PICO-BT01

Intel® Atom™ SoC
Intel® I211 Ethernet
1 USB3.0, 2 USB2.0, 2 COM
4-bit Digital I/O
1 mSATA/ MiniCard (Full-size)
1 MiniCard (Half-size)
BIO Connector for Daughterboard

PICO-BT01 Rev. A Manual 1st Ed.
January 23, 2015

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Packing List

Before you begin installing your card, please make sure that the following materials have been shipped:

- 1 Heat Spreader
- 1 COMs + line-out cable
- 1 DVD-ROM for Manual (in PDF Format) and Drivers
- 1 PICO-BT01

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

Contents

Chapter

1

General Information

1.1 Introduction

The PICO-BT01 is the embedded board with PICO-ITX form factor AAEON developed. It supports Intel®'s Atom™ E3845/E3825 SoC Up to 1.91 GHz. Moreover, the Intel® Atom™ E3845/E3825 SoC offers a high performance computing platform with low power consumption. This new product supports DDR3L SODIMM at speeds of 1066/1333 MHz, up to 8 GB.

One half size MiniCard and one mSATA/MiniCard interfaces provide ample storages. With one Gigabit Ethernet, two COM ports, and both USB3.0 and USB2.0 ports, the PICO-BT01 meets the requirements of today's demanding applications.

Display requirements are met with an abundance of interfaces such as VGA, DP and LVDS. The PICO-BT01 supports 18/24-bit LVDS with PWM function.

With all of its integrated features, the PICO-BT01 strikes a balance of performance and price. This versatile product targets Industrial Automation, Entertainment, Networking, KIOSK/POS, Transportation, Banking, Healthcare and Digital Signage applications that require high performance and high reliability.

1.2 Features

- Intel® Atom™ E3845/E3825 SoC Up to 1.91 GHz
- 204-pin SODIMM DDR3L 1066/1333MHz up to 8GB
- 10/100/1000M Intel® I211 Ethernet
- CRT, 18/24-bit LVDS, DP
- VGA/DP co-lay Support
- HD Audio for Line out
- mSATA/MiniCard (Full-Size) Slot x 1, MiniCard (Half-size) x 1
- USB3.0 x 1, USB 2.0 x 2, COM x 2, 4-bit Digital I/O
- BIO Connector for Daughter Board

1.3 Specifications

System

● **From Factor**	PICO-ITX
● **Processor**	Intel® Atom™ E3845/E3825 SoC Up to 1.91 GHz
● **System Memory**	204-pin SODIMM DDR3 1066/1333 MHz, up to 8 GB
● **Chipset**	Intel Atom™ SoC
● **I/O Chipset**	Fintek F81801
● **Ethernet**	Intel® I211 x 1
● **BIOS**	AMI BIOS-32 Mb ROM
● **Wake On LAN**	Yes
● **Watchdog Timer**	1-255 steps by software program
● **H/W Status Monitoring**	Monitoring system temperature, voltage status
● **Expansion Interface**	mSATA/ Mini Card (Full-size) x 1 (select with BIOS) 1 x MiniCard (Half-size)
● **Battery**	Lithium Battery
● **Power Requirement**	DC 12V, AT/ATX (Default)
● **Board Size**	3.94" x 2.76" (100mm x 72mm)
● **Gross Weight**	0.44 lbs (200g)
● **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

Display: Supports CRT/TFT LCD/DP

- **Chipset** Intel Atom™ SoC
- **Resolution** Up to 1440 x 900 (18/24-bit) @ 60 Hz for LVDS (select with BIOS or jumper);

  Up to 2048 x 1152 @ 60 Hz for CRT

  Up to 2560 x 1400 @ 60Hz for DP
- **LCD Interface** 18/24-bit LVDS with PWM function

I/O: Fintek F81801U-I

- **Storage** SATA2 x 1
- **Serial Port** RS-232 x 1

  RS-232/422/485 x 1
- **USB** USB3.0 x 1

  USB2.0 x 2
- **Digital I/O** 4-bit Programmable (2-in/ 2-out)
- **Audio** HD Audio Codec (Realtek ALC892)

Chapter

2

Quick Installation Guide

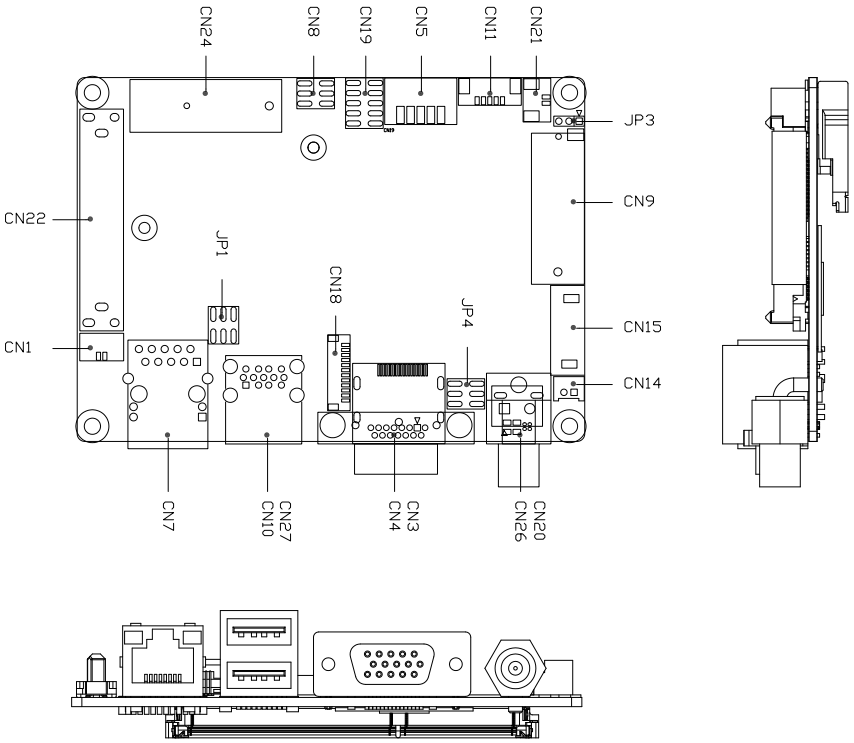
2.1 Safety Precautions

Always completely disconnect the power cord from your board whenever you are working on it. Do not make connections while the power is on, because a sudden rush of power can damage sensitive electronic components.

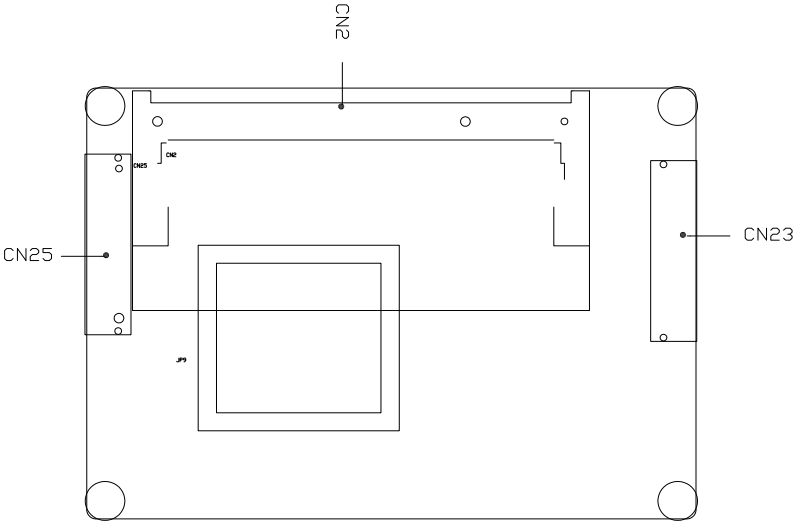
Always ground yourself to remove any static charge before touching the board. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis

