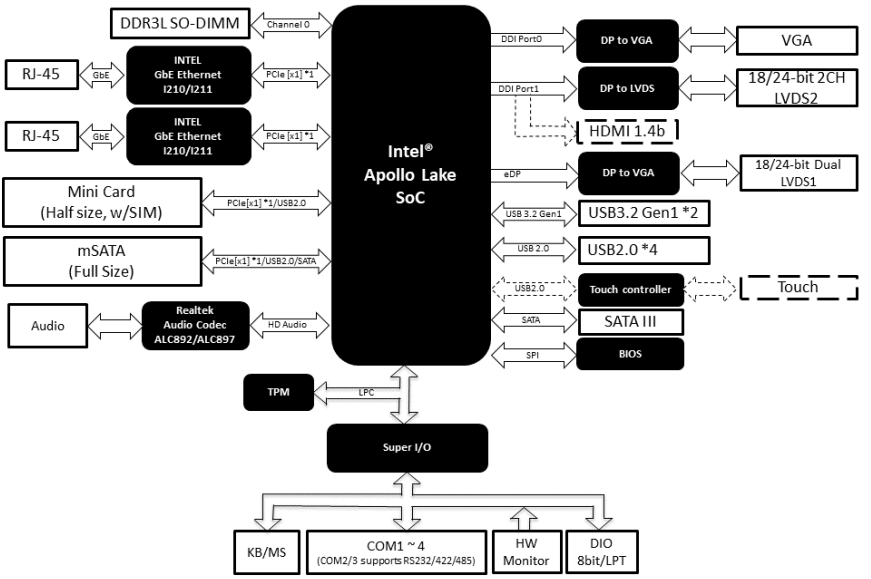
Environment

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 (Hours)	365,976

Certification

EMC	CE/ FCC Class A

1.2 Function Block Diagram

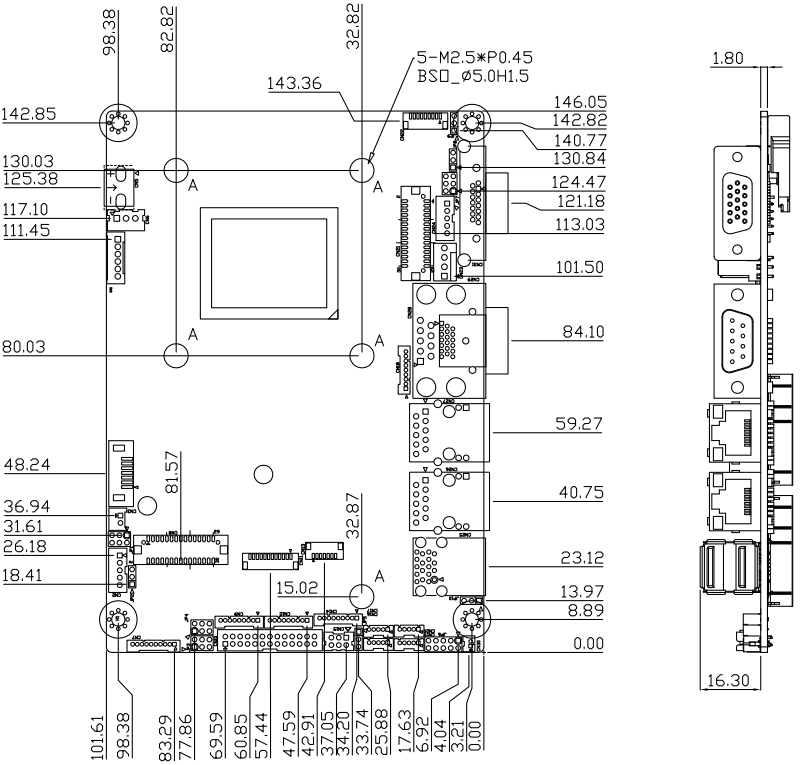


Chapter 2

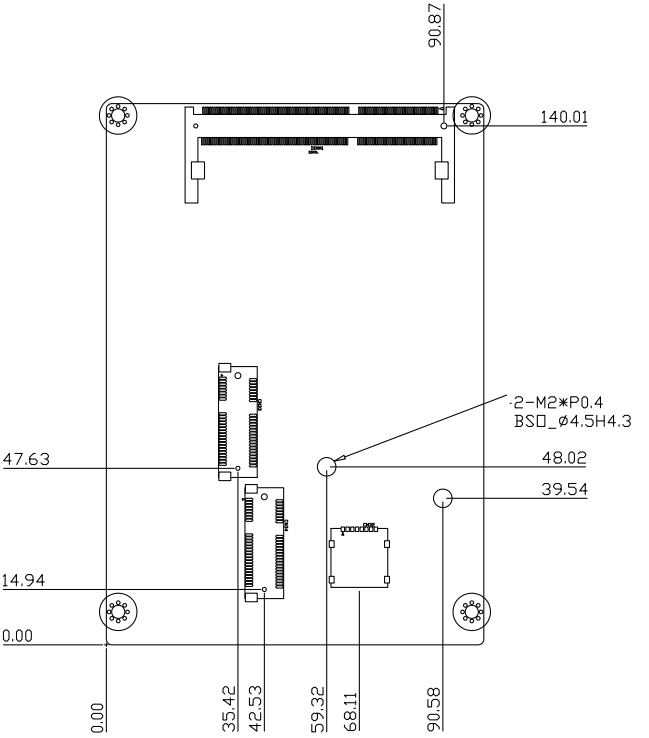
Hardware Information

2.1 Dimensions

Component Side



Solder Side


90.87
140.01
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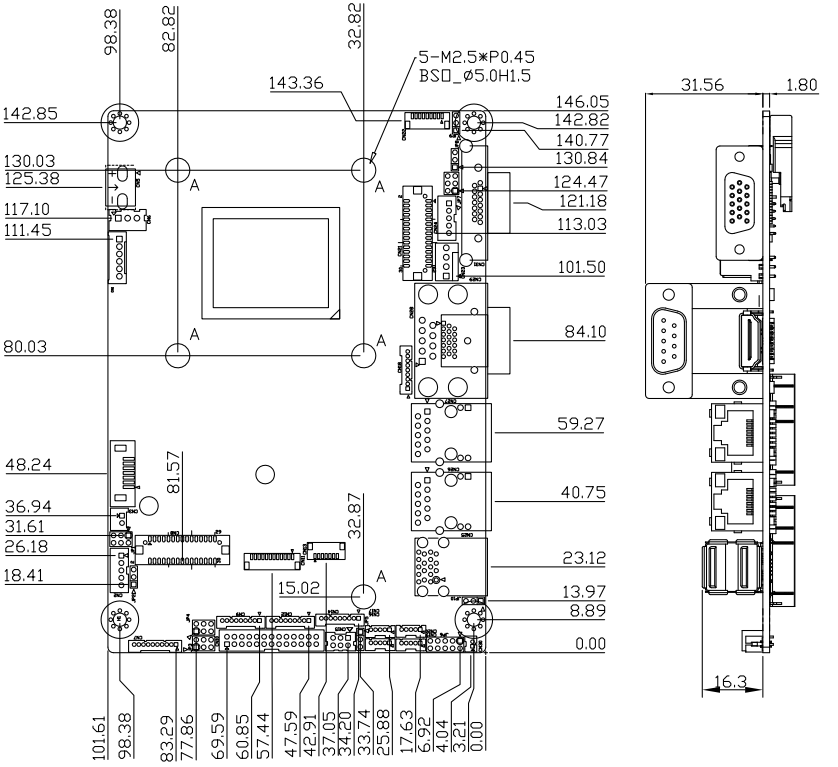
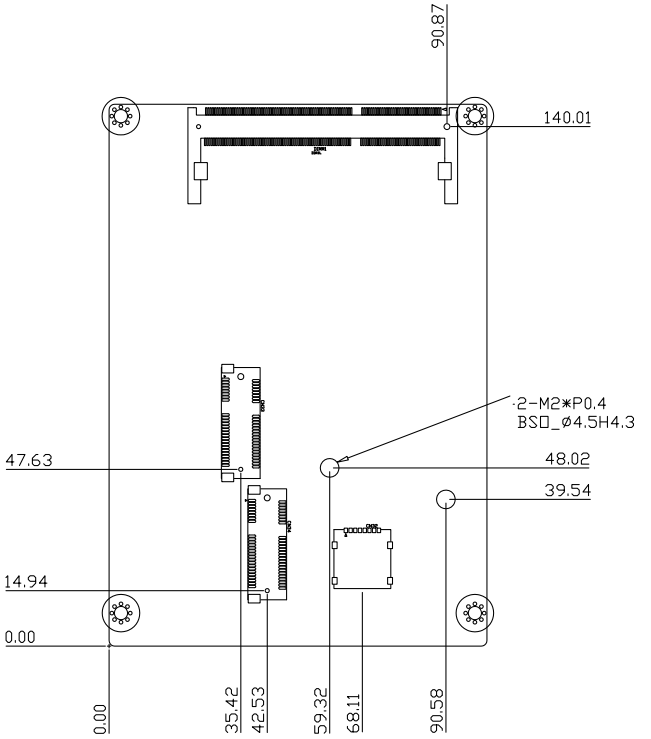
BS□_ø4.5H4.3
47.63
48.02
39.54
14.94
0.00
0.00
35.42
42.53
59.32
68.11
90.58

