

AEC-6977

Fanless Embedded Controller

Intel® 3rd Generation Core™ i/ Celeron®

Processor (FCBGA1023)

with 2 Gigabit Ethernet

COM x 6, USB x 6, CFast™, Mini Card x 2

SATA 6.0Gb/s x 2, SATA 3.0Gb/s x 2

PCI x 2 or PCI x 1 + PCI-E[x4] x 1 or PCI-E[x4] x 2

VGA x 1, HDMI x 1, DVI-D x 1

Dual-Channel 24-bit LVDS

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Packing List

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

- 1 AEC-6977 Embedded Controller
- 1 Phoenix Power Connector
- 4 M3 x 4mm Screws
- 6 6# -32 x 10mm Screws
- 2 Wallmount Brackets
- 1 DVD-ROM for manual (in PDF format) and Drivers

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

Safety & Warranty

Please read the following safety instructions carefully. It is advised that you keep this manual for future references

1. Disconnect this device from any AC supply before cleaning.
2. While cleaning, use a damp cloth instead of liquid or spray detergents.
3. For any pluggable equipment, the power outlet must be installed near the device and easily accessible.
4. Keep this device away from humidity.
5. Place this device on a solid surface during installation. Dropping it or letting it fall could cause damage.
6. The openings on the device's enclosure are for dissipating heat. **DO NOT COVER THE OPENINGS.**
7. Make sure the voltage of the power source is correct before connecting the device to the power outlet.
8. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
9. All cautions and warnings on the device should be noted.
10. 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.
11. Never pour any liquid into the openings. This could cause fire or electric shock.
12. **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**
13. **DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW -10° C (14°F) OR ABOVE 60° C (140° F) TO PREVENT DAMAGE.**
14. 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 devices.

FCC

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.

China RoHS Requirements
产品中有害有毒物质或元素名称及含量
AAEON Boxer/ 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>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。</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:</p> <p>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。</p> <p>二、上述部件物质中央处理器、内存、硬盘、电源为选购品。</p>						

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Chapter

1

**General
Information**

1.1 Introduction

Due to the growing popularity from the IPC market, the newest Boxer series AEC-6977 has been introduced by AAEON. Being a control center, the AEC-6977 is suitable for Machine Control, Data Processing, Fleet Management, Data Management. AEC-6977 equips a high efficiency heat conduction mechanism.

The AEC-6977 is compact in size but has attractive and flexible extension capabilities such as 2 USB 2.0 ports and 4 USB 3.0 ports, VGA, Audio, 6 COM ports, PCI and PCI-E[x4].

Stable Design for Rugged Environment

The AEC-6977 is designed for rugged environments due to the following reasons; first, it can withstand tough vibration testing up to 3 g rms. With the anti-vibration hard drive device option, the AEC-6977 can be used in high vibration environments. In addition, the AEC-6977 offers low power consumption system that while operating in ambient temperatures ranging from -20° to 65°C with Core™ i7-3517UE processor.

The AEC-6977 is a standalone high performance controller designed for long-life operation and with high reliability. It can replace traditional methods and become the mainstream controller for the multimedia entertainment market.

1.2 Features

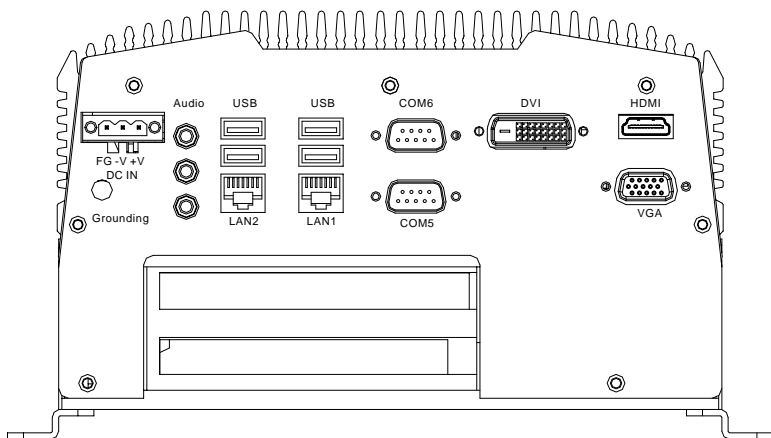
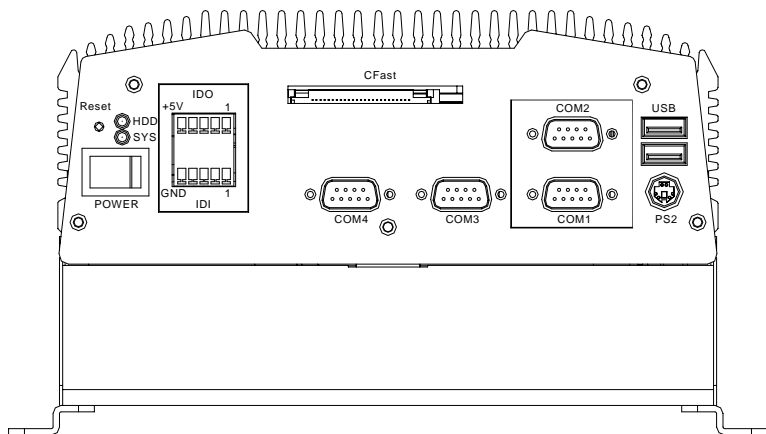
- Fanless Design
- Intel® 3rd Generation Core™ i/ Celeron® Processor (FCBGA1023)
- Intel® QM77 Chipset
- Gigabit Ethernet, RJ-45 x 2
- Intel® Integrated Graphics Engine Supports Dual View by VGA, DVI-D, HDMI
- SATA 6.0 Gb/s x 2, SATA 3.0 Gb/s x 2, Support RAID 0, 1, 5, 10
- USB 2.0 x 2, USB 3.0 x 4, COM x 6 (2.5KV Isolation x 2), 2.5KV Isolated DIO x 1 (4 in, 4 out)
- Mini Card x 2, CFast™ x 1
- PCI x 2 or PCI x 1 + PCI-Express[x4] x 1 or PCI-Express[x4] x 2

1.3 Specifications

● CPU		Intel® 3 rd Generation Core™ i/ Celeron® Processor (FCBGA1023)
● Chipset		Intel® QM77
● System Memory		DDR3 SODIMM x 2, Max. 16 GB, support DDR3 1066/ 1333
● Display Interface	VGA	DB-15 x 1, shared system memory up to 512MB/DVMT 5.0
	DVI	DVI-D x 1 (optional 2 nd DVI, support 1920x1200 @ 60 Hz
	HDMI	HDMI x 1, support 1920x1200 @ 60 Hz
	Others	Dual-channel 24-bit LVDS (optional extension kit)
● Storage Device	SSD	CFast™ slot
	HDD	SATA 6.0 Gb/s x 2 (SATA 0, 2), SATA 3.0 Gb/s x 2 (SATA 2, 3), support RAID 0, 1, 5, 10
● Network	LAN	Gigabit Ethernet
	Wireless	Optional by Mini Card
● Front I/O	USB Host	USB3.0 x 2
	Serial Port	RS-232 x 1, RS-232/422/485 x 1, both support optional 2.5KV Isolation , optional extra RS-232 x 6
	DIO	8-bit programmable, optional 2.5KV

