

BOXER-6951-A01-1010

32.1840.921-00

Fanless Embedded Box PC

User's Manual 1st Ed

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Packing List

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

Item	Quantity
● BOXER-6951-A01-1010/ 32.1840.921-00	1
● Wallmount bracket	2
● Screw Package	1
● RAM Thermal Pad	1
● Phoenix power connector	1
● Product DVD with User's Manual (in pdf) and drivers	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 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. All cables and adapters supplied by AAEON are certified and in accordance with the material safety laws and regulations of the country of sale. Do not use any cables or adapters not supplied by AAEON to prevent system malfunction or fires.
3. Make sure the power source matches the power rating of the device.
4. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
5. Always completely disconnect the power before working on the system's hardware.
6. No connections should be made when the system is powered as a sudden rush of power may damage sensitive electronic components.
7. 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.
8. Always disconnect this device from any AC supply before cleaning.
9. While cleaning, use a damp cloth instead of liquid or spray detergents.
10. Make sure the device is installed near a power outlet and is easily accessible.
11. Keep this device away from humidity.
12. Place the device on a solid surface during installation to prevent falls
13. Do not cover the openings on the device to ensure optimal heat dissipation.
14. Watch out for high temperatures when the system is running.
15. Do not touch the heat sink or heat spreader when the system is running
16. Never pour any liquid into the openings. This could cause fire or electric shock.

17. 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.
18. 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
19. **DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WITH TEMPERATURES BEYOND THE DEVICE'S PERMITTED STORAGE TEMPERATURES (SEE CHAPTER 1) TO PREVENT DAMAGE.**

FCC Statement

Warning!



This device complies with Part 15 FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

Caution:

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

Attention:

Il y a un risque d'explosion si la batterie est remplacée de façon incorrecte. Ne la remplacer qu'avec le même modèle ou équivalent recommandé par le constructeur. Recycler les batteries usées en accord avec les instructions du fabricant et les directives gouvernementales de recyclage.

China RoHS Requirements (CN)

产品中有毒有害物质或元素名称及含量

AAEON Embedded Box PC/ Industrial System

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	○	○	○	○	○	○
外壳	○	○	○	○	○	○
中央处理器 与内存	○	○	○	○	○	○
硬盘	○	○	○	○	○	○
电源	○	○	○	○	○	○
<p>○：表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363-2006 标准规定的限量要求以下。</p> <p>X：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 标准规定的限量要求。</p> <p>备注： 一、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。 二、上述部件物质中央处理器、内存、硬盘、电源为选购品。</p>						

China RoHS Requirement (EN)

Poisonous or Hazardous Substances or Elements in Products
 AAEON Embedded Box PC/ Industrial System

Component	Poisonous or Hazardous Substances or Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
PCB & Other Components	○	○	○	○	○	○
Wires & Connectors for External Connections	○	○	○	○	○	○
Chassis	○	○	○	○	○	○
CPU & RAM	○	○	○	○	○	○
Hard Disk	○	○	○	○	○	○
PSU	○	○	○	○	○	○

O: The quantity of poisonous or hazardous substances or elements found in each of the component's parts is below the SJ/T 11363-2006-stipulated requirement.

X: The quantity of poisonous or hazardous substances or elements found in at least one of the component's parts is beyond the SJ/T 11363-2006-stipulated requirement.

Note: The Environment Friendly Use Period as labeled on this product is applicable under normal usage only

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Chapter 1

Product Specifications

1.1 Specifications

System

- **Processor** Intel® Celeron® 1020E
- **System Memory** DDR3 SO-DIMM x 2, up to 16 GB (4 GB preinstalled)
- **Chipset** Intel® QM77 Express
- **Storage** 2.5" SATA HDD/SSD drive bay x 1
- **Rear I/O Panel**
 - DB-9 x 1 for RS-232/422/485
 - DB-9 x 3 for RS-232
 - DB-15 x 1 for VGA out
 - RJ-45 x 2 for 10/100/1000 base-T
 - USB type A x 2 for USB 3.0 (bootable)
 - USB type A x 3 for USB 2.0 (bootable)
 - Power on/off switch (green LED)
 - 2-pin terminal block x 1 for 24Vdc
 - 2-pin terminal block x 1 for 24Vdc @ 1A power output
 - Ground pin x 1
- **Front Indicators**
 - System LED x 1
 - LAN1 LED x 1
 - LAN2 LED x 1
- **Expansion Slot** PCI with bus master x 2
- **OS Support**
 - Windows® 7 Professional (32/64-bit)
 - Windows® XP Professional (32-bit)
 - Linux 12.3 (32/64-bit, Linux kernel 3.1.x)

Linux 13.1 (32/64-bit, Linux kernel 3.11.x)

Mechanical

- **Construction** Rugged aluminum chassis
- **Mounting** Wall-mounted
Desktop-mounted
- **Dimension (W x H x D)** 214 x 104.3 x 237.8 mm (8.43 x 4.11 x 9.36")
- **Net Weight** 4.2 kg (9.26 lb)

Environmental

- **IP Classification** IP52 (with added dust cover)
- **Operating Temperature** -20 ~ 50°C (-4 ~ 122°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5~95% @ 40°C, non-condensing
- **Anti-Vibration** 1 G_{rms}/ 5 ~ 500 Hz/ Operation- HDD
- **Anti-Shock** 20 G peak acceleration (11 msec. duration)-HDD
- **EMC** EN61000-6-2
EN61000-6-4

Power

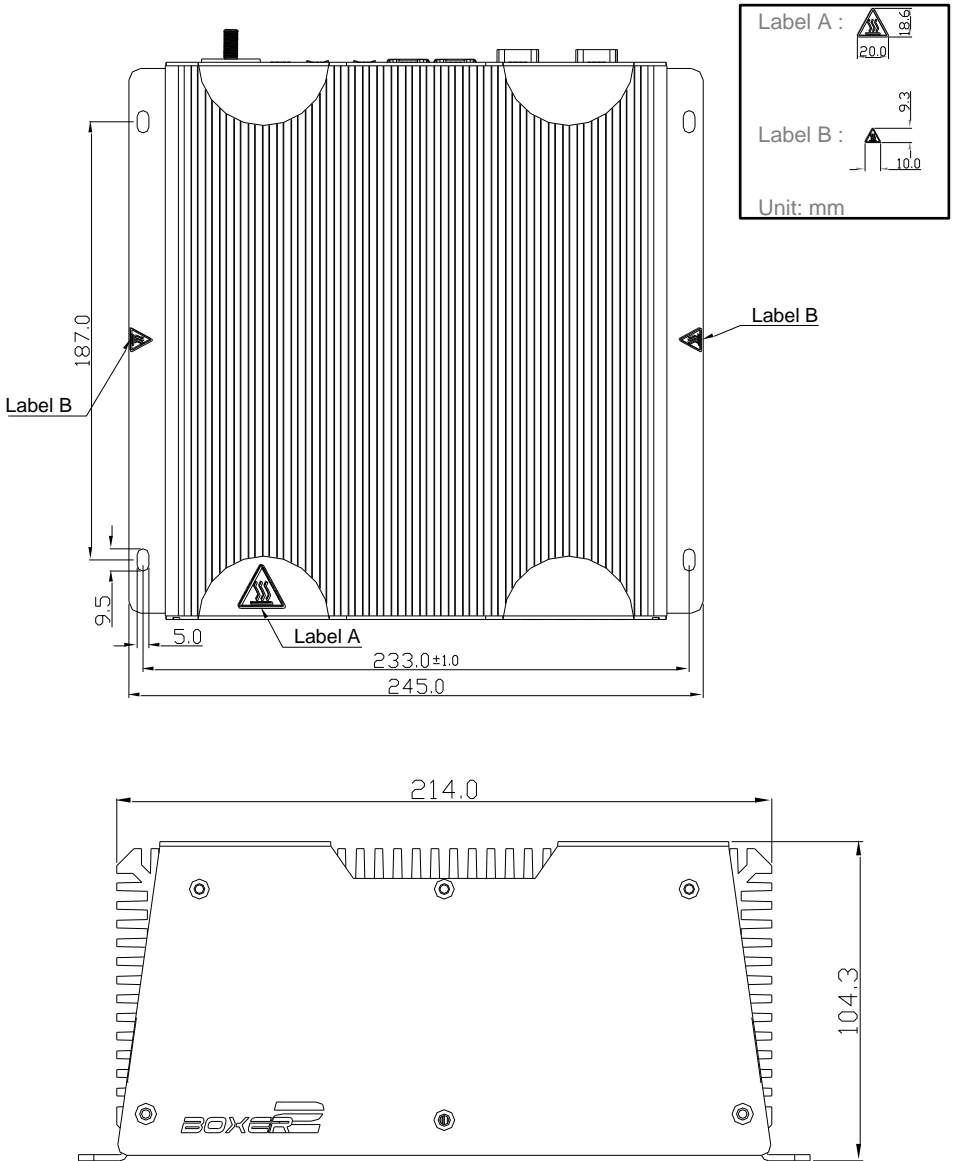
- **DC Input** DC 24 V
- **Power Consumption** 60 W

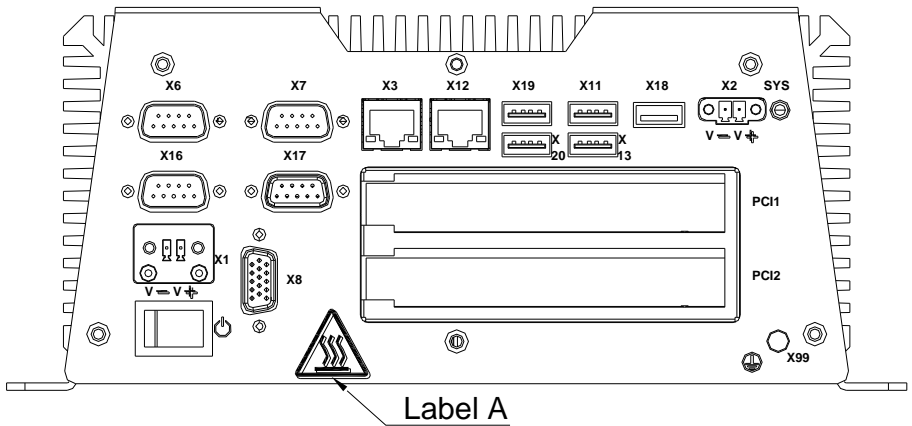
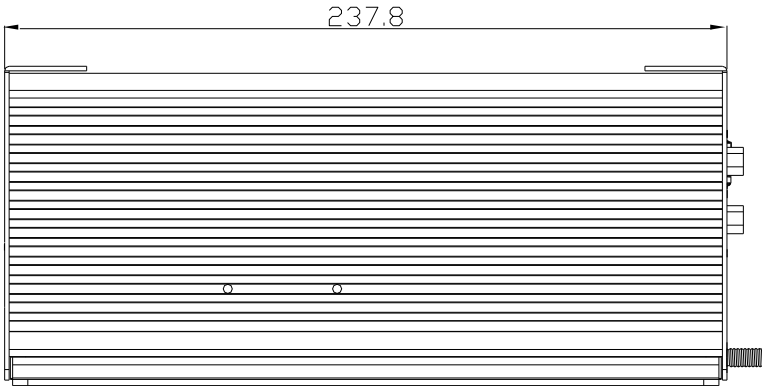
Chapter 2

Hardware Information

2.1 Dimensions and I/O Ports

Chassis



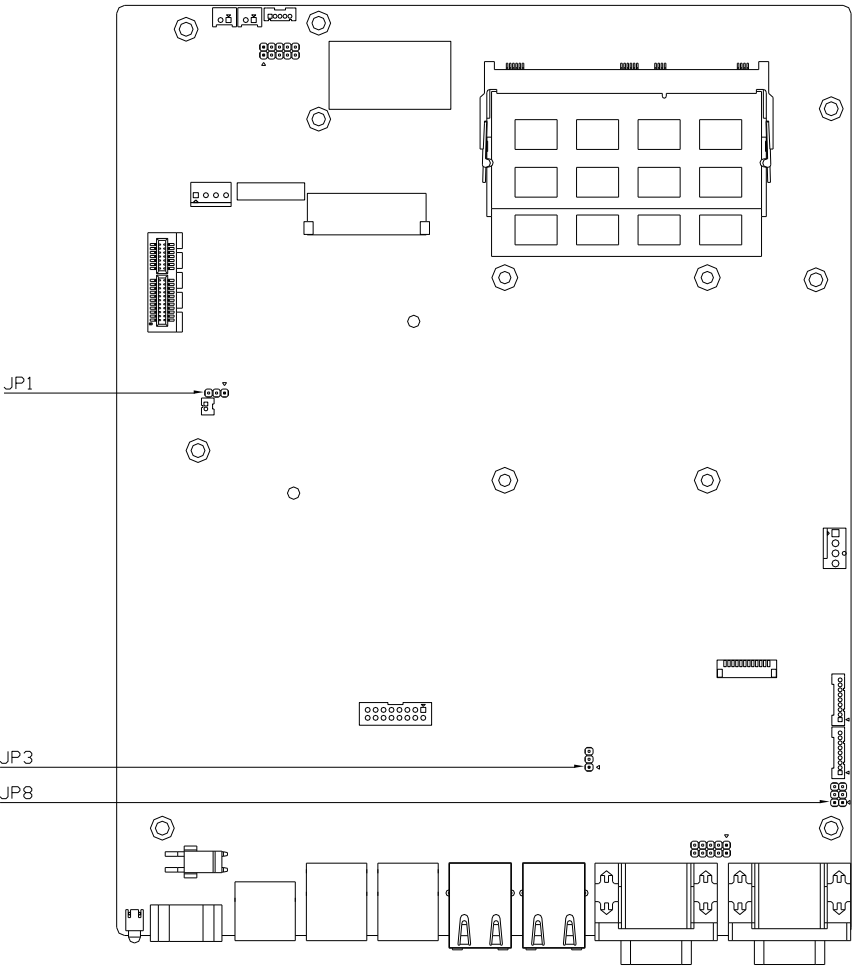


I/O Port List

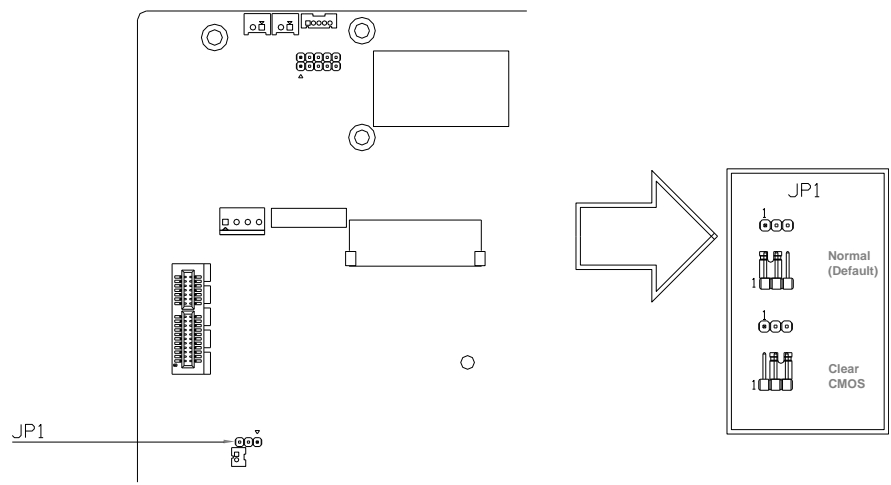
Label	Port
X1	DC-Out (24V)
X2	DC-In (24V)
X3	LAN Port 1
X6	COM2 Port (RS-232/422/485)
X7	COM3 Port (RS-232)
X8	Video Out (VGA)

X11	USB
X12	LAN Port 2
X13	USB
X16	COM1 Port (RS-232)
X17	COM4 Port (RS-232)
X18	USB 2.0 connector for keyboard/ mouse
X19	USB
X20	USB
X99	GND

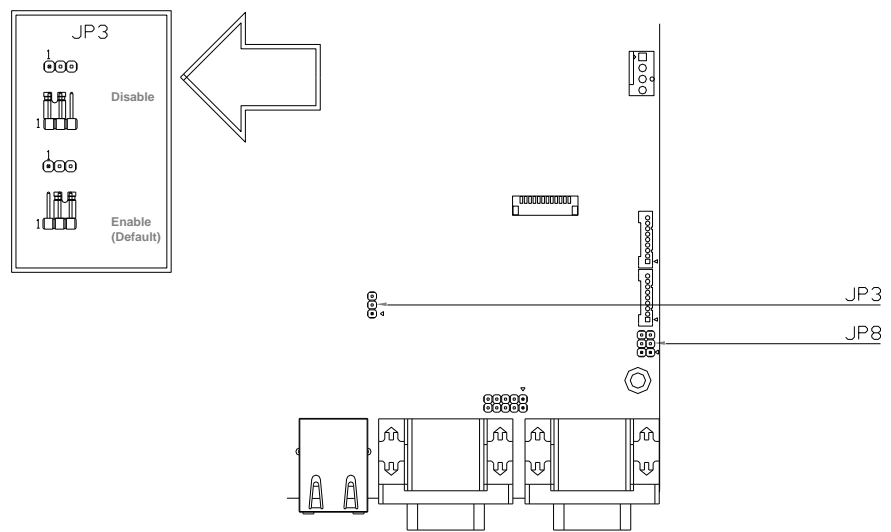
2.2 Jumper Settings



JP1



JP3

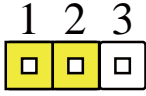


2.3 List of Jumpers

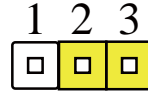
Please refer to the table below for all of the system's jumpers that you can configure for your application