2.1.1 Dimensions (Optional HDMI SKU)

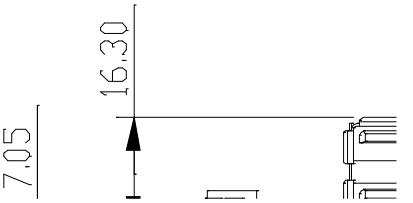
Component Side



Solder Side

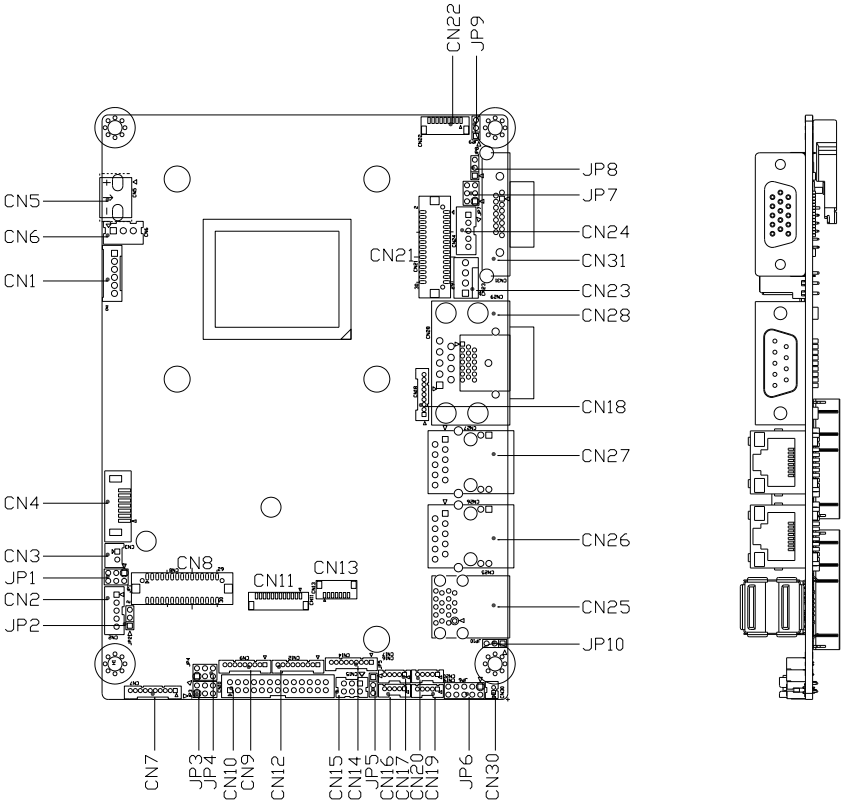

90.87
140.01
2-M2*P0.4
BS□_ø4.5H4.3
47.63
48.02
39.54
14.94
0.00
0.00
35.42
42.53
59.32
68.11
90.58

With Heatsink

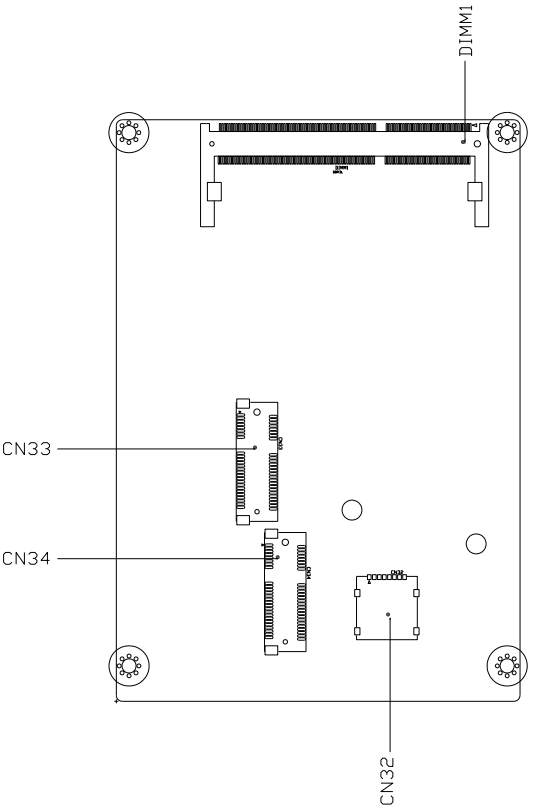


2.2 Jumpers and Connectors

Component Side

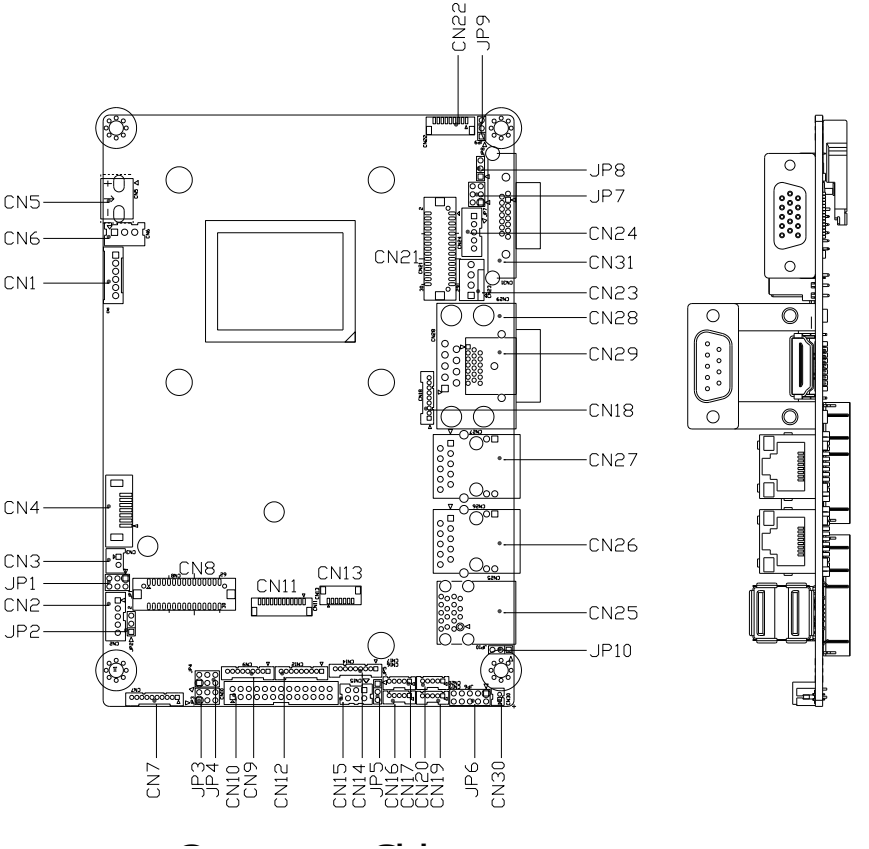


Solder Side

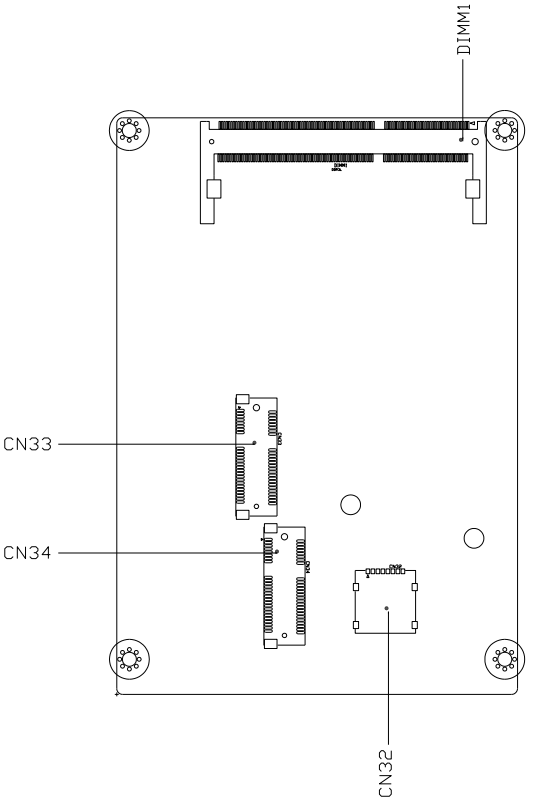


2.2.1 Jumpers and Connectors (Optional HDMI SKU)

Component Side



Solder Side

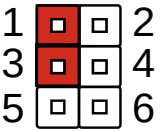


2.3 List of Jumpers

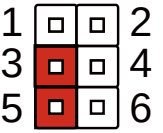
Please refer to the table below for all of the board's jumpers that you can configure for your application

Label	Function.
JP1	LVDS Port1 Backlight Inverter VCC Selection and Operating VDD Selection
JP2	LVDS Port1 Backlight Lightness Control Mode Selection
JP3	COM2 Pin8 Function Selection
JP4	COM3 Pin8 Function Selection
JP5	Auto Power Button Enable/Disable Selection
JP6	Front Panel Connector
JP7	LVDS Port2 Backlight Inverter VCC Selection and Operating VDD Selection
JP8	LVDS Port2 Backlight Lightness Control Mode Selection
JP9	Touch Screen 4/5/8-wire Mode Selection
JP10	Clear CMOS Jumper

2.3.1 LVDS Port 1 Backlight Inverter VCC Selection (JP1)

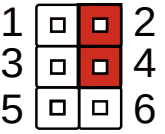


+12V

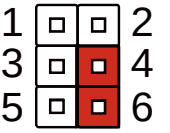


+5V (**Default**)

2.3.2 LVDS Port 1 Operating VDD Selection (JP1)



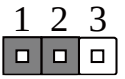
+3.3V (**Default**)



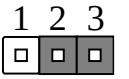
+5V

Note: To prevent damage to the system or unwanted operation, do not use any other configuration for JP1 than what is shown in Ch2.4.1 and Ch2.4.2.

2.3.3 LVDS Port 1 Backlight Lightness Control Mode Selection (JP2)

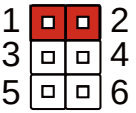


VR Mode (**Default**)

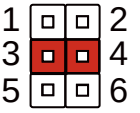


PWM Mode

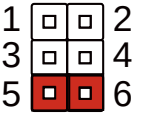
2.3.4 COM2 Pin8 Function Selection (JP3)



+12V

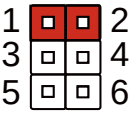


Ring (**Default**)

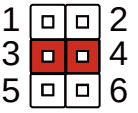


+5V

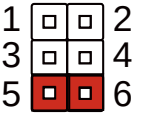
2.3.5 COM3 Pin8 Function Selection (JP4)



+12V

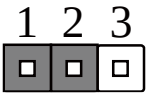


Ring (**Default**)

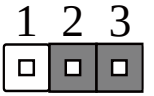


+5V

2.3.6 Auto Power Button Enable/Disable Selection (JP5)



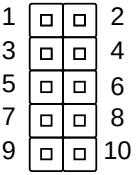
Disable/ ATX Mode



Enable/ AT Mode (**Default**)

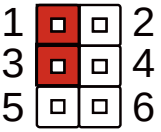
Note: When disabled, the power button of JP6 (pins 1-2) must be used to power on the system.

2.3.7 Front Panel Connector (JP6)

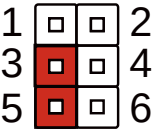


Pin	Pin Name	Pin	Pin Name
1	PWR_BTN-	2	PWR_BTN+
3	HDD_LED-	4	HDD_LED+
5	SPEAKER-	6	SPEAKER+
7	PWR_LED-	8	PWR_LED+
9	H/W RESET-	10	H/W RESET+

2.3.8 LVDS Port 2 Backlight Inverter VCC Selection (JP7)

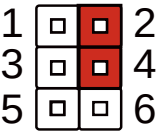


+12V

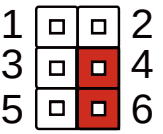


+5V (Default)

2.3.9 LVDS Port 2 Operating VDD Selection (JP7)



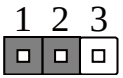
+3.3V (**Default**)



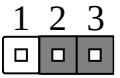
+5V

Note: To prevent damage to the system or unwanted operation, do not use any other configuration for JP1 than what is shown in Ch2.4.1 and Ch2.4.2.

2.3.10 LVDS Port 2 Backlight Lightness Control Mode Selection (JP8)

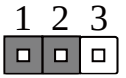


VR Mode (**Default**)

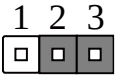


PWM Mode

2.3.11 Touch Screen 4, 5, 8 Wire Selection (JP9)

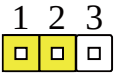


4/8-Wire Mode (**Default**)

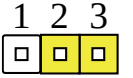


5-Wire Mode

2.3.12 Clear CMOS Jumper (JP10)



Normal (**Default**)



Clear CMOS

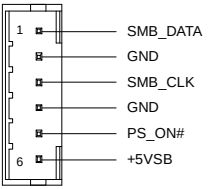
2.4 List of Connectors

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

Label	Function
CN1	+5VSB Output w/SMBus
CN2	LVDS Port1 Inverter / Backlight Connector
CN3	+5V Output for SATA HDD
CN4	SATA Port
CN5	External Power Input
CN6	External +5VSB Input (Optional)
CN7	Audio I/O Port
CN8	LVDS Port1
CN9	COM Port 2
CN10	LPT Port or Digital I/O Port
CN11	LPC Port
CN12	COM Port 3
CN13	SPI Debug Port
CN14	COM Port 4
CN15	PS/2 Keyboard/Mouse Combo Port
CN16	USB 2.0 Port 2
CN17	USB 2.0 Port 3
CN18	COM Port 1 (Wafer, Optional)
CN19	USB 2.0 Port 4
CN20	USB 2.0 Port 5
CN21	LVDS Port2
CN22	Touch Screen Connector (Optional)
CN23	CPU FAN (Optional)

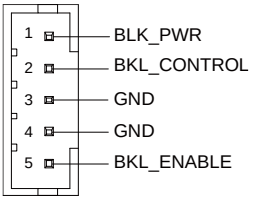
Label	Function
CN24	LVDS Port2 Inverter / Backlight Connector
CN25	USB Ports 0 and 1
CN26	LAN (RJ-45) Port2
CN27	LAN (RJ-45) Port1
CN28	COM Port 1 (D-SUB 9)
CN29	HDMI Port (Optional)
CN30	Battery
CN31	VGA Port
CN32	Micro SIM Card Socket
CN33	Mini-Card Slot (Half-Size)
CN34	mSATA Slot (Full-Size)
DIMM1	DDR3L SO-DIMM Slot

2.4.1 +5VSB Output w/SMBus (CN1)



Pin	Pin Name	Signal Type	Signal Level
1	SMB_DATA	I/O	+3.3V
2	GND	GND	
3	SMB_CLK	I/O	+3.3V
4	GND	GND	
5	PS_ON#	OUT	+5V
6	+5VSB	PWR	+5V

2.4.2 LVDS Port 1 Inverter / Backlight Connector (CN2)

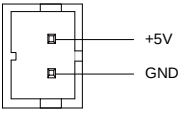


Pin	Pin Name	Signal Type	Signal Level
1	BKL_PWR	PWR	+5V / +12V
2	BKL_CONTROL	OUT	
3	GND	GND	
4	GND	GND	
5	BKL_ENABLE	OUT	+5V

Note 1: LVDS BKL_PWR can be set to +5V or +12V by JP1. Max current is 2A.

Note 2: LVDS BKL_CONTROL can be set by JP2

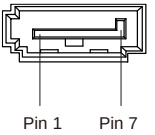
2.4.3 +5V Output for SATA HDD (CN3)



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

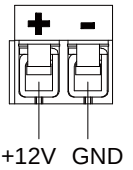
Note: Pin 1 max current is 2A

2.4.4 SATA Port (CN4)



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	

2.4.5 External Power Input (CN5)

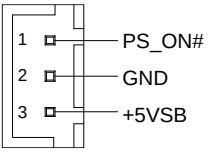


Pin	Pin Name	Signal Type	Signal Level
1	+VIN	PWR	9V~19V or 12V
2	GND	GND	

Note 1: There are two types of power input, 9V~19V or 12V only, by BOM Change.

Note 2: Pin 1 +VIN max current is 8A

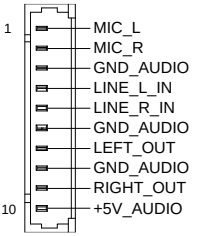
2.4.6 External +5VSB Input (CN6) (Optional)



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

Caution: When using CN6 power connector, ensure the ATX power supply is fully discharged when powering off, or before restarting the system. Discharge time depends on the power supply and can be 3 to 5 seconds or more.