		Isolation 2.5KV, DO x 4 and DI x 4
	KB/MS	PS/2 x 1
	Others	Power button x 1, Reset button x 1
● Rear I/O	USB Host	USB 2.0 x 2 and USB 3.0 x 2
	LAN	RJ-45 x 2
	Serial Port	RS-232 x 2
	Audio	Mic-in, Line-in, Line-out
	Others	Power input x 1
● Expansion	PCIe[x1]	2 (optional)
	PCI	2 (optional, limited 2.1A @ +12V)
	Mini Card	2 (optional)
	Others	SIM x 1 (optional)
● Indicator	Front	System LED x 1, HDD LED x 1
● Power Requirement		DC-in 9~30V input, optional 100~240V
● System Cooling		Passive cooling
● Mounting		Wallmount
● Operating Temperature		<p><i>Without Airflow, with wide temperature Storage and RAM:</i></p> <p>-4°F ~ 122°F (-20°C ~ 50°C) (35W TDP CPU)</p> <p>-4°F ~ 149°F (-20°C ~ 65°C) (17W TDP CPU, not include riser card)</p> <p><i>Ambient with Airflow, with wide temperature Storage and RAM:</i></p>

		-4°F ~ 140°F (-20°C ~ 60°C) (35W TDP CPU) -4°F ~ 167°F (-20°C ~ 65°C) (17W TDP CPU, not include riser card)
● Storage Temperature		-4°F ~ 158°F (-20°C ~ 70°C)
● Anti-Vibration		3 g rms/ 5~500 Hz/ operation-CFast™; 1 g rms/ 5~500 Hz/ operation-HDD
● Anti-Shock		50 G peak acceleration (11 msec. duration) –CFast™
● Certification	EMC	CE/FCC Class A
● Dimension (W x H x D)		8.19" x 4.9" x 9.37" (208mm x 124.4mm x 238mm)
● OS Support		Windows® XP Embedded, Windows® XP, Windows® 7, Linux Fedora 10

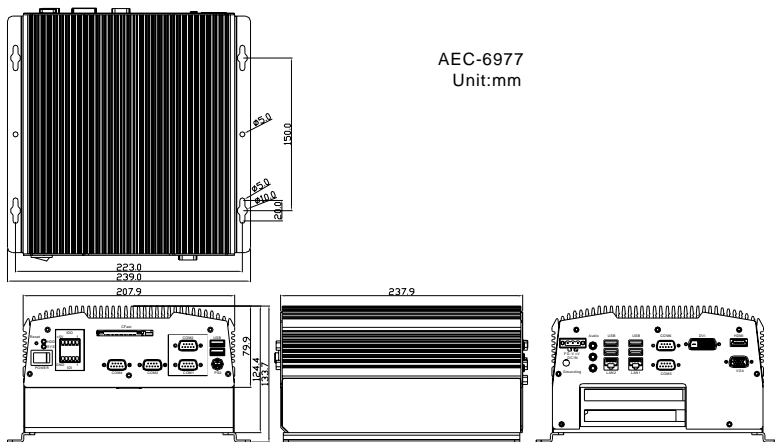


Chapter

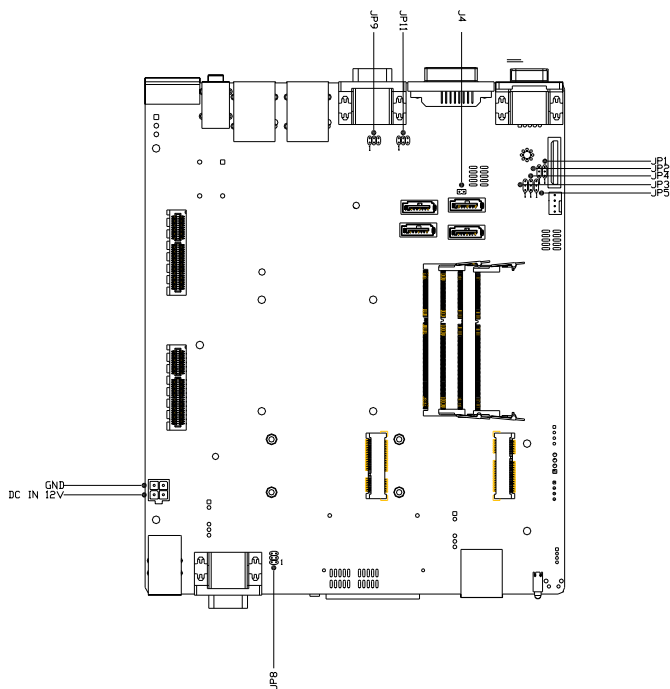
2

Hardware Installation

2.1 Dimension



2.2 Location of Jumpers and Connectors



2.3 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	Clear CMOS
JP2	Clear ME
JP3	Inverter Power Selection
JP4	LVDS Port Backlight Lightness Control Mode Selection
JP5	LVDS Voltage Selection
JP8	RS-232/422/485 Selection
JP9	COM6 +12V/+5V/RING Selection
JP11	COM5 +12V/+5V/RING Selection
J6	Auto Power Button

2.4 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 of the board's connectors:

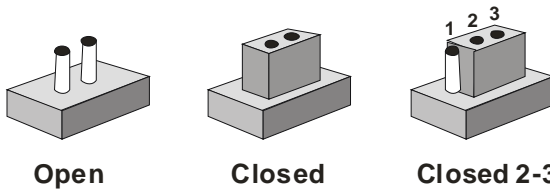
Label	Function
CN1	Front Panel Connector
CN2	4-pin ATX Power +12V Connector
CN6 ~ CN7	LAN / USB Connector
CN8	CFast™ Connector
CN10	COM3 RS-232 Box Header

CN11	COM4 RS-232 Box Header
CN13	COM5 / COM6 Connector
CN15	VGA / HDMI Connector
CN16	DVI-I Connector
CN17	LVDS Connector
CN18	LVDS Inverter / Backlight Connector
CN21	Mini Card Connector With SIM
CN24	Mini Card Connector
CN26/CN33	PCIE*4 Connector
CN27	USB X2 / PS2 Connector
CN29	Digital I/O
CN30	ISOLATION COM1 / COM2 Connector
CN31	DC IN
PWR1 ~ PWR2	SATA POWER
SATA1~SATA2	SATA 3.0 Connector
SATA3~SATA4	SATA Connector
DIMM1,DIMM2	DDR3 DIMM Slot
USB1	USB Box Header
FAN1~ FAN2	4 Pin Fan Connector
AUDIO1	AUDIO Connector

2.5 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.