2.2 Location of Connectors and Jumpers

Component Side

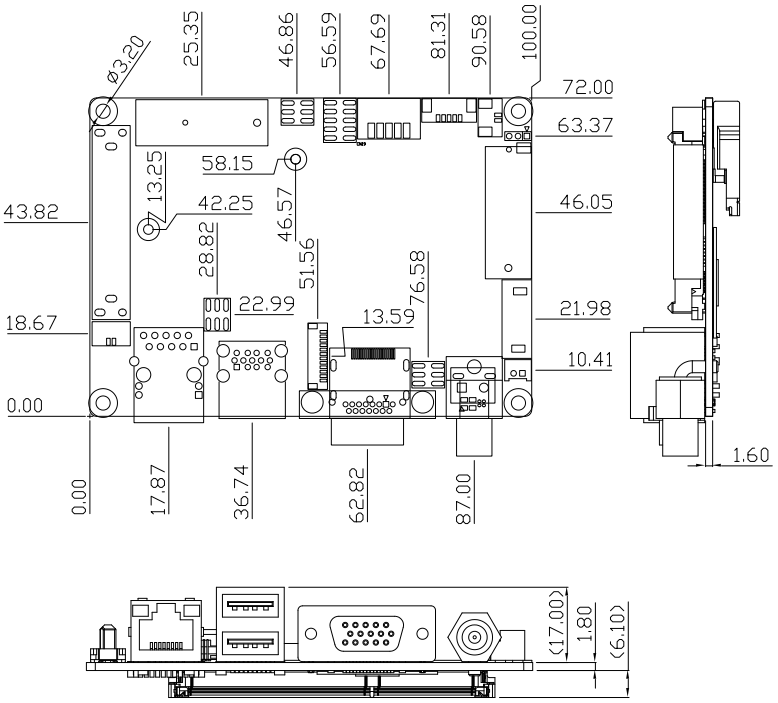


Solder Side

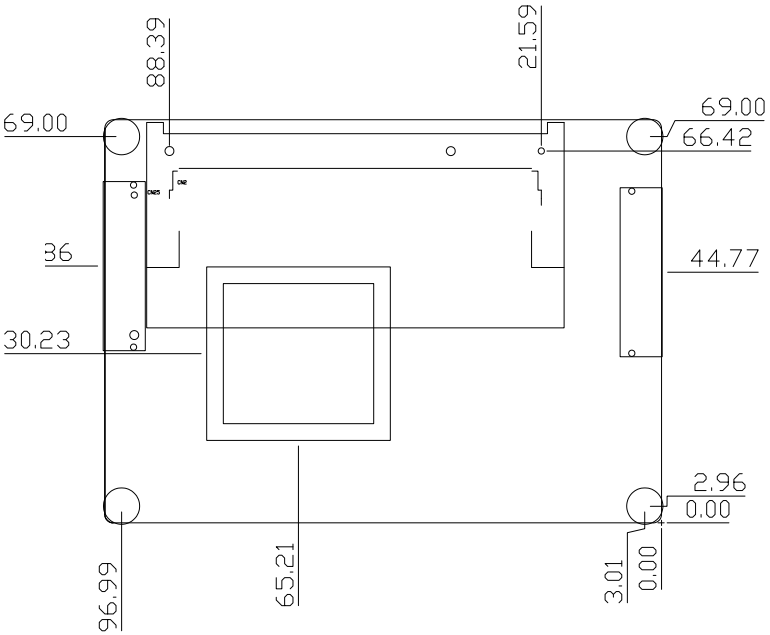


2.3 Mechanical Drawing

Component Side



Solder Side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36
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96.99
65.21
3.01
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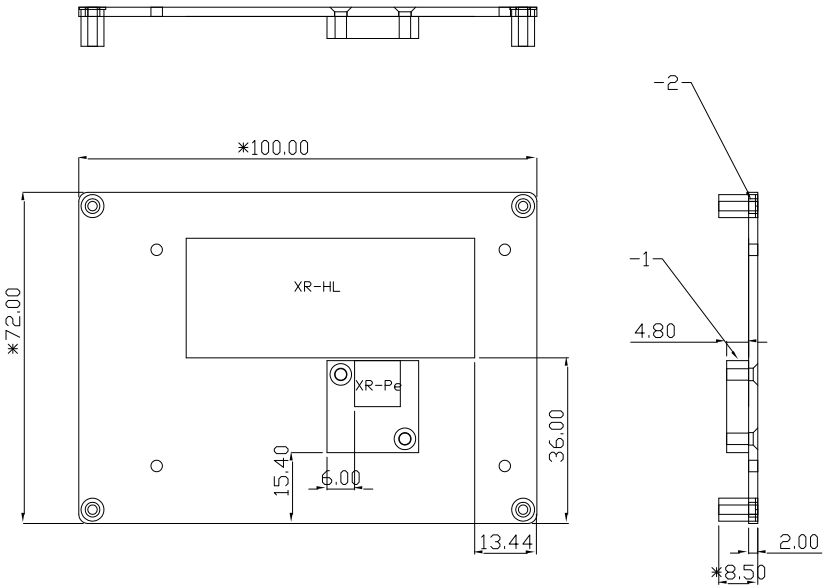
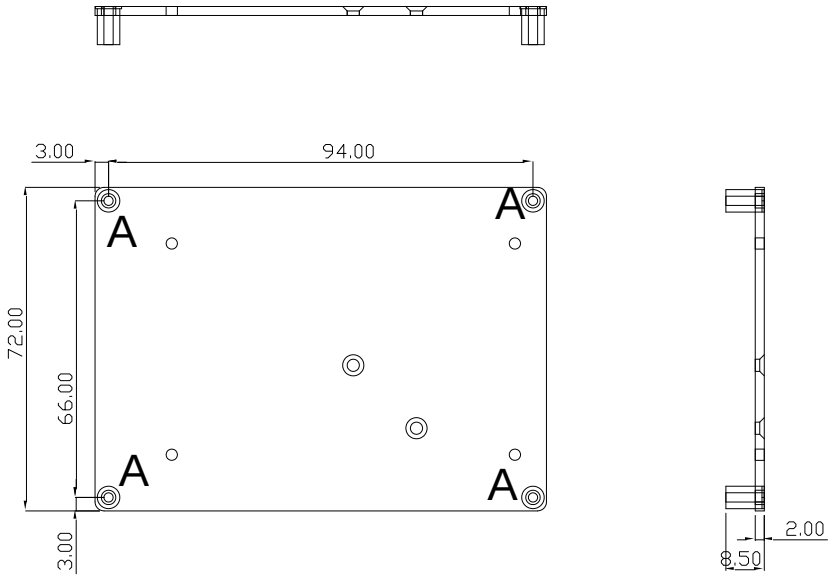
Heat Spreader

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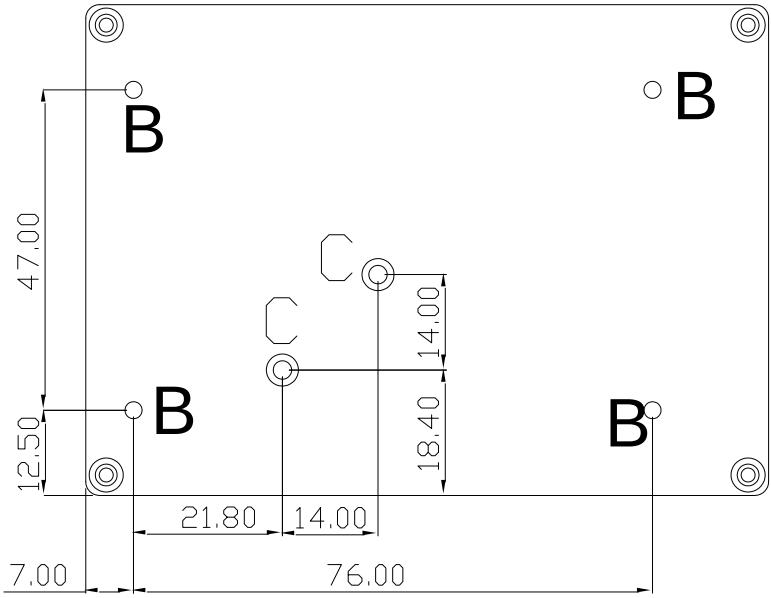
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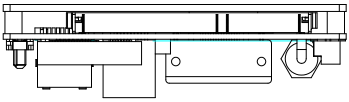
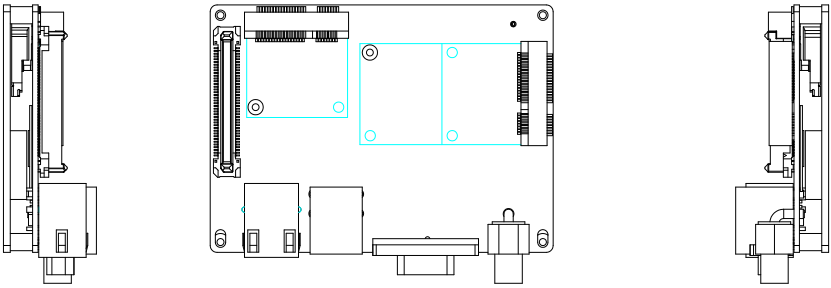
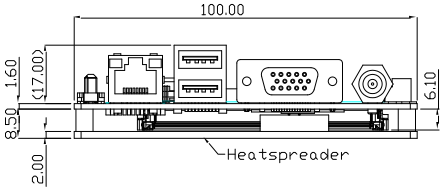
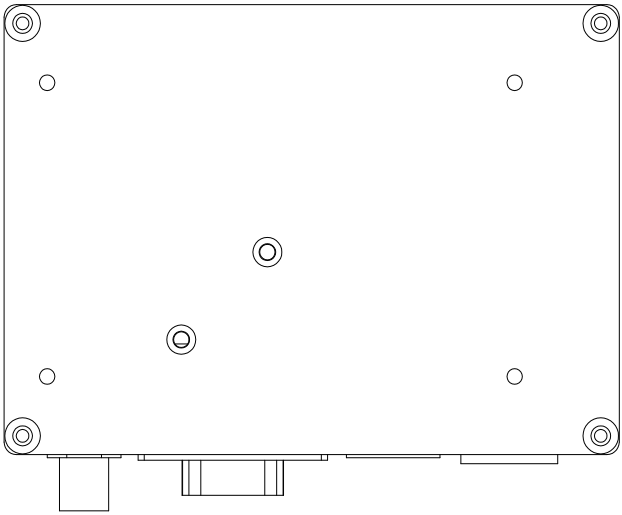
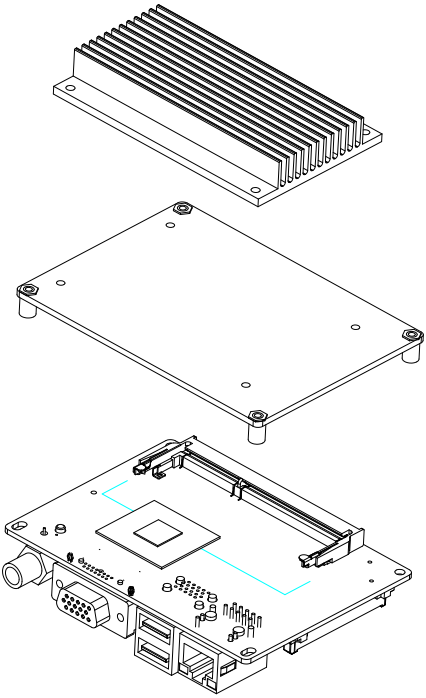





100.00
1.60
(17.00)
8.50
2.00
6.10
Heatspreader



2.4 Heat Spreader Installation



Before Installation, please make sure to:

- Insert the RAM (DDR3L SODIMM RAM only) first as it will later be covered by the heat spreader
- Remove the plastic sheet covering the thermal pad on the heat spreader. Failure to do so will greatly affect the thermal pad's effectiveness

1. Turn the board over
2. Place the heat spreader on the board and tighten the screws
3. Place the heat sink (if any) on the heat spreader and tighten the screws

2.5 List of Jumpers

The board has a number of jumpers that allow you to configure your system to suit your application.

The table below shows the function of each of the board's jumpers:

Label	Function
JP1(1,3,5)	Clear CMOS Jumper
JP1(2,4,6)	Auto Power Button Enable/Disable Selection
JP3	LVDS Port Operating Voltage Selection
JP4(1,3,5)	LVDS Port Backlight Inverter Voltage Selection
JP4(2,4,6)	LVDS Port Backlight Lightness Control Mode Selection

2.6 List of Connectors

The board has a number of connectors that allow you to configure your system to suit your application. The table below shows the function of each board's connectors:

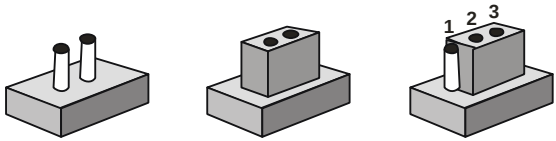
Label	Function
CN1	Battery
CN2	DDR3L SO-DIMM Slot
CN3	VGA Port
CN4	DP port
CN5	LVDS Port Inverter / Backlight Connector
CN7	LAN (RJ-45) Port
CN8	Digital IO Port
CN9	Mini-Card Slot (Full Size)/mSATA (By BIOS)
CN10	USB Ports 0 and 1
CN11	USB 2.0 Port 2
CN14	+5V Output for SATA HDD
CN15	SATA Port
CN18	LPC Port
CN19	Front Panel
CN20	External +12V Input
CN21	Buzzer connector
CN22	BIO connector
CN24	Mini-Card Slot (Half-Mini Card)
CN25	LVDS Connector

CN27	COM Port 1/2 & line out connector

2.7 Setting Jumpers

You configure your card to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper you connect the pins with the clip.

To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2 or 2 and 3.



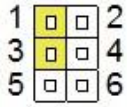
Open Closed Closed 2-3

A pair of needle-nose pliers may be helpful when working with jumpers.

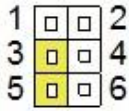
If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any change.

Generally, you simply need a standard cable to make most connections.