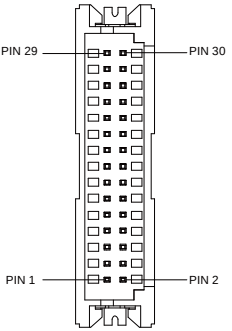
2.4.7 Audio I/O Port (CN7)



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

Pin	Pin Name	Signal Type	Signal Level
4	LINE_L_IN	IN	
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

2.4.8 LVDS Port 1 (CN8)

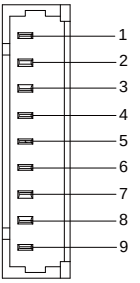


Note 1: LVDS LCD_PWR can be set to +3.3V or +5V by JP1. Max current is 2A.

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	

Pin	Pin Name	Signal Type	Signal Level
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	
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	

2.4.9 COM Port 2 (CN9)



Note 1: Pin 8 mode (Ring/+5V/+12V) can be set by JP3. Max current in power supply mode is 0.5A

Note 2: COM2 RS-232/422/485 can be set by BIOS setting. Default is RS-232.

RS-232 Mode

Pin	Pin Name	Signal Type	Signal Level
1	DCD2	IN	
2	DSR2	IN	
3	RX2	IN	
4	RTS2	OUT	±5V
5	TX2	OUT	±5V
6	CTS2	IN	
7	DTR2	OUT	±5V
8	RI2/+5V/+12V	IN	+5V/+12V
9	GND	GND	

RS-485 Mode

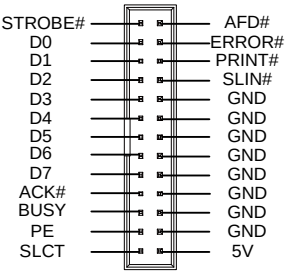
Pin	Pin Name	Signal Type	Signal Level
1	RS485_ D2-	I/O	±5V
2	NC		
3	RS485_D2+	I/O	±5V
4	NC		
5	NC		
6	NC		
7	NC		
8	NC/+5V/+12V	PWR	+5V/+12V
9	GND	GND	

RS-422 Mode

Pin	Pin Name	Signal Type	Signal Level
1	RS422_TX2-	OUT	±5V
2	NC		
3	RS422_TX2+	OUT	±5V
4	NC		
5	RS422_RX2+	IN	
6	NC		
7	RS422_RX2-	IN	
8	NC/+5V/+12V	PWR	+5V/+12V
9	GND	GND	

2.4.10 LPT Port or Digital I/O Port (CN10)

LPT Port Definitions



Note 1: LPT or Digital I/O function can be set by BIOS. Default is Digital I/O.

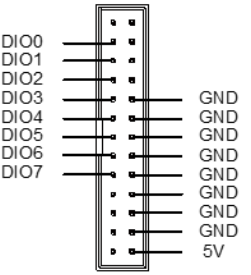
Note 2: +5V input max current 0.5A

LPT Mode

Pin	Pin Name	Signal Type	Signal Level
1	STROBE#	IN	
2	AFD#	I/O	
3	PD0	I/O	
4	ERROR#	IN	
5	PD1	I/O	
6	PRINT#	I/O	
7	PD2	I/O	
8	SLIN#	I/O	
9	PD3	I/O	
10	GND	GND	
11	PD4	I/O	
12	GND	GND	
13	PD5	I/O	

Pin	Pin Name	Signal Type	Signal Level
14	GND	GND	
15	PD6	I/O	
16	GND	GND	
17	PD7	I/O	
18	GND	GND	
19	ACK#	IN	
20	GND	GND	
21	BUSY	IN	
22	GND	GND	
23	PE	IN	
24	GND	GND	
25	SLCT	IN	
26	5V	PWR	+5V

Digital I/O Mode

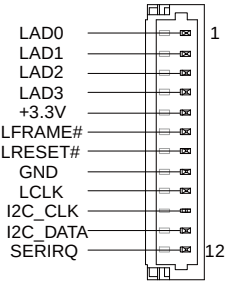


Note: +5V input max current 0.5A

Pin	Pin Name	Signal Type	Signal Level
1	NC		
2	NC		

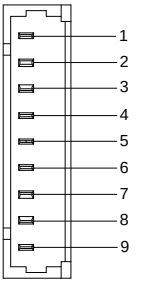
Pin	Pin Name	Signal Type	Signal Level
3	DIO0	I/O	+5V
4	NC		
5	DIO1	I/O	+5V
6	NC		
7	DIO2	I/O	+5V
8	NC		
9	DIO3	I/O	+5V
10	GND	GND	
11	DIO4	I/O	+5V
12	GND	GND	
13	DIO5	I/O	+5V
14	GND	GND	
15	DIO6	I/O	+5V
16	GND	GND	
17	DIO7	I/O	+5V
18	GND	GND	
19	NC		
20	GND	GND	
21	NC		
22	GND	GND	
23	NC		
24	GND	GND	
25	NC		
26	5V	PWR	+5V

2.4.11 LPC Port (CN11)



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_CLK	OUT	+3.3V
11	I2C_DATA	I/O	+3.3V
12	SERIRQ	I/O	+3.3V

2.4.12 COM Port 3 (CN12)



Note 1: Pin 8 mode (Ring/+5V/+12V) can be set by JP4. Max current in power supply mode is 0.5A

Note 2: COM2 RS-232/422/485 can be set by BIOS setting. Default is RS-232.

RS-232 Mode

Pin	Pin Name	Signal Type	Signal Level
1	DCD3	IN	
2	DSR3	IN	
3	RX3	IN	
4	RTS3	OUT	±5V
5	TX3	OUT	±5V
6	CTS3	IN	
7	DTR3	OUT	±5V
8	RI3/+5V/+12V	IN	+5V/+12V
9	GND	GND	

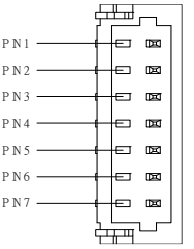
RS-485 Mode

Pin	Pin Name	Signal Type	Signal Level
1	RS485_ D3-	I/O	±5V
2	NC		
3	RS485_D3+	I/O	±5V
4	NC		
5	NC		
6	NC		
7	NC		
8	NC/+5V/+12V	PWR	+5V/+12V
9	GND	GND	

RS-422 Mode

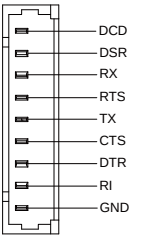
Pin	Pin Name	Signal Type	Signal Level
1	RS422_TX3-	OUT	±5V
2	NC		
3	RS422_TX3+	OUT	±5V
4	NC		
5	RS422_RX3+	IN	
6	NC		
7	RS422_RX3-	IN	
8	NC/+5V/+12V	PWR	+5V/+12V
9	GND	GND	

2.4.13 BIOS Debug Port (CN13)



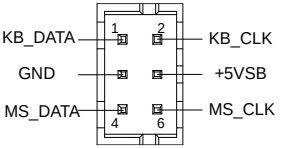
Pin	Pin Name	Signal Type	Signal Level
1	SPI_MISO	OUT	
2	GND	GND	
3	SPI_CLK	IN	
4	+3.3VSB	PWR	+3.3V
5	SPI_MOSI	IN	
6	SPI_CS	IN	
7	NC		

2.4.14 COM Port 4 (CN14)



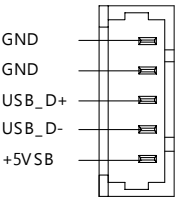
Pin	Pin Name	Signal Type	Signal Level
1	DCD4	IN	
2	DSR4	IN	
3	RX4	IN	
4	RTS4	OUT	±9V
5	TX4	OUT	±9V
6	CTS4	IN	
7	DTR4	OUT	±9V
8	RI4	IN	
9	GND	GND	

2.4.15 PS/2 Keyboard/Mouse Combo Port (CN15)



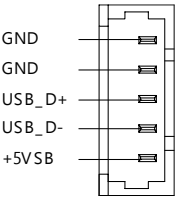
Pin	Pin Name	Signal Type	Signal Level
1	KB_ DATA	I/O	+5V
2	KB_CLK	I/O	+5V
3	GND	GND	
4	+5VSB	PWR	+5V
5	MS_DATA	I/O	+5V
6	MS_CLK	I/O	+5V

2.4.16 USB 2.0 Port 2 (CN16)



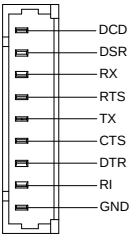
Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USB_D-	DIFF	
3	USB_D+	DIFF	
4	GND	GND	
5	GND	GND	

2.4.17 USB 2.0 Port 3 (CN17)



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	

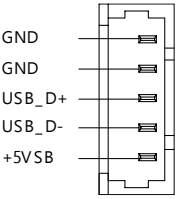
2.4.18 COM Port 1 (CN18) (Wafer, Optional)



Pin	Pin Name	Signal Type	Signal Level
1	DCD1	IN	
2	DSR1	IN	
3	RX1	IN	
4	RTS1	OUT	±9V

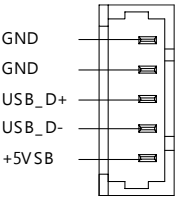
Pin	Pin Name	Signal Type	Signal Level
5	TX1	OUT	±9V
6	CTS1	IN	
7	DTR1	OUT	±9V
8	RI1	IN	
9	GND	GND	

2.4.19 USB 2.0 Port 4 (CN19)



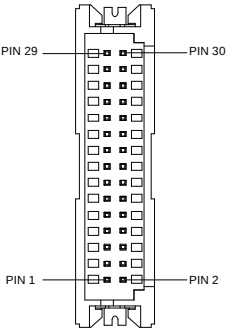
Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USB_D-	DIFF	
3	USB_D+	DIFF	
4	GND	GND	
5	GND	GND	

2.4.20 USB 2.0 Port 5 (CN20)



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	

2.4.21 LVDS Port 2 (CN21)



Note: LVDS2 LCD_PWR can be set to +3.3V or +5V by JP7. Max current is 2A

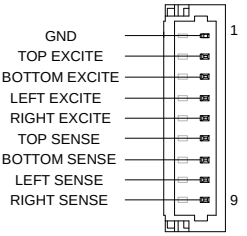
Pin	Pin Name	Signal Type	Signal Level
1	BKL_ENABLE	OUT	
2	BKL_CONTROL	OUT	

Pin	Pin Name	Signal Type	Signal Level
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	
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	

Pin	Pin Name	Signal Type	Signal Level
29	LVDS_B_CLK-	DIFF	
30	LVDS_B_CLK+	DIFF	

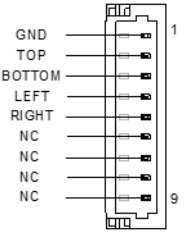
2.4.22 Touchscreen Connector (CN22)

8-Wire Mode



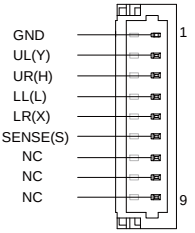
Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	TOP EXCITE	IN	
3	BOTTOM EXCITE	IN	
4	LEFT EXCITE	IN	
5	RIGHT EXCITE	IN	
6	TOP SENSE	IN	
7	BOTTOM SENSE	IN	
8	LEFT SENSE	IN	
9	RIGHT SENSE	IN	

4-Wire Mode



Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	TOP	IN	
3	BOTTOM	IN	
4	LEFT	IN	
5	RIGHT	IN	
6	NC		
7	NC		
8	NC		
9	NC		

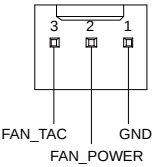
5-Wire Mode



Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	UL(Y)	IN	

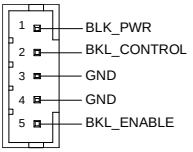
Pin	Pin Name	Signal Type	Signal Level
3	UR(H)	IN	
4	LL(L)	IN	
5	LR(X)	IN	
6	SENSE(S)	IN	
7	NC		
8	NC		
9	NC		

2.4.23 CPU Fan (CN23, Optional)



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

2.4.24 LVDS Port 2 Inverter / Backlight Connector (CN24)

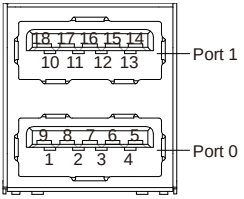


Pin	Pin Name	Signal Type	Signal Level
1	BKL_PWR	PWR	+5V / +12V
2	BKL_CONTROL	OUT	
3	GND	GND	
4	GND	GND	
5	BKL_ENABLE	OUT	+5V

Note 1: LVDS2 BKL_PWR can be set to +5V or +12V by JP7

Note 2: LVDS2 BKL_CONTROL can be set by JP8

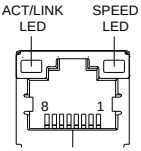
2.4.25 USB 3.0 Ports 0 and 1 (CN25)



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

Pin	Pin Name	Signal Type	Signal Level
5	USB_SSRX–	DIFF	
6	USB_SSRX+	DIFF	
7	GND	GND	
8	USB_SSTX–	DIFF	
9	USB_SSTX+	DIFF	
10	+5VSB	PWR	+5V
11	USB_D-	DIFF	
12	USB_D+	DIFF	
13	GND	GND	
14	USB_SSRX–	DIFF	
15	USB_SSRX+	DIFF	
16	GND	GND	
17	USB_SSTX–	DIFF	
18	USB_SSTX+	DIFF	