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.

2.6 Clear CMOS (JP1)

JP1	Function
1-2	Normal (Default)
2-3	Clear CMOS

2.7 Clear ME (JP2)

JP2	Function
1-2	Normal (Default)
2-3	Clear ME

2.8 Inverter Power Selection (JP3)

JP3	Function
1-2	+12V (Default)
2-3	+5V

2.9 LVDS Port Backlight Lightness Control Mode Selection (JP4)

JP4	Function
1-2	PWM MODE
2-3	VR MODE (Default)

2.10 LCD Voltage Selection (JP5)

JP5	Function
1-2	+5V
2-3	+3.3V (Default)

2.11 Isolation COM2 RS232/RS485/RS422 selection (JP8)

JP8	Function
RS232	1-2,3-4,5-6 close
RS422	3-4 close , 1-2 5-6 open

RS485 5-6 close , 1-2 3-4 open

2.12 COM6 +12V/+5V/Ring Selection (JP9)

JP9	Function
1-2	+12V
3-4	+5V
5-6	Ring (Default)

2.13 COM5 +12V/+5V/Ring Selection (JP11)

JP6	Function
1-2	+12V
3-4	+5V
5-6	Ring (Default)

2.14 Auto Power Button (J6)

J6	Function
OPEN	ATX (Default)
1-2	AT

2.15 SATA Power (PWR1~PWR2)

Pin	Signal
1	+12V
2	GND
3	GND
4	+5V

2.16 Front Panel Connector (CN4)

Pin	Signal	Pin	Signal
1	Power On Button (-)	2	Power On Button (+)
3	HDD LED (-)	4	HDD LED (+)

5	SPEAKER(-)	6	SPEAKER(+)
7	Power LED (-)	8	Power LED (+)
9	Reset Switch (-)	10	Reset Switch (+)

2.17 LVDS Connector (CN17)

Pin	Signal	Pin	Signal
1	BKL_EN	2	BKL_CTL
3	LVDSVCC	4	GND
5	LVDSA_CLK#	6	LVDSA_CLK
7	LVDSVCC	8	GND
9	LVDSA_DATA0#	10	LVDSA_DATA0
11	LVDSA_DATA1#	12	LVDSA_DATA1
13	LVDSA_DATA2#	14	LVDSA_DATA2
15	LVDSA_DATA3#	16	LVDSA_DATA3
17	LVDS_DDC_DATA	18	LVDS_DDC_CLK
19	LVDSB_DATA0#	20	LVDSB_DATA0
21	LVDSB_DATA1#	22	LVDSB_DATA1
23	LVDSB_DATA2#	24	LVDSB_DATA2
25	LVDSB_DATA3#	26	LVDSB_DATA3
27	LVDSVCC	28	GND
29	LVDSB_CLK#	30	LVDSB_CLK

2.18 LVDS Inverter/ Backlight Connector (CN18)

Pin	Signal	Pin	Signal
1	VDD	2	BKL_CTL
3	GND	4	GND
5	BKL_EN		

2.19 RS-232/422/485 Pin DEFINE (COM2)

RS-232 Mode

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

RS-422 Mode

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

RS-485 Mode

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

2.20 RS-232 Box Header (COM3)

Pin	Signal	Pin	Signal
1	DCD	2	RXD

3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI		

2.21 RS-232 Box Header (COM4)

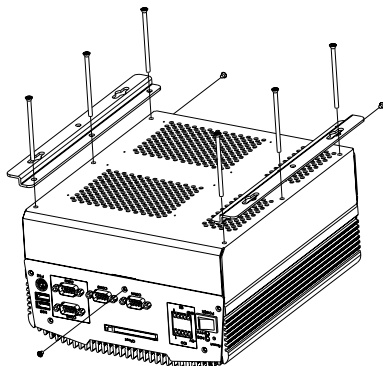
Pin	Signal	Pin	Signal
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI		

2.22 USB Box Header (USB3~USB4)

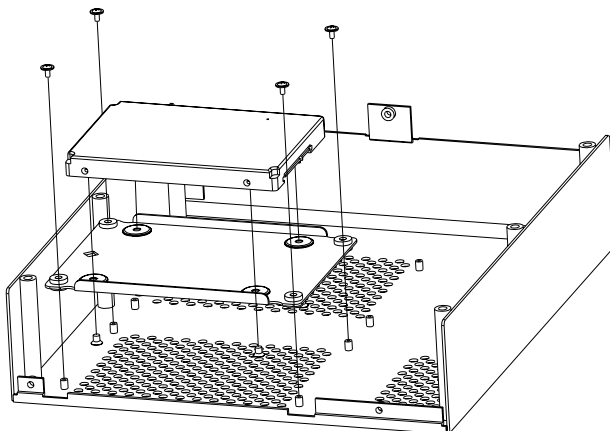
Pin	Signal	Pin	Signal
1	+5V	2	GND
3	USBD-	4	GND
5	USBD+	6	USBD+
7	GND	8	USBD-
9	GND	10	+5V

2.23 HDD Installation

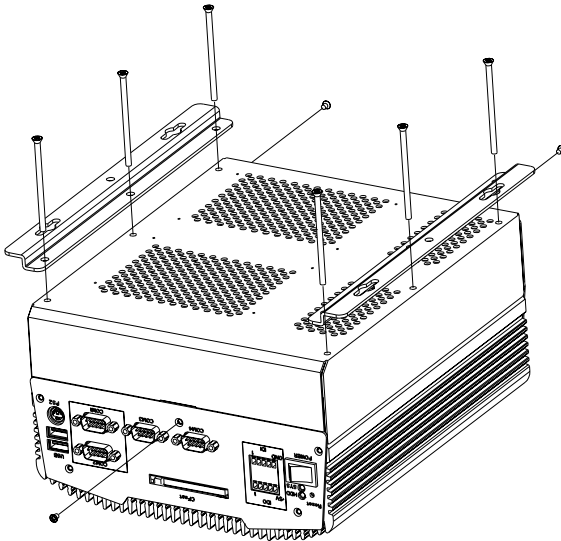
Step 1: Unfasten the six screws on the bottom lid and three screws on the front and rear panel.



Step 2: Place the HDD to the HDD bracket and fasten the four screws to the bottom lid of the AEC-6977.