2.8 Clear CMOS Jumper (JP1 1,3,5)

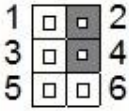


Normal (Default)

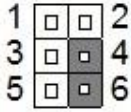


Clear CMOS

2.9 Auto Power Button Enable/Disable Selection (JP1 2,4,6)

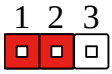


Enable (Default)

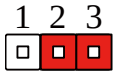


Disable

2.10 LVDS Port Operating Voltage Selection (JP3)

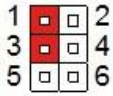


+5V

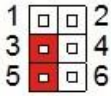


+3.3V (Default)

2.11 LVDS Port Backlight Inverter Voltage Selection (JP4 1,3,5)

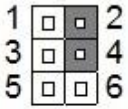


+12V

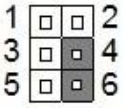


+5V (Default)

2.12 LVDS Backlight Lightness Control Mode Selection (JP4 2,4,6)



VR Mode (Default)



PWM Mode

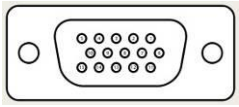
2.13 Battery (CN1)

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

2.14 DDR3L SO-DIMM Slot (CN2)

Standard specification

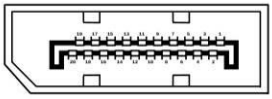
2.15 VGA Port (CN3)



VGA			
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	

VGA			
Pin	**Pin Name**	**Signal Type**	**Signal level**
9	+5V	PWR	+5V
10	GND	GND	
11	NC		
12	DDC_DATA	I/O	+5V
13	HSYNC	OUT	
14	VSYNC	OUT	
15	DDC_CLK	I/O	+5V

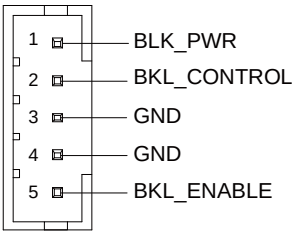
2.16 DP Port (CN4)



Pin	Pin Name	Signal Type	Signal level
1	DDI0_DP_D0_P	DIFF	
2	GND	GND	
3	DDI0_DP_D0_N	DIFF	
4	DDI0_DP_D1_P	DIFF	
5	GND	GND	
6	DDI0_DP_D1_N	DIFF	

7	DDI0_DP_D2_P	DIFF	
8	GND	GND	
9	DDI0_DP_D2_N	DIFF	
10	DDI0_DP_D3_P	DIFF	
11	GND	GND	
12	DDI0_DP_D3_N	DIFF	
13	GND		
14	GND		
15	DDI0_DP_AUX_P	I/O	+3.3V
16	GND		
17	DDI0_DP_AUX_N	I/O	+3.3V
18	HPLG_DETECT	IN	+1.8V
19	RTN_PWR		
20	PWR	IN	+3.3V

2.17 LVDS Port Inverter / Backlight Connector (CN5)



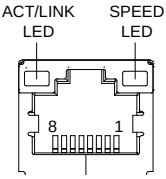
Pin	Pin Name	Signal Type	Signal Level
1	BKL_PWR	PWR	+5V / +12V
2	BKL_CONTROL	OUT	
3	GND	GND	
4	GND	GND	
5	BKL_ENABLE	OUT	+3.3V

※ LVDS2/BKL_PWR can be set to +5V or +12V by JP4.

※ LVDS2/BKL_CONTROL can be set by JP4.

※ The driving current supports up to 2A

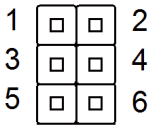
2.18 LAN (RJ-45) Port (CN7)



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

2.19 Digital IO Port (CN8)



Pin	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V
2	DIO0	I/O	+5V
3	DIO1	I/O	+5V
4	DIO2	I/O	+5V
5	DIO3	I/O	+5V
6	GND	GND	

2.20 MiniCard Slot (Full Size)/mSATA (By BIOS) (CN9)

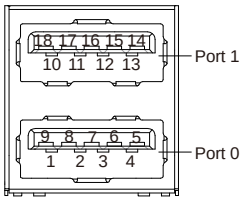
Pin	Pin Name	Signal Type	Signal level
1	PCIE_WAKE#	IN	
2	+3.3VSB/+3.3V	PWR	+3.3V
3	NC		

Pin	Pin Name	Signal Type	Signal level
4	GND	GND	
5	NC		
6	+1.5V	PWR	+1.5V
7	PCIE_CLK_REQ#	IN	
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

Pin	Pin Name	Signal Type	Signal level
23	PCIE_RX-/mSATARX+	DIFF	
24	+3.3VSB/+3.3V	PWR	+3.3V
25	PCIE_RX+/mSATARX-	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-/mSATATX-	DIFF	
32	SMB_DATA	I/O	+3.3V
33	PCIE_TX+/mSATATX+	DIFF	
34	GND	GND	
35	GND	GND	
36	USB_D-	DIFF	
37	GND	GND	
38	USB_D+	DIFF	
39	+3.3VSB/+3.3V	PWR	+3.3V
40	GND	GND	
41	+3.3VSB/+3.3V	PWR	+3.3V

Pin	Pin Name	Signal Type	Signal level
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/+3.3V	PWR	+3.3V

2.21 USB Ports 0 and 1 (CN10)

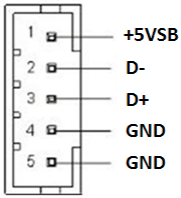


Pin	Pin Name	Signal Type	Signal level
1	+5VSB	PWR	+5V
2	USB0_D-	DIFF	

PICO-ITX Board		PICO-BT01	
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	NC		
15	NC		
16	GND	GND	
17	NC		
18	NC		

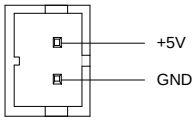
※ Only Port0 supports USB3.0.

2.22 USB 2.0 Port 3 (CN11)



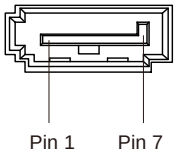
Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USB2_D-	DIFF	
3	USB2_D+	DIFF	
4	GND	GND	
5	GND	GND	

2.23 +5V Output for SATA HDD (CN14)



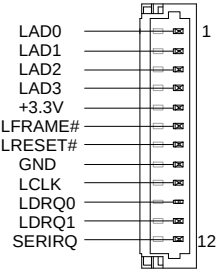
Pin	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V
2	GND	GND	

2.24 SATA Port (CN15)



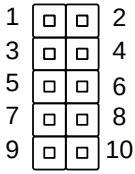
Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	SATA_TX1+	DIFF	
3	SATA_TX1-	DIFF	
4	GND	GND	
5	SATA_RX1-	DIFF	
6	SATA_RX1+	DIFF	
7	GND	GND	

2.25 LPC Port (CN18)



Pin	Pin Name	Signal Type	Signal Level
1	LAD0	I/O	+3.3V
2	LAD1	I/O	+3.3V
3	LAD2	I/O	+3.3V
4	LAD3	I/O	+3.3V
5	+3.3V	PWR	+3.3V
6	LFRAME#	IN	
7	LRESET#	OUT	+3.3V
8	GND	GND	
9	LCLK	OUT	
10	LDRQ0	IN	
11	LDRQ1	IN	
12	SERIRQ	I/O	+3.3V

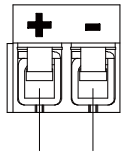
2.26 Front Panel (CN19)



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+

2.27 External +12V Input (CN20)



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

2.28 Buzzer Connector (CN21)

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

2.29 BIO Connector (CN22)

Pin	Pin Name	Pin	Pin Name
1	+12VSB	2	GND
3	GND	4	PCIE_TXN0
5	PCIE_RXN0	6	PCIE_TXP0
7	PCIE_RXP0	8	GND

9	GND	10	NC
11	NC	12	NC
13	NC	14	GND
15	GND	16	PS_ON#
17	NC	18	NC
19	+5VSB	20	+5VSB
21	+5VSB	22	+5VSB
23	PCIE_REF_CLK0	24	RESET#
25	PCIE_REF_CLK0#	26	GND
27	GND	28	NC
29	NC	30	NC
31	NC	32	GND
33	GND	34	NC
35	NC	36	NC
37	NC	38	GND
39	GND	40	NC
41	NC	42	GND
43	NC	44	NC
45	GND	46	NC
47	USBN0	48	GND
49	USBP0	50	USBN1
51	GND	52	USBP2
53	SMB_CLK	54	GND
55	SMB_DATA	56	WAKE#

57	GND	58	USB_OC0#
59	+5V	60	USB_OC1#
61	+5V	62	+5V
63	+5V	64	+5V
65	LPC_AD0	66	LPC_FRAME#
67	LPC_AD1	68	SERIRQ
69	LPC_AD2	70	LPC_DRQ
71	LPC_AD3	72	GPIO0
73	GND	74	AGND
75	LPC_CLK	76	AUD_LINEOUT_L
77	PME#	78	AUD_LINEOUT_R
79	GND	80	GND

2.30 MiniCard Slot (Half-Mini Card) (CN24)

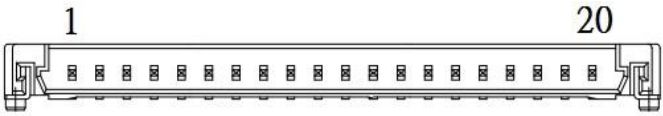
Pin	Pin Name	Signal Type	Signal Level
1	PCIE_WAKE#	IN	
2	+3.3VSB	PWR	+3.3V
3	NC		
4	GND	GND	
5	NC		
6	+1.5V	PWR	+1.5V
7	PCIE_CLK_REQ#	IN	
8	NC	PWR	

PICO-ITX Board		PICO-BT01	
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

PICO-ITX Board		PICO-BT01	
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	
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

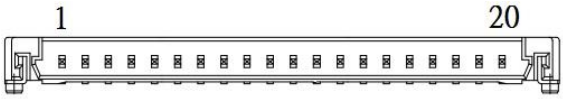
2.31 LVDS Port (CN25)



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

12	GND	GND	
13	LVDS_DA2+	DIFF	
14	LVDS_DA2-	DIFF	
15	GND	GND	
16	LVDS_DA3+	DIFF	
17	LVDS_DA3-	DIFF	
18	DDC_CLK	I/O	+3.3V
19	DDC_DATA	I/O	
20	DDC_CLK	I/O	

2.32 COM Port 1/2 & Line Out Connector (CN27)



Pin	Pin Name	Signal Type	Signal Level
1	DCDB	IN	
2	DSRB	IN	
3	RXB	IN	
4	RTSB	OUT	±9V
5	TXB	OUT	±9V
6	CTSB	IN	
7	DTRB	OUT	±9V

8	RIB/+5V/+12V	IN/ PWR	+5V/+12V
9	DCDA	IN	
10	DSRA	IN	
11	RXA	IN	
12	RTSA	OUT	±9V
13	TXA	OUT	±9V
14	CTSA	IN	
15	DTRA	OUT	±9V
16	RIA	IN	
17	GND	GND	
18	AGND	GND	
19	LOUT_R	I/O	
20	LOUT_L	I/O	

COM port2 RS-485

Pin	Pin Name	Signal Type	Signal level
1	RS485_D-	I/O	±5V
2	NC		
3	RS485_D+	I/O	±5V
4	NC		
5	NC		
6	NC		

Pin	Pin Name	Signal Type	Signal level
7	NC		
8	NC/+5V/+12V	PWR	+5V/+12V
17	GNDGND	IN	

COM port2 RS-422

Pin	Pin Name	Signal Type	Signal level
1	RS422_TX-	OUT	±5V
2	NC		
3	RS422_TX+	OUT	±5V
4	NC		
5	RS422_RX+	IN	
6	NC		
7	RS422_RX-	IN	
8	NC/+5V/+12V	PWR	+5V/+12V
17	GND	GND	