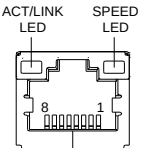
2.4.26 LAN (RJ-45) Port 2 (CN26)



Pin	Pin Name	Signal Type	Signal Level
1	MDI0+	DIFF	
2	MDI0-	DIFF	
3	MDI1+	DIFF	
4	MDI2+	DIFF	

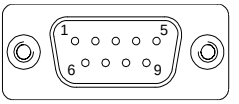
Pin	Pin Name	Signal Type	Signal Level
5	MDI2-	DIFF	
6	MDI1-	DIFF	
7	MDI3+	DIFF	
8	MDI3-	DIFF	

2.4.27 LAN (RJ-45) Port 1 (CN27)



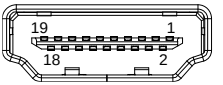
Pin	Pin Name	Signal Type	Signal Level
1	MDI0+	DIFF	
2	MDI0-	DIFF	
3	MDI1+	DIFF	
4	MDI2+	DIFF	
5	MDI2-	DIFF	
6	MDI1-	DIFF	
7	MDI3+	DIFF	
8	MDI3-	DIFF	

2.4.28 COM Port 1 (CN28, D-SUB 9)



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	IN	

2.4.29 HDMI Port (CN29, Optional)



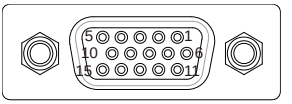
Pin	Pin Name	Signal Type	Signal Level
1	TMDS_DAT2+	DIFF	
2	GND	GND	
3	TMDS_DAT2-	DIFF	
4	TMDS_DAT1+	DIFF	
5	GND	GND	

Pin	Pin Name	Signal Type	Signal Level
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	

2.4.30 Battery (CN30)

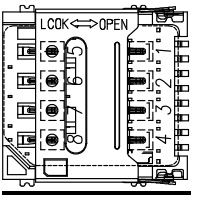
Pin	Pin Name	Signal Type	Signal Level
1	+3.3V	PWR	3.3V
2	GND	GND	

2.4.31 VGA Port (CN31)



Pin	Pin Name	Signal Type	Signal Level
1	RED	OUT	
2	GREEN	OUT	
3	BLUE	OUT	
4	NC		
5	GND	GND	
6	RED_GND_RTN	GND	
7	GREEN_GND_RTN	GND	
8	BLUE_GND_RTN	GND	
9	+5V	PWR	+5V
10	NC		
11	NC		
12	DDC_DATA	I/O	+5V
13	HSYNC	OUT	
14	VSYNC	OUT	
15	DDC_CLK	I/O	+5V

2.4.32 Micro SIM Card Socket (CN32)



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

2.4.33 Mini-Card Slot (Half-Mini) (CN33)

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	

Pin	Pin Name	Signal Type	Signal Level
8	UIM_PWR	PWR	
9	GND	GND	
10	UIM_DATA	I/O	
11	PCIE_REF_CLK-	DIFF	
12	UIM_CLK	IN	
13	PCIE_REF_CLK+	DIFF	
14	UIM_RST	IN	
15	GND	GND	
16	UIM_VPP	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	
32	SMB_DATA	I/O	+3.3V
33	PCIE_TX+	DIFF	

Pin	Pin Name	Signal Type	Signal Level
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

2.4.34 mSATA (Full-Size) (CN34)

Note: CN34 can be changed to Mini Card by BOM change.

Pin	Pin Name	Signal Type	Signal Level
1	NC	IN	
2	+3.3V	PWR	+3.3V

Pin	Pin Name	Signal Type	Signal Level
3	NC		
4	GND	GND	
5	NC		
6	+1.5V	PWR	+1.5V
7	NC		
8	NC		
9	GND	GND	
10	NC		
11	NC		
12	NC		
13	NC		
14	NC		
15	GND	GND	
16	NC		
17	NC		
18	GND	GND	
19	NC		GND
20	NC		
21	GND	GND	
22	NC	OUT	
23	SATA_RX+	DIFF	
24	+3.3V	PWR	+3.3V
25	SATA_RX-	DIFF	
26	GND	GND	
27	GND	GND	
28	+1.5V	PWR	+1.5V

Pin	Pin Name	Signal Type	Signal Level
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	
36	NC		
37	GND	GND	
38	NC		
39	+3.3V	PWR	+3.3V
40	GND	GND	
41	+3.3V	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	+3.3V	PWR	+3.3V

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 module will output a few short beeps or display an error message. The module can usually continue the boot up sequence with non-fatal errors.

The system configuration verification routines check the current system configuration against the values stored in the CMOS memory and BIOS NVRAM. If a system configuration is not found or an error is detected, the module will load the default configuration and reboot automatically.

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

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

The system CMOS memory has an integral lithium battery backup for data retention. However, you will need to replace the battery unit when it 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 – Date and time can be set here. Press <Tab> to switch between date elements

Advanced – Access advanced hardware settings and options

Chipset – Chipset Host Bridge settings and options

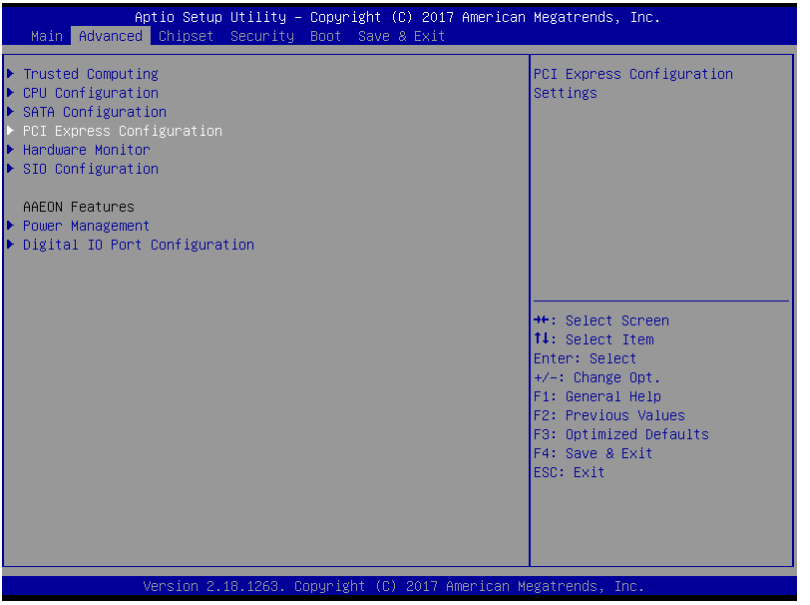
Security – Set setup administrator password.

Boot – Boot options including BBS priority and Quiet Boot

Save & Exit –Save your changes and exit the program

3.3 Setup Submenu: Main

3.4 Setup Submenu: Advanced

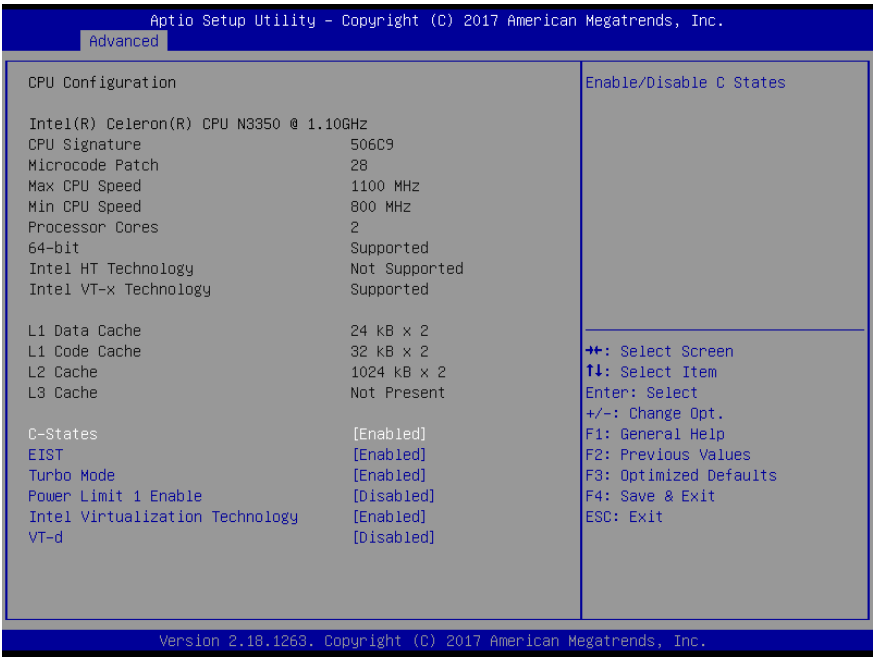


3.4.1 Trusted Computing

Options Summary		
Security Device Support	Disable	
	Enable	Optimal Default, Failsafe Default
Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.		
SHA-1 PCR Bank	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 Version	TCG_1_2	
	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 Version	1.2	
	1.3	Optimal Default, Failsafe Default
Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.		

3.4.2 CPU Configuration

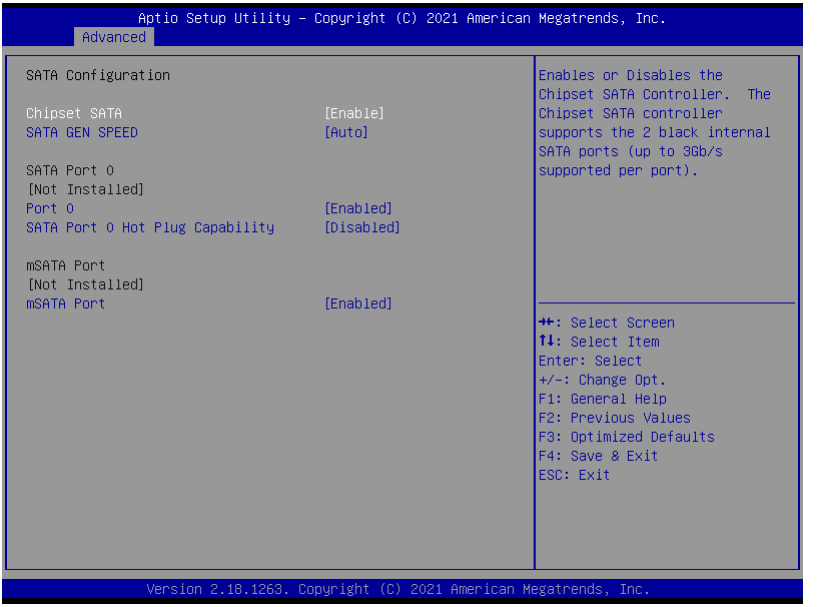


Options Summary		
C-States	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable C States.		
EIST™	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable Intel SpeedStep.		
Turbo Mode	Disabled	
	Enabled	Optimal Default, Failsafe Default
Turbo Mode		
Power Limit 1 Enable	Disabled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

Table Continues on Next Page…

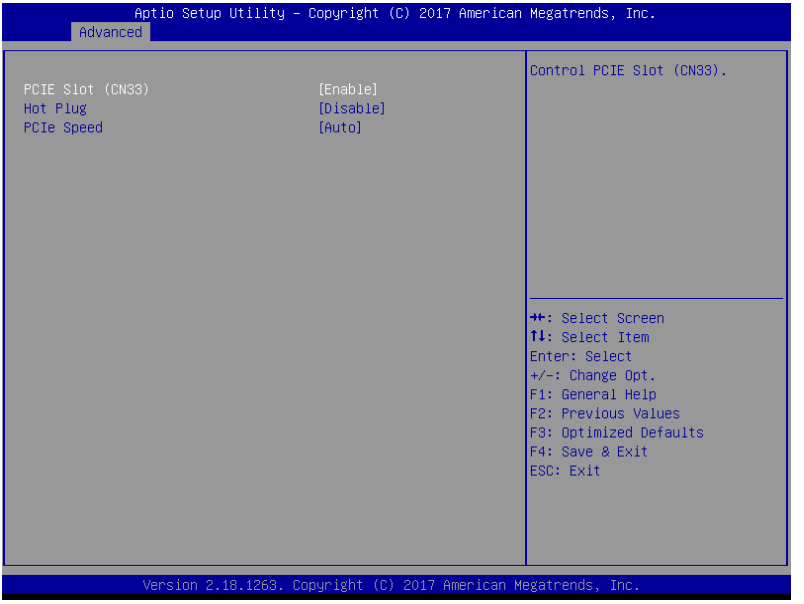
Options Summary		
Intel Virtualization Technology	Disabled	
	Enabled	Optimal Default, Failsafe Default
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.		
VT-d	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disable CPU VT-d		

3.4.3 SATA Configuration



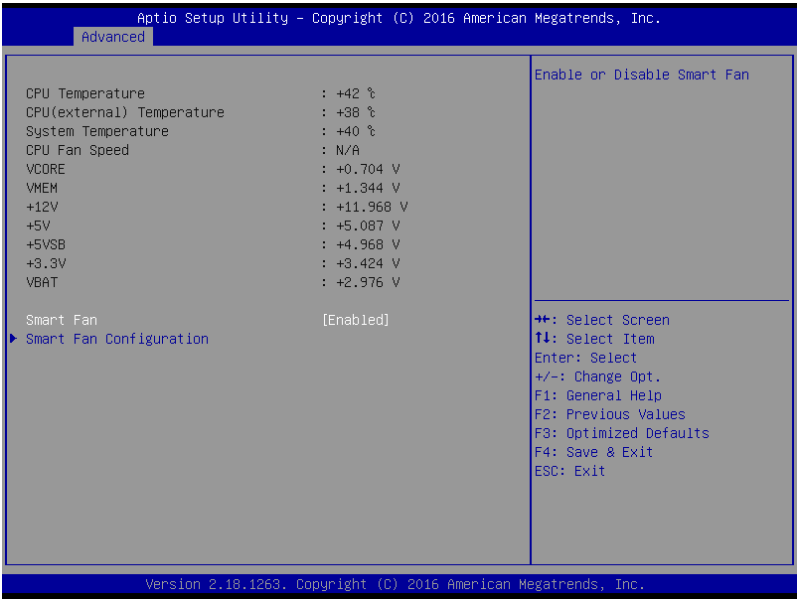
Options Summary		
Chipset SATA	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enables or Disables the Chipset SATA Controller. The Chipset SATA controller supports the 2 black internal SATA ports (up to 3Gb/s supported per port).		
SATA GEN SPEED	Auto	Optimal Default, Failsafe Default
	GEN1	
	GEN2	
	GEN3	
SATA Gen Speed Selection		
Port 0/ mSATA	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enables or Disables SATA Port		
SATA Port 0 Hot Plug Capability	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enables or Disables SATA hot plug.		