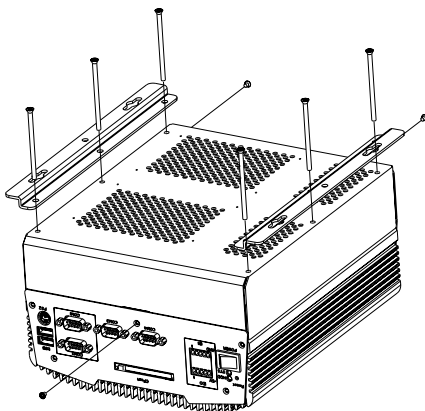


Step 3: Fasten the screws on the front and rear panels, and the brackets of AEC-6977.

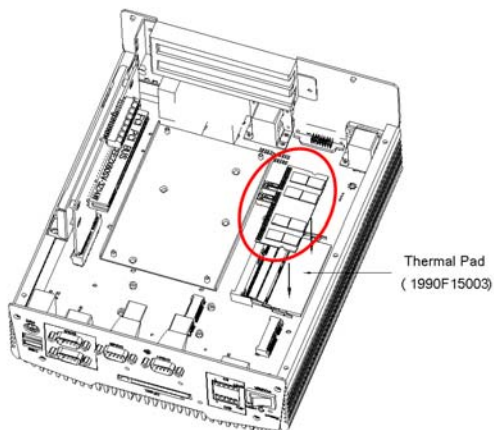


2.24 Memory Card Installation

Step 1: Unfasten the six screws on the bottom lid and three screws on the front and rear panel.



Step 2: Insert the thermal pad to the memory slot first.



Step 3: Remove the Release Paper (Liner) from the Heatsink module.



Step 4: Line up the left leg of the Heatsink module with the round hole on the RAM card and the right leg with the edge of the RAM card as the following graphic shows. Then combine the Heatsink with the RAM card.



Step 5: Insert the combined RAM module to the mainboard.

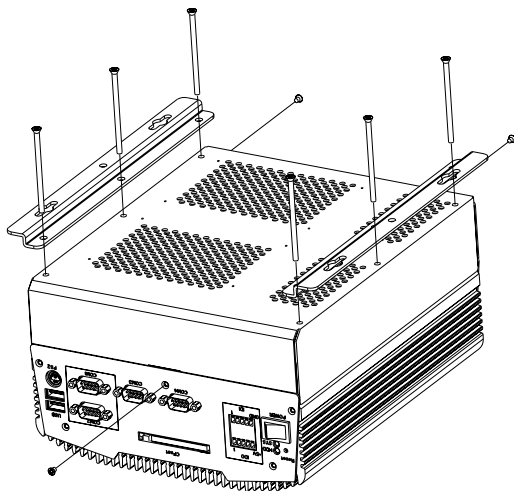


(Single RAM)



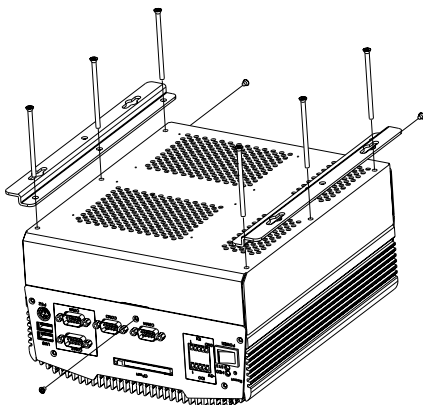
(Dual RAM)

Step 6: Fasten the screws on the front and rear panels, and the brackets of AEC-6977.

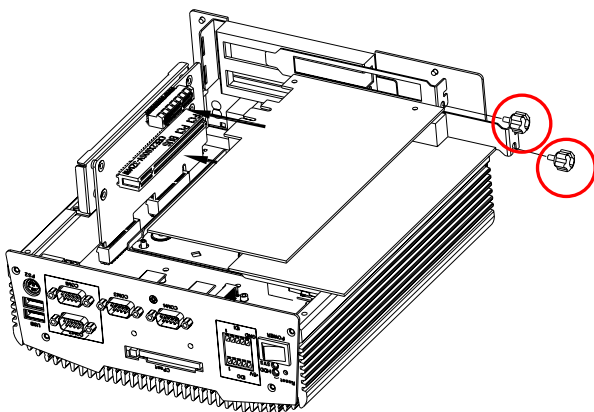


2.25 PCI Card Installation

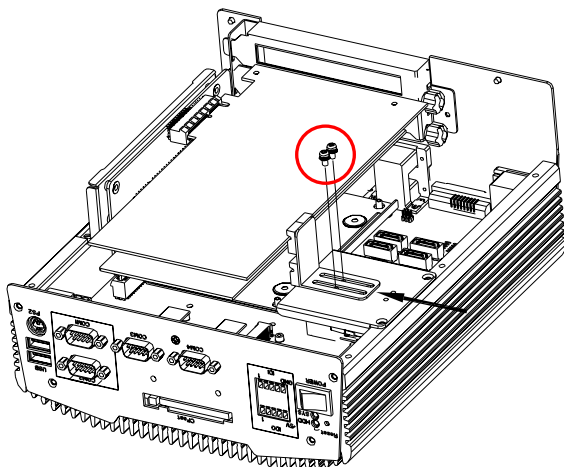
Step 1: Unfasten the six screws on the bottom lid and the three screws on front and rear panels.



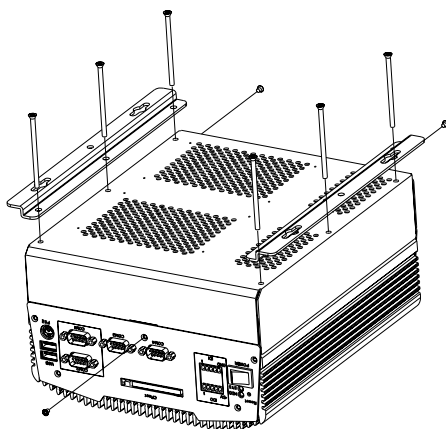
Step 2: Insert the PCI bracket and fasten the two screws to fix the PCI bracket.



Step 3: Install a hold-down bracket to fix the PCI Card and make sure the PCI Card installs properly. Then, use two screws to fix the hold-down bracket.

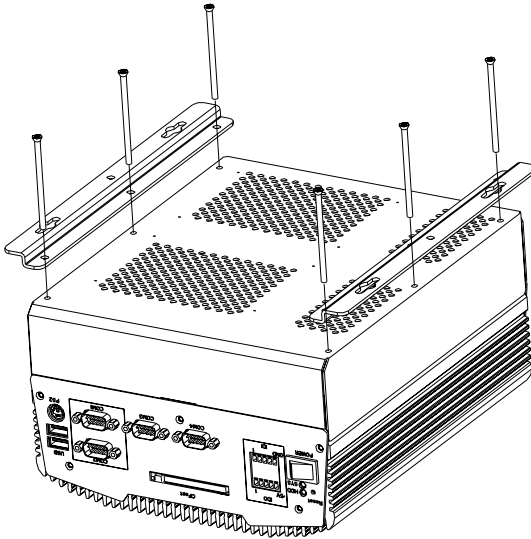


Step 4: Fasten the screws on the front and rear panels, and the brackets of AEC-6977.