Label	Function
JP1	Clear CMOS
JP3	AT/ATX mode select
JP8	RS-232/ 422/ 485 selection

2.3.1 Clear CMOS (JP1)

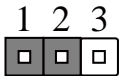


Normal (Default)

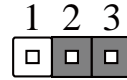


Clear CMOS

2.3.2 Auto Power Button (JP3)



VR Mode (Default)



PWM Mode

2.3.3 COM2 RS232/ RS422/ RS485 selection (JP8)

Pin	Function
1-2/ 3-4/ 5-6	RS232 (Default)
3-4	RS422
5-6	PS485

2.4 List of Connectors

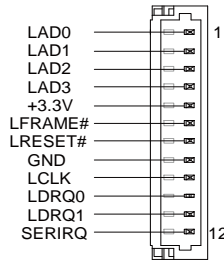
Please refer to the table below for all of the system's connectors that you can configure for your application

Label	Function
CN3	SPI ROM Connector (for debug)
CN23	LPC Debug port
CN29	PCIe slot connector
CN34A	COM1 connector (RS232)
CN34B	COM2 connector (RS232/422/485)
CN35	Dual stack USB connector (3.0/2.0)
CN36	Dual stack USB connector (3.0/2.0)
CN39	Power output
CN42	LAN1 Connector
CN43	LAN2 Connector
CN44	USB 2.0 connector
CN45	DC-in
CN46	MiniCard Connector w/ onboard SIM
CN47	VGA connector
CN48A	COM4 connector (RS232)
CN48B	COM3 connector (RS232)
DIMM1	SO-DIMM connector
DIMM2	SO-DIMM connector
PWR1	SATA Power connector (+12V/ +5V)
PWRSW1	Power Switch
SATA1	SATA connector

2.4.1 SPI ROM connector (for debug) (CN3)

Pin	Signal	Pin	Signal
1	+3.3V	2	GND
3	SPI_CS0	4	SPI_CLK
5	SPI_SO	6	SPI_SI
7	GND	8	NC

2.4.2 LPC Port (CN23)



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
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2.4.3 PCIe Slot Connector (CN29)

Pin	Signal	Pin	Signal
A1	GND	B1	+12V
A2	+12V	B2	+12V
A3	+12V	B3	+12V
A4	GND	B4	GND
A5	NC	B5	SMB_CLK
A6	NC	B6	SMB_DATA
A7	NC	B7	GND
A8	NC	B8	+3.3V
A9	+3.3V	B9	NC
A10	+3.3V	B10	+3.3VAUX
A11	RESET	B11	PCIE_WAKE
A12	GND	B12	NC
A13	CLK_PCIE_SLOT_P1	B13	GND
A14	CLK_PCIE_SLOT_N1	B14	PCIE_TXP4
A15	GND	B15	PCIE_TXN4
A16	PCIE_RXP4	B16	GND
A17	PCIE_RXN4	B17	PRSNT
A18	GND	B18	GND

2.4.4 COM2 connector (RS232/422/485) (CN34B)

RS-232			
Pin	Signal	Pin	Signal
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI		

RS-422			
Pin	Signal	Pin	Signal
1	TXD-	2	RXD+
3	TXD+	4	RXD-
5	GND	6	N/C
7	N/C	8	N/C
9	N/C		

RS-485			
Pin	Signal	Pin	Signal
1	D-	2	N/C
3	D+	4	N/C
5	GND	6	N/C
7	N/C	8	N/C
9	N/C		

2.4.5 Dual stack USB Connector (3.0/ 2.0) (CN35)

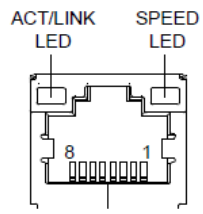
Pin	Signal	Pin	Signal
1	VCC_USB	10	VCC_USB
2	USB_PN2 (2.0)	11	USB_PN3 (2.0)
3	USB_PP2 (2.0)	12	USB_PP3 (2.0)
4	GND	13	GND
5	USB_SSRX2N (3.0)	14	USB_SSRX3N (3.0)
6	USB_SSRX2P (3.0)	15	USB_SSRX3P (3.0)
7	GND	16	GND
8	USB_SSTX2N (3.0)	17	USB_SSTX3N (3.0)
9	USB_SSTX2P (3.0)	18	USB_SSTX3P (3.0)

2.4.6 Dual stack USB Connector (3.0/ 2.0) (CN36)

Pin	Signal	Pin	Signal
1	VCC_USB	10	VCC_USB
2	USB_PN0 (2.0)	11	USB_PN1 (2.0)
3	USB_PP0 (2.0)	12	USB_PP1 (2.0)
4	GND	13	GND
5	USB_SSRX0N (3.0)	14	USB_SSRX1N (3.0)
6	USB_SSRX0P (3.0)	15	USB_SSRX1P (3.0)
7	GND	16	GND

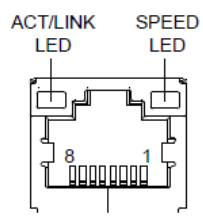
8	USB_SSTX0N (3.0)	17	USB_SSTX1N (3.0)
9	USB_SSTX0P (3.0)	18	USB_SSTX1P (3.0)

2.4.7 LAN1 Connector (CN42)



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

2.4.8 LAN2 Connector (CN43)



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

1	MDIO+	2	MDIO-
---	-------	---	-------

2.4.9 USB 2.0 connector (CN44)

Pin	Signal	Pin	Signal
1	VCC_USB	2	USB_PN5
3	USB_PP5	4	GND

2.4.10 DC-in (CN45)

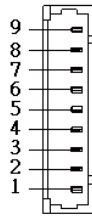
Pin	Signal	Pin	Signal
1	24 V	2	GND

2.4.11 MiniCard Connector w/ onboard SIM (CN46)

Pin	Signal	Pin	Signal
1	PCIE_WAKE#	2	+V3.3A
3	NC	4	GND
5	NC	6	+1.5V
7	PCIE_CLK_REQ#	8	UIM_PWR
9	GND	10	UIM_DATA
11	PCIE_REF_CLK-	12	UIM_CLK
13	PCIE_REF_CLK+	14	UIM_RST
15	GND	16	UIM_VPP
17	NC	18	GND
19	NC	20	W_DISABLE#
21	GND	22	PCIE_RST#

23	PCIE_RX-	24	+V3.3A
25	PCIE_RX+	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PCIE_TX-	32	SMB_DATA
33	PCIE_TX+	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+V3.3A	40	GND
41	+V3.3A	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	+1.5V
49	NC	50	GND
51	NC	52	+V3.3A

2.4.12 VGA Connector (CN47)



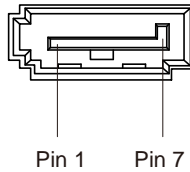
Pin	Signal	Pin	Signal
1	CRT_RED	2	CRT_GREEN
3	CRT_BLUE	4	NC
5	GND	6	GND
7	GND	8	GND

9	+5V	10	CRT_PLUG
11	NC	12	DDC_DATA
13	CRT_HSYNC	14	CRT_VSYNC
15	DDC_CLK	16	GND

2.4.13 SATA Power connector (+12V/ +5V) (PWR1)

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

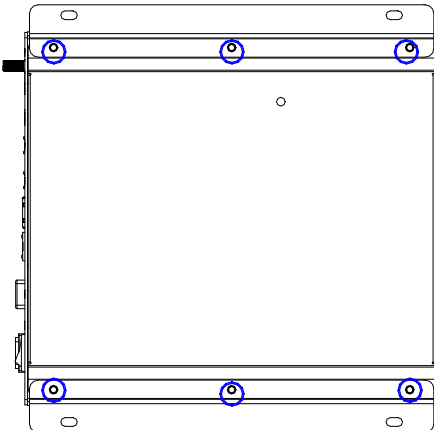
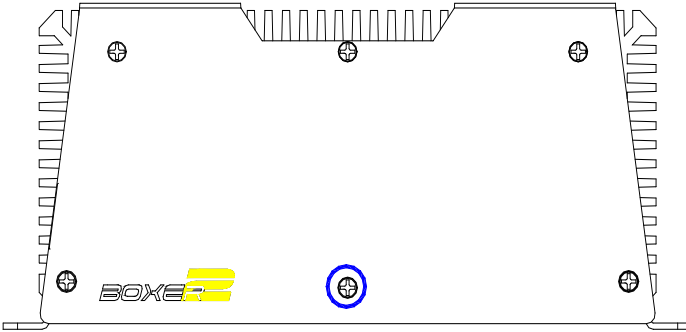
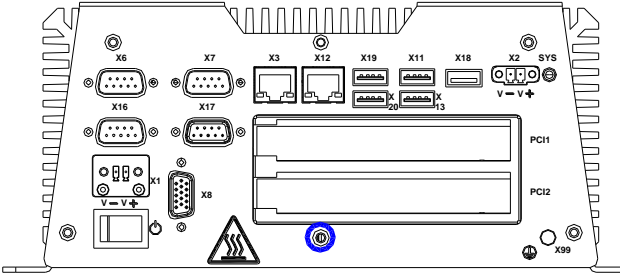
2.4.14 SATA Connector (SATA1)



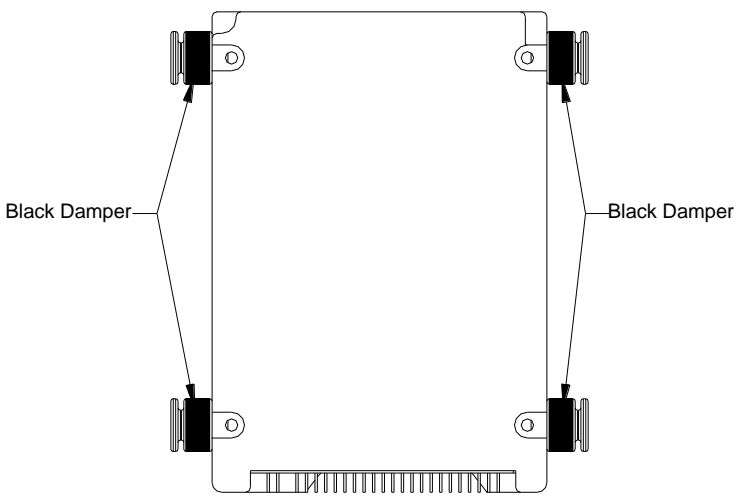
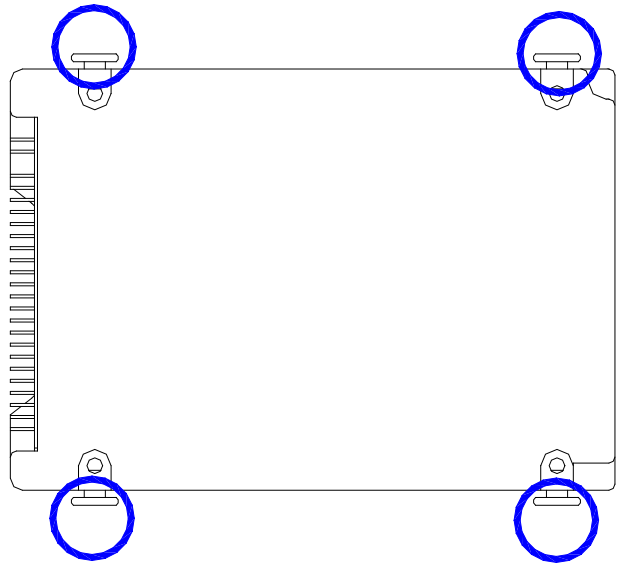
Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	SATA_TX+	DIFF	
3	SATA_TX-	DIFF	
4	GND	GND	
5	SATA_RX-	DIFF	
6	SATA_RX+	DIFF	
7	GND	GND	

2.5 Hard Disk Drive Installation

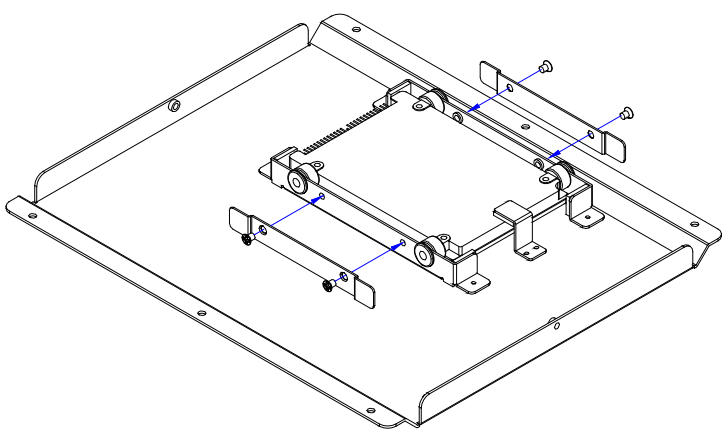
1. Remove the highlighted screws to access the device's interior



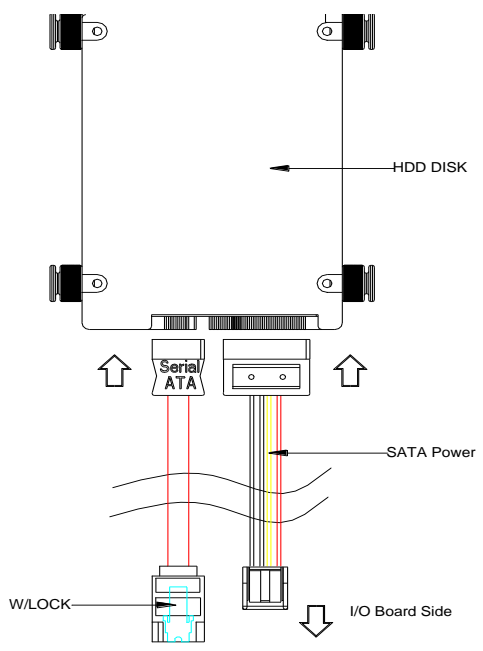
2. Attach 4 screws onto the HDD with dampers



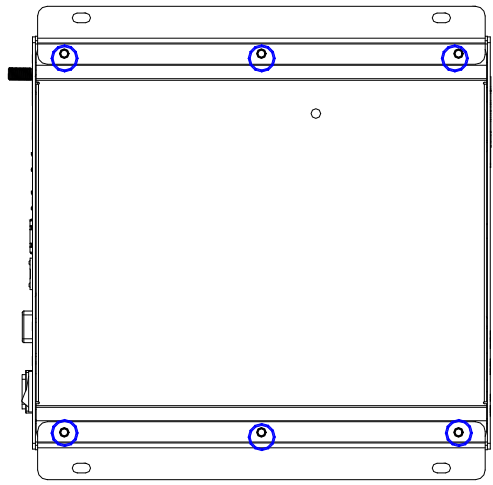
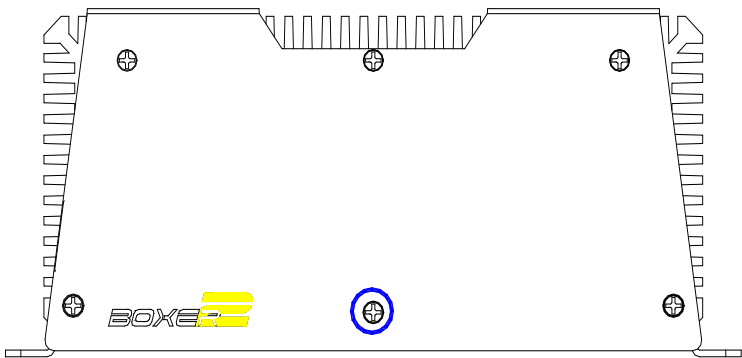
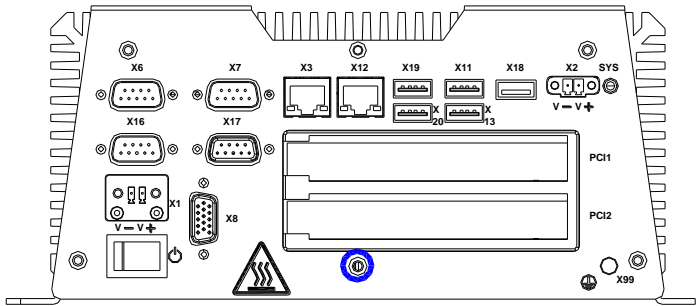
- 3. Place the assembled HDD onto the base of the device and attach the damper brackets with screws.



- 4. Attach the SATA cables.