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

※ COM2 RI/+5V/+12V function can be set by BOM(R524-RI/R521-+12V/R526-+5V)

2.33 Electrical Specifications for I/O Port

I/O	Reference	Signal Name	Rate Output
VGA	CN3	VGA: +5V	+5V/0.5A
LVDS Port Inverter / Backlight Connector	CN5	VDD	+5V/2A or +12V/2A
Digital IO Port	CN8	D0~D3	+5V/(Open drain)
MiniCard Slot	CN9	+3.3VSB +1.5V	+3.3V/1.1A +1.5V/0.375A
USB 3.0 Port 1 & 2	CN10	+5VSB	+5VSB/1A (per channel)
USB 2.0 Port 3	CN11	+5VSB	+5VSB/0.5A
+5V Output for SATA HDD	CN14	+5V	+5V/1A
LPC Port	CN18	+3.3V	+3.3V/0.5A
COM Port 2	CN23	+5V/+12V	+5V/1A or +12V/1A
Mini-Card Slot	CN24	+3.3VSB +1.5V	+3.3V/1.1A +1.5V/0.375A
LVDS Port	CN25	VCC	+3.3V/2A or +5V/2A

China RoHS Requirements

产品中有毒有害物质或元素名称及含量

AAEON Main Board/ Daughter Board/ Backplane

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板及其电子组件	×	○	○	○	○	○
外部信号连接器及线材	×	○	○	○	○	○

O：表示该有毒有害物质在该部件所有均质材料中的含量均在 **SJ/T 11363-2006** 标准规定的限量要求以下。

X：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 **SJ/T 11363-2006** 标准规定的限量要求。

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。

Chapter

3

AMI BIOS Setup

3.1 System Test and Initialization

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

System configuration verification

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

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

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

The PICO-BT01 CMOS memory has an integral lithium battery backup for data retention. However, you will need to replace the complete unit when it finally runs down.

3.2 AMI BIOS Setup

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

Entering Setup

Power on the computer and press <Del>or <F2> immediately. This will allow you to enter Setup.

Main

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

Advanced

Enable disable boot option for legacy network devices.

Chipset

Host bridge parameters.

Boot

Enables/disable quiet boot option.

Security

Set setup administrator password.

Save & Exit

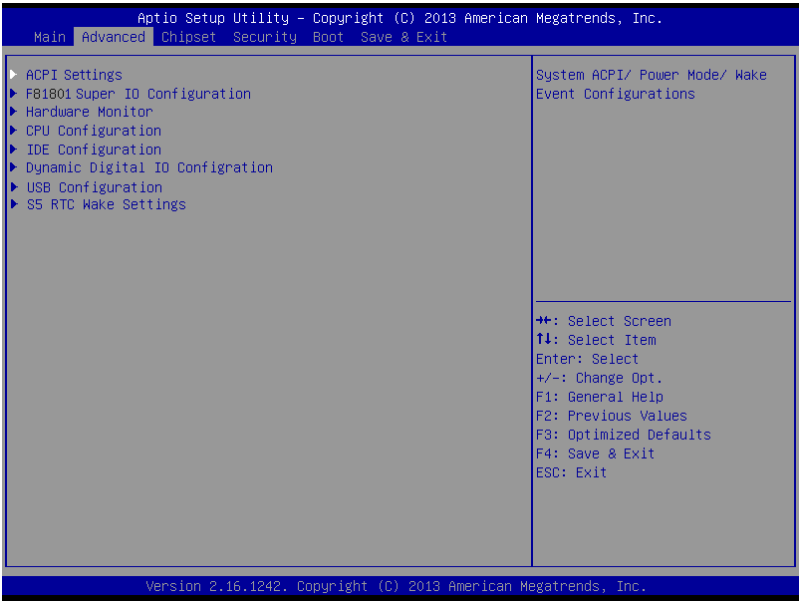
Exit system setup after saving the changes.

BIOS Setup Menu

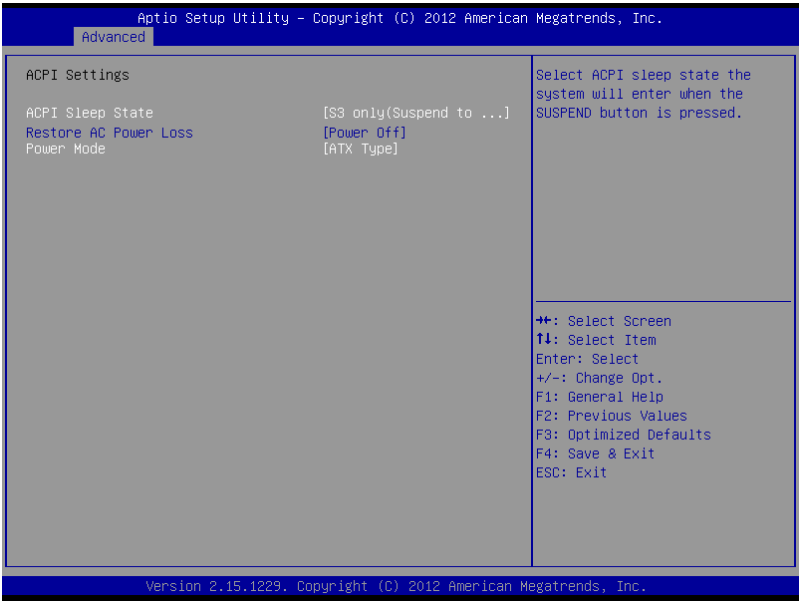
Main

Press '*Delete*' Key to enter Setup

Advanced


Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Main Advanced Chipset Security Boot Save & Exit
ACPI Settings
F81801 Super IO Configuration
Hardware Monitor
CPU Configuration
IDE Configuration
Dynamic Digital IO Configration
USB Configuration
S5 RTC Wake Settings
System ACPI/ Power Mode/ Wake Event Configurations
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

Advanced -> ACPI Settings

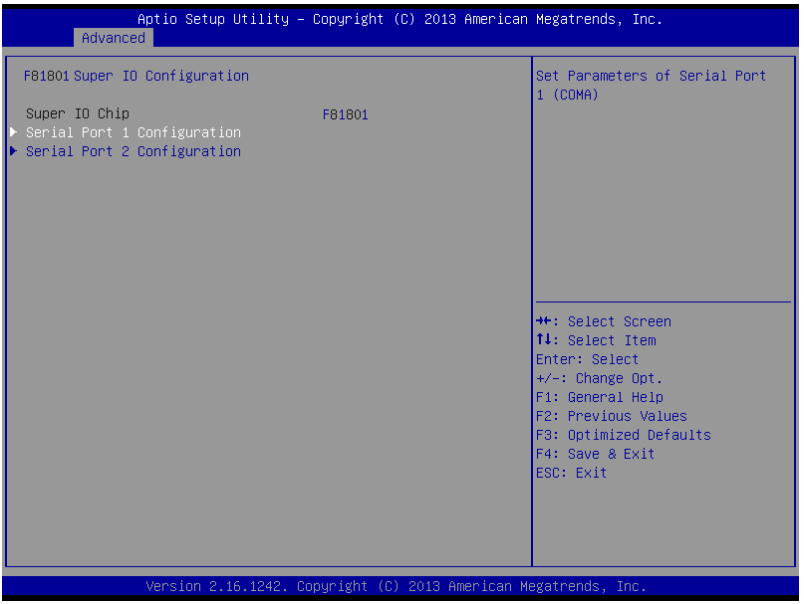


Options summary:

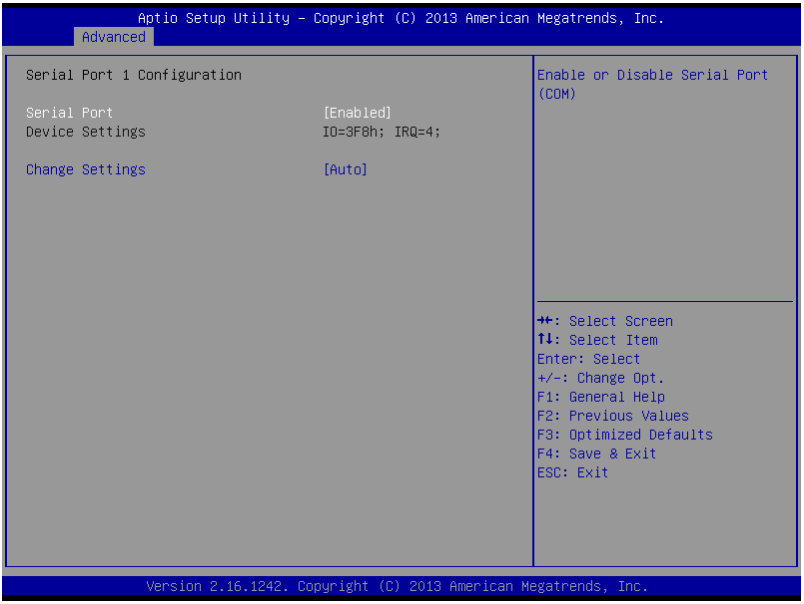
ACPI Sleep State	Suspend Disabled	Optimal Default, Failsafe Default
	S3 (Suspend to RAM)	
Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.		
Restore AC Power Loss	Power Off	
	Power On	
	Last State	Optimal Default, Failsafe Default
Select AC power state when power is re-applied after a power failure		

Power Mode	ATX Type	Optimal Default, Failsafe Default
	AT Type	
Select power supply mode		

Advanced -> F81801 Super IO Configuration



Advanced -> Super IO Configuration Serial Port 1 Configuration



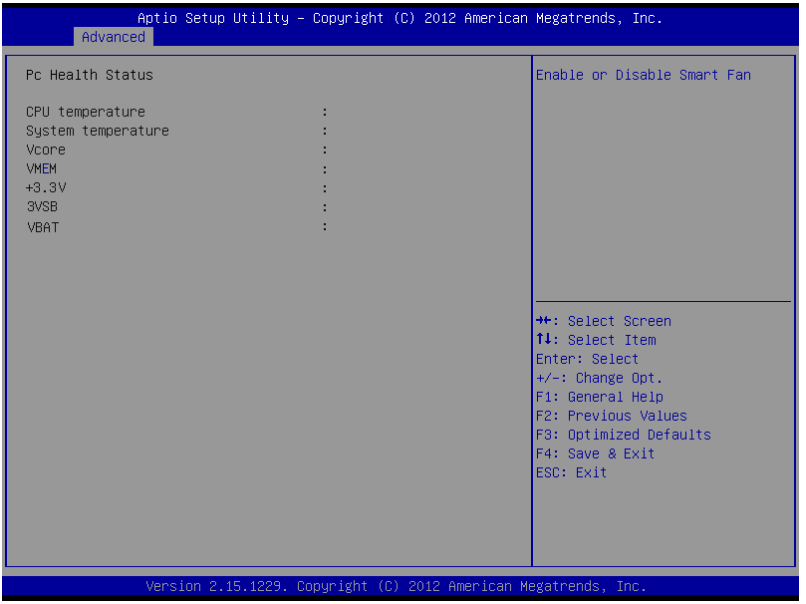
Advanced -> Super IO Configuration Serial Port 2 Configuration