2.26 Wallmount Bracket Installation

Fasten the brackets with the appropriate screws.



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 AEC-6977 CMOS memory has an integral lithium battery backup for data retention. You have to replace the battery 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 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/disables quiet boot option.

Security

Set setup administrator password.

Save & Exit

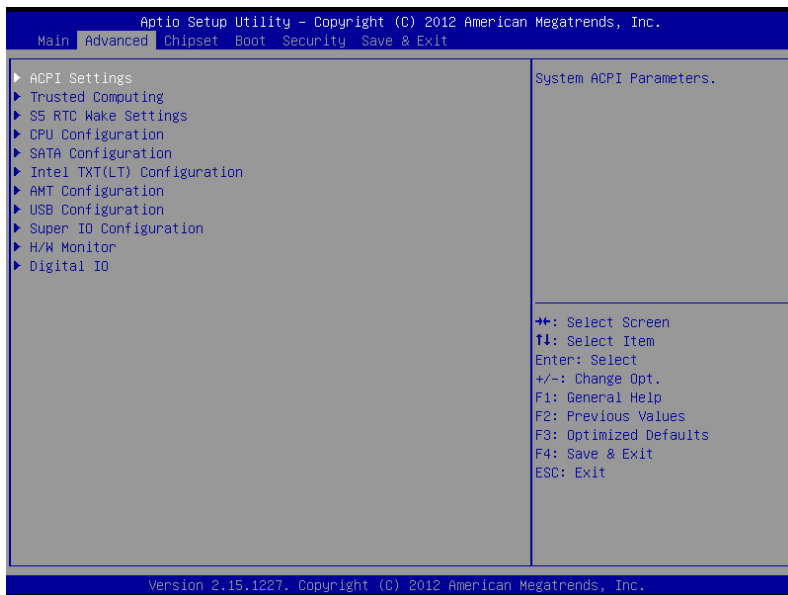
Exit system setup after saving the changes.

Setup Menu

Setup submenu: Main

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.	
Main Advanced Chipset Boot Security Save & Exit	
BIOS Information AEC-6977 R1.1(A977AM11) (12/09/2013)	Set the Date. Use Tab to switch between Date elements.
BIOS Vendor American Megatrends Core Version 4.6.5.3 x64 Compliancy UEFI 2.3; PI 1.2	
System Date [Tue 01/13/2009] System Time [01:39:12]	
Access Level Administrator	
	++: Select Screen T1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1227. Copyright (C) 2012 American Megatrends, Inc.	

Setup submenu: Advanced



ACPI Settings

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Advanced

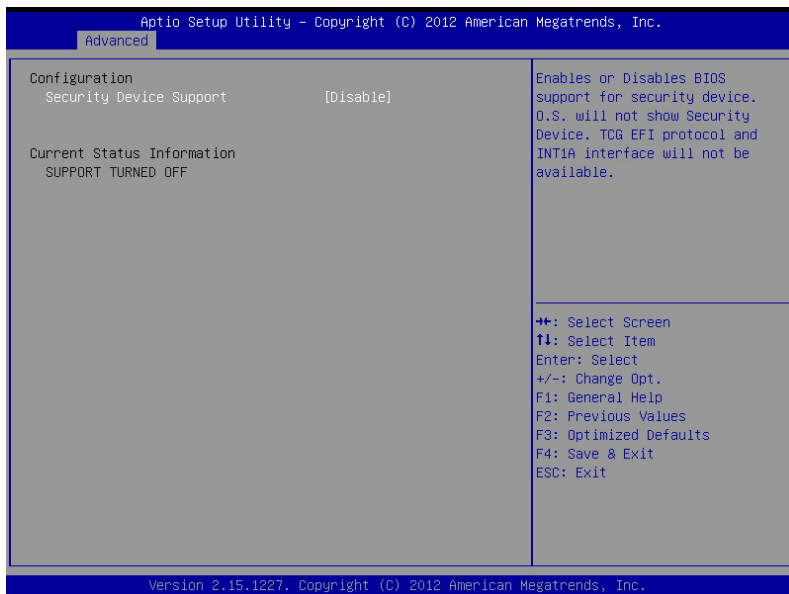
<p>ACPI Settings</p> <p>ACPI Sleep State [S3 only(Suspend to...)]</p>	<p>Select ACPI sleep state the system will enter when the SUSPEND button is pressed.</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit </p>
---	--

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Options summary:

Suspend mode	Suspend Disabled	
	S1 only (CPU Stop Clock)	
	S3 only (Suspend to RAM)	Optimal Default, Failsafe Default
Select the ACPI state used for System Suspend		

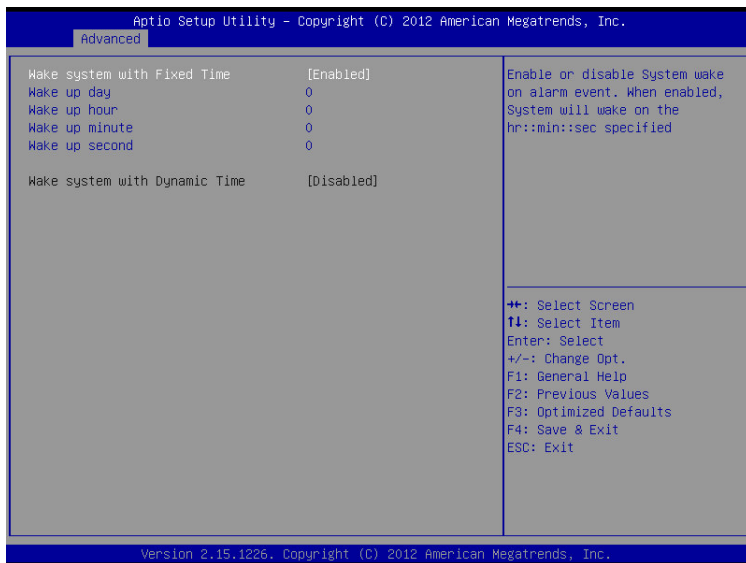
Trusted Computing



Options summary:

Security Device Support	Disable	Optimal Default, Failsafe Default
	Enable	
Enables or Disabled BIOS support for security device.		