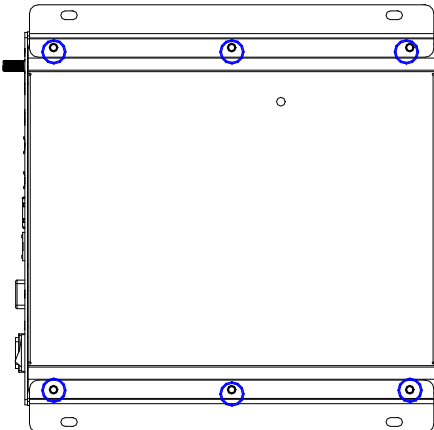
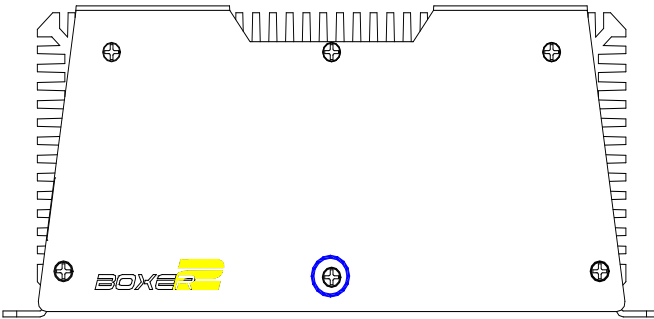
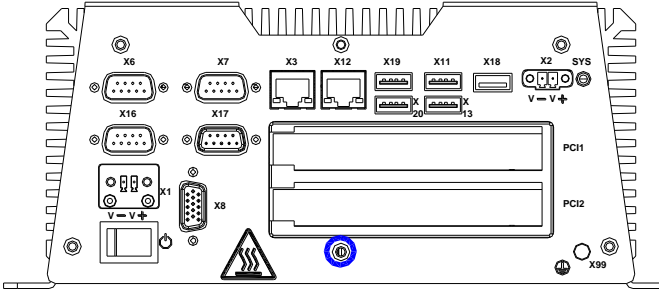


5. Re-secure the highlighted screws to close the device

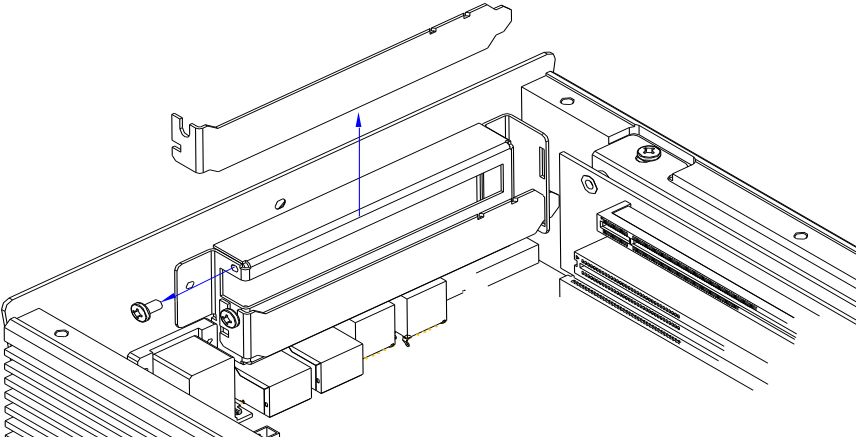


2.6 PCI Card Installation

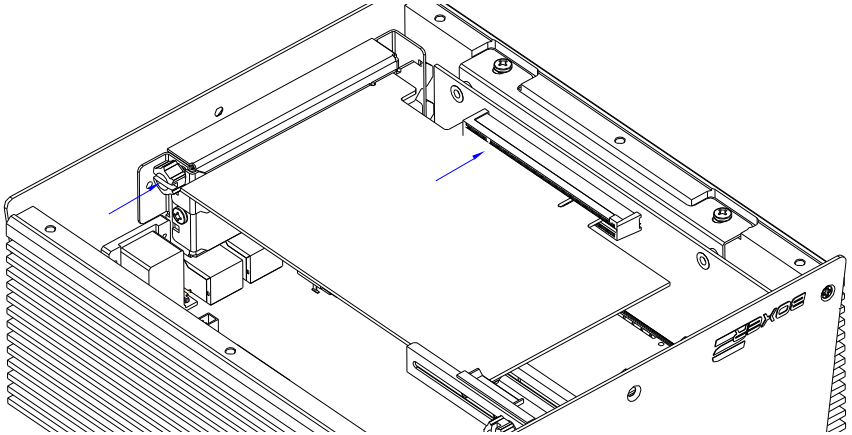
1. Remove the highlighted screw to access the device's interior



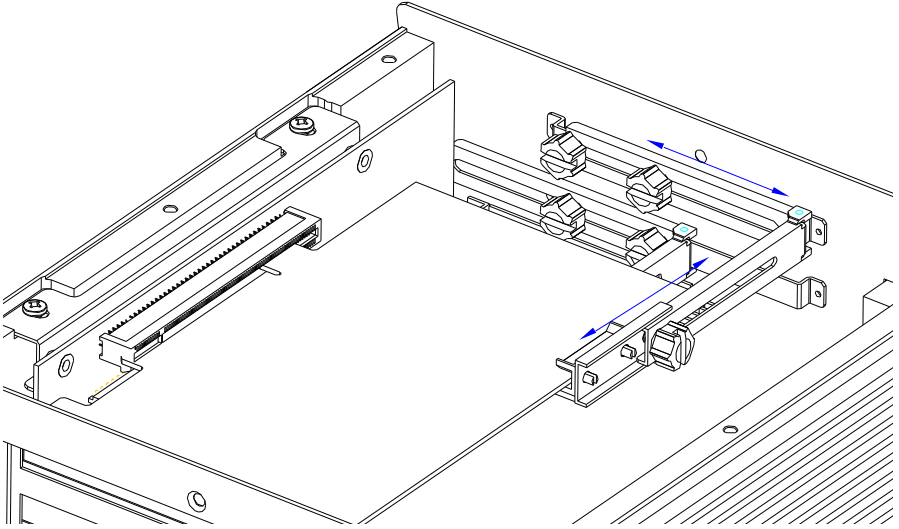
2. Remove the PCI card cover and keep the removed screw for use later



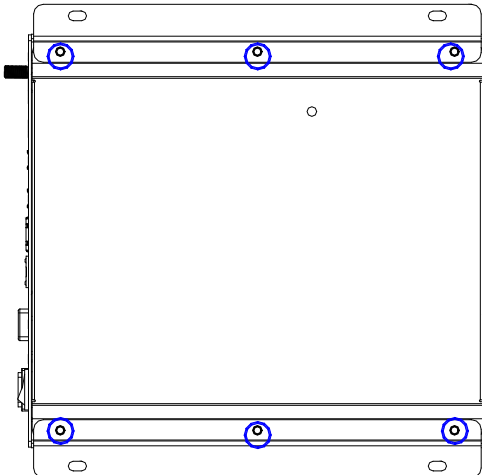
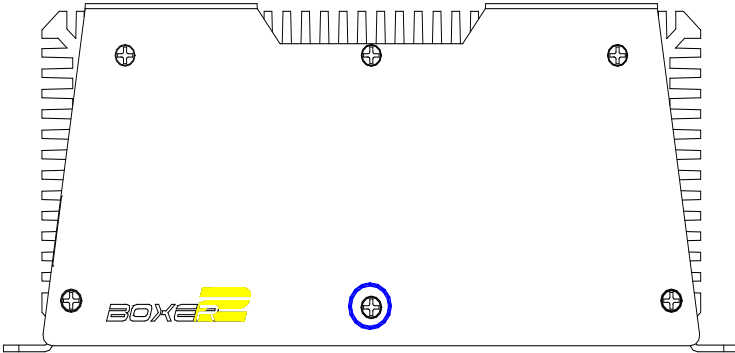
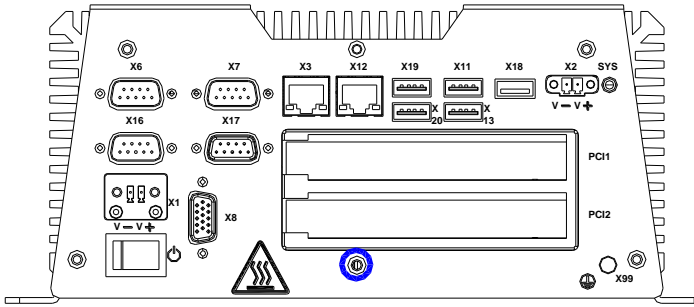
3. Slot the card into the PCI slot and secure with the screw removed in step 2



- Slide the mortise to secure the card into position

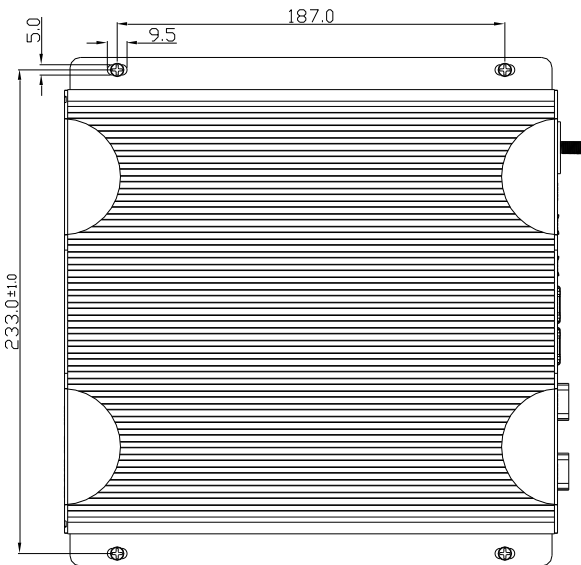
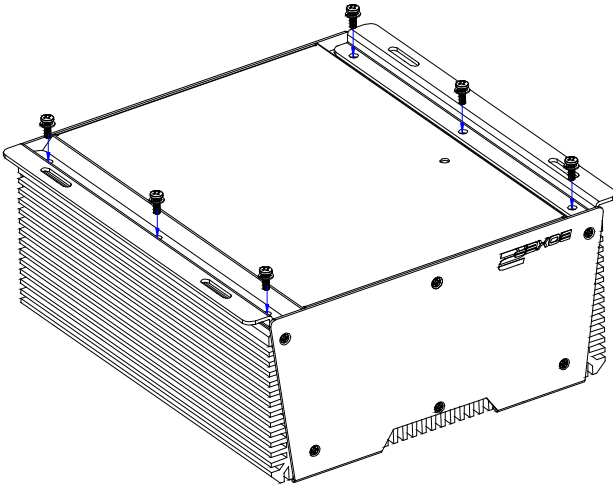


5. Re-secure the highlighted screws to close the device



2.7 Wallmount Kit Installation

1. To install the wallmount kit, simply secure two brackets to the bottom of the device as shown in the diagram below.



Chapter 3

AMI BIOS Setup

3.1 System Test and Initialization

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

The system configuration verification routines check the current system configuration against the values stored in the CMOS memory. If they do not match, an error message will be outputted, in which case you will need to run the BIOS setup program to set the configuration information in memory.

There are three situations in which you will need to change the CMOS settings:

- You are starting your system for the first time
- You have changed your system's hardware
- The CMOS memory has lost power and the configuration information is erased

The system's CMOS memory uses a backup battery for data retention, which is to be replaced once emptied.

3.2 AMI BIOS Setup

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

To enter BIOS Setup, press immediately while your computer is powering up.

The function for each interface can be found below.

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

Advanced – Enable/ Disable boot option for legacy network devices

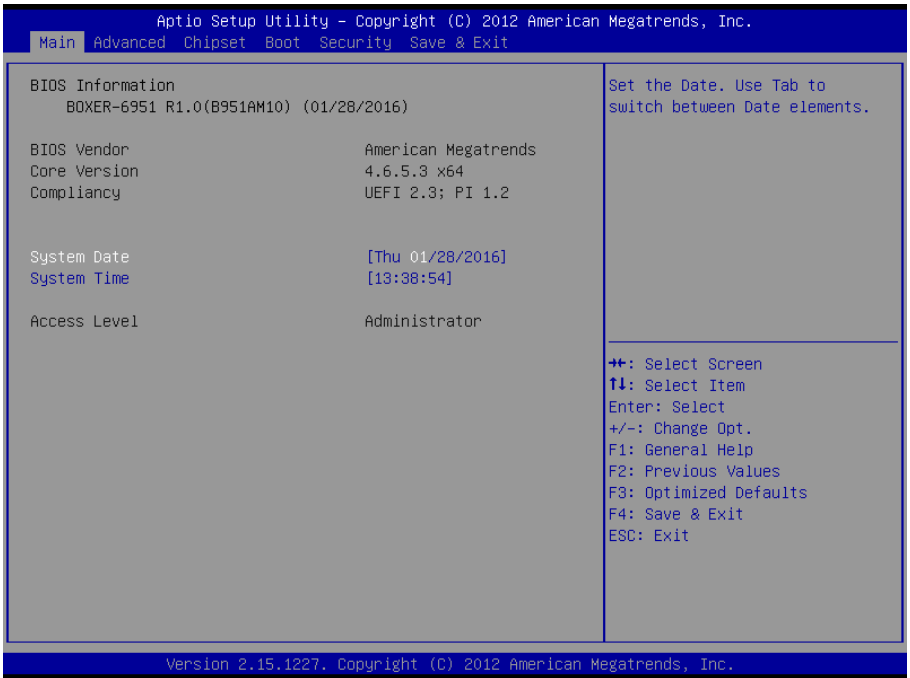
Chipset – For hosting bridge parameters

Boot – Enable/ Disable quiet Boot Option

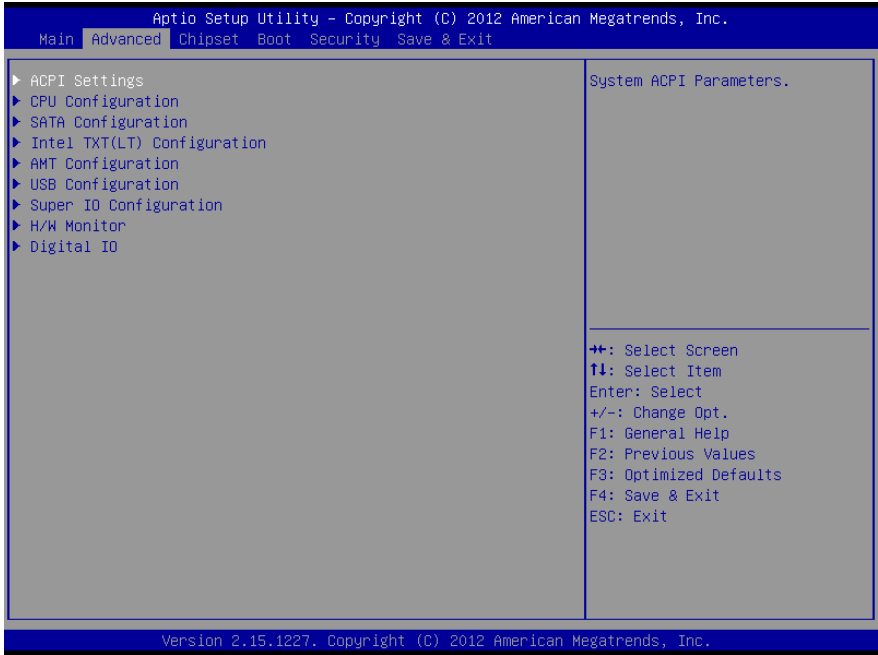
Security – The setup administrator password can be set here