3.4.3.1 PCI Express Configuration



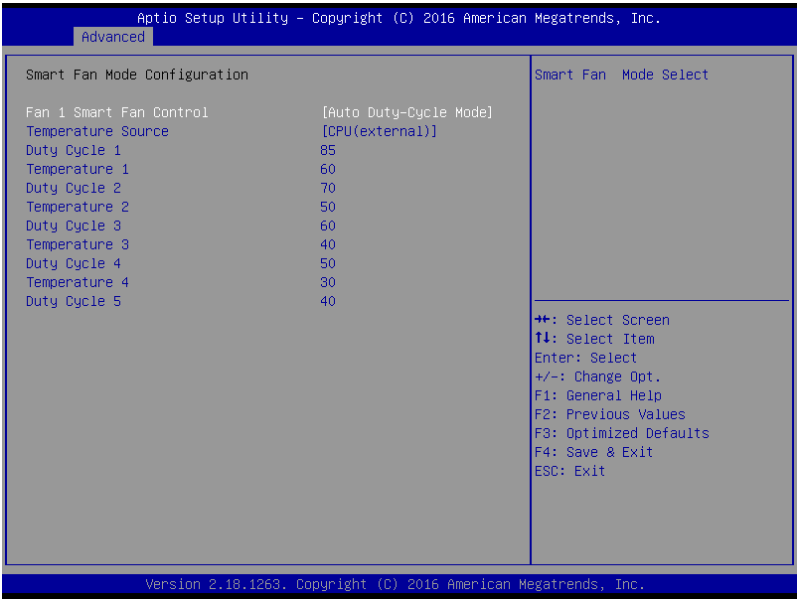
Options Summary		
PCIE Slot (CN33)	Disabled	
	Enabled	Optimal Default, Failsafe Default
Control PCIE Slot (CN33)		
Hot Plug	Disabled	Optimal Default, Failsafe Default
	Enabled	
PCIE Express Hot Plug Enable/Disable		
PCIe Speed	Auto	Optimal Default, Failsafe Default
	Gen 1	
	Gen 2	
Configure PCIe Speed		

3.4.4 Hardware Monitor



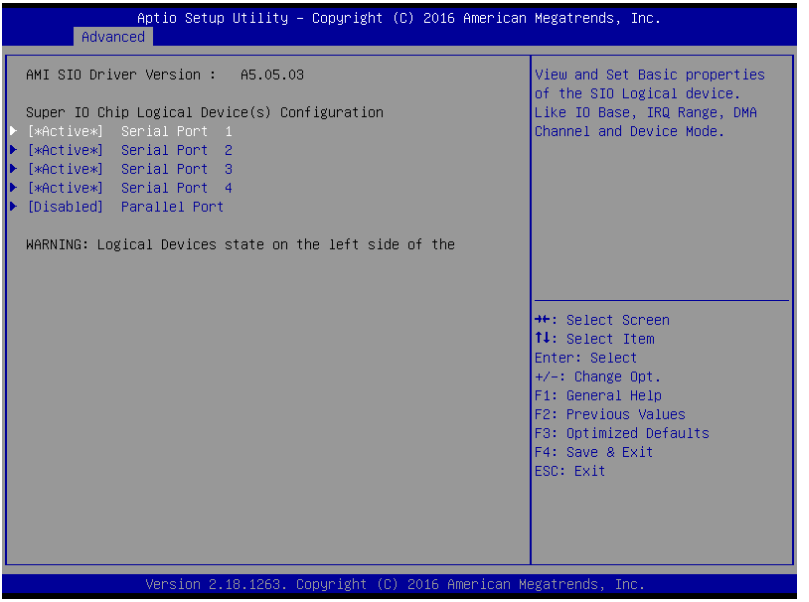
Options Summary		
Smart Fan	Disable	
	Enable	Optimal Default, Failsafe Default
Enables or Disables Smart Fan.		

3.4.4.1 Smart Fan Configuration

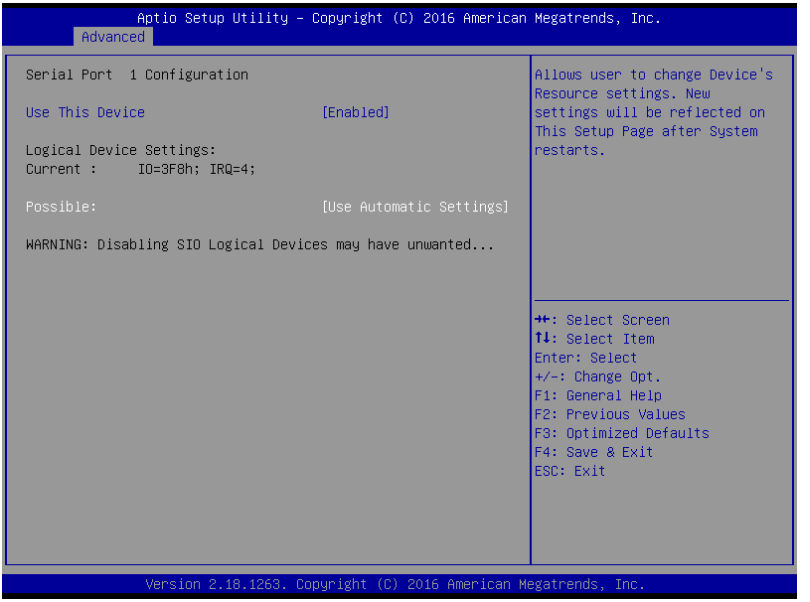


Options Summary		
Fan 1 Smart Fan Control	Manual Duty Mode	
	Auto Duty-Cycle Mode	Optimal Default, Failsafe Default
Smart Fan Mode Select		
Temperature Source	CPU (external)	Optimal Default, Failsafe Default
	System	
Select the monitored temperature source for this fan.		
Duty Cycle 1	85	
Temperature 1	60	
Auto fan speed control. Fan speed will follow different temperature by different duty cycle 1-100		

3.4.5 SIO Configuration

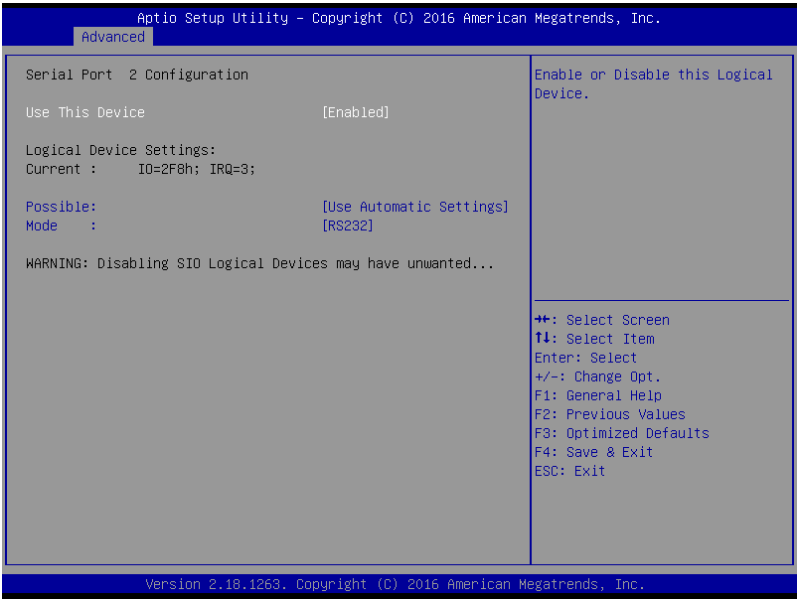


3.4.5.1 Serial Port 1 Configuration



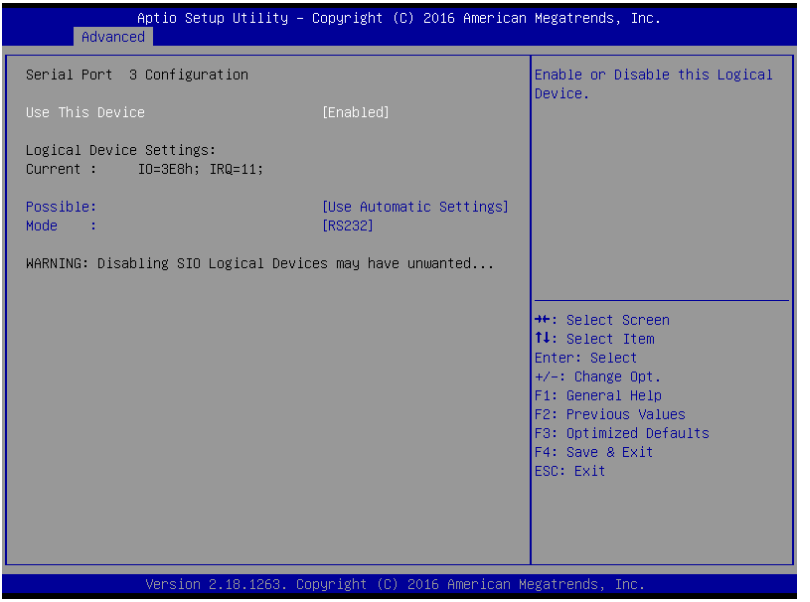
Options Summary		
Use This Device	Disable	
	Enable	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=3F8h; IRQ=4	
	IO=2F8h; IRQ=3	
Allows user to change Device's Resource settings. New settings will be reflected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

3.4.5.2 Serial Port 2 Configuration



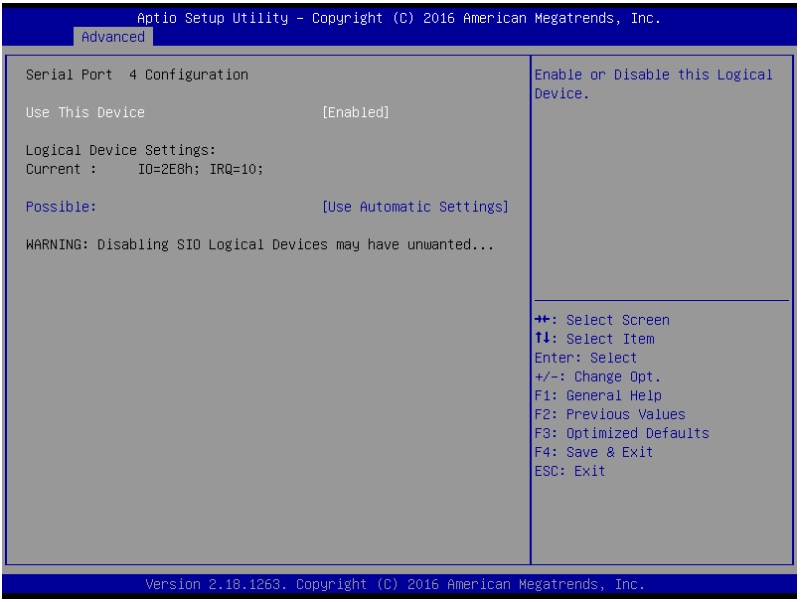
Options Summary		
Use This Device	Disable	
	Enable	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2F8h; IRQ=3	
	IO=3F8h; IRQ=4	
Allows user to change Device's Resource settings. New settings will be reflected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

3.4.5.3 Serial Port 3 Configuration



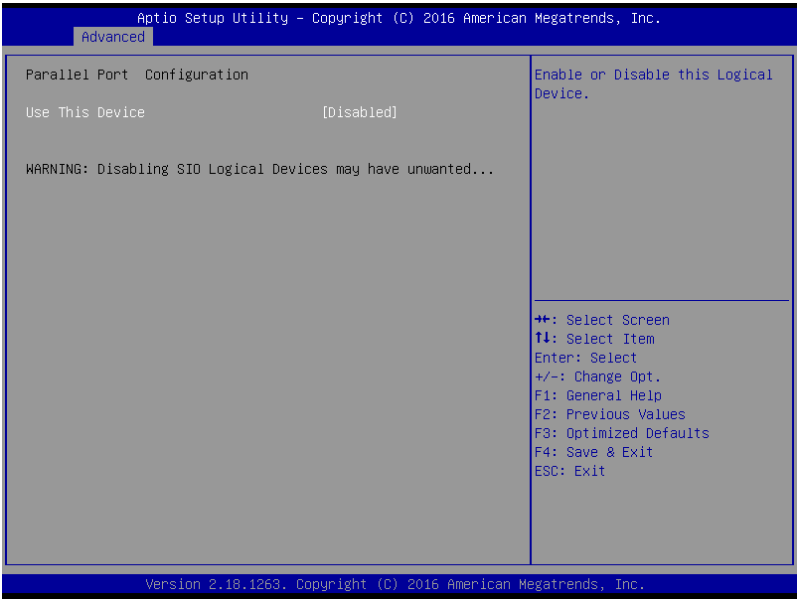
Options Summary		
Use This Device	Disable	
	Enable	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=3E8h; IRQ=11	
	IO=2E8h; IRQ=11	
Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts.		
Mode:	RS232	Optimal Default, Failsafe Default
	RS422	
	RS485	
UART RS232, 422, 485 selection.		