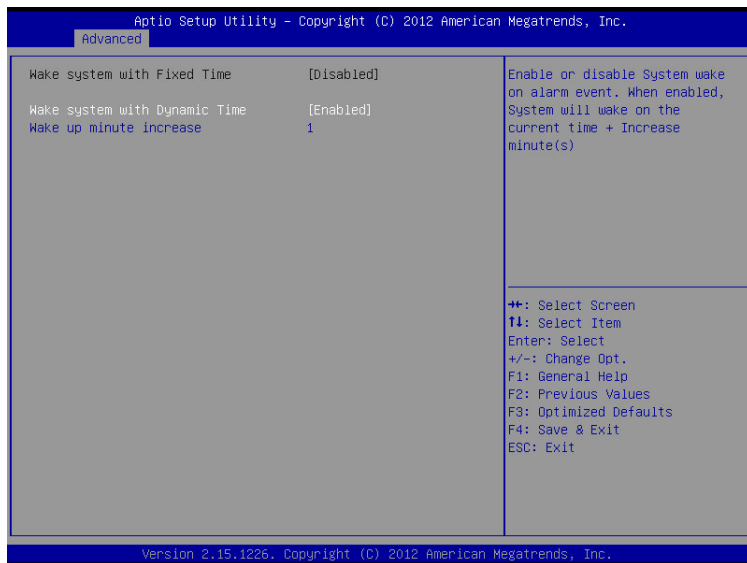
S5 RTC Wake Settings (Fixed Time)



Options summary:

Wake system with Fixed Time	Disabled	Optimal Default, Failsafe Default
	Enabled	
En/Disable System wake on alarm event. When enabled, System will wake on the hr:min:sec specified		
Wake up day	0-31	Default 0
Select 0 for daily system wake up, 1-31 for witch day of the moth that you would like the system to wake up.		
Wake up day	0-23	Default 0
Select 0-23 For example enter 3 for 3am and 15 for 3pm		
Wake up day	0-59	Default 0
Select 0-59		
Wake up day	0-59	Default 0
Select 0-59		

S5 RTC Wake Settings (Dynamic Time)



Options summary:

Wake system with	Disabled	Optimal Default, Failsafe Default
Dynamic Time	Enabled	
En/Disable System wake on alarm event. When enabled, System will wake on current time + Increases minutese(s)		
Wake up day	1-5	Default 1
Select 1-5		

CPU Configuration

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Advanced

CPU Configuration		When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology
Intel(R) Celeron(R) CPU 1020E @ 2.20GHz		
CPU Signature	306a9	
Microcode Patch	19	
Max CPU Speed	2200 MHz	
Min CPU Speed	1200 MHz	
CPU Speed	2200 MHz	
Processor Cores	2	
Intel HT Technology	Not Supported	
Intel VT-x Technology	Supported	
Intel SMX Technology	Not Supported	
64-bit	Supported	
L1 Data Cache	32 kB x 2	
L1 Code Cache	32 kB x 2	
L2 Cache	256 kB x 2	
L3 Cache	2048 kB	
Intel Virtualization Technology	[Disabled]	++: Select Screen T1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

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Options summary:

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

IDE Configuration (IDE)

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Advanced

SATA Controller(s)	[Enabled]	Enable or disable SATA Device.
SATA Mode Selection	[IDE]	
Serial ATA Port 0	ST9160412AS (160.0GB)	+*: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Serial ATA Port 1	Empty	
Serial ATA Port 2	Empty	
Serial ATA Port 3	Empty	
C-Fast	Empty	

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IDE Configuration (AHCI)

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Advanced

SATA Controller(s)	[Enabled]	Determines how SATA controller(s) operate.
SATA Mode Selection	[AHCI]	
Serial ATA Port 0	ST9160412AS (160.0GB)	
Port 0	[Enabled]	
Hot Plug	[Disabled]	
Serial ATA Port 1	Empty	
Port 1	[Enabled]	
Hot Plug	[Disabled]	
Serial ATA Port 2	Empty	
Port 2	[Enabled]	
Hot Plug	[Disabled]	
Serial ATA Port 3	Empty	
Port 3	[Enabled]	
Hot Plug	[Disabled]	
C-Fast	Empty	
Port 4	[Enabled]	
Hot Plug	[Disabled]	

+/: Select Screen
 T1: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

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IDE Configuration (RAID)

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Advanced

SATA Controller(s)	[Enabled]	Determines how SATA controller(s) operate.
SATA Mode Selection	[RAID]	
Serial ATA Port 0	ST9160412AS (160.0GB)	
Port 0	[Enabled]	
Hot Plug	[Disabled]	
Serial ATA Port 1	Empty	
Port 1	[Enabled]	
Hot Plug	[Disabled]	
Serial ATA Port 2	Empty	
Port 2	[Enabled]	
Hot Plug	[Disabled]	
Serial ATA Port 3	Empty	
Port 3	[Enabled]	
Hot Plug	[Disabled]	
C-Fast	Empty	
Port 4	[Enabled]	
Hot Plug	[Disabled]	

+-: Select Screen
 T1: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

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Options summary:

SATA Controllers	Disabled	Default
	Enabled	
En/Disable SATA Controller.		
SATA Mode	IDE	Default
	AHCI	
	RAID	
IDE: Configure SATA controllers as legacy IDEAHCI: Configure SATA controllers to operate in AHCI mode		
Port x	Disabled	Optimal Default, Failsafe Default
	Enabled	
En/Disable SATA Port.		
Hot Plug	Disabled	Optimal Default, Failsafe Default
	Enabled	
En/Disable Hot Plug feature.		

Intel TXT(LT) Configuration

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Advanced

Intel Trusted Execution Technology Configuration	
Intel TXT support only can be enabled/disabled if SMX is enabled. VT and VT-d support must also be enabled prior to TXT.	
Secure Mode Extensions (SMX)	Disabled
Intel TXT(LT) Support	[Disabled]

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

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AMT Configuration

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Advanced

Intel AMT Un-Configure ME	[Enabled] [Disabled]	Enable/Disable Intel (R) Active Management Technology BIOS Extension. Note : iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device ++: Select Screen ↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
------------------------------	-------------------------	---

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Options summary:

Intel AMT	Disabled	Optimal Default, Failsafe Default
	Enabled	
En/Disable Intel Active Management Technology BIOS Extension. Note: iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device.		
Un-configure ME	Disabled	Optimal Default, Failsafe Default
	Enabled	
OEMFlag Bit 15: Un-Configure ME without password.		

Serial Port 1 Configuration

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Advanced

Serial Port 1 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	⇧+: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Device Settings	IO=3F8h; IRQ=4;	
Change Settings	[Auto]	

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Options summary:

Serial Port	Disabled	Default
	Enabled	
Allows BIOS to En/Disable correspond serial port.		
Change Settings	Auto	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;		
Allows BIOS to Select Serial Port resource.		

Serial Port 3 Configuration

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Advanced

Serial Port 3 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Device Settings	IO=3E8h; IRQ=5;	
Change Settings	[Auto]	

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Options summary:

Serial Port	Disabled	Default
	Enabled	
Allows BIOS to En/Disable correspond serial port.		
Change Settings	Auto	Default
	IO=3E8h; IRQ=10;	
	IO=3E8h; IRQ=10,11;;	
	IO=2E8h; IRQ=10,11;	
	IO=2D0h; IRQ=10,11;	
IO=2D8h; IRQ=10,11;		
Allows BIOS to Select Serial Port resource.		