Save & Exit – Save your changes and exit the program

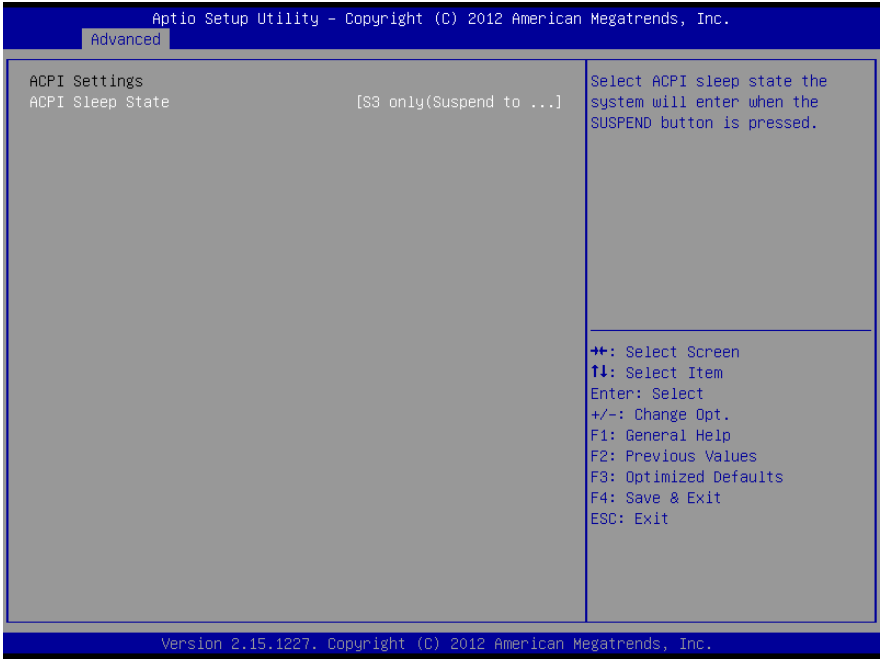
3.3 Setup Submenu: Main



3.4 Setup Submenu: Advanced



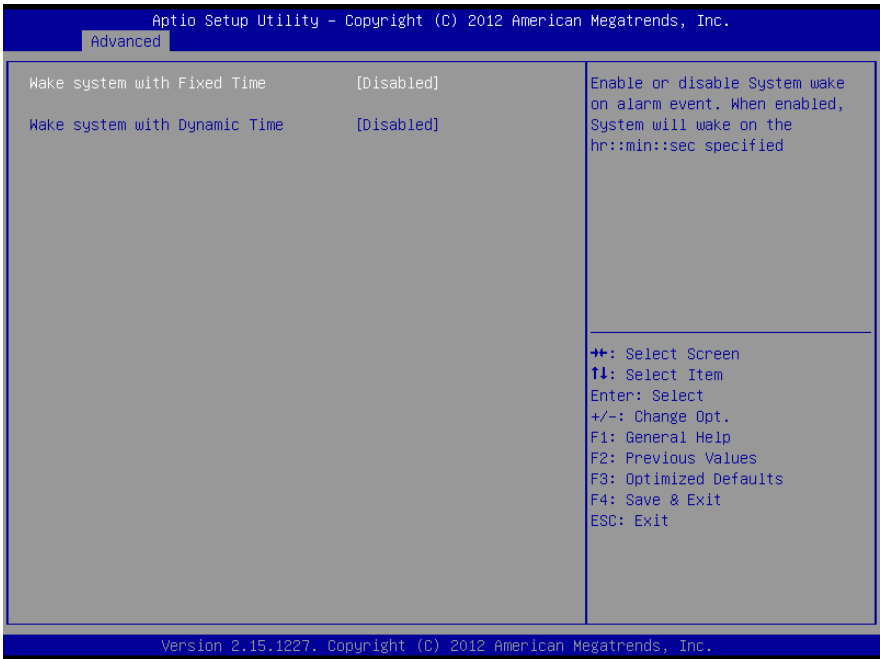
3.4.1 Advanced: ACPI Settings



Options summary:

ACPI Sleep State	Suspend Disable	Optimal Default, Failsafe Default
	S1 only(CPU Stop Clock)	
	S3 only(Suspend to RAM)	
Select ACPI sleep state the system will enter when the SUSPEND button is pressed.		

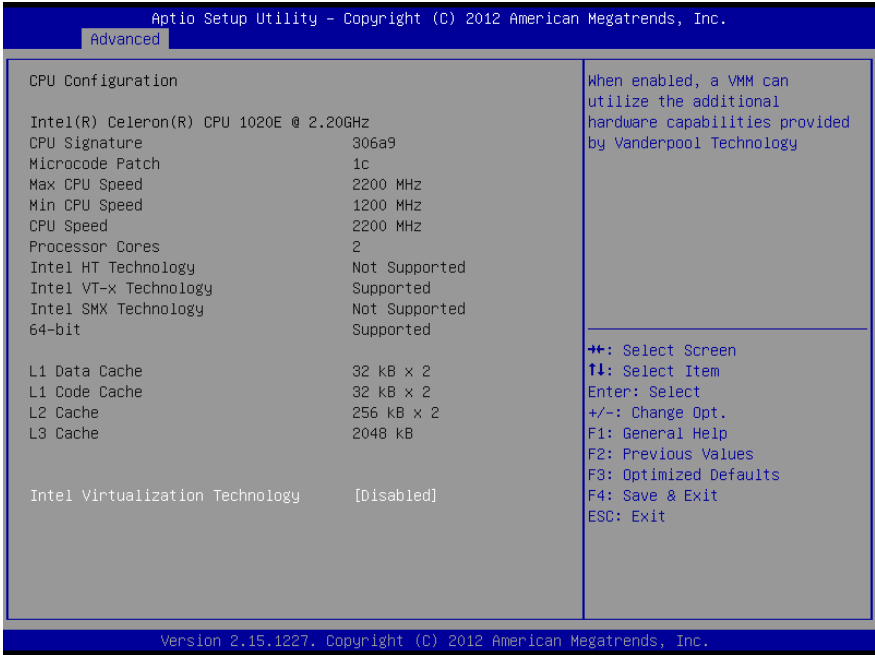
3.4.2 Advanced: RTC Wake Settings



Options summary:

Wake system with Fixed Time	Disabled	Optimal Default, Failsafe Default
	Enable	
Enable or disable System wake on alarm event. When enabled, System will wake on the hr::min::sec specified		
Wake system with Dynamic Time	Disabled	Optimal Default, Failsafe Default
	Enable	
Enable or disable System wake on alarm event. When enabled, System will wake on the current time + Increase minute(s)		

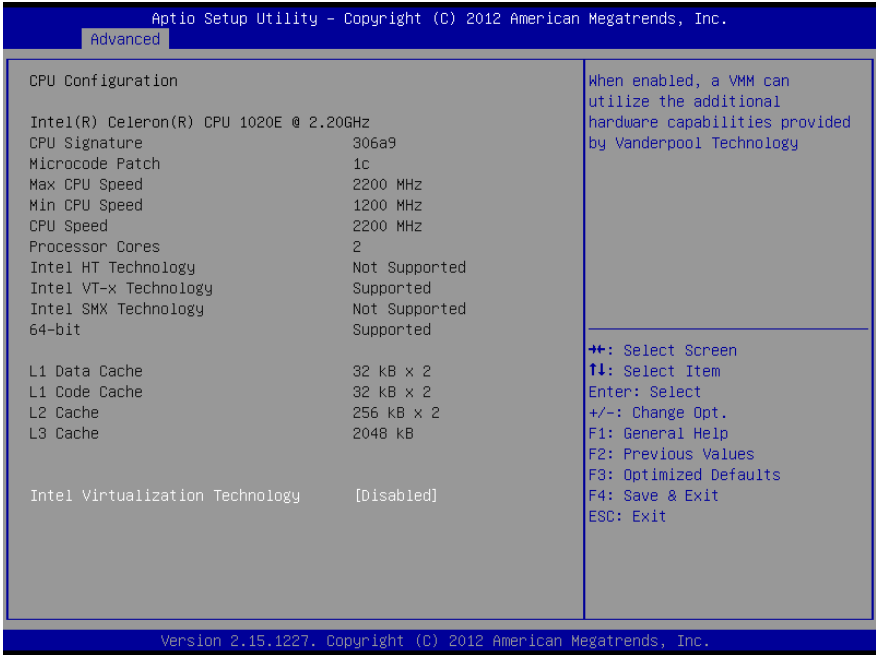
3.4.3 Advanced: CPU Configuration



Options summary:

Hyper-Threading	Disabled	Optimal Default, Failsafe Default
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology		

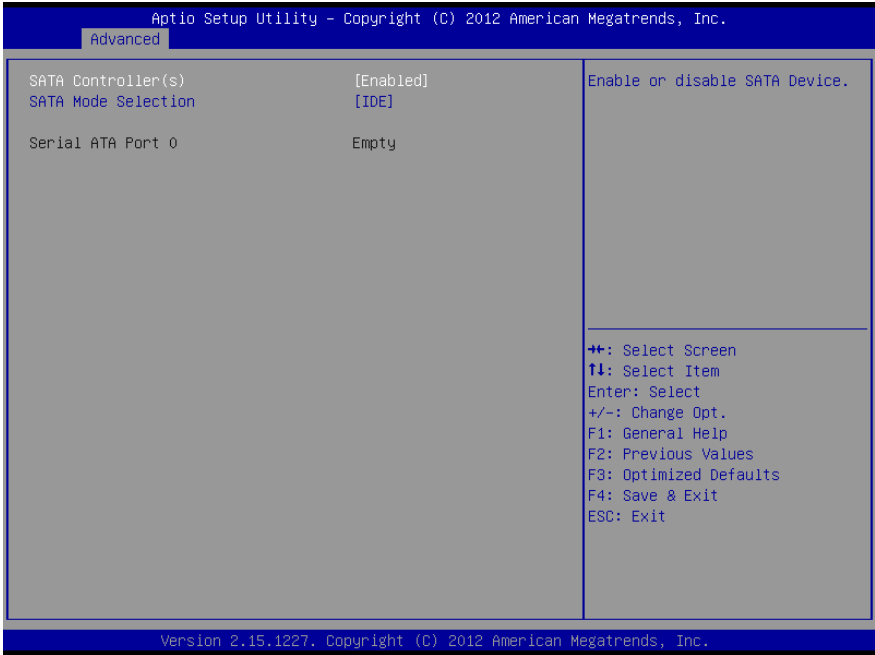
3.4.4 Advanced: CPU Configuration



Options summary:

Hyper-Threading	Disabled	Optimal Default, Failsafe Default
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology		

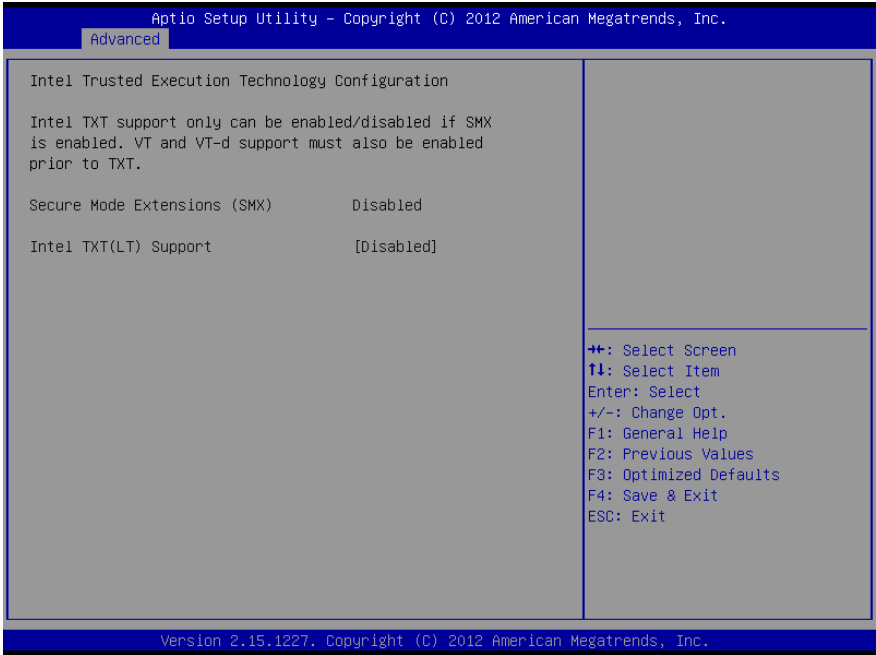
3.4.5 Advanced: AMT Configuration



Options summary:

SATA Controllers	Enable	Optimal Default, Failsafe Default
	Disable	
En/Disable SATA Controller		
SATA Mode Selection	IDE	Optimal Default, Failsafe Default
	AHCI	
Determines how SATA controller(s) operate.		

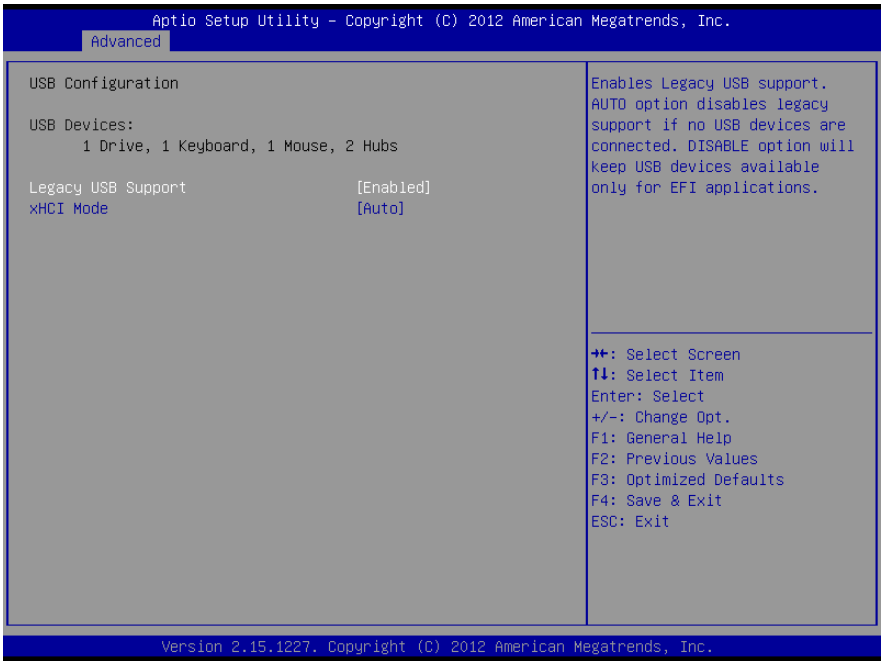
3.4.6 Advanced: Intel TXT (LT) Configuration



Options summary:

Secure Mode Extensions (SMX)	Disable	Optimal Default, Failsafe Default
Intel TXT(LT) Support	Disable	Optimal Default, Failsafe Default

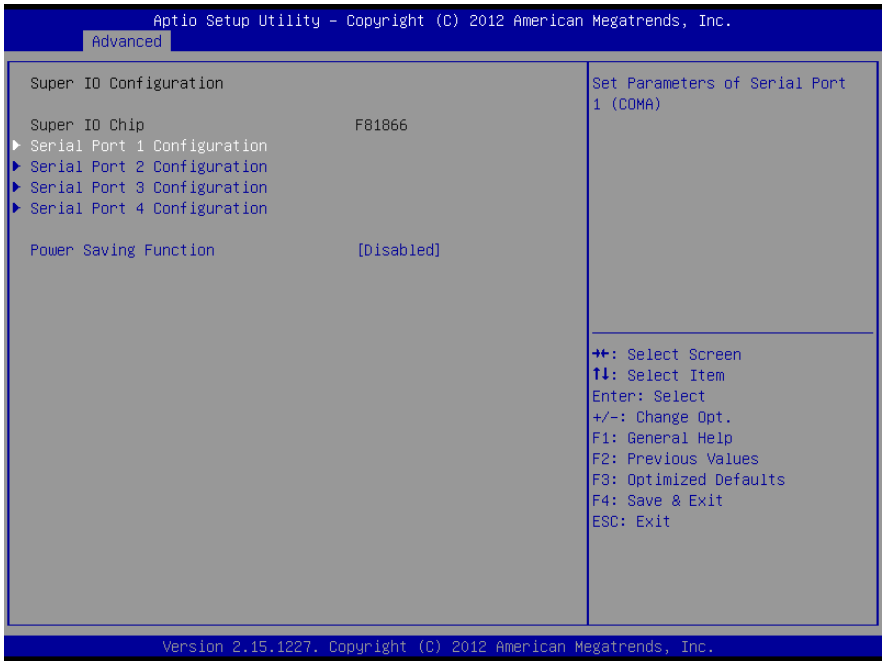
3.4.7 Advanced: USB Configuration



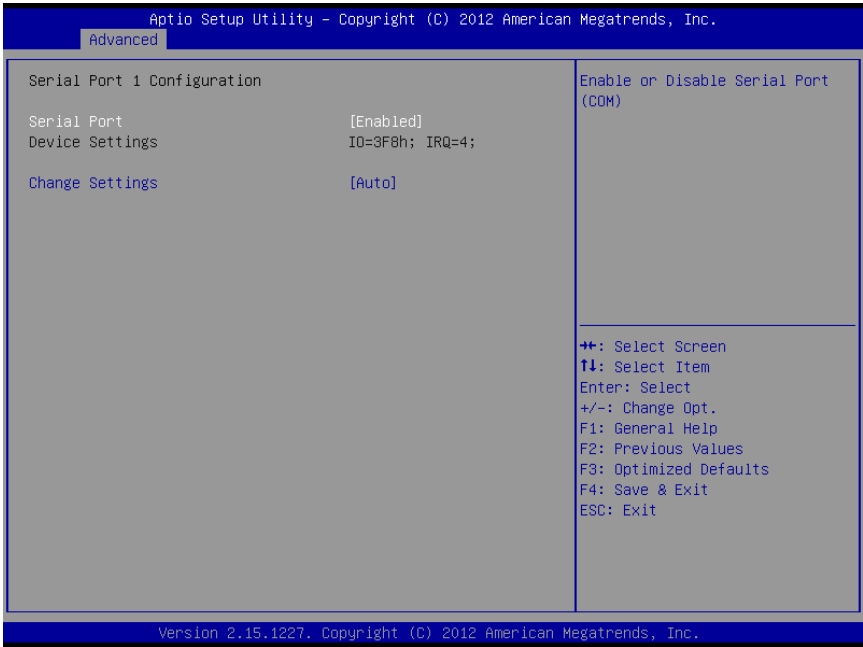
Options summary:

Legacy USB Support	Enable	Optimal Default, Failsafe Default
	Disable	
	Auto	
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.		
xHCI Mode	Auto	Optimal Default, Failsafe Default
	Enabled	
	Disable	
Mode of operation of xHCI controller.		