3.4.5.4 Serial Port 4 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=2E8h; IRQ=10	
	IO=3E8h; IRQ=10	
Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts.		

3.4.5.5 Parallel Port Configuration

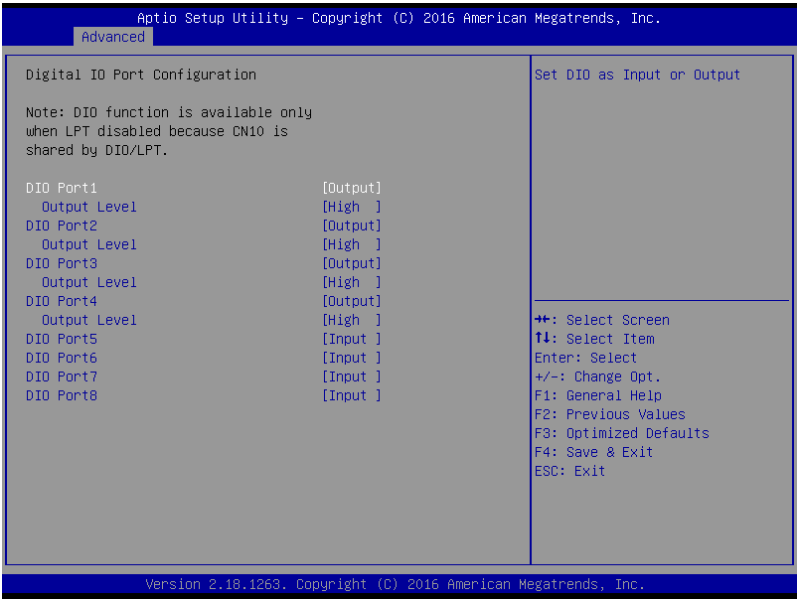


Options Summary		
Use This Device	Disable	
	Enable	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		

3.4.6 Power Management

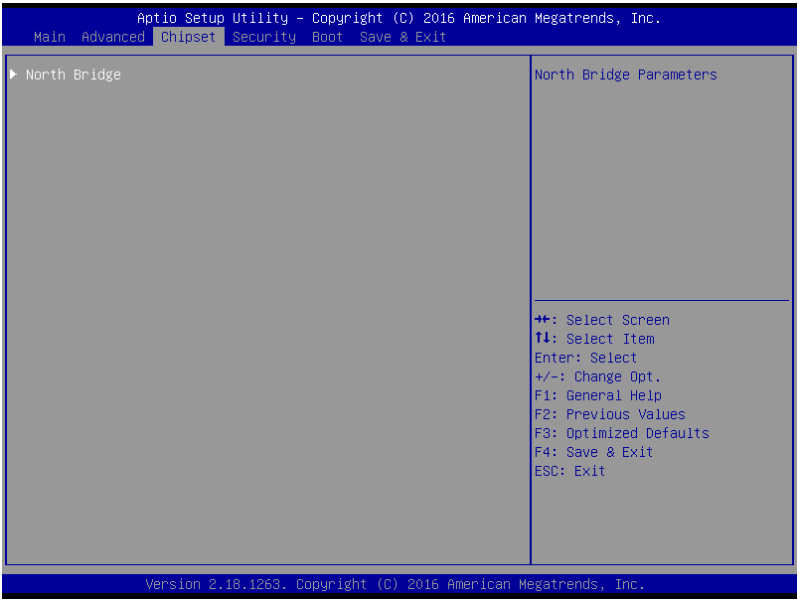
Options Summary		
Power Mode	ATX Type	Optimal Default, Failsafe Default
	AT Type	
Select system power mode		
Power Saving (ERP) Control	Disabled	Optimal Default, Failsafe Default
	Enabled	
Configure power mode for power saving function.		
Restore AC Power Loss	Last State	Optimal Default, Failsafe Default
	Always On	
	Always Off	
RTC wake system from S5	Disable	Optimal Default, Failsafe Default
	Fixed Time	
Select system power mode		

3.4.7 Digital IO Port Configuration

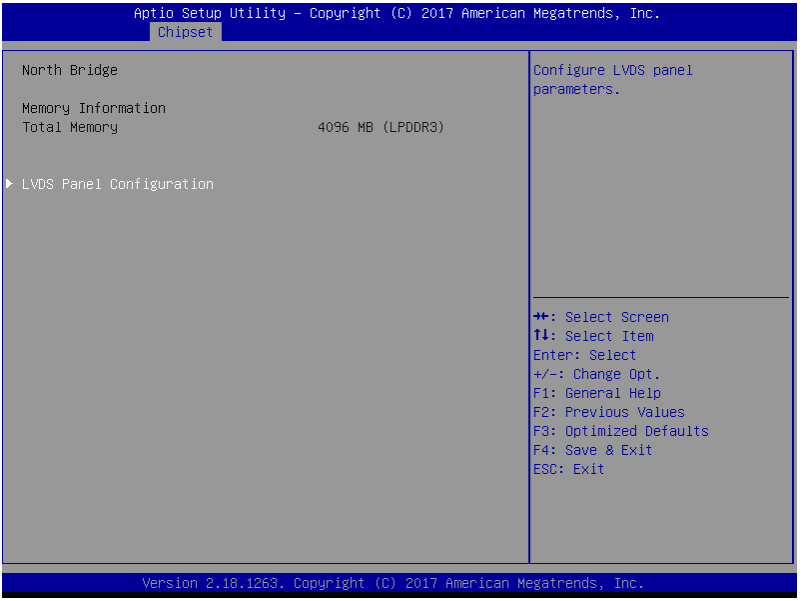


Options Summary		
DIO Port*	Output	
	Input	
Set DIO as Input or Output		
Output Level	High	Optimal Default, Failsafe Default
	Low	
Set output level when DIO pin is output		

3.5 Setup Submenu: Chipset

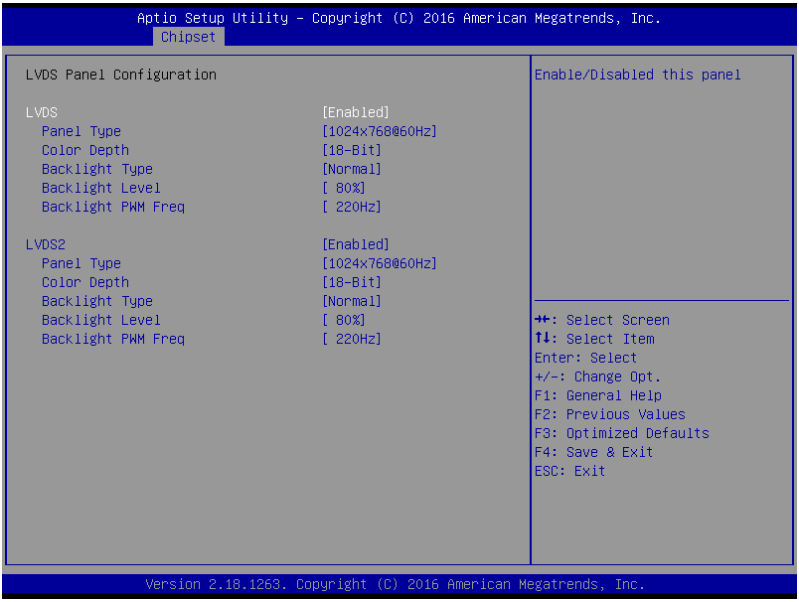


3.5.1 North Bridge



3.5.1.1 North Bridge: LVDS Panel Configuration

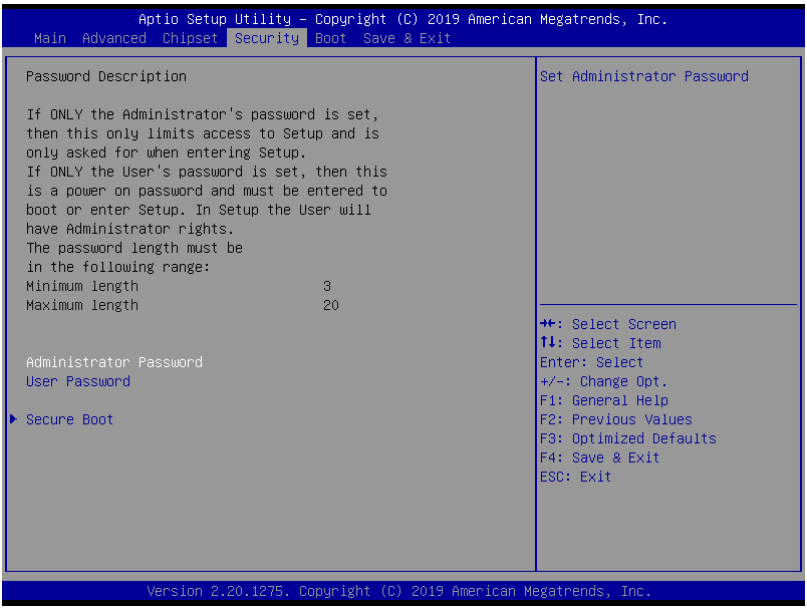
Note: LVDS2 only available for SKU with two LVDS ports



Options Summary		
LVDS	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disabled this panel.		
LVDS Panel Type	640x480@60Hz	
	800x480@60Hz	
	800x600@60Hz	
	1024x600@60Hz	
	1024x768@60Hz	Optimal Default, Failsafe Default
	1280x768@60Hz	
	1280x800@60Hz	
	1280x1024@60Hz	
	1366x768@60Hz	
	1440x900@60Hz	
	1600x1200@60Hz	
	1920x1080@60Hz	
	1920x1200@60Hz	

Options Summary		
Select LCD panel used by Internal Graphics Device by selecting the appropriate setup item.		
Color Depth	18-bit	Optimal Default, Failsafe Default
	24-bit	
	36-bit	
	48-bit	
Select panel type		
Backlight Type	Normal	Optimal Default, Failsafe Default
	Inverted	
Select backlight control signal type		
Backlight Level	0%	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.