Serial Port 4 Configuration

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.

Advanced

Serial Port 4 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	⇧+: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Device Settings	IO=2E8h; IRQ=5;	
Change Settings	[Auto]	

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Options summary:

Serial Port	Disabled	Default
	Enabled	
Allows BIOS to En/Disable correspond serial port.		
Change Settings	Auto	Default
	IO=2E8h; IRQ=10;	
	IO=3E8h; IRQ=10,11;;	
	IO=2E8h; IRQ=10,11;	
	IO=2D0h; IRQ=10,11;	
IO=2D8h; IRQ=10,11;		
Allows BIOS to Select Serial Port resource.		

Serial Port 5 Configuration

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Advanced

Serial Port 5 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	IO=2D0h; IRQ=5;	
Change Settings	[Auto]	

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

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Options summary:

Serial Port	Disabled	Default
	Enabled	
Allows BIOS to En/Disable correspond serial port.		
Change Settings	Auto	Default
	IO=2D0h; IRQ=5;	
	IO=3E8h; IRQ=5;	
	IO=2E8h; IRQ=5;	
	IO=2D0h; IRQ=5;	
Allows BIOS to Select Serial Port resource.		

Serial Port 6 Configuration

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Advanced

<p>Serial Port 6 Configuration</p> <p>Serial Port [Enabled]</p> <p>Device Settings IO=2D8h; IRQ=5;</p> <p>Change Settings [Auto]</p>	<p>Enable or Disable Serial Port (COM)</p> <hr/> <p> →: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit </p>
--	---

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Options summary:

Serial Port	Disabled	Default
	Enabled	
Allows BIOS to En/Disable correspond serial port.		
Change Settings	Auto	Default
	IO=2D8h; IRQ=5;	
	IO=3E8h; IRQ=5;	
	IO=2E8h; IRQ=5;	
	IO=2D0h; IRQ=5;	
Allows BIOS to Select Serial Port resource.		

F81866 H/W Monitor

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Advanced

Pc Health Status	
CPU temperature	: +85 ℃
System temperature	: +61 ℃
Fan1 Speed	: N/A
Fan2 Speed	: N/A
Vcore	: +0.864 V
5Vdual	: +5.146 V
5Vsb	: +5.116 V
12V	: +12.120 V
VDC3V	: +3.392 V
VSB3V	: +3.424 V
VBAT	: +3.344 V

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

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Digital IO

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Advanced

DIO_P#1	[Input]	Set GPIO Output as Hi or Low
DIO_P#2	[Input]	
DIO_P#3	[Input]	
DIO_P#4	[Input]	
DIO_P#5	[Output]	
DIO_P#5 Direction	[Hi]	
DIO_P#6	[Output]	
DIO_P#6 Direction	[Hi]	
DIO_P#7	[Output]	
DIO_P#7 Direction	[Hi]	
DIO_P#8	[Output]	
DIO_P#8 Direction	[Hi]	

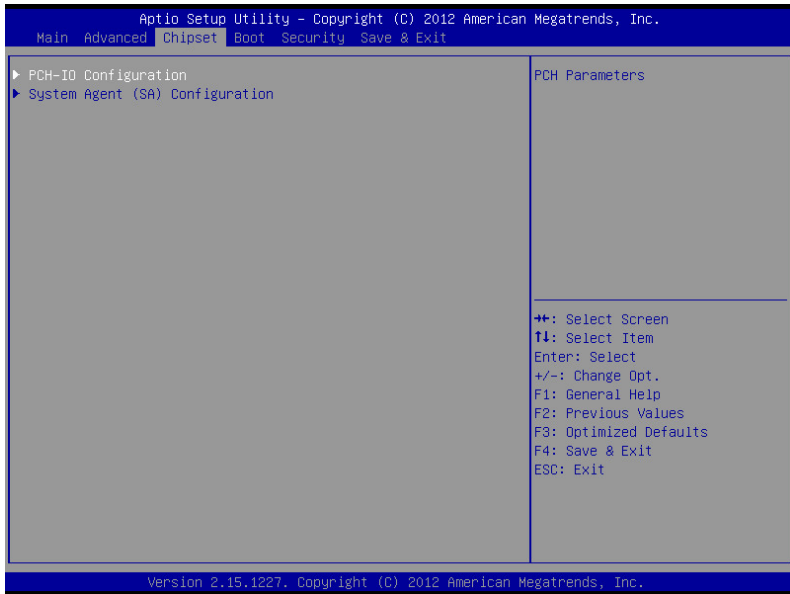
⇐+: Select Screen
 T1: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

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Options summary:

DIO_P#5~8 Direction	Low	Default
	Hi	
Allows BIOS to select high/low voltage level to output to corresponding DIO ping.		

Setup submenu: Chipset



PCH-IO Configuration

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Chipset

<p>PCH-IO Configuration</p> <p>Power Mode [ATX Type] Restore AC Power Loss [Power Off]</p> <p>PCH LAN Controller [Enabled]</p>	<p>Select Power Supply Mode.</p> <hr/> <p> →: Select Screen ↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit </p>
--	--

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Options summary:

Power Mode	ATX Type	Default
	AT Type	
Select Power Supply Mode.		
Power Mode	Power Off	Default
	Power On	
	Last State	
Select AC power state when power is re-applied after a power failure.		
PCH LAN Controller	Enabled	Default
	Disabled	
Enable or disable onboard NIC.		

System Agent (SA) Configuration

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.	
Chipset	
System Agent (SA) Configuration	Select the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display
Primary IGFX Boot Display [VBIOS Default]	
DVMT Pre-Allocated [64M]	
DVMT Total Gfx Mem [MAX]	
	←+: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1227. Copyright (C) 2012 American Megatrends, Inc.	

Options summary:

Primary IGFX Boot Display	VBIOS Default	Default
	CRT	
	HDMI	
	DVI	
Select the Video Device which will be activated during POST.		
DVMT Pre-Allocated	32M	
	64M	Default
	96M	
	128M	
	160M	
	192M	
	224M	
	256M	
	288M	
	320M	
	352M	
	284M	
	416M	
	448M	
	480M	
512M		
1024M		
Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.		
DVMT Total Gfx Mem	128M	
	256M	
	MAX	Default
Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.		