3.4.8 Advanced: Super IO Configuration



3.4.8.1 Super IO Configuration: Serial Port 1 Configuration



Options summary:

Serial Port	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable or Disable Serial Port (COM)		
Change Settings	Auto	Optimal Default, Failsafe Default
	IO=3F8h; IRQ=4	
	IO=3F8h; IRQ=3,4	
	IO=2F8h; IRQ=3,4	
	IO=3E8h; IRQ=3,4	
	IO=2E8h; IRQ=3,4	
Select an optimal setting for Super IO device.		

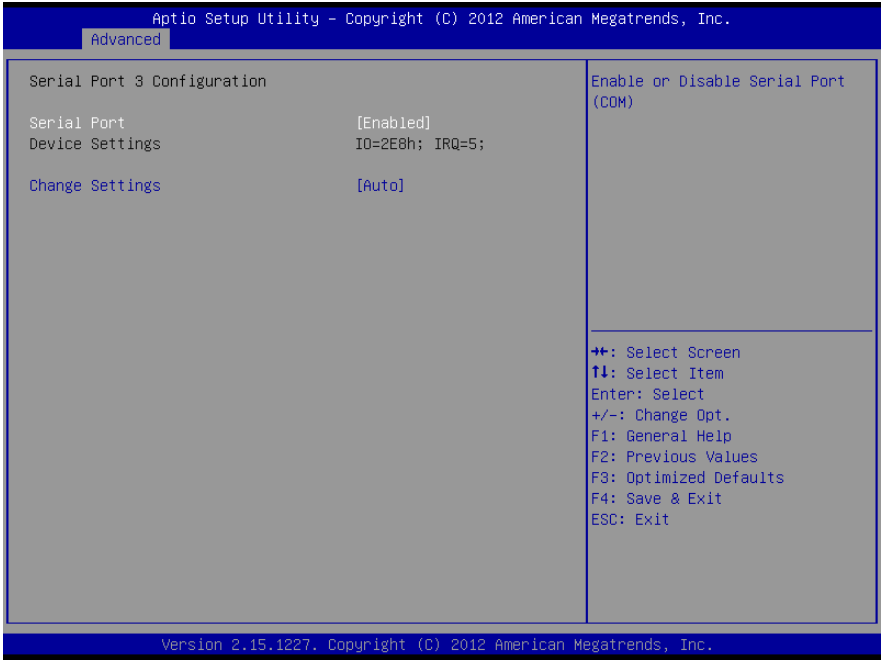
3.4.8.2 Super IO Configuration: Serial Port 2 Configuration



Options summary:

Serial Port	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable or Disable Serial Port (COM)		
Change Settings	Auto	Optimal Default, Failsafe Default
	IO=2F8h; IRQ=3	
	IO=3F8h; IRQ=3,4	
	IO=2F8h; IRQ=3,4	
	IO=3E8h; IRQ=3,4	
	IO=2E8h; IRQ=3,4	
Select an optimal setting for Super IO device.		
Device Type	RS232	Optimal Default, Failsafe Default
	RS422	
	RS485	
Select RS232, RS422 or RS485		

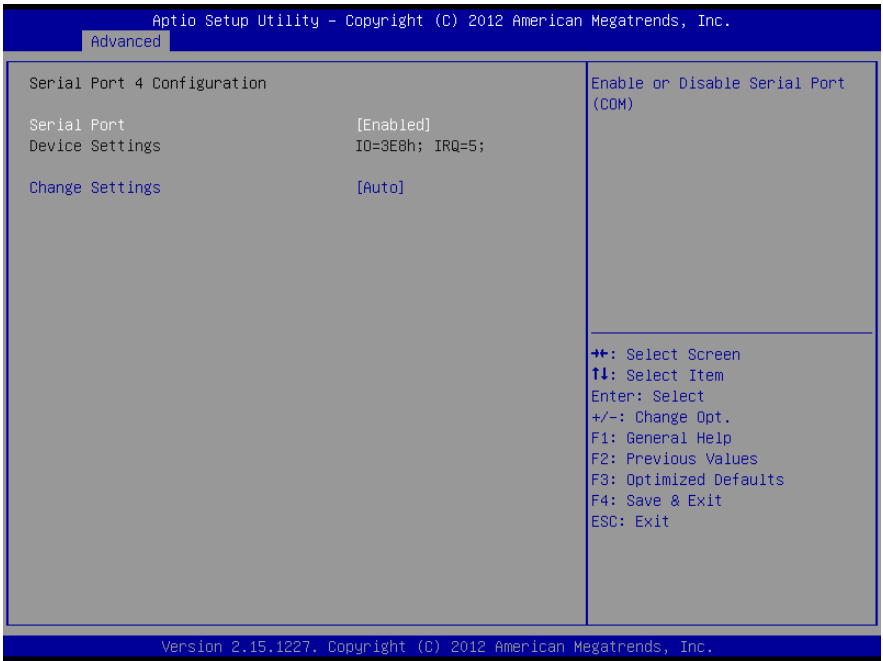
3.4.8.3 Super IO Configuration: Serial Port 3 Configuration



Options summary:

Serial Port	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable or Disable Serial Port (COM)		
Change Settings	Auto	Optimal Default, Failsafe Default
	IO=2E8h; IRQ=5	
	IO=3E8h; IRQ=5	
	IO=2D0h; IRQ=5	
	IO=2D8h; IRQ=5	
Select an optimal setting for Super IO device.		

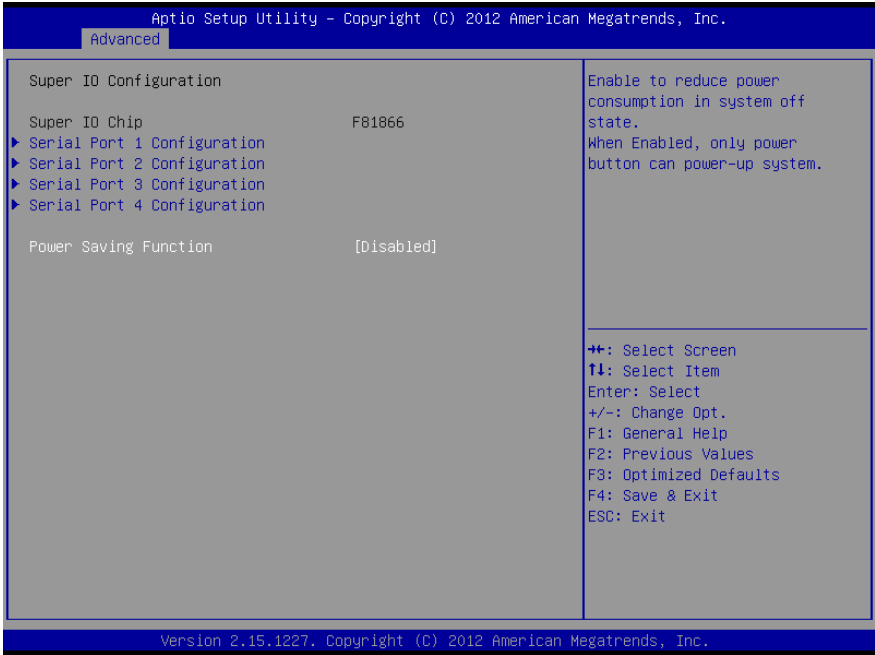
3.4.8.4 Super IO Configuration: Serial Port 4 Configuration



Options summary:

Serial Port	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable or Disable Serial Port (COM)		
Change Settings	Auto	Optimal Default, Failsafe Default
	IO=3E8h; IRQ=5	
	IO=2E8h; IRQ=5	
	IO=2D0h; IRQ=5	
	IO=2D8h; IRQ=5	
Select an optimal setting for Super IO device.		

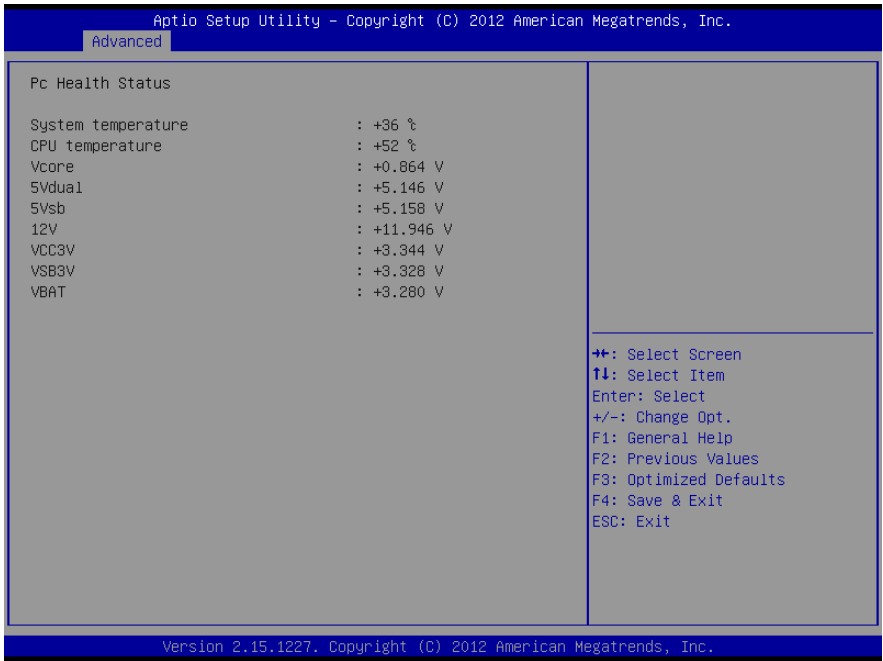
3.4.8.5 Super IO Configuration: Power Saving Function



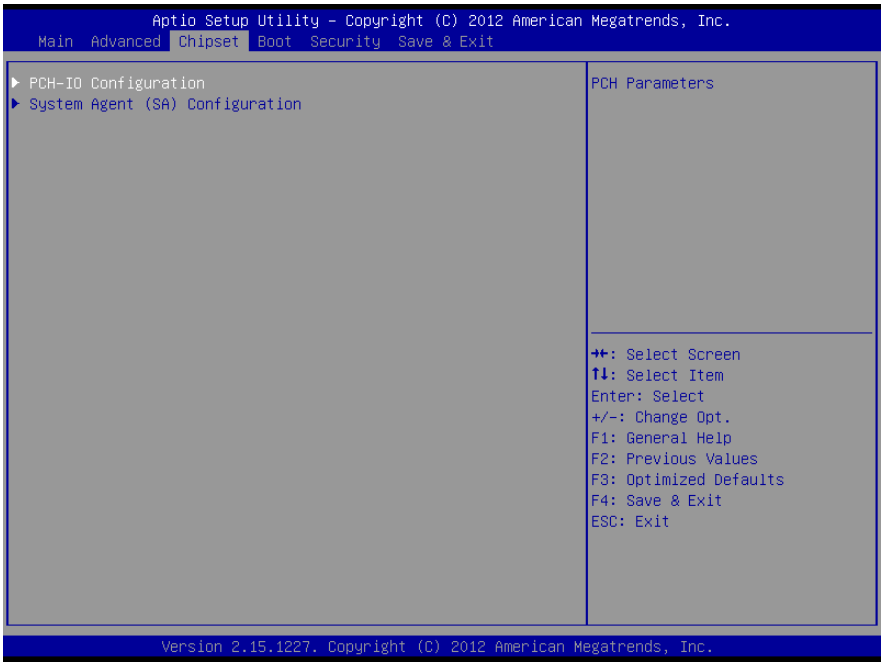
Options summary:

Power Saving Function	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable to reduce power consumption in system off state When Enabled, only power button can power-up system.		

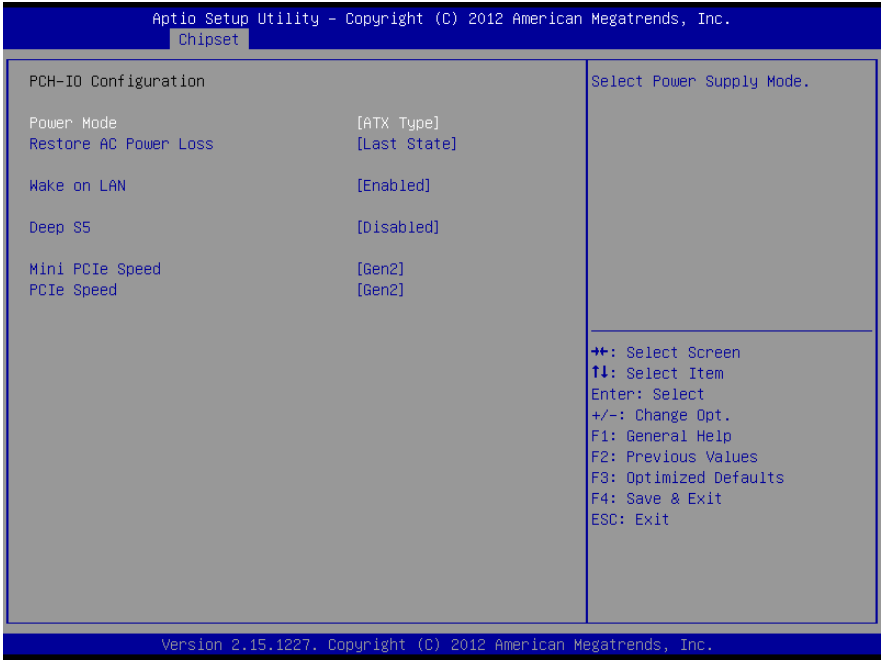
3.4.9 Advanced: Hardware Monitor



3.5 Setup submenu: Chipset



3.5.1 Chipset: PCH-IO Configuration

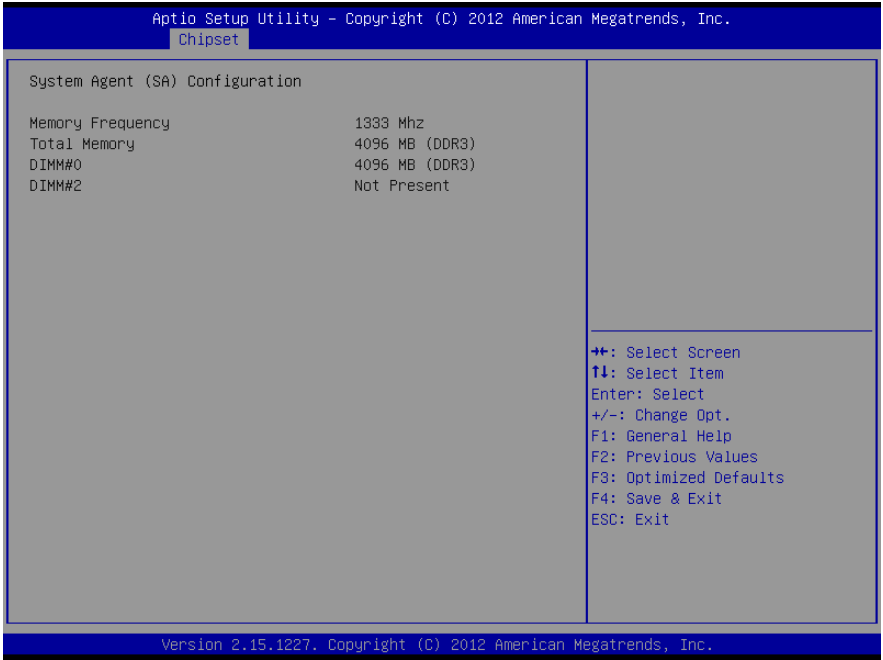


Options summary:

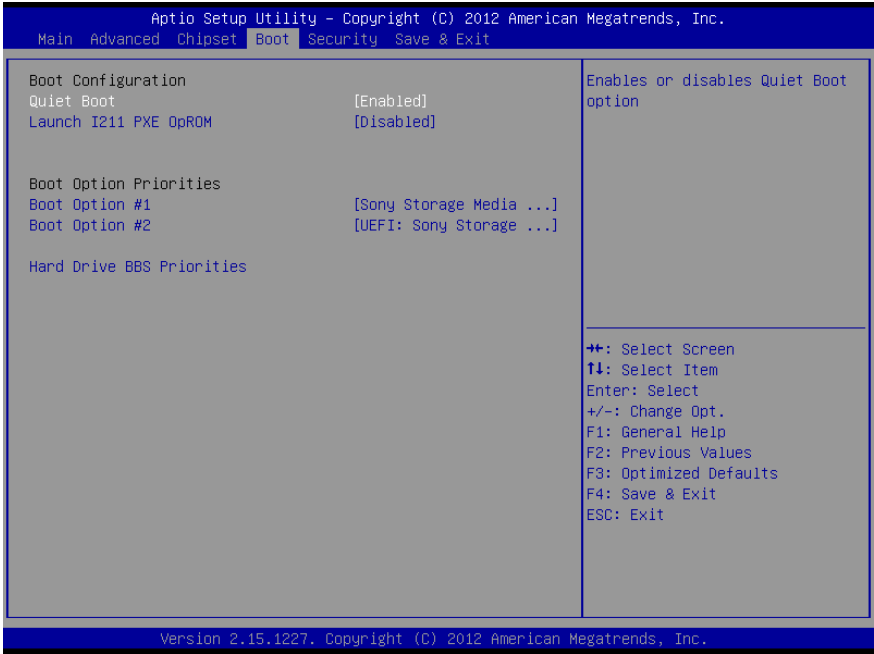
Power Mode	ATX Type	Optimal Default, Failsafe Default
	AT Type	
Select Power Supply Mode.		
Restore AC power Loss	Power Off	Optimal Default, Failsafe Default
	Power On	
	Last State	
Select AC power state when power is re-applied after a power failure.		
Wake on LAN	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable or disable integrated LAN to wake the system. (The Wake On LAN cannot be disabled if ME is on at Sx state.)		
Deep S5	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled/Disabled Deep S5.\n\nNote :\nWhen Deep S5 is enabled, Intel (R) AMT and Wake On PCH LAN functions are not available in system shut down.		
Mini PCIe Speed	Gen1	

	Gen2	Optimal Default, Failsafe Default
Select Mini PCI Express port speed.		
PCIe Speed	Gen1	
	Gen2	Optimal Default, Failsafe Default
Select PCI Express port speed.		