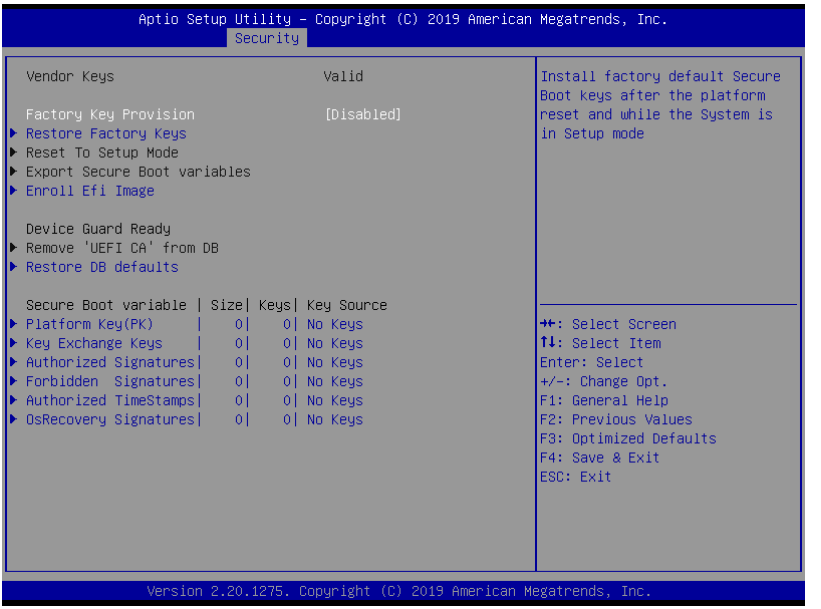
Removing the Password

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

3.6.1.1 Key Management

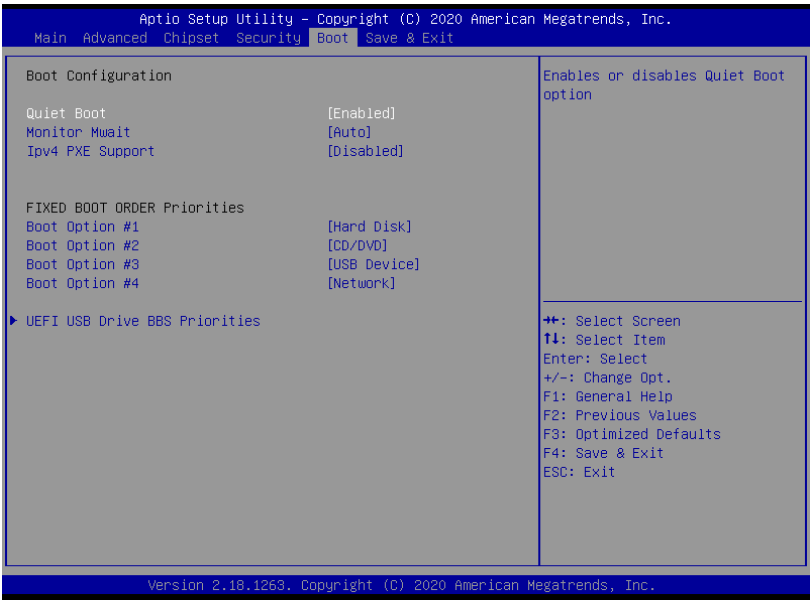


Options Summary		
Factory Key Provision	Disabled	Optimal Default, Failsafe Default
	Enabled	
Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode. The mode change requires platform reset		
Restore Factory Keys		
Force System to User Mode.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

Table Continues on Next Page…

Options Summary		
Remove 'UEFI CA' from DB		
Device Guard ready system must not list 'Microsoft UEFI CA' Certificate in Authorized Signature database (db)		
Restore DB defaults		
Restore DB variable to factory defaults		
Platform Key(PK)	Details	
	Export	
	Update	
	Delete	
Key Exchange Keys	Details	
	Export	
	Update	
	Append	
	Delete	
Authorized Signatures	Details	
	Export	
	Update	
	Append	
	Delete	
Forbidden Signatures	Details	
	Export	
	Update	
	Append	
	Delete	
Authorized Time Stamps	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		

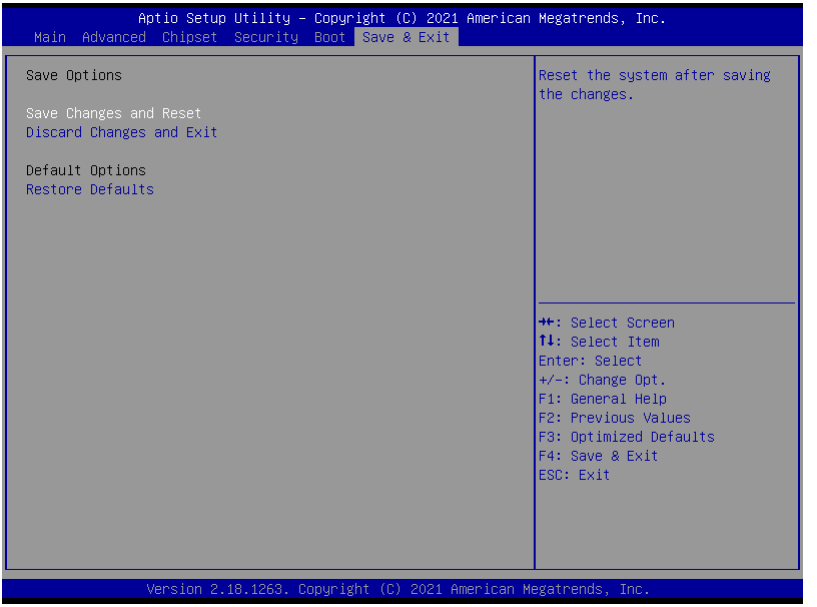
3.7 Setup Submenu: Boot



Options Summary		
Quiet Boot	Disabled	
	Enabled	Optimal Default, Failsafe Default
EnableDisable 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.		

Note: When installing Linux OS, set the **Monitor Mwait** to Disabled

3.8 Setup Submenu: Save & Exit



3.9 User Notes

When installing Linux OS, set the Monitor Mwait to Disabled (See Ch. 3.7 Boot)

Chapter 4

Drivers Installation

4.1 Drivers Download and Installation

Drivers for the GENE-APL5 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-apl5

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 Touch Driver

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

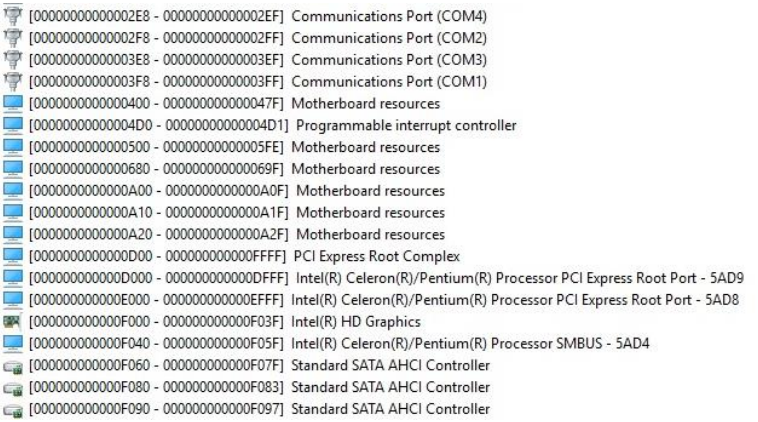
Step 7 – Install GPIO Driver

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

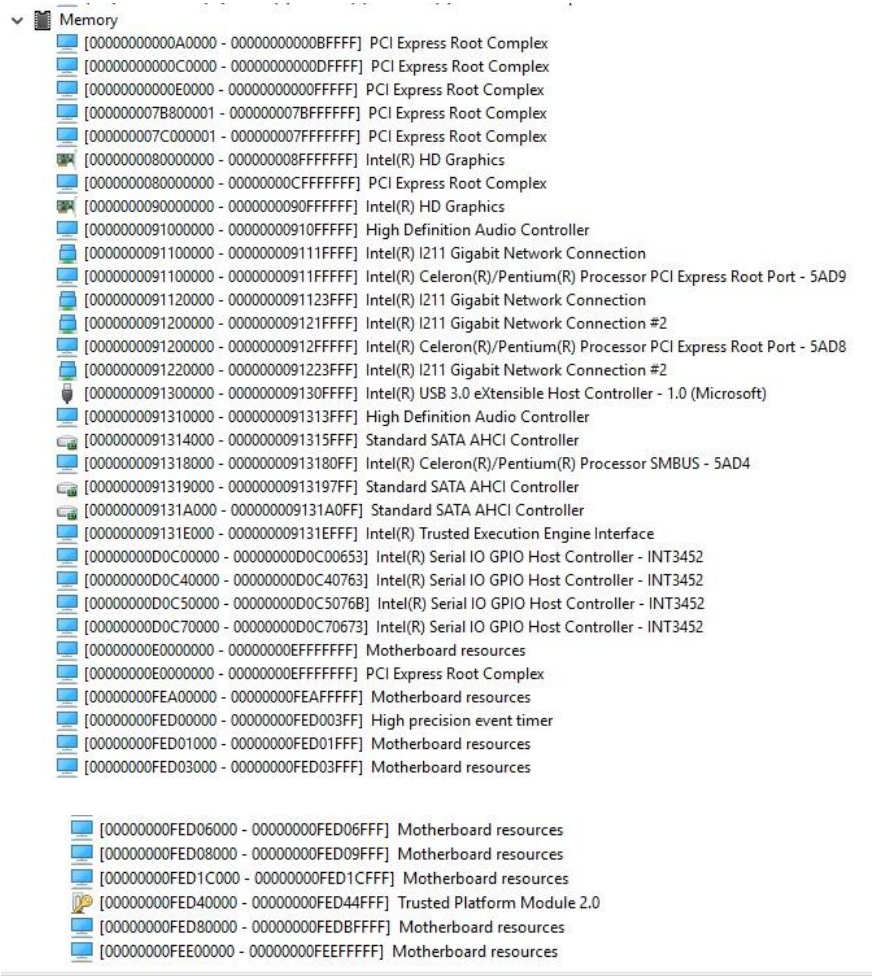
Appendix A

I/O Information

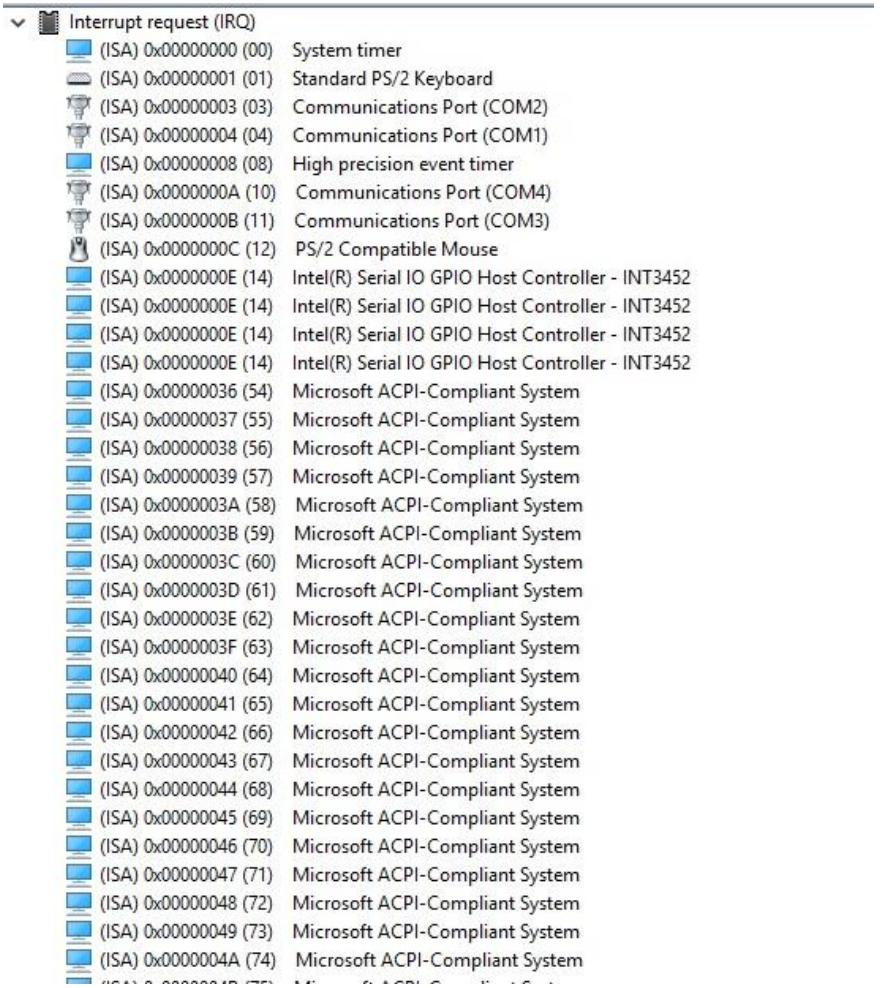
A.1 I/O Address Map

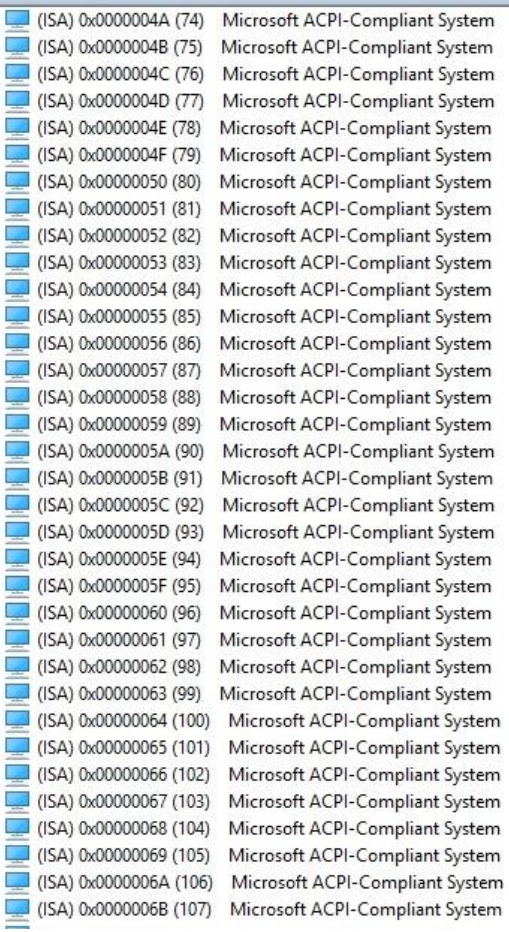

[00000000000002E8 - 00000000000002EF] Communications Port (COM4)
[00000000000002F8 - 00000000000002FF] Communications Port (COM2)
[00000000000003E8 - 00000000000003EF] Communications Port (COM3)
[00000000000003F8 - 00000000000003FF] Communications Port (COM1)
[0000000000000400 - 000000000000047F] Motherboard resources
[00000000000004D0 - 00000000000004D1] Programmable interrupt controller
[0000000000000500 - 000000000000005FE] Motherboard resources
[0000000000000680 - 000000000000069F] Motherboard resources
[0000000000000A00 - 0000000000000A0F] Motherboard resources
[0000000000000A10 - 0000000000000A1F] Motherboard resources
[0000000000000A20 - 0000000000000A2F] Motherboard resources
[0000000000000D00 - 000000000000FFFF] PCI Express Root Complex
[000000000000D000 - 000000000000DFFF] Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD9
[000000000000E000 - 000000000000EFFF] Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD8
[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