Options summary:

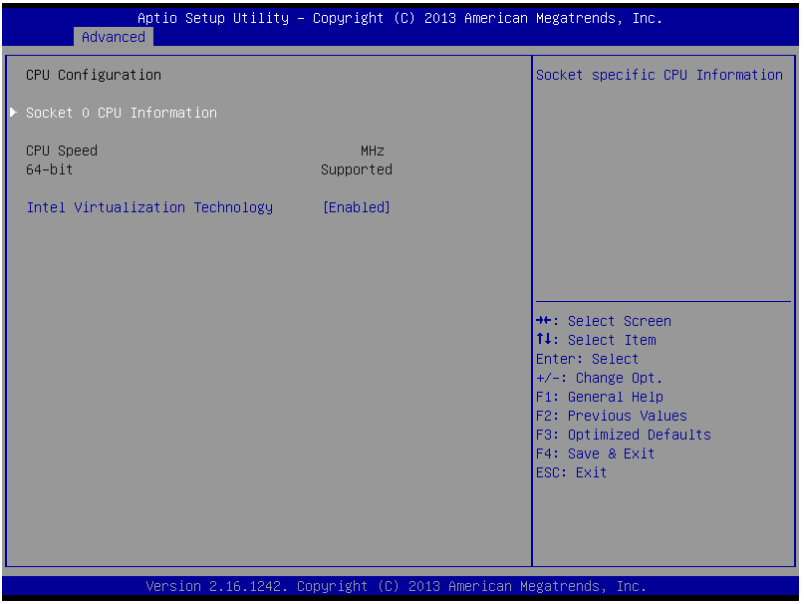
Serial Port	Disabled	
	Enabled	Default
Allows BIOS to En/Disable correspond serial port.		
Change Settings (Serial Port 1)	Auto	Default
	IO=3F8h; IRQ=4;	
	IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12;	

	IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;	
	IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;	
	IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	
Allows BIOS to Select Serial Port resource.		
Change Settings (Serial Port 2)	Auto	Default
	IO=2F8h; IRQ=3;	
	IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12;	
	IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;	
	IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;	
	IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	
COM2 Type Select	RS232	Default
	RS422	
	RS485	
Select Working model		

Advanced -> H/W Monitor



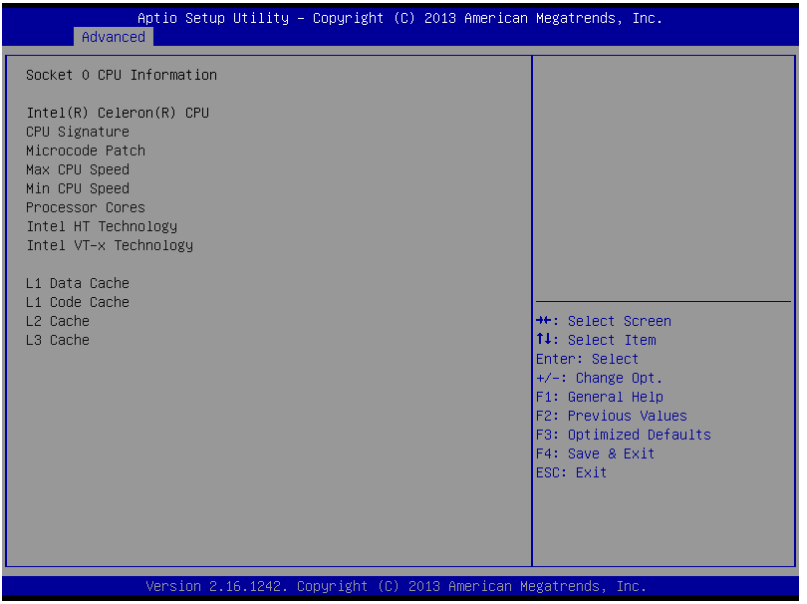
Advanced -> CPU Configuration



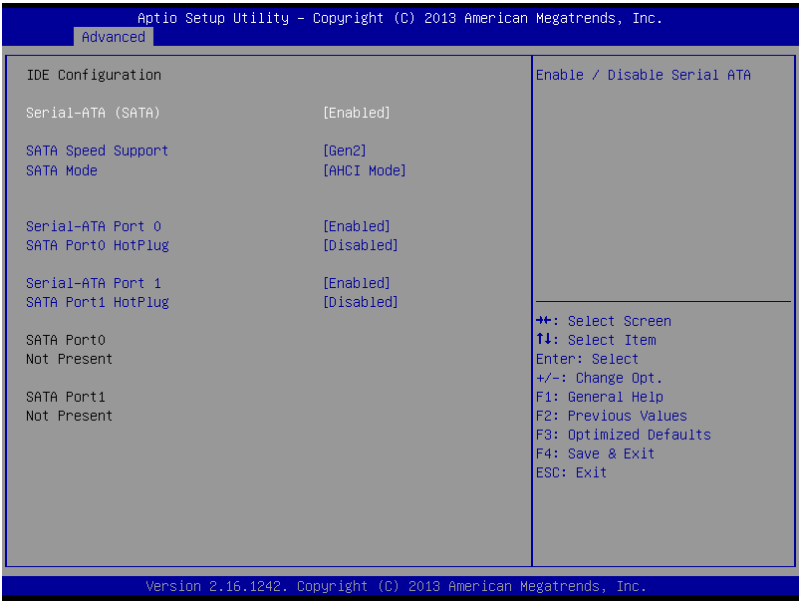
Options summary:

Intel Virtualization Technology	Disabled	Optimal Default, Failsafe Default
	Enabled	
When enabled, a VMM can utilize the additional hardware capabilities provided by Vander pool Technology		

Advanced -> CPU Configuration Socket 0 CPU Information



Advanced -> SATA Configuration

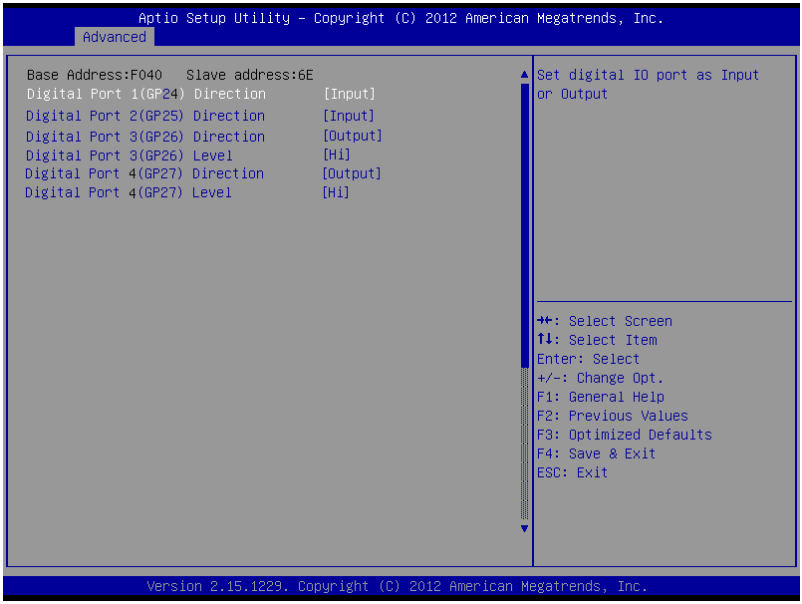


Options summary:

Serial-ATA (SATA)	Enabled	Default
	Disabled	
En/Disable SATA		
SATA Speed Support	Gen1	Default
	Gen2	
SATA Speed Support Gen1 or Gen2		
SATA Mode	IDE	Default
	AHCI	

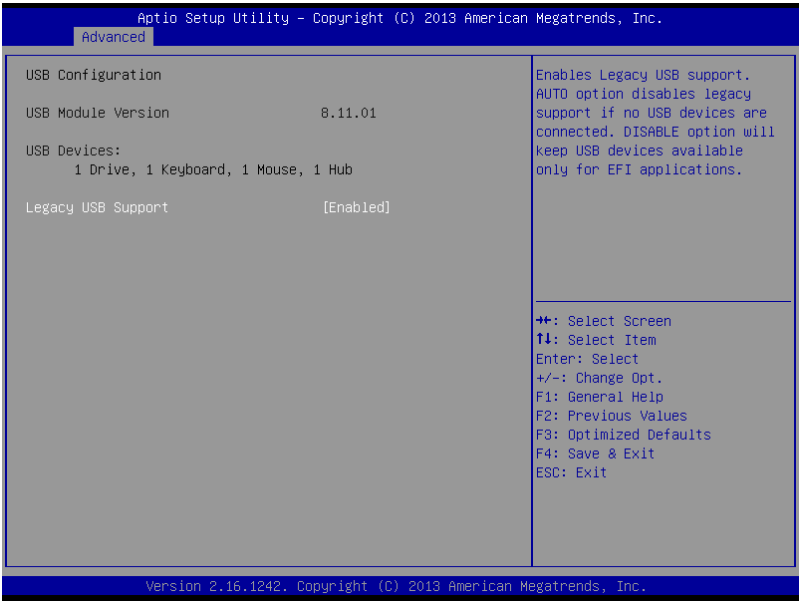
IDE: Configure SATA controllers as legacy IDE AHCI: Configure SATA controllers to operate in AHCI mode		
Serial-ATA Port x	Enabled	Default
	Disabled	
En/Disable SATA Port		
SATA Port1 HotPlug	Enabled	
	Disabled	Default
En/Disable SATA Port Hotplug		

Advanced->Dynamic Digital IO Configuration



Digital Port X Direction	Input	
	Output	
Set DIO as input or Output		
Digital Port X Level	Hi	Default
	Low	
Set DIO Output port Hi or Low		

Advanced -> USB Configuration

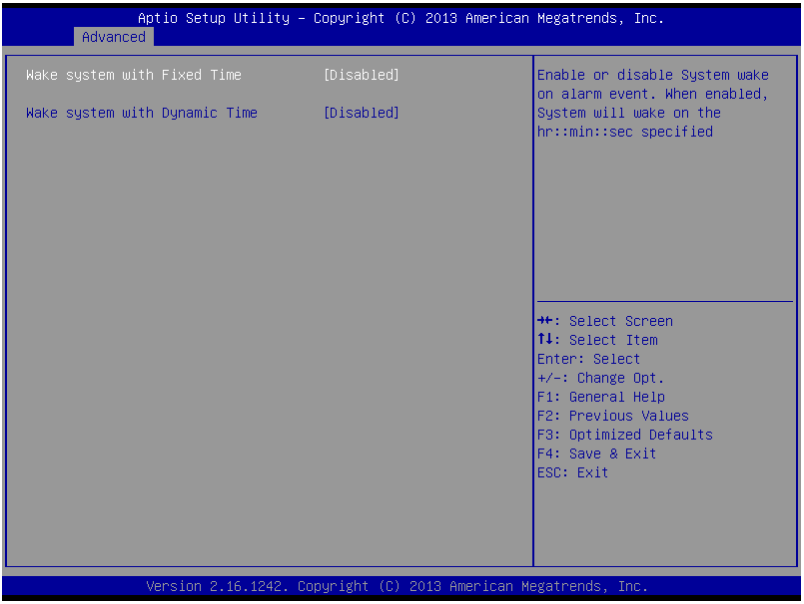


Options summary:

Legacy USB Support	Enabled	Optimal Default, Failsafe Default
	Disabled	
	Auto	
Enables BIOS Support for Legacy USB Support. When enabled, USB can be functional in legacy environment like DOS. AUTO option disables legacy support if no USB devices are connected		
Device Name (Emulation Type)	Auto	Optimal Default, Failsafe Default
	Floppy	

	Forced FDD	
	Hard Disk	
	CDROM	
If Auto. USB devices less than 530MB will be emulated as Floppy and remaining as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD(Ex. ZIP drive)		

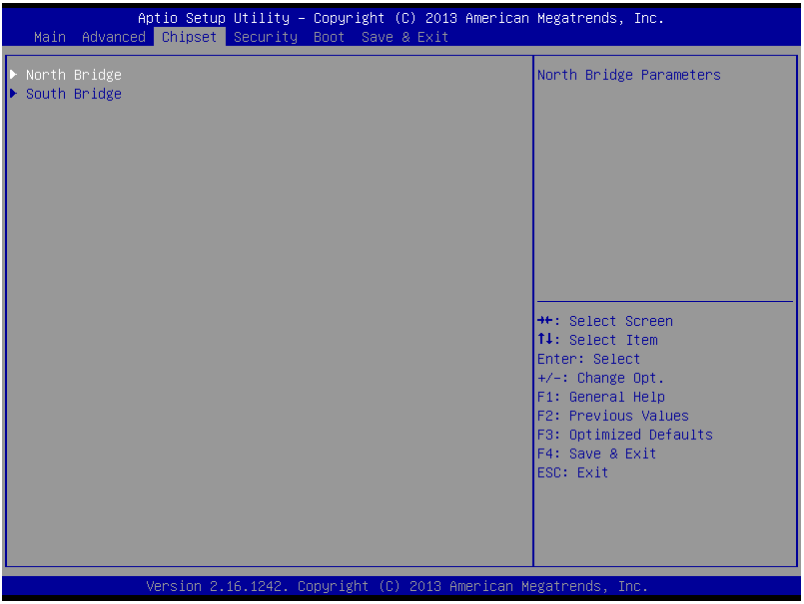
Advanced -> S5 RTC Wake Settings



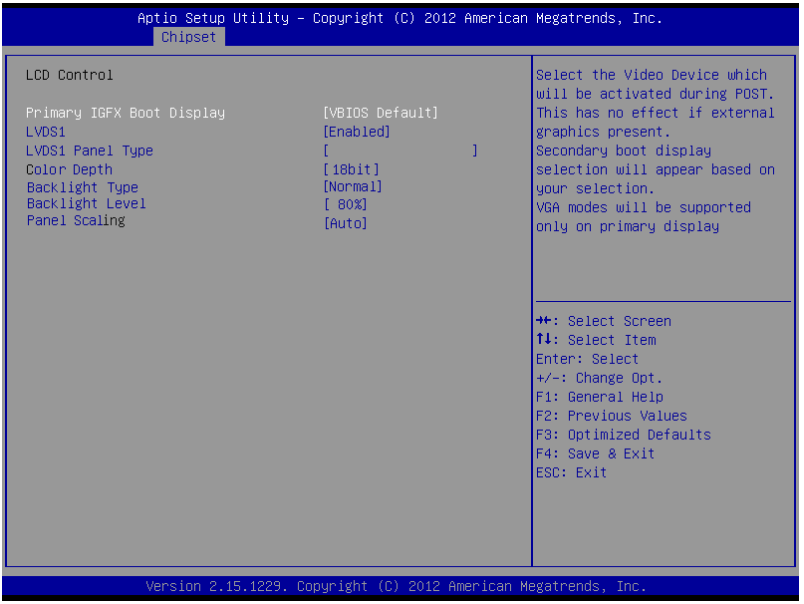
Options summary:

Wake system with Fixed Time		Enable	
		Disable	Optimal Default, Failsafe Default
	Wake up hour	0	
	Wake up minute	0	
	Wake up second	0	
Wake system with Dynamic Time		Enable	
		Disable	Optimal Default, Failsafe Default
	Wake up minute increase	0	
Select RTC wake mode			

Chipset


Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Main Advanced Chipset Security Boot Save & Exit
North Bridge
South Bridge
North Bridge Parameters
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

Chipset -> Host Bridge

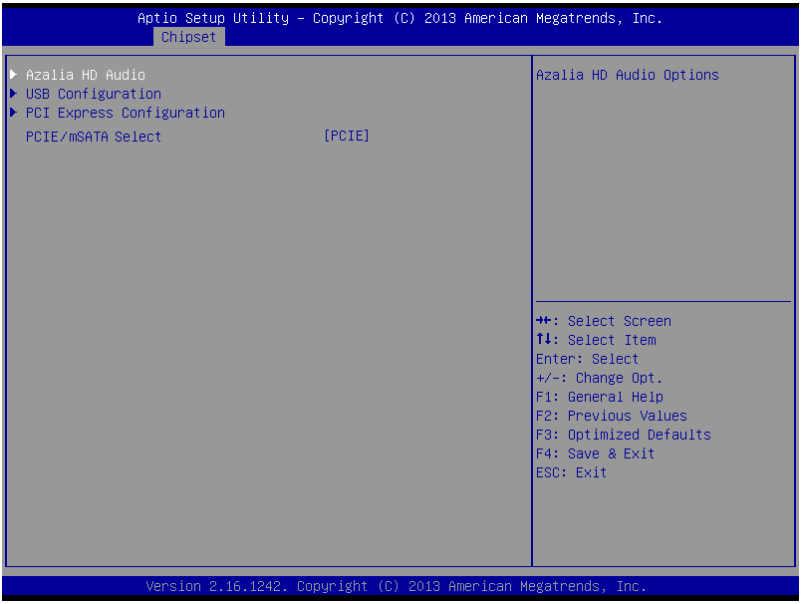


Options summary:

Primary IGFX Boot Display	VBIOS Default	Optimal Default, Failsafe Default
	CRT	
	DP	
	LVDS	
Select the Video device		
LVDS1	Disabled	
	Enabled	Optimal Default, Failsafe Default
En/Dis LVDS		
Panel Type	640x480	

	800x480	
	800x600	
	1024x600	
	1024x768	Optimal Default, Failsafe Default
	1280x768	
	1366x768	
	1440x900	
Select panel type		
Color Depth	18Bit	Optimal Default, Failsafe Default
	24Bit	
Set color depth		
Backlight Type	Normal	Optimal Default, Failsafe Default
	Inverted	
Select backlight control signal type		
Backlight Level	0-100%	
Select backlight control level		
Panel Scaling	Auto	Optimal Default, Failsafe Default
	Off	
	Force Scaling	
Select the LCD scaling option used by the internal graphics device.		

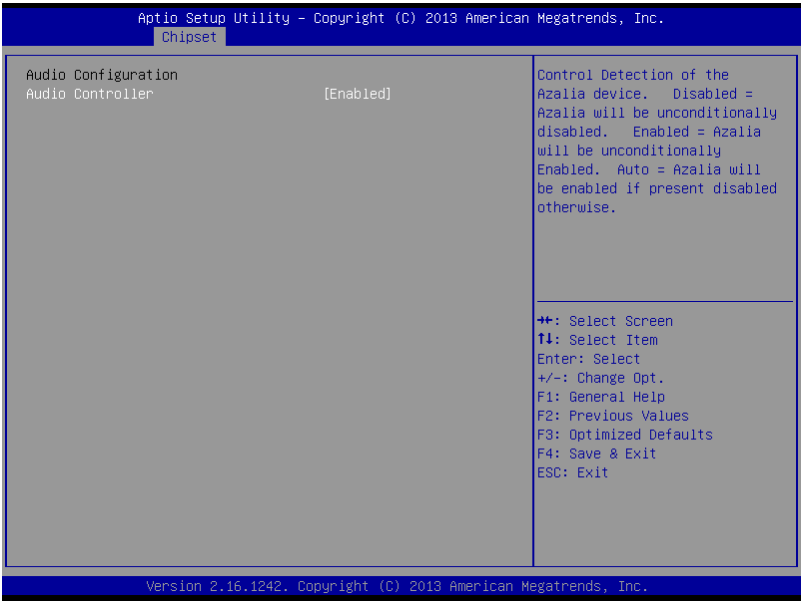
Chipset -> South Bridge



Options summary:

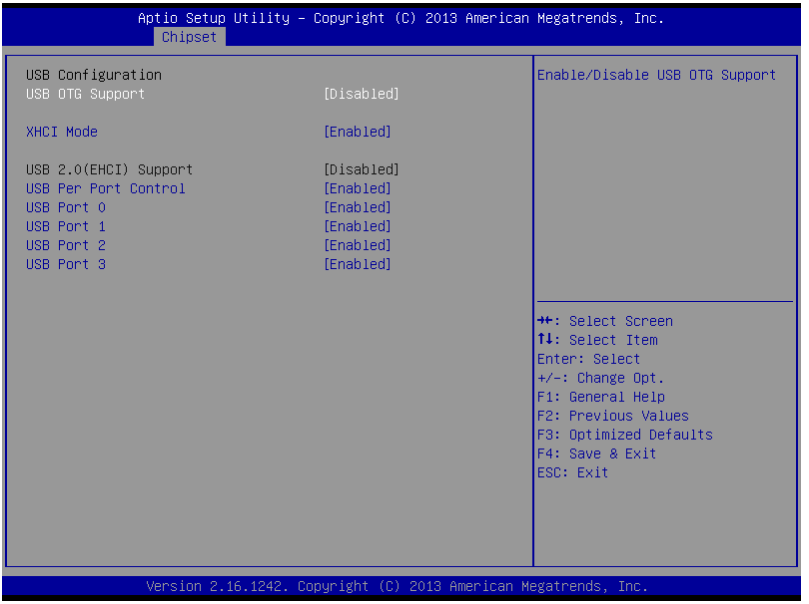
PCIE/mSATA Select	PCIE	Optimal Default, Failsafe Default
	mSATA	
PCIE/mSATA Select		

Chipset -> South Bridge -> Azallia HD Audio

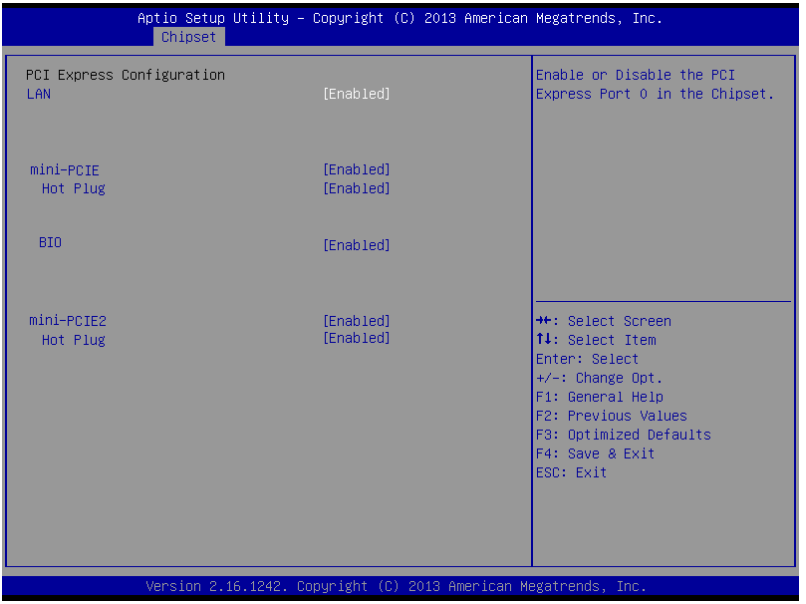


Azalia HD Audio	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabling/Disabling HD Audio controller.		