3.5.2 Chipset: System Agent (SA) Configuration



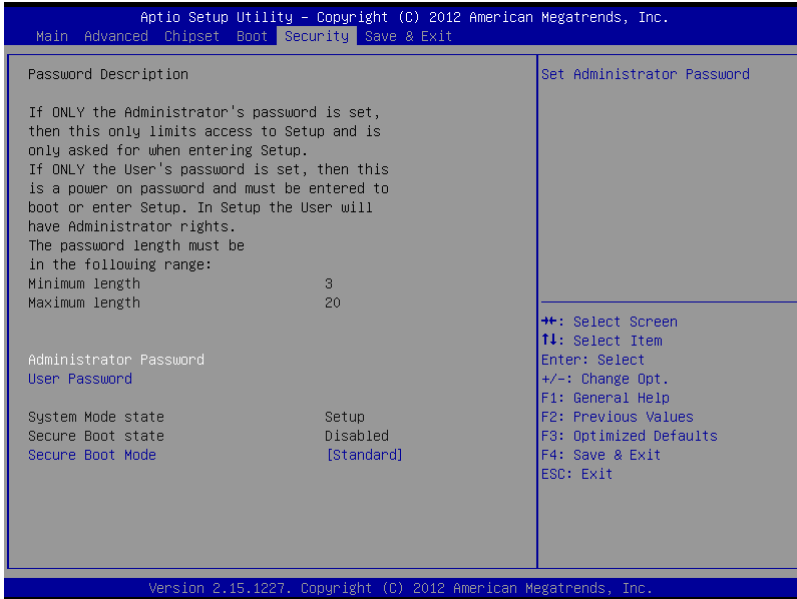
3.6 Setup submenu: Boot



Options summary:

Quiet Boot	Disabled	Default
	Enabled	
Enables or disables Quiet Boot option		
Launch I211 PXE OpROM	Disabled	Default
	Enabled	
Enable or Disable Legacy Boot Option for I211		

3.7 Setup submenu: Security



Change User/Administrator Password

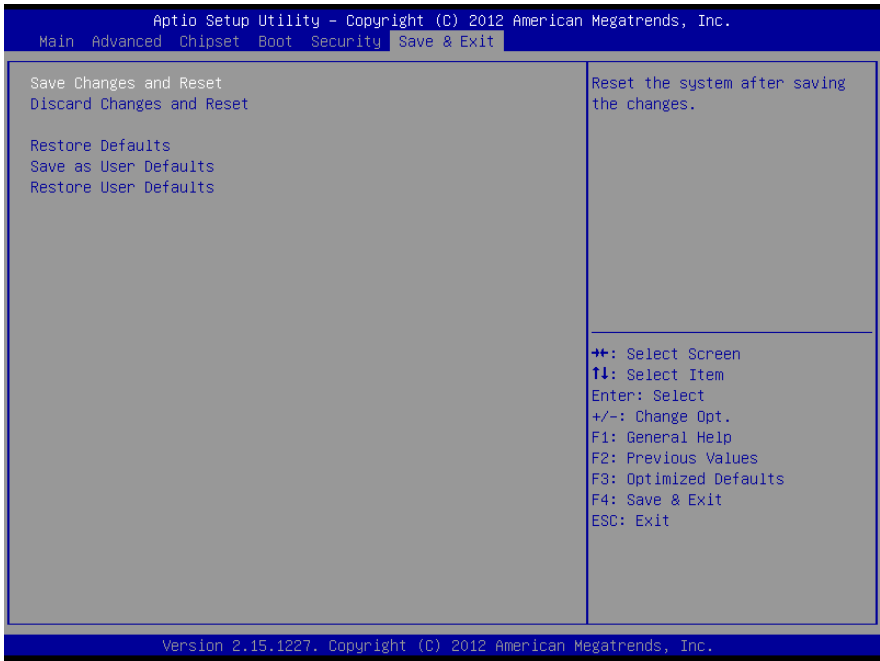
You can set a User Password once an Administrator Password is set. The password will be required during boot up, or when the user enters the Setup utility. Please Note that a User Password does not provide access to many of the features in the Setup utility.

Select the password you wish to set, press Enter to open a dialog box to enter your password (you can enter no more than six letters or numbers). Press Enter to confirm your entry, after which you will be prompted to retype your password for a final confirmation. Press Enter again after you have retyped it correctly.

Removing the Password

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

3.8 Setup submenu: Save & Exit



Chapter 4

Drivers Installation

4.1 Product CD/DVD

The BOXER-6951 comes with a product DVD that contains all the drivers and utilities you need to setup your product. Insert the DVD and follow the steps in the autorun program to install the drivers.

In case the program does not start, follow the sequence below to install the drivers.

Step 1 – Install Chipset Driver

1. Open the **Step1 - Chipset** folder and select your OS
2. Open the **.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 2 – Install Graphics Driver

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

Step 3 – Install LAN Driver

For Windows 7

1. Open 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

For Windows XP

1. Open Device Manager
2. In the device tree, locate the device with an exclamation mark and right click to open properties
3. Under the Drivers tab, select update driver
4. Navigate to the directory where is drivers are stored and confirm
5. Follow the instructions
6. Drivers will be installed automatically

Step 4 – Install USB3.0 Driver (Windows 7 only)

1. Open the **Step3 - USB3.0** folder followed by **Setup.exe**
2. Follow the instructions
3. Drivers will be installed automatically

Step 5 – Install RAID & AHCI Driver

1. Open the **Step5 - RAID & AHCI** folder
2. Install **NDP452-KB2901907-x86-x64-AllOS-ENU.exe (Microsoft.NET Framework)**
3. Select your OS and install the RAID & AHCI drivers

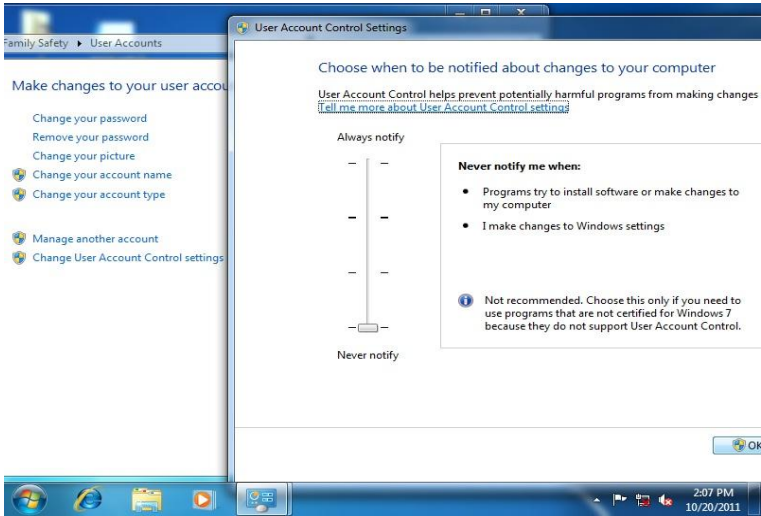
Step 6 – Install ME Driver

1. Open the **Step6 - ME** folder followed by **setup.exe** file in the folder
2. Follow the instructions
3. Drivers will be installed automatically

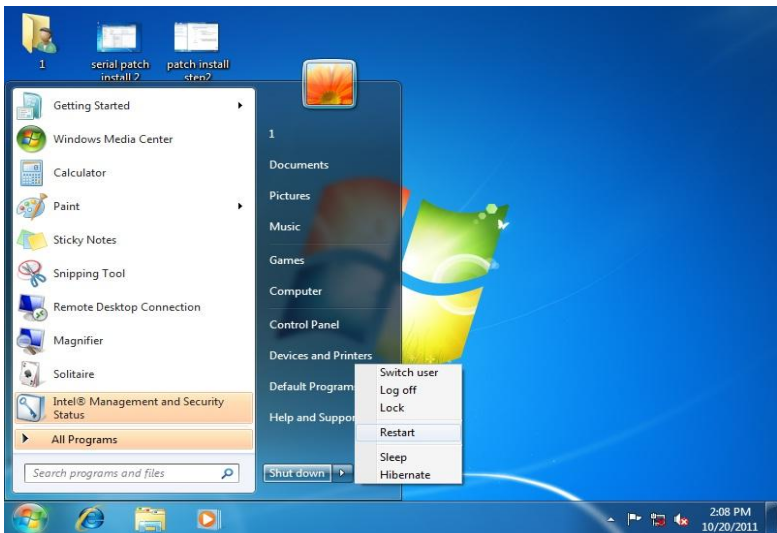
Step 7 – Install UART Drivers (Optional)

For Windows 7:

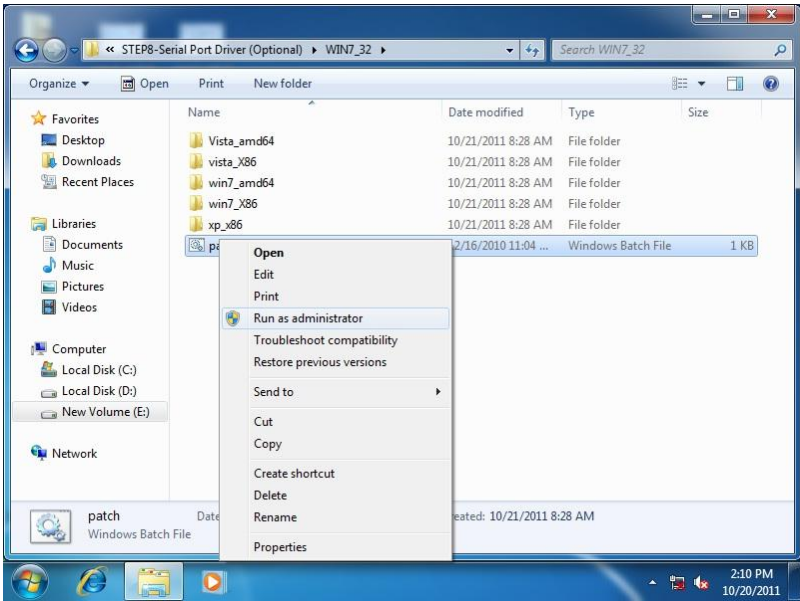
1. Change User Account Control settings to **Never notify**



2. Reboot and log in as administrator



3. Run patch.bat as administrator



Appendix A

Watchdog Timer Programming

A.1 Watchdog Timer Initial Program

Table 1 : SuperIO relative register table		
	Default Value	Note
Index	0x2E(Note1)	SIO MB PnP Mode Index Register 0x2E or 0x4E
Data	0x2F(Note2)	SIO MB PnP Mode Data Register 0x2F or 0x4F

Table 2 : Watchdog relative register table					
	LDN	Register	BitNum	Value	Note
Timer Counter	0x07(Note3)	0xF6(Note4)		(Note24)	Time of watchdog timer (0~255) This register is byte access
Counting Unit	0x07(Note5)	0xF5(Note6)	3(Note7)	0(Note8)	Select time unit. 0: second 1: minute
Watchdog Enable	0x07(Note9)	0xF5(Note10)	5(Note11)	1(Note12)	0: Disable 1: Enable
Timeout Status	0x07(Note13)	0xF5(Note14)	6(Note15)	1	1: Clear timeout status
Output Mode	0x07(Note16)	0xF5(Note17)	4(Note18)	1(Note19)	Select WDTRST# output mode 0: level 1: pulse
WDTRST output	0x07(Note20)	0xFA(Note21)	0(Note22)	1(Note23)	Enable/Disable time out output via WDTRST# 0: Disable 1: Enable

```

*****
// SuperIO relative definition (Please reference to Table 1)
#define byte   SIOIndex //This parameter is represented from Note1
#define byte   SIOData //This parameter is represented from Note2
#define void   IOWriteByte(byte IOPort, byte Value);
#define byte   IOReadByte(byte IOPort);
// Watch Dog relative definition (Please reference to Table 2)
#define byte   TimerLDN //This parameter is represented from Note3
#define byte   TimerReg //This parameter is represented from Note4
#define byte   TimerVal // This parameter is represented from Note24
#define byte   UnitLDN //This parameter is represented from Note5
#define byte   UnitReg //This parameter is represented from Note6
#define byte   UnitBit //This parameter is represented from Note7
#define byte   UnitVal //This parameter is represented from Note8
#define byte   EnableLDN //This parameter is represented from Note9
#define byte   EnableReg //This parameter is represented from Note10
#define byte   EnableBit //This parameter is represented from Note11
#define byte   EnableVal //This parameter is represented from Note12
#define byte   StatusLDN // This parameter is represented from Note13
#define byte   StatusReg // This parameter is represented from Note14
#define byte   StatusBit // This parameter is represented from Note15
#define byte   ModeLDN // This parameter is represented from Note16
#define byte   ModeReg // This parameter is represented from Note17
#define byte   ModeBit // This parameter is represented from Note18
#define byte   ModeVal // This parameter is represented from Note19
#define byte   WDTRstLDN // This parameter is represented from Note20
#define byte   WDTRstReg // This parameter is represented from Note21
#define byte   WDTRstBit // This parameter is represented from Note22
#define byte   WDTRstVal // This parameter is represented from Note23
*****

```

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

    // Procedure : AaeonWDTEnable
    // This procedure will enable the WDT counting.
    AaeonWDTEnable();
}
*****
```

```

*****
// Procedure : AaeonWDTEnable
VOID AaeonWDTEnable (){
    WDTEnableDisable(EnableLDN, EnableReg, EnableBit, 1);
}

// Procedure : AaeonWDTConfig
VOID AaeonWDTConfig (){
    // Disable WDT counting
    WDTEnableDisable(EnableLDN, EnableReg, EnableBit, 0);
    // Clear Watchdog Timeout Status
    WDTClearTimeoutStatus();
    // WDT relative parameter setting
    WDTParameterSetting();
}

VOID WDTEnableDisable(byte LDN, byte Register, byte BitNum, byte Value){
    SIOBitSet(LDN, Register, BitNum, Value);
}

VOID WDTParameterSetting(){
    // Watchdog Timer counter setting
    SIOByteSet(TimerLDN, TimerReg, TimerVal);
    // WDT counting unit setting
    SIOBitSet(UnitLDN, UnitReg, UnitBit, UnitVal);
    // WDT output mode setting, level / pulse
    SIOBitSet(ModelLDN, ModeReg, ModeBit, ModeVal);
    // Watchdog timeout output via WDTRST#
    SIOBitSet(WDTRstLDN, WDTRstReg, WDTRstBit, WDTRstVal);
}

VOID WDTClearTimeoutStatus(){
    SIOBitSet(StatusLDN, StatusReg, StatusBit, 1);
}
*****

```

```

*****
VOID  SIOEnterMBPnPMode(){
    IOWriteByte(SIOIndex, 0x87);
    IOWriteByte(SIOIndex, 0x87);
}

VOID  SIOExitMBPnPMode(){
    IOWriteByte(SIOIndex, 0xAA);
}

VOID  SIOSelectLDN(byte LDN){
    IOWriteByte(SIOIndex, 0x07); // SIO LDN Register Offset = 0x07
    IOWriteByte(SIOData, LDN);
}

VOID  SIOBitSet(byte LDN, byte Register, byte BitNum, byte Value){
    Byte TmpValue;

    SIOEnterMBPnPMode();
    SIOSelectLDN(byte LDN);
    IOWriteByte(SIOIndex, Register);
    TmpValue = IOReadByte(SIOData);
    TmpValue &= ~(1 << BitNum);
    TmpValue |= (Value << BitNum);
    IOWriteByte(SIOData, TmpValue);
    SIOExitMBPnPMode();
}