A.3 IRQ Mapping Chart




(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
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(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
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(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
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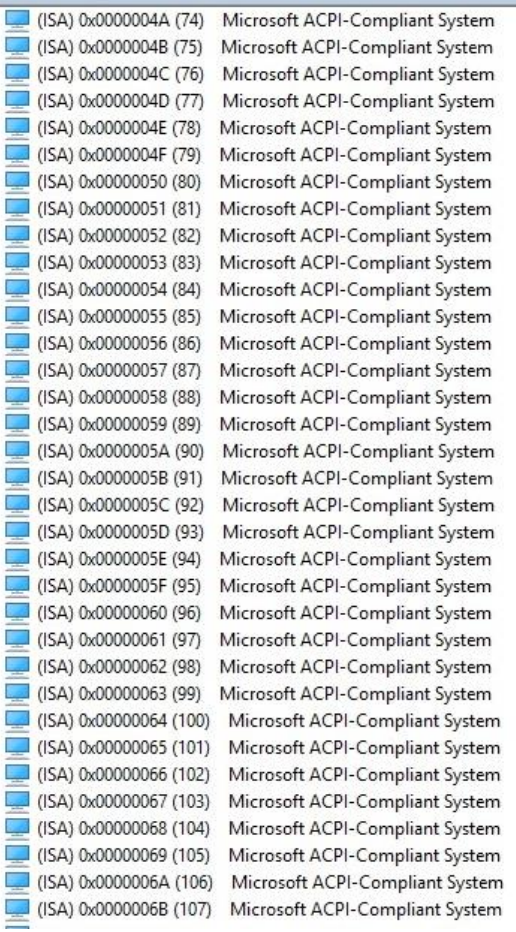
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(ISA) 0x0000004D (77) Microsoft ACPI-Compliant System
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(ISA) 0x00000058 (88) Microsoft ACPI-Compliant System
(ISA) 0x00000059 (89) Microsoft ACPI-Compliant System
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(ISA) 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
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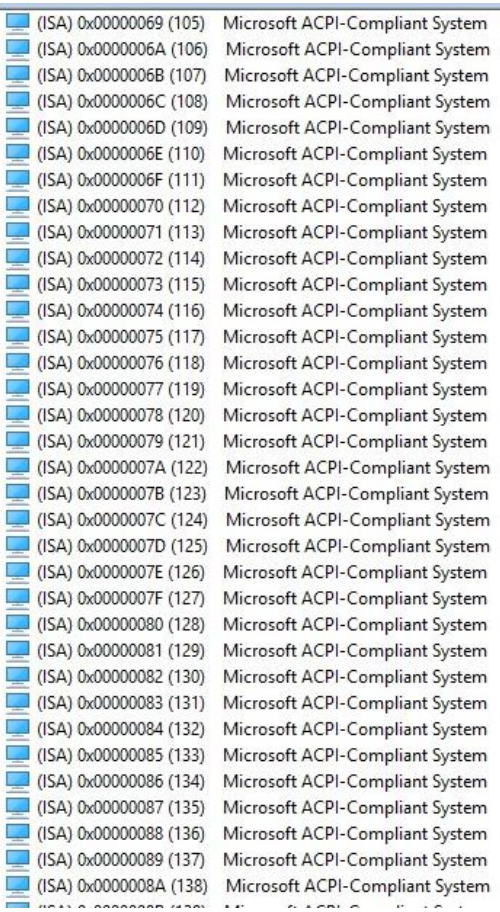
(ISA) 0x00000060 (96) Microsoft ACPI-Compliant System
(ISA) 0x00000061 (97) Microsoft ACPI-Compliant System
(ISA) 0x00000062 (98) Microsoft ACPI-Compliant System
(ISA) 0x00000063 (99) Microsoft ACPI-Compliant System
(ISA) 0x00000064 (100) Microsoft ACPI-Compliant System
(ISA) 0x00000065 (101) Microsoft ACPI-Compliant System
(ISA) 0x00000066 (102) Microsoft ACPI-Compliant System
(ISA) 0x00000067 (103) Microsoft ACPI-Compliant System
(ISA) 0x00000068 (104) Microsoft ACPI-Compliant System
(ISA) 0x00000069 (105) Microsoft ACPI-Compliant System
(ISA) 0x0000006A (106) Microsoft ACPI-Compliant System
(ISA) 0x0000006B (107) Microsoft ACPI-Compliant System


(ISA) 0x00000069 (105) Microsoft ACPI-Compliant System
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(ISA) 0x0000006D (109) Microsoft ACPI-Compliant System
(ISA) 0x0000006E (110) Microsoft ACPI-Compliant System
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(ISA) 0x00000085 (133) Microsoft ACPI-Compliant System
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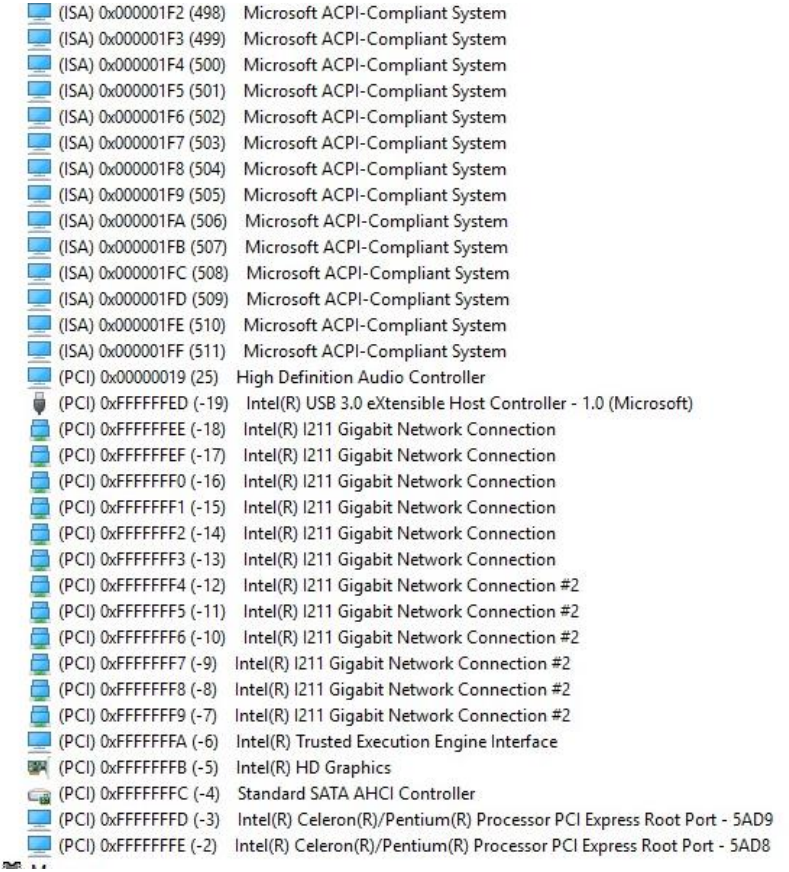
(ISA) 0x00000088 (136) Microsoft ACPI-Compliant System
(ISA) 0x00000089 (137) Microsoft ACPI-Compliant System
(ISA) 0x0000008A (138) Microsoft ACPI-Compliant System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(ISA) 0x000001FA (506) Microsoft ACPI-Compliant System
(ISA) 0x000001FB (507) Microsoft ACPI-Compliant System
(ISA) 0x000001FC (508) Microsoft ACPI-Compliant System
(ISA) 0x000001FD (509) Microsoft ACPI-Compliant System
(ISA) 0x000001FE (510) Microsoft ACPI-Compliant System
(ISA) 0x000001FF (511) Microsoft ACPI-Compliant System
(PCI) 0x00000019 (25) High Definition Audio Controller
(PCI) 0xFFFFFFED (-19) Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
(PCI) 0xFFFFFFEE (-18) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFEF (-17) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF0 (-16) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF1 (-15) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF2 (-14) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF3 (-13) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF4 (-12) Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFF5 (-11) Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFF6 (-10) Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFF7 (-9) Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFF8 (-8) Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFF9 (-7) Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFFA (-6) Intel(R) Trusted Execution Engine Interface
(PCI) 0xFFFFFFFB (-5) Intel(R) HD Graphics
(PCI) 0xFFFFFFFC (-4) Standard SATA AHCI Controller
(PCI) 0xFFFFFFFD (-3) Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD9
(PCI) 0xFFFFFFFE (-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		
CN1	External AUX Power and PS_ON#	JST	PHR-6	N/A	N/A
CN2	LVDS Port1 Inverter Connector	JST	PHR-5	N/A	N/A
CN3	+5Vout Connector	JST	PHR-2	2 Pins for SATA HDD Power	1702150155
CN4	SATA Connector	Molex	887505318	SATA Cable	1709070500
CN5	Power Input Connector	Molex	19211-0003	Power Cable	170204010R
CN6	External +5VSB Power Input and PS_ON#	JST	XHP-3	ATX Cable	170220020B
CN7	Audio Connector	Molex	51021-1000	Audio Cable	1709100254
CN8	LVDS Port1 Connector	HIROSE	DF13-30DS-1.25C	N/A	N/A
CN9	COM Port #2 Connector	Molex	51021-0900	Serial Port Cable	1701090150

Connector Label	Function	Mating Connector		Available Cable	Cable P/N
		Vendor	Model No		
CN10	LPT or Digital I/O Connector	Molex	51110-2650	Parallel Port Cable	1701260200
CN11	LPC Connector	JST	SHR-12V-S-B	AAEON LPC Cable	1703120130
CN12	COM Port #3 Connector	Molex	51021-0900	Serial Port Cable	1701090150
CN14	COM Port #4 Connector	Molex	51021-0900	Serial Port Cable	1701090150
CN15	PS/2 KB/MS Connector	JST	PHDR-06VS	PS/2 KB/MS Cable	1700060152
CN16	USB Port #2 Connector	Molex	51021-0500	USB Cable	1700050207
CN17	USB Port #3 Connector	Molex	51021-0500	USB Cable	1700050207
CN19	USB Port #4 Connector	Molex	51021-0500	USB Cable	1700050207
CN20	USB Port #5 Connector	Molex	51021-0500	USB Cable	1700050207
CN21	LVDS Port2 Connector	HIROSE	DF13-30DS-1.25C	N/A	N/A
CN22	Touch Screen Connector	JST	SHR-9V-S-B	N/A	N/A
CN23	CPU Fan Connector	Molex	22-01-2035	N/A	N/A

Connector Label	Function	Mating Connector		Available Cable	Cable P/N
		Vendor	Model No		
CN24	LVDS Port1 Inverter Connector	JST	PHR-5	N/A	N/A
CN30	External RTC Connector	Molex	51021-0200	Battery Cable	175011301C

Appendix C

Electrical Specifications for I/O Ports

C.1 Electrical Specifications for I/O Ports

Connector Label	Signal Name	Rate Output	I/O
CN2	+5V/+12V	+5V/1.5A or +12V/1.5A	LVDS Port1 Inverter / Backlight Connector
CN3	+5V	+5V/1A	+5V Output for SATA HDD
CN8	+3.3V/+5V	+3.3V/2A or +5V/2A	LVDS Port1
CN9	+5V/+12V	+5V/1A or +12V/1A	COM Port 2
CN10	+5V	+5V/1A	Digital IO Port
CN12	+5V/+12V	+5V/1A or +12V/1A	COM Port 3
CN16	+5VSB	+5V/0.5A	USB 2.0 Ports 2
CN17	+5VSB	+5V/0.5A	USB 2.0 Ports 3
CN19	+5VSB	+5V/0.5A	USB 2.0 Ports 4
CN20	+5VSB	+5V/0.5A	USB 2.0 Ports 5
CN21	+3.3V/+5V	+3.3V/2A or +5V/2A	LVDS Port2
CN23	+12V	+12V/0.5A	CPU FAN
CN24	+5V/+12V	+5V/1.5A or +12V/1.5A	LVDS Port2 Inverter / Backlight Connector
CN25	+5VSB	+5V/1A (per channel)	USB Ports 0 and 1
CN34	+3.3V	+3.3V/1A	mSATA (Full-Mini Card)
CN33	+3.3VSB +1.5V	+3.3V/1.1A +1.5V/0.375A	Mini-Card Slot (Half-Mini Card)