Chipset -> South Bridge -> USB Configuration



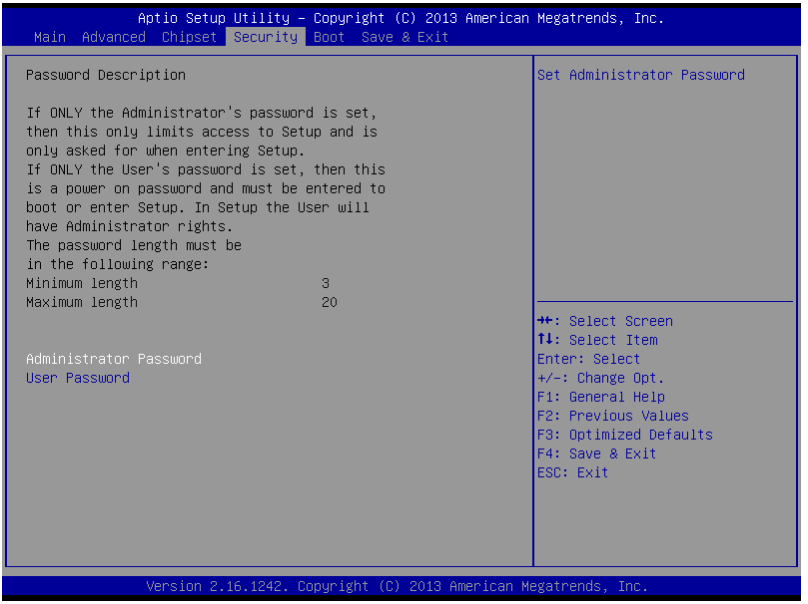
Chipset -> South Bridge -> PCI Express Configuration



Options summary:

PCI Express Root Port x	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enabling/Disabling PCI Express root ports		

Security



Setup submenu: Security

Change User/Supervisor Password

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

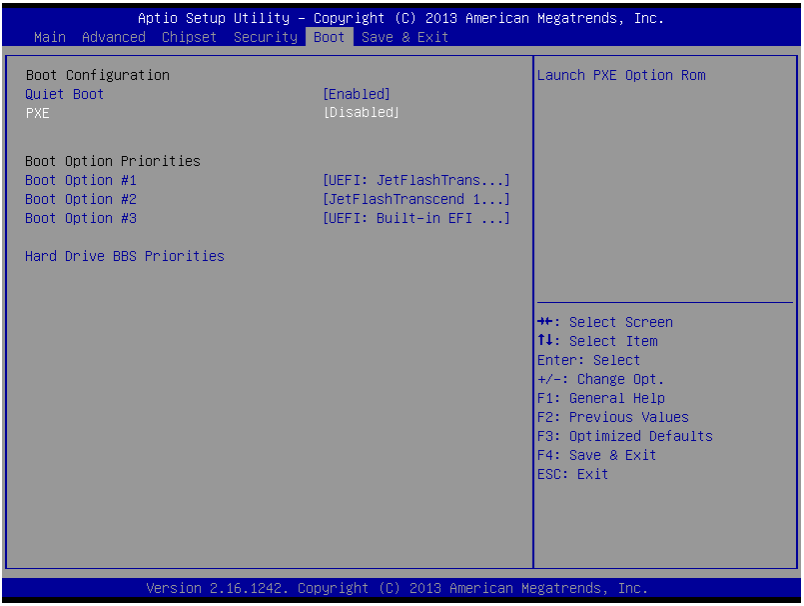
If you highlight these items and press Enter, a dialog box appears which lets you enter a password. You can enter no more than six letters or numbers. Press Enter after you have typed in the password. A second dialog box asks you to retype the password for confirmation. Press Enter after you have retyped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

when the user enters the Setup utility.

Removing the Password

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

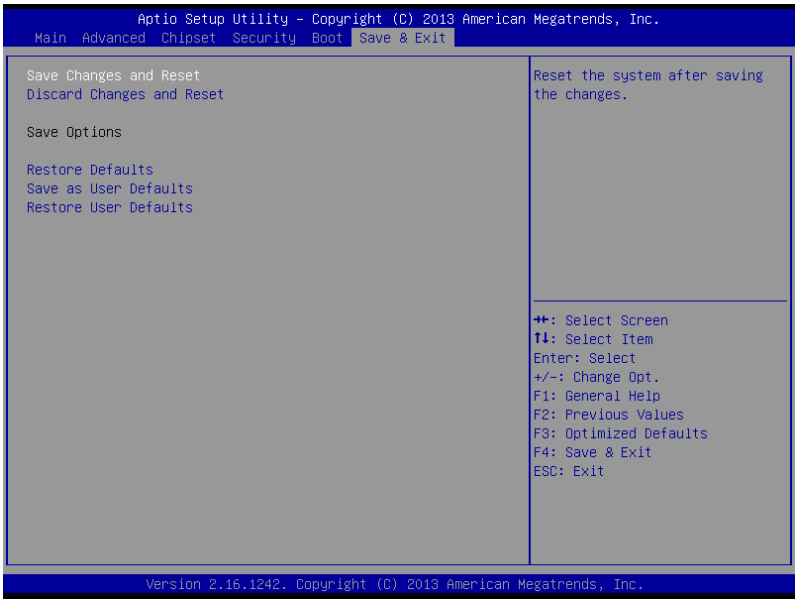
Boot



Options summary:

PXE	Disabled	Default
	Enabled	
En/Disable PXE boot for I211 LAN		
Quiet Boot	Disabled	
	Enabled	Default
En/Disable showing boot logo.		

Exit


Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Main Advanced Chipset Security Boot Save & Exit
Save Changes and Reset
Discard Changes and Reset
Save Options
Restore Defaults
Save as User Defaults
Restore User Defaults
Reset the system after saving the changes.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

Chapter

4

Driver Installation

.

The PICO-BT01 comes with an AutoRun DVD-ROM that contains all the drivers and utilities that needs to be installed.

Insert the DVD, the installation guide will start automatically. If it doesn't, please follow the sequence below to install the drivers.

Follow the sequence below to install the drivers:

Step 1 – Install Chipset Driver

Step 2 – Install VGA Driver

Step 3 – Install LAN Driver

Step 4 – Install Audio Driver

Step 5 – Install TXE Driver

Step 6 – Install USB3.0 Driver

Step 7 – Install MBI Driver

Please refer instructions below for further details.

4.1 Installation

Insert the PICO-BT01 DVD-ROM into the disk drive. And install the drivers from Step 1 to Step 7 in order.

Step 1 – Install Chipset Driver

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

Step 2 – Install VGA Driver

1. Open the ***Step2 - Graphic*** folder and select your OS
2. Open the ***Setup.exe*** file in the folder
3. Follow the instructions
4. Driver will be installed automatically

Step 3 – Install LAN Driver

1. Open the ***Step3 - LAN*** folder followed by the ***I211*** folder
2. Select your OS
3. Open the ***.exe*** file in the folder
4. Follow the instructions
5. Driver will be installed automatically

Step 4 – Install Audio Driver

1. Open the ***Step4 - Audio*** folder and open the

Win7_8-32_64_R273.exe file

2. Follow the instructions
3. Driver will be installed automatically

Step 5 – Install TXE Driver

1. Open the ***Step5 - TXE*** folder and open the ***SetupTXE.exe*** file
2. Follow the instructions
3. Driver will be installed automatically

Step 6 – Install USB3.0 Driver

1. Open the ***Step6 - USB3.0*** folder and open the ***Setup.exe*** file
2. Follow the instructions
3. Driver will be installed automatically

Step 7 – Install MBI Driver

1. Open the ***Step7 - MBI*** folder and open the ***Setup.exe*** file
2. Follow the instructions
3. Driver will be installed automatically

Appendix

A

Programming the Watchdog Timer

A.1 Watchdog Timer Registers

Table 1 : Watch dog relative IO address		
	Default Value	**Note**
I/O Base Address	**0xA00**	I/O Base address for Watchdog operation. This address is assigned by SIO LDN7, register 0x60-0x61.

Table 2 : Watchdog relative register table				
Register	**Offset**	**BitNum**	**Value**	**Note**
Watchdog WDTRST# Enable	**0x00**	**7**	**1**	Enable/Disable time out output via WDTRST# 0: Disable 1: Enable
Pulse Width	**0x05**	**0:1**	**01**	Width of Pulse signal 00: 1ms (do not use) 01: 25ms 10: 125ms 11: 5s ***Pulse width is must longer then 16ms.***
Signal Polarity	**0x05**	**2**	**0**	0: low active 1: high active ***Must set this bit to 0***
Counting Unit	**0x05**	**3**	**0**	Select time unit. 0: second 1: minute
Output Signal Type	**0x05**	**4**	**1**	0: Level 1: Pulse ***Must set this bit to 1***
Watchdog Timer Enable	**0x05**	**5**	**1**	0: Disable 1: Enable
Timeout Status	**0x05**	**6**	**1**	1: timeout occurred. Write a 1 to clear timeout status
Timer Counter	**0x06**			Time of watchdog timer (0~255)