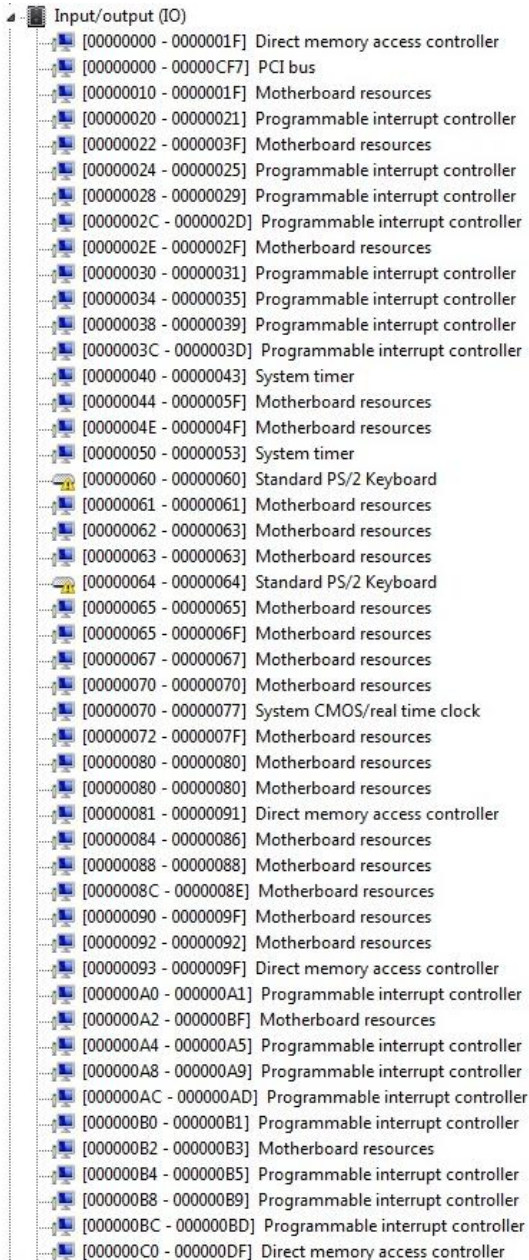
VOID  SIOByteSet(byte LDN, byte Register, byte Value){
    SIOEnterMBPnPMode();
    SIOSelectLDN(LDN);
    IOWriteByte(SIOIndex, Register);
    IOWriteByte(SIOData, Value);
    SIOExitMBPnPMode();
}
*****

```


Appendix B

I/O Information

B.1 I/O Address Map

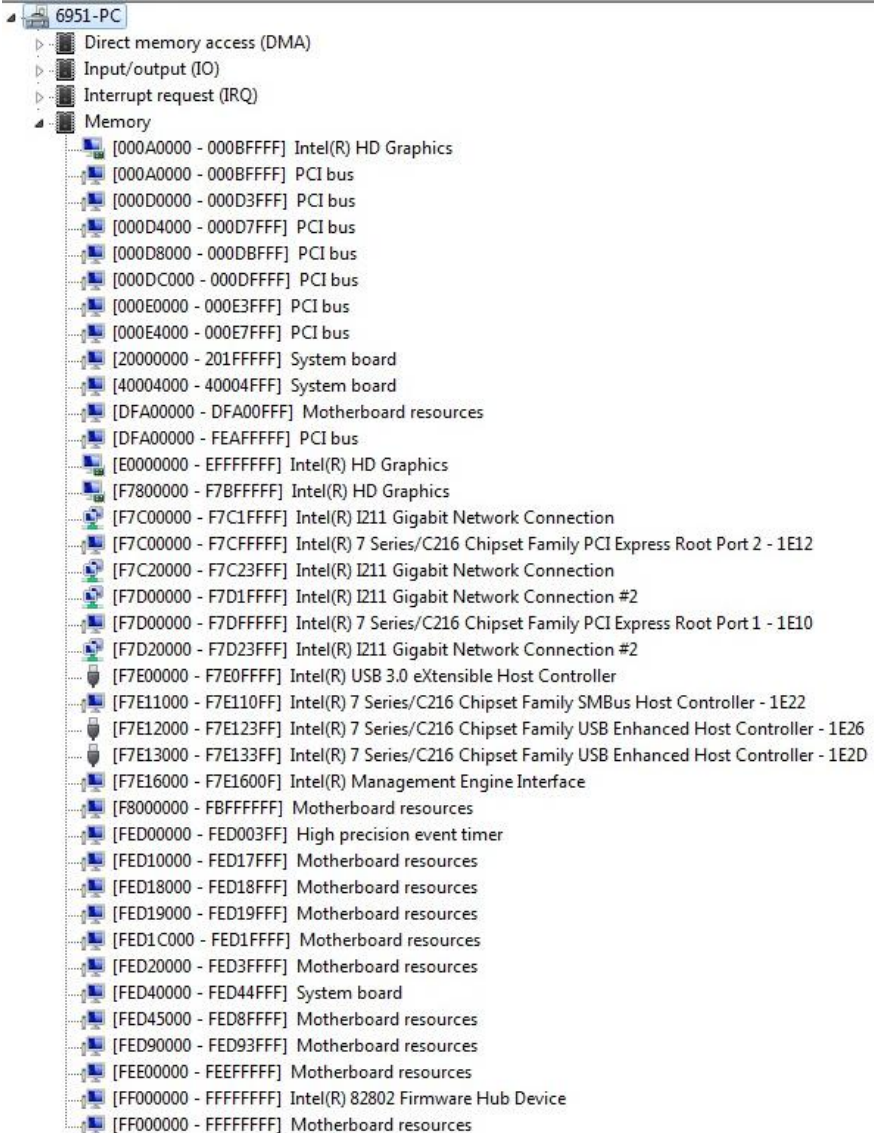


The image shows a screenshot of an I/O Address Map. The title is "Input/output (IO)". The list contains 40 entries, each with a memory address range in brackets and a description of the hardware component. The components include Direct memory access controllers, PCI bus, Motherboard resources, Programmable interrupt controllers, System timer, Standard PS/2 Keyboard, and System CMOS/real time clock.

Address Range	Component
[00000000 - 0000001F]	Direct memory access controller
[00000000 - 00000CF7]	PCI bus
[00000010 - 0000001F]	Motherboard resources
[00000020 - 00000021]	Programmable interrupt controller
[00000022 - 0000003F]	Motherboard resources
[00000024 - 00000025]	Programmable interrupt controller
[00000028 - 00000029]	Programmable interrupt controller
[0000002C - 0000002D]	Programmable interrupt controller
[0000002E - 0000002F]	Motherboard resources
[00000030 - 00000031]	Programmable interrupt controller
[00000034 - 00000035]	Programmable interrupt controller
[00000038 - 00000039]	Programmable interrupt controller
[0000003C - 0000003D]	Programmable interrupt controller
[00000040 - 00000043]	System timer
[00000044 - 0000005F]	Motherboard resources
[0000004E - 0000004F]	Motherboard resources
[00000050 - 00000053]	System timer
[00000060 - 00000060]	Standard PS/2 Keyboard
[00000061 - 00000061]	Motherboard resources
[00000062 - 00000063]	Motherboard resources
[00000063 - 00000063]	Motherboard resources
[00000064 - 00000064]	Standard PS/2 Keyboard
[00000065 - 00000065]	Motherboard resources
[00000065 - 0000006F]	Motherboard resources
[00000067 - 00000067]	Motherboard resources
[00000070 - 00000070]	Motherboard resources
[00000070 - 00000077]	System CMOS/real time clock
[00000072 - 0000007F]	Motherboard resources
[00000080 - 00000080]	Motherboard resources
[00000080 - 00000080]	Motherboard resources
[00000081 - 00000091]	Direct memory access controller
[00000084 - 00000086]	Motherboard resources
[00000088 - 00000088]	Motherboard resources
[0000008C - 0000008E]	Motherboard resources
[00000090 - 0000009F]	Motherboard resources
[00000092 - 00000092]	Motherboard resources
[00000093 - 0000009F]	Direct memory access controller
[000000A0 - 000000A1]	Programmable interrupt controller
[000000A2 - 000000BF]	Motherboard resources
[000000A4 - 000000A5]	Programmable interrupt controller
[000000A8 - 000000A9]	Programmable interrupt controller
[000000AC - 000000AD]	Programmable interrupt controller
[000000B0 - 000000B1]	Programmable interrupt controller
[000000B2 - 000000B3]	Motherboard resources
[000000B4 - 000000B5]	Programmable interrupt controller
[000000B8 - 000000B9]	Programmable interrupt controller
[000000BC - 000000BD]	Programmable interrupt controller
[000000C0 - 000000DF]	Direct memory access controller

[000000E0 - 000000EF]	Motherboard resources
[000000F0 - 000000FF]	Numeric data processor
[000002E8 - 000002EF]	Communications Port (COM3)
[000002F8 - 000002FF]	Communications Port (COM2)
[000003B0 - 000003BB]	Intel(R) HD Graphics
[000003C0 - 000003DF]	Intel(R) HD Graphics
[000003E8 - 000003EF]	Communications Port (COM4)
[000003F8 - 000003FF]	Communications Port (COM1)
[00000400 - 00000453]	Motherboard resources
[00000454 - 00000457]	Motherboard resources
[00000458 - 0000047F]	Motherboard resources
[000004D0 - 000004D1]	Motherboard resources
[000004D0 - 000004D1]	Programmable interrupt controller
[00000500 - 0000057F]	Motherboard resources
[00000680 - 0000069F]	Motherboard resources
[00000A00 - 00000A0F]	Motherboard resources
[00000A10 - 00000A1F]	Motherboard resources
[00000A20 - 00000A2F]	Motherboard resources
[00000D00 - 0000FFFF]	PCI bus
[00001000 - 0000100F]	Motherboard resources
[0000164E - 0000164F]	Motherboard resources
[0000D000 - 0000DFFF]	Intel(R) 7 Series/C216 Chipset Family PCI Express Root Port 2 - 1E12
[0000E000 - 0000EFFF]	Intel(R) 7 Series/C216 Chipset Family PCI Express Root Port 1 - 1E10
[0000F000 - 0000F03F]	Intel(R) HD Graphics
[0000F040 - 0000F05F]	Intel(R) 7 Series/C216 Chipset Family SMBus Host Controller - 1E22
[0000F060 - 0000F06F]	Intel(R) 7 Series/C216 Chipset Family 2 port Serial ATA Storage Controller - 1E09
[0000F070 - 0000F07F]	Intel(R) 7 Series/C216 Chipset Family 2 port Serial ATA Storage Controller - 1E09
[0000F080 - 0000F083]	Intel(R) 7 Series/C216 Chipset Family 2 port Serial ATA Storage Controller - 1E09
[0000F090 - 0000F097]	Intel(R) 7 Series/C216 Chipset Family 2 port Serial ATA Storage Controller - 1E09
[0000F0A0 - 0000F0A3]	Intel(R) 7 Series/C216 Chipset Family 2 port Serial ATA Storage Controller - 1E09
[0000F0B0 - 0000F0B7]	Intel(R) 7 Series/C216 Chipset Family 2 port Serial ATA Storage Controller - 1E09
[0000F0C0 - 0000F0CF]	Intel(R) 7 Series/C216 Chipset Family 4 port Serial ATA Storage Controller - 1E01
[0000F0D0 - 0000F0DF]	Intel(R) 7 Series/C216 Chipset Family 4 port Serial ATA Storage Controller - 1E01
[0000F0E0 - 0000F0E3]	Intel(R) 7 Series/C216 Chipset Family 4 port Serial ATA Storage Controller - 1E01
[0000F0F0 - 0000F0F7]	Intel(R) 7 Series/C216 Chipset Family 4 port Serial ATA Storage Controller - 1E01
[0000F100 - 0000F103]	Intel(R) 7 Series/C216 Chipset Family 4 port Serial ATA Storage Controller - 1E01
[0000F110 - 0000F117]	Intel(R) 7 Series/C216 Chipset Family 4 port Serial ATA Storage Controller - 1E01
[0000FFFF - 0000FFFF]	Motherboard resources
[0000FFFF - 0000FFFF]	Motherboard resources
▶	Interrupt request (IRQ)
▶	Memory


















































B.2 Memory Address Map



Address Range	Device Name
[000A0000 - 000BFFFF]	Intel(R) HD Graphics
[000A0000 - 000BFFFF]	PCI bus
[000D0000 - 000D3FFF]	PCI bus
[000D4000 - 000D7FFF]	PCI bus
[000D8000 - 000DBFFF]	PCI bus
[000DC000 - 000DFFFF]	PCI bus
[000E0000 - 000E3FFF]	PCI bus
[000E4000 - 000E7FFF]	PCI bus
[20000000 - 201FFFFFF]	System board
[40004000 - 40004FFF]	System board
[DFA00000 - DFA00FFF]	Motherboard resources
[DFA00000 - FEAFFFFFF]	PCI bus
[E0000000 - EFFFFFFF]	Intel(R) HD Graphics
[F7800000 - F7BFFFFFF]	Intel(R) HD Graphics
[F7C00000 - F7C1FFFF]	Intel(R) I211 Gigabit Network Connection
[F7C00000 - F7CFFFFFF]	Intel(R) 7 Series/C216 Chipset Family PCI Express Root Port 2 - 1E12
[F7C20000 - F7C23FFF]	Intel(R) I211 Gigabit Network Connection
[F7D00000 - F7D1FFFF]	Intel(R) I211 Gigabit Network Connection #2
[F7D00000 - F7DFFFFFF]	Intel(R) 7 Series/C216 Chipset Family PCI Express Root Port 1 - 1E10
[F7D20000 - F7D23FFF]	Intel(R) I211 Gigabit Network Connection #2
[F7E00000 - F7E0FFFF]	Intel(R) USB 3.0 eXtensible Host Controller
[F7E11000 - F7E110FF]	Intel(R) 7 Series/C216 Chipset Family SMBus Host Controller - 1E22
[F7E12000 - F7E123FF]	Intel(R) 7 Series/C216 Chipset Family USB Enhanced Host Controller - 1E26
[F7E13000 - F7E133FF]	Intel(R) 7 Series/C216 Chipset Family USB Enhanced Host Controller - 1E2D
[F7E16000 - F7E1600F]	Intel(R) Management Engine Interface
[F8000000 - FBFFFFFF]	Motherboard resources
[FED00000 - FED003FF]	High precision event timer
[FED10000 - FED17FFF]	Motherboard resources
[FED18000 - FED18FFF]	Motherboard resources
[FED19000 - FED19FFF]	Motherboard resources
[FED1C000 - FED1FFFF]	Motherboard resources
[FED20000 - FED3FFFF]	Motherboard resources
[FED40000 - FED44FFF]	System board
[FED45000 - FED8FFFF]	Motherboard resources
[FED90000 - FED93FFF]	Motherboard resources
[FEE00000 - FEEFFFFFF]	Motherboard resources
[FF000000 - FFFFFFFF]	Intel(R) 82802 Firmware Hub Device
[FF000000 - FFFFFFFF]	Motherboard resources

B.3 IRQ Mapping Chart

Interrupt request (IRQ)	
(ISA) 0x00000000 (00)	System timer
(ISA) 0x00000001 (01)	Standard PS/2 Keyboard
(ISA) 0x00000003 (03)	Communications Port (COM2)
(ISA) 0x00000004 (04)	Communications Port (COM1)
(ISA) 0x00000005 (05)	Communications Port (COM3)
(ISA) 0x00000005 (05)	Communications Port (COM4)
(ISA) 0x00000008 (08)	System CMOS/real time clock
(ISA) 0x0000000C (12)	Microsoft PS/2 Mouse
(ISA) 0x0000000D (13)	Numeric data processor
(ISA) 0x00000051 (81)	Microsoft ACPI-Compliant System
(ISA) 0x00000052 (82)	Microsoft ACPI-Compliant System
(ISA) 0x00000053 (83)	Microsoft ACPI-Compliant System
(ISA) 0x00000054 (84)	Microsoft ACPI-Compliant System
(ISA) 0x00000055 (85)	Microsoft ACPI-Compliant System
(ISA) 0x00000056 (86)	Microsoft ACPI-Compliant System
(ISA) 0x00000057 (87)	Microsoft ACPI-Compliant System
(ISA) 0x00000058 (88)	Microsoft ACPI-Compliant System
(ISA) 0x00000059 (89)	Microsoft ACPI-Compliant System
(ISA) 0x0000005A (90)	Microsoft ACPI-Compliant System
(ISA) 0x0000005B (91)	Microsoft ACPI-Compliant System
(ISA) 0x0000005C (92)	Microsoft ACPI-Compliant System
(ISA) 0x0000005D (93)	Microsoft ACPI-Compliant System
(ISA) 0x0000005E (94)	Microsoft ACPI-Compliant System
(ISA) 0x0000005F (95)	Microsoft ACPI-Compliant System
(ISA) 0x00000060 (96)	Microsoft ACPI-Compliant System
(ISA) 0x00000061 (97)	Microsoft ACPI-Compliant System
(ISA) 0x00000062 (98)	Microsoft ACPI-Compliant System
(ISA) 0x00000063 (99)	Microsoft ACPI-Compliant System
(ISA) 0x00000064 (100)	Microsoft ACPI-Compliant System
(ISA) 0x00000065 (101)	Microsoft ACPI-Compliant System
(ISA) 0x00000066 (102)	Microsoft ACPI-Compliant System
(ISA) 0x00000067 (103)	Microsoft ACPI-Compliant System
(ISA) 0x00000068 (104)	Microsoft ACPI-Compliant System
(ISA) 0x00000069 (105)	Microsoft ACPI-Compliant System
(ISA) 0x0000006A (106)	Microsoft ACPI-Compliant System
(ISA) 0x0000006B (107)	Microsoft ACPI-Compliant System
(ISA) 0x0000006C (108)	Microsoft ACPI-Compliant System
(ISA) 0x0000006D (109)	Microsoft ACPI-Compliant System
(ISA) 0x0000006E (110)	Microsoft ACPI-Compliant System
(ISA) 0x0000006F (111)	Microsoft ACPI-Compliant System
(ISA) 0x00000070 (112)	Microsoft ACPI-Compliant System
(ISA) 0x00000071 (113)	Microsoft ACPI-Compliant System
(ISA) 0x00000072 (114)	Microsoft ACPI-Compliant System
(ISA) 0x00000073 (115)	Microsoft ACPI-Compliant System
(ISA) 0x00000074 (116)	Microsoft ACPI-Compliant System
(ISA) 0x00000075 (117)	Microsoft ACPI-Compliant System
(ISA) 0x00000076 (118)	Microsoft ACPI-Compliant System
(ISA) 0x00000077 (119)	Microsoft ACPI-Compliant System

	(ISA) 0x00000078 (120)	Microsoft ACPI-Compliant System
	(ISA) 0x00000079 (121)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007A (122)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007B (123)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007C (124)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007D (125)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007E (126)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007F (127)	Microsoft ACPI-Compliant System
	(ISA) 0x00000080 (128)	Microsoft ACPI-Compliant System
	(ISA) 0x00000081 (129)	Microsoft ACPI-Compliant System
	(ISA) 0x00000082 (130)	Microsoft ACPI-Compliant System
	(ISA) 0x00000083 (131)	Microsoft ACPI-Compliant System
	(ISA) 0x00000084 (132)	Microsoft ACPI-Compliant System
	(ISA) 0x00000085 (133)	Microsoft ACPI-Compliant System
	(ISA) 0x00000086 (134)	Microsoft ACPI-Compliant System
	(ISA) 0x00000087 (135)	Microsoft ACPI-Compliant System
	(ISA) 0x00000088 (136)	Microsoft ACPI-Compliant System
	(ISA) 0x00000089 (137)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008A (138)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008B (139)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008C (140)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008D (141)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008E (142)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008F (143)	Microsoft ACPI-Compliant System
	(ISA) 0x00000090 (144)	Microsoft ACPI-Compliant System
	(ISA) 0x00000091 (145)	Microsoft ACPI-Compliant System
	(ISA) 0x00000092 (146)	Microsoft ACPI-Compliant System
	(ISA) 0x00000093 (147)	Microsoft ACPI-Compliant System
	(ISA) 0x00000094 (148)	Microsoft ACPI-Compliant System
	(ISA) 0x00000095 (149)	Microsoft ACPI-Compliant System
	(ISA) 0x00000096 (150)	Microsoft ACPI-Compliant System
	(ISA) 0x00000097 (151)	Microsoft ACPI-Compliant System
	(ISA) 0x00000098 (152)	Microsoft ACPI-Compliant System
	(ISA) 0x00000099 (153)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009A (154)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009B (155)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009C (156)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009D (157)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009E (158)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009F (159)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A0 (160)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A1 (161)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A2 (162)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A3 (163)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A4 (164)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A5 (165)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A6 (166)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A7 (167)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A8 (168)	Microsoft ACPI-Compliant System

(ISA) 0x000000A9 (169)	Microsoft ACPI-Compliant System
(ISA) 0x000000AA (170)	Microsoft ACPI-Compliant System
(ISA) 0x000000AB (171)	Microsoft ACPI-Compliant System
(ISA) 0x000000AC (172)	Microsoft ACPI-Compliant System
(ISA) 0x000000AD (173)	Microsoft ACPI-Compliant System
(ISA) 0x000000AE (174)	Microsoft ACPI-Compliant System
(ISA) 0x000000AF (175)	Microsoft ACPI-Compliant System
(ISA) 0x000000B0 (176)	Microsoft ACPI-Compliant System
(ISA) 0x000000B1 (177)	Microsoft ACPI-Compliant System
(ISA) 0x000000B2 (178)	Microsoft ACPI-Compliant System
(ISA) 0x000000B3 (179)	Microsoft ACPI-Compliant System
(ISA) 0x000000B4 (180)	Microsoft ACPI-Compliant System
(ISA) 0x000000B5 (181)	Microsoft ACPI-Compliant System
(ISA) 0x000000B6 (182)	Microsoft ACPI-Compliant System
(ISA) 0x000000B7 (183)	Microsoft ACPI-Compliant System
(ISA) 0x000000B8 (184)	Microsoft ACPI-Compliant System
(ISA) 0x000000B9 (185)	Microsoft ACPI-Compliant System
(ISA) 0x000000BA (186)	Microsoft ACPI-Compliant System
(ISA) 0x000000BB (187)	Microsoft ACPI-Compliant System
(ISA) 0x000000BC (188)	Microsoft ACPI-Compliant System
(ISA) 0x000000BD (189)	Microsoft ACPI-Compliant System
(ISA) 0x000000BE (190)	Microsoft ACPI-Compliant System
(PCI) 0x0000000B (11)	Intel(R) 7 Series/C216 Chipset Family SMBus Host Controller - 1E22
(PCI) 0x00000010 (16)	Intel(R) 7 Series/C216 Chipset Family USB Enhanced Host Controller - 1E2D
(PCI) 0x00000010 (16)	Intel(R) 7 Series/C216 Chipset Family PCI Express Root Port 1 - 1E10
(PCI) 0x00000010 (16)	Intel(R) Management Engine Interface
(PCI) 0x00000010 (16)	Xeon(R) processor E3-1200 v2/3rd Gen Core processor PCI Express Root Port - 0151
(PCI) 0x00000010 (16)	Xeon(R) processor E3-1200 v2/3rd Gen Core processor PCI Express Root Port - 0159
(PCI) 0x00000011 (17)	Intel(R) 7 Series/C216 Chipset Family PCI Express Root Port 2 - 1E12
(PCI) 0x00000013 (19)	Intel(R) 7 Series/C216 Chipset Family 4 port Serial ATA Storage Controller - 1E01
(PCI) 0x00000013 (19)	Intel(R) 7 Series/C216 Chipset Family 2 port Serial ATA Storage Controller - 1E09
(PCI) 0x00000017 (23)	Intel(R) 7 Series/C216 Chipset Family USB Enhanced Host Controller - 1E26
(PCI) 0xFFFFFFF5 (-11)	Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF6 (-10)	Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF7 (-9)	Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF8 (-8)	Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF9 (-7)	Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFFA (-6)	Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFF8 (-5)	Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFF4 (-4)	Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFF3 (-3)	Intel(R) USB 3.0 eXtensible Host Controller
(PCI) 0xFFFFFFF2 (-2)	Intel(R) HD Graphics
Memory	

B.4 DMA Channel Assignments



Appendix C

Digital I/O Ports

C.1 DI/O Programming

BOXER-6951 utilizes FINTEK F81866 chipset as its Digital I/O controller. Below are the procedures to complete its configuration. AAEON initial DI/O program is also attached for developing customized program for your application.

There are three steps to complete the configuration setup:

- (1) Enter the MB PnP Mode
- (2) Modify the data of configuration registers
- (3) Exit the MB PnP Mode. Undesired result may occur if the MB PnP Mode is not exited normally.

C.2 Digital I/O Register

	Default Value	Note
Index	0x2E(Note1)	SIO MB PnP Mode Index Register 0x2E or 0x4E
Data	0x2F(Note2)	SIO MB PnP Mode Data Register 0x2F or 0x4F

	LDN	Register	BitNum	Value	Note
DIO-1 Pin Status	0x06(Note3)	0x8A(Note4)	0(Note5)		GPIO80
DIO-2 Pin Status	0x06(Note6)	0x8A(Note7)	1(Note8)		GPIO81
DIO-3 Pin Status	0x06(Note9)	0x8A(Note10)	2(Note11)		GPIO82
DIO-4 Pin Status	0x06(Note12)	0x8A(Note13)	3(Note14)		GPIO83
DIO-5 Pin Status	0x06(Note15)	0x8A(Note16)	4(Note17)		GPIO84
DIO-6 Pin Status	0x06(Note18)	0x8A(Note19)	5(Note20)		GPIO85
DIO-7 Pin Status	0x06(Note21)	0x8A(Note22)	6(Note23)		GPIO86
DIO-8 Pin Status	0x06(Note24)	0x8A(Note25)	7(Note26)		GPIO87

	LDN	Register	BitNum	Value	Note
DIO-1 Output Data	0x06(Note27)	0x89(Note28)	0(Note29)	(Note30)	GPIO80
DIO-2 Output Data	0x06(Note31)	0x89(Note32)	1(Note33)	(Note34)	GPIO81
DIO-3 Output Data	0x06(Note35)	0x89(Note36)	2(Note37)	(Note38)	GPIO82
DIO-4 Output Data	0x06(Note39)	0x89(Note40)	3(Note41)	(Note42)	GPIO83
DIO-5 Output Data	0x06(Note43)	0x89(Note44)	4(Note45)	(Note46)	GPIO84
DIO-6 Output Data	0x06(Note47)	0x89(Note48)	5(Note49)	(Note50)	GPIO85
DIO-7 Output Data	0x06(Note51)	0x89(Note52)	6(Note53)	(Note54)	GPIO86
DIO-8 Output Data	0x06(Note55)	0x89(Note56)	7(Note57)	(Note58)	GPIO87

C.3 Digital I/O Sample Program