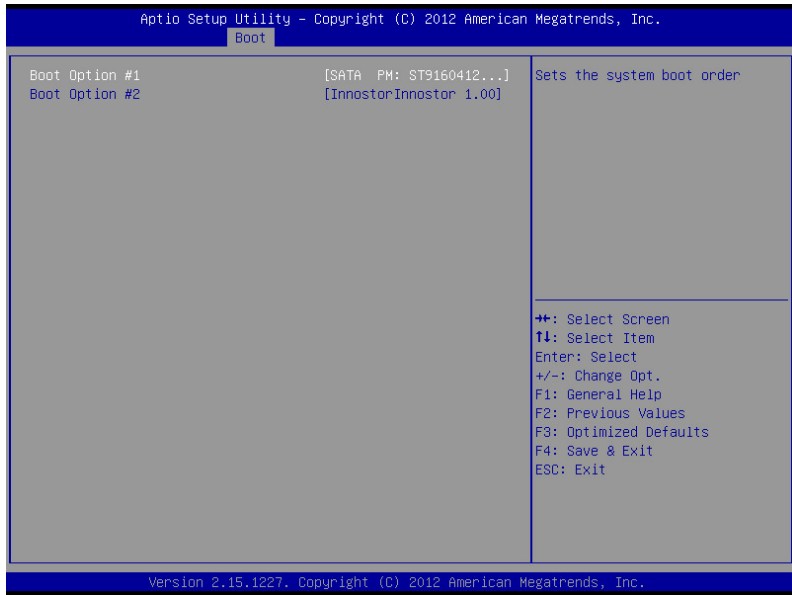
Setup submenu: Boot



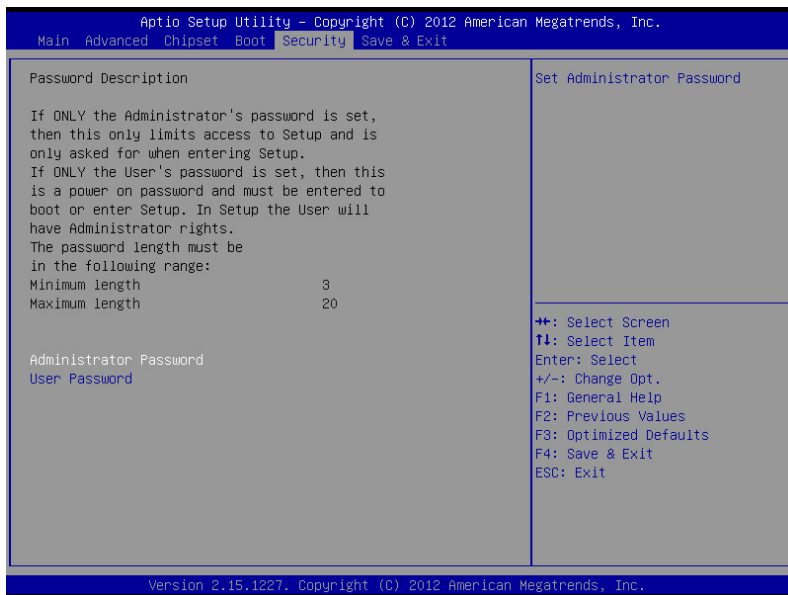
Options summary:

Quiet Boot	Disabled	Default
	Enabled	
En/Disable showing boot logo.		
Launch I82579LM PXE OpROM	Disabled	Default
	Enabled	
En/Disable Legacy Boot Option for I82579LM.		
Launch I82574L PXE OpROM	Disabled	Default
	Enabled	
En/Disable Legacy Boot Option for I82583V.		

BBS Priorities



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.

Setup submenu: Exit



Chapter

4

**Driver
Installation**

The AEC-6977 comes with an AutoRun DVD-ROM that contains all drivers and utilities that can help you to install the driver automatically.

Insert the driver DVD, the driver DVD-title will auto start and show the installation guide. If not, 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 Audio Driver
- Step 4 – Install LAN Driver
- Step 5 – Install USB 3.0 Driver
- Step 6 – Install RAID & AHCI Driver
- Step 7 – Install ME Driver
- Step 8 – Install TPM Driver
- Step 9 – Install Serial Port Driver (Optional)

Note: If you encountered compatible issues for COM port, please install the drivers in the STEP 8 folder as an administrator.

Please read instructions below for further detailed installations.

4.1 Installation:

Insert the AEC-6977 DVD-ROM into the DVD-ROM drive. And install the drivers from Step 1 to Step 9 in order.

Step 1 – Install Chipset Driver

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

Step 2 – Install VGA Driver

1. Open the **STEP2-VGA** folder and select your OS
2. Open the **.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Note 1:

- This motherboard supports VGA and LVDS display devices. In Single Display mode, use the hot keys to switch between VGA to LVDS device or vice versa. By default, press **<Ctrl>+<Alt>+<F1>** to switch to VGA device and press **<Ctrl>+<Alt>+<F3>** to switch to LVDS device.
- Before removing the current display device, connect the display device that you want to use, and then press the hot keys to switch to that device.

Note 2: If the OS is Windows[®] XP, you have to install the driver of dotNet Framework first. Simply click on ***dotnetfx35.exe*** located in ***dotNet Framwork*** folder.

Step 3 – Install Audio Driver

1. Open the **STEP3-AUDIO** folder and select your OS
2. Open the **.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 4 – Install LAN Driver

1. Open the **STEP4-LAN** folder and select your OS
2. Open the **.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 5 – Install USB3.0 Driver

1. Open the **STEP5-USB3.0** folder and open the “**Win7_32_64**” folder
2. Open the **Setup.exe** file
3. Follow the instructions
4. Drivers will be installed automatically

Step 6 – Install RAID & AHCI Driver

Please refer to **Appendix C RAID & AHCI Settings**

Step 7 – Install ME Driver

1. Open the **STEP7-ME** folder and open **setup.exe**
2. Follow the instructions
3. Drivers will be installed automatically

Step 8 – Install TPM Driver

1. Open the **STEP8-TPM** folder and select your OS
2. Open the **Setup.exe** in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 9 – Install Serial Port Driver (Optional)

1. Open the **STEP9-SERIAL PORT (OPTIONAL)** folder and select your OS
2. Open the **patch.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Appendix

A

Programming the Watchdog Timer

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 WDRstLDN // This parameter is represented from Note20
#define byte WDRstReg // This parameter is represented from Note21
#define byte WDRstBit // This parameter is represented from Note22
#define byte WDRstVal // 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(ModeLDN, 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

Input/output (I/O)	
[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
[00002D0 - 00002D7]	Communications Port (COM5)




















































[000002D8 - 000002DF]	Communications Port (COM6)
[000002E8 - 000002EF]	Communications Port (COM4)
[000002F8 - 000002FF]	Communications Port (COM2)
[000003B0 - 000003BB]	Intel(R) HD Graphics
[000003C0 - 000003DF]	Intel(R) HD Graphics
[000003E8 - 000003EF]	Communications Port (COM3)
[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
[0000E000 - 0000EFFF]	Intel(R