A.2 WatchDog Sample Program

```
*************************************************************************
// WDT I/O operation relative definition (Please reference to Table 1)
#define   WDTAddr        0xA00    // WDT I/O base address
Void   WDTWriteByte(byte Register, byte Value);
byte   WDTReadByte(byte Register);
Void   WDTSetReg(byte Register, byte Bit, byte Val);
// Watch Dog relative definition (Please reference to Table 2)
#define   DevReg          0x00   // Device configuration register
     #define   WDTRstBit   0x80   // Watchdog WDTRST# (Bit7)
     #define   WDTRstVal   0x80   // Enabled WDTRST#
#define   TimerReg       0x05   // Timer register
     #define   PSWidthBit     0x00     // WDTRST# Pulse width (Bit0:1)
     #define   PSWidthVal     0x01     // 25ms for WDTRST# pulse
     #define   PolarityBit    0x02     // WDTRST# Signal polarity (Bit2)
     #define   PolarityVal    0x00     // Low active for WDTRST#
     #define   UnitBit          0x03     // Unit for timer (Bit3)
     #define   ModeBit          0x04     // WDTRST# mode (Bit4)
     #define   ModeVal          0x01     // 0:level 1: pulse
     #define   EnableBit       0x05     // WDT timer enable (Bit5)
     #define   EnableVal       0x01     // 1: enable
     #define   StatusBit       0x06     // WDT timer status (Bit6)
#define   CounterReg   0x06   // Timer counter register
*************************************************************************

*************************************************************************
VOID   Main(){
        // Procedure : AaeonWDTConfig
        // (byte)Timer : Counter of WDT timer.(0x00~0xFF)
        // (boolean)Unit : Select time unit(0: second, 1: minute).
        AaeonWDTConfig(Counter, Unit);

        // Procedure : AaeonWDTEnable
        // This procudure will enable the WDT counting.
        AaeonWDTEnable();
```

```
}
*****************************************************************************

*****************************************************************************
// Procedure : AaeonWDTEnable
VOID   AaeonWDTEnable (){
       WDTEnableDisable(1);
}

// Procedure : AaeonWDTConfig
VOID   AaeonWDTConfig (byte Counter, BOOLEAN Unit){
       // Disable WDT counting
       WDTEnableDisable(0);
       // Clear Watchdog Timeout Status
       WDTClearTimeoutStatus();
       // WDT relative parameter setting
       WDTParameterSetting(Timer, Unit);
}

VOID   WDTEnableDisable(byte Value){
       If (Value == 1)
          WDTSetBit(TimerReg, EnableBit, 1);
       else
          WDTSetBit(TimerReg, EnableBit, 0);
}

VOID   WDTParameterSetting(byte Counter, BOOLEAN Unit){
       // Watchdog Timer counter setting
      WDTWriteByte(CounterReg, Counter);
      // WDT counting unit setting
      WDTSetBit(TimerReg, UnitBit, Unit);
      // WDT output mode set to pulse
      WDTSetBit(TimerReg, ModeBit, ModeVal);
      // WDT output mode set to active low
      WDTSetBit(TimerReg, PolarityBit, PolarityVal);
      // WDT output pulse width is 25ms
      WDTSetBit(TimerReg, PSWidthBit, PSWidthVal);
```

```
        // Watchdog WDTRST# Enable
        WDTSetBit(DevReg, WDTRstBit, WDTRstVal);
}

VOID   WDTClearTimeoutStatus(){
        WDTSetBit(TimerReg, StatusBit, 1);
}
*****************************************************************************

*****************************************************************************
VOID   WDTWriteByte(byte Register, byte Value){
        IOWriteByte(WDTAddr+Register, Value);
}

byte   WDTReadByte(byte Register){
        return IOReadByte(WDTAddr+Register);
}

VOID   WDTSetBit(byte Register, byte Bit, byte Val){
        byte TmpValue;

        TmpValue = WDTReadByte(Register);
        TmpValue &= ~(1 << Bit);
        TmpValue |= Val << Bit;
        WDTWriteByte(Register, TmpValue);
}

*****************************************************************************
```

Appendix

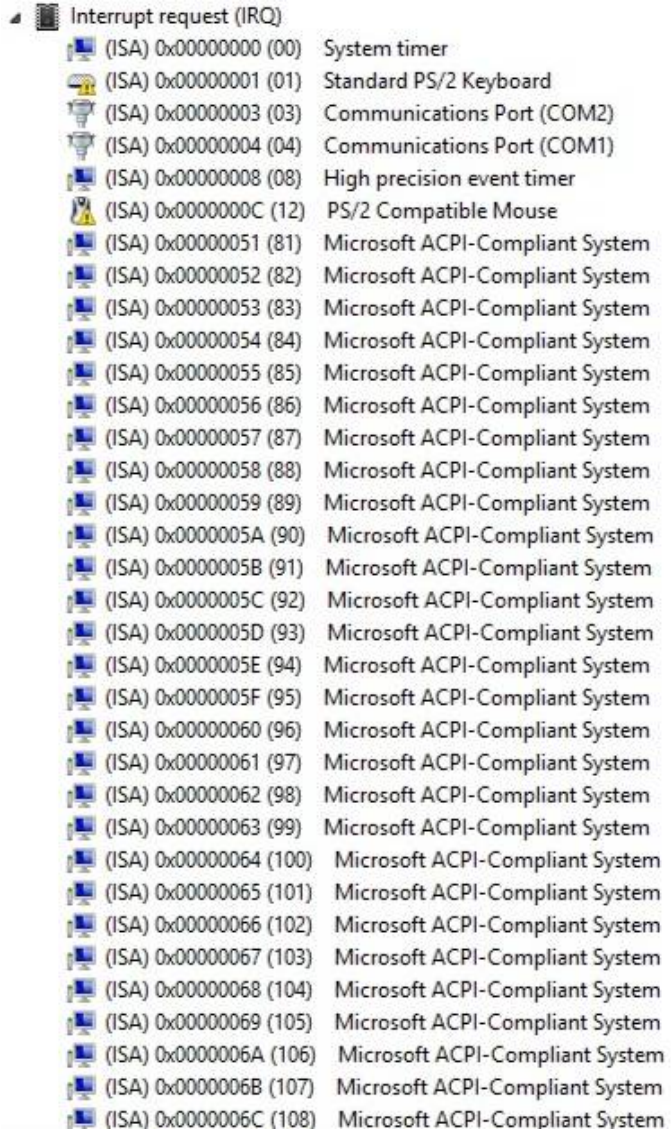
B

I/O Information

B.1 I/O Address Map

B.2 Memory Address Map

B.3 IRQ Mapping Chart



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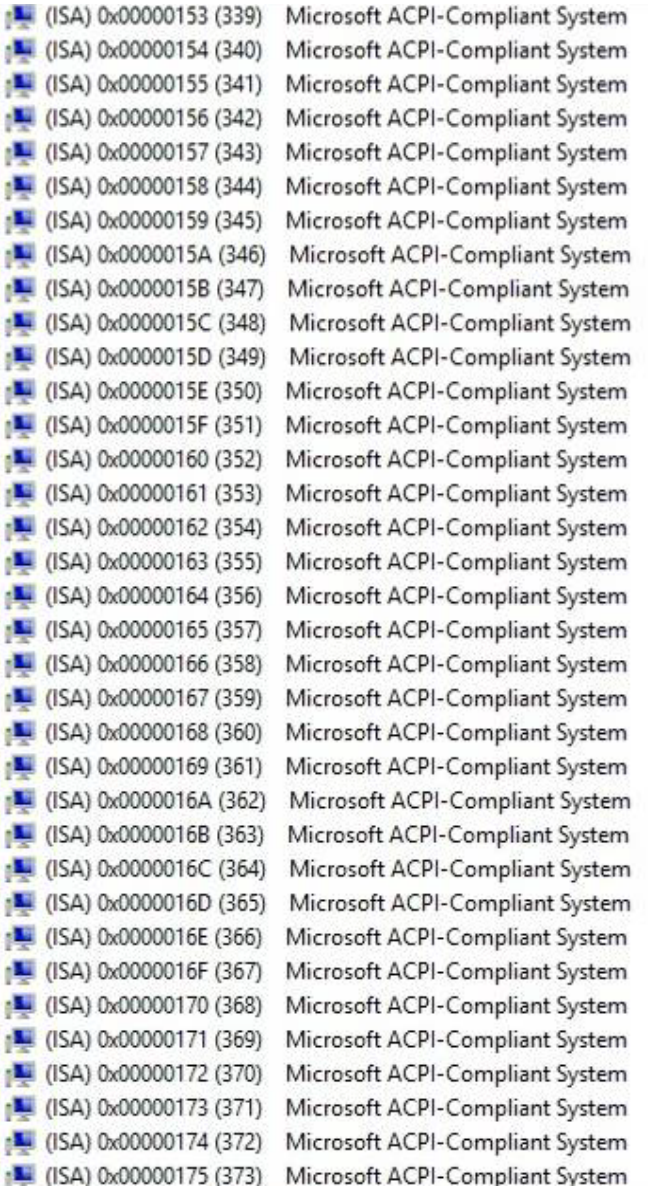
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(ISA) 0x0000019D (413)	Microsoft ACPI-Compliant System
(ISA) 0x0000019E (414)	Microsoft ACPI-Compliant System
(ISA) 0x0000019F (415)	Microsoft ACPI-Compliant System
(ISA) 0x000001A0 (416)	Microsoft ACPI-Compliant System
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(ISA) 0x000001A2 (418)	Microsoft ACPI-Compliant System
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(ISA) 0x000001A7 (423)	Microsoft ACPI-Compliant System
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(ISA) 0x000001A9 (425)	Microsoft ACPI-Compliant System
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(ISA) 0x000001AE (430)	Microsoft ACPI-Compliant System
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(ISA) 0x000001FE (510) Microsoft ACPI-Compliant System
(ISA) 0x000001FF (511) Microsoft ACPI-Compliant System
(PCI) 0x00000005 (05) Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12
(PCI) 0x00000010 (16) Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 1 - 0F48
(PCI) 0x00000011 (17) Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 2 - 0F4A
(PCI) 0x00000012 (18) Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 3 - 0F4C
(PCI) 0x00000013 (19) Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
(PCI) 0x00000013 (19) Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 4 - 0F4E
(PCI) 0x00000016 (22) High Definition Audio Controller
(PCI) 0xFFFFFFF7 (-9) Intel(R) Trusted Execution Engine Interface
(PCI) 0xFFFFFFF8 (-8) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF9 (-7) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFFA (-6) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFFB (-5) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFFC (-4) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFFD (-3) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFFE (-2) Intel(R) USB 3.0 eXtensible Host Controller - 0100 (Microsoft)
Memory
[000A0000 - 000BFFFF] Microsoft Basic Display Adapter
[000A0000 - 000BFFFF] PCI Express Root Complex

Appendix

C

Mating Connector

C.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	Battery	PINREX	712-73-02TWE0	Battery Cable	175011901M
CN2	DDR3 204PIN SKT	FOXCONN	AS0A626-JER6-7H		N/A
CN3	VGA Connector	Astron	HDLH-B15-CFHN1T-1-R		NA
CN4	DPConnector	FOXCONN	13VD51203-D7JJ-7H		NA
CN5	LVDS Port Inverter / Backlight Connector	PINREX	721-94-05TWR9		NA
CN7	LAN Connector	UDE	RT7-17FAAM1A		NA
CN8	Digital IO Port	JST	SM6B-GHS-TB		NA
CN9	Mini-Card Slot (Full-Mini Card)	FOXCONN	AS0B226-S68Q-7H		NA
CN10	USB 3.0 Connector	Contek	UDNFA199N-AY-21-A		NA
CN11	USB Connector	FLYINGWAY	FWT-HPW12008-05M00R	USB Cable	1700050207
CN14	+5V Output for SATA HDD	PINREX	721-81-02TW00	SATA power cable	1702150155
CN15	SATA Port	TechBest	007-01-00757		NA

CN18	LPC Port	PINREX	710-73-12TW01	AAEON LPC Cable	1703120130
CN19	Front Panel Connector	PINREX	222-97-05GBE1	Front Panel Cable	1701100156
CN20	External +12V Input	DINKLE	DT-126VP-S20 16002P	Power cable	170204010R
CN21	Buzzer connector	PINREX	712-73-02TWE 0	Buzzer Cable	170302010C
CN22	BIO connector	Hirose	FX18-80P-0.8S V		N/A
CN23	COM Port 1/2 & line out connector	PINREX	712-94-20TWR 8	COM Port 1/2 & line out cable	1703200153
CN24	Mini-Card Slot (Half-Mini Card)	FOXCONN	AS0B226-S68Q -7H		NA
CN25	LVDS Port	PINREX	712-94-20TWR 8	LVDS cable	170430015A