```
*****
// SuperIO relative definition (Please reference to Table 1)
#define byte SIOIndex //This parameter is represented from Note1
#define byte SIOData //This parameter is represented from Note2
#define void IOWriteByte(byte IOPort, byte Value);
#define byte IOReadByte(byte IOPort);
// Digital Input Status relative definition (Please reference to Table 2)
#define byte DInput1LDN // This parameter is represented from Note3
#define byte DInput1Reg // This parameter is represented from Note4
#define byte DInput1Bit // This parameter is represented from Note5
#define byte DInput2LDN // This parameter is represented from Note6
#define byte DInput2Reg // This parameter is represented from Note7
#define byte DInput2Bit // This parameter is represented from Note8
#define byte DInput3LDN // This parameter is represented from Note9
#define byte DInput3Reg // This parameter is represented from Note10
#define byte DInput3Bit // This parameter is represented from Note11
#define byte DInput4LDN // This parameter is represented from Note12
#define byte DInput4Reg // This parameter is represented from Note13
#define byte DInput4Bit // This parameter is represented from Note14
#define byte DInput5LDN // This parameter is represented from Note15
#define byte DInput5Reg // This parameter is represented from Note16
#define byte DInput5Bit // This parameter is represented from Note17
#define byte DInput6LDN // This parameter is represented from Note18
#define byte DInput6Reg // This parameter is represented from Note19
#define byte DInput6Bit // This parameter is represented from Note20
#define byte DInput7LDN // This parameter is represented from Note21
#define byte DInput7Reg // This parameter is represented from Note22
#define byte DInput7Bit // This parameter is represented from Note23
#define byte DInput8LDN // This parameter is represented from Note24
#define byte DInput8Reg // This parameter is represented from Note25
#define byte DInput8Bit // This parameter is represented from Note26
*****
```

```

*****
// Digital Output control relative definition (Please reference to Table 3)
#define byte DOutput1LDN // This parameter is represented from Note27
#define byte DOutput1Reg // This parameter is represented from Note28
#define byte DOutput1Bit // This parameter is represented from Note29
#define byte DOutput1Val // This parameter is represented from Note30
#define byte DOutput2LDN // This parameter is represented from Note31
#define byte DOutput2Reg // This parameter is represented from Note32
#define byte DOutput2Bit // This parameter is represented from Note33
#define byte DOutput2Val // This parameter is represented from Note34
#define byte DOutput3LDN // This parameter is represented from Note35
#define byte DOutput3Reg // This parameter is represented from Note36
#define byte DOutput3Bit // This parameter is represented from Note37
#define byte DOutput3Val // This parameter is represented from Note38
#define byte DOutput4LDN // This parameter is represented from Note39
#define byte DOutput4Reg // This parameter is represented from Note40
#define byte DOutput4Bit // This parameter is represented from Note41
#define byte DOutput4Val // This parameter is represented from Note42
#define byte DOutput5LDN // This parameter is represented from Note43
#define byte DOutput5Reg // This parameter is represented from Note44
#define byte DOutput5Bit // This parameter is represented from Note45
#define byte DOutput5Val // This parameter is represented from Note46
#define byte DOutput6LDN // This parameter is represented from Note47
#define byte DOutput6Reg // This parameter is represented from Note48
#define byte DOutput6Bit // This parameter is represented from Note49
#define byte DOutput6Val // This parameter is represented from Note50
#define byte DOutput7LDN // This parameter is represented from Note51
#define byte DOutput7Reg // This parameter is represented from Note52
#define byte DOutput7Bit // This parameter is represented from Note53
#define byte DOutput7Val // This parameter is represented from Note54
#define byte DOutput8LDN // This parameter is represented from Note55
#define byte DOutput8Reg // This parameter is represented from Note56
#define byte DOutput8Bit // This parameter is represented from Note57
#define byte DOutput8Val // This parameter is represented from Note58
*****

```

```
*****
VOID Main(){
    Boolean PinStatus ;

    // Procedure : AaeonReadPinStatus
    // Input :
    //     Example, Read Digital I/O Pin 3 status
    // Output :
    //     InputStatus :
    //         0: Digital I/O Pin level is low
    //         1: Digital I/O Pin level is High
    PinStatus = AaeonReadPinStatus(DInput3LDN, DInput3Reg, DInput3Bit);

    // Procedure : AaeonSetOutputLevel
    // Input :
    //     Example, Set Digital I/O Pin 6 level
    AaeonSetOutputLevel(DOutput6LDN, DOutput6Reg, DOutput6Bit,
DOutput6Val);
}
*****
```

```
*****
Boolean  AaeonReadPinStatus(byte LDN, byte Register, byte BitNum){
    Boolean PinStatus ;

    PinStatus = SIOBitRead(LDN, Register, BitNum);
    Return PinStatus ;
}
VOID  AaeonSetOutputLevel(byte LDN, byte Register, byte BitNum, byte Value){
    ConfigToOutputMode(LDN, Register, BitNum);
    SIOBitSet(LDN, Register, BitNum, Value);
}
*****
```

```

*****
VOID  SIOEnterMBPnPMode(){
    IOWriteByte(SIOIndex, 0x87);
    IOWriteByte(SIOIndex, 0x87);
}

VOID  SIOExitMBPnPMode(){
    IOWriteByte(SIOIndex, 0xAA);
}

VOID  SIOSelectLDN(byte LDN){
    IOWriteByte(SIOIndex, 0x07); // SIO LDN Register Offset = 0x07
    IOWriteByte(SIOData, LDN);
}

VOID  SIOBitSet(byte LDN, byte Register, byte BitNum, byte Value){
    Byte TmpValue;

    SIOEnterMBPnPMode();
    SIOSelectLDN(byte LDN);
    IOWriteByte(SIOIndex, Register);
    TmpValue = IOReadByte(SIOData);
    TmpValue &= ~(1 << BitNum);
    TmpValue |= (Value << BitNum);
    IOWriteByte(SIOData, TmpValue);
    SIOExitMBPnPMode();
}

VOID  SIOByteSet(byte LDN, byte Register, byte Value){
    SIOEnterMBPnPMode();
    SIOSelectLDN(LDN);
    IOWriteByte(SIOIndex, Register);
    IOWriteByte(SIOData, Value);
    SIOExitMBPnPMode();
}
*****

```



```

*****
Boolean  SIOBitRead(byte LDN, byte Register, byte BitNum){
    Byte TmpValue;

    SIOEnterMBPnPMode();
    SIOSelectLDN(LDN);
    IOWriteByte(SIOIndex, Register);
    TmpValue = IOReadByte(SIOData);
    TmpValue &= (1 << BitNum);
    SIOExitMBPnPMode();
    If(TmpValue == 0)
        Return 0;
    Return 1;
}

VOID  ConfigToOutputMode(byte LDN, byte Register, byte BitNum){
    Byte TmpValue, OutputEnableReg;

    OutputEnableReg = Register-1;
    SIOEnterMBPnPMode();
    SIOSelectLDN(LDN);
    IOWriteByte(SIOIndex, OutputEnableReg);
    TmpValue = IOReadByte(SIOData);
    TmpValue |= (1 << BitNum);
    IOWriteByte(SIOData, OutputEnableReg);
    SIOExitMBPnPMode();
}
*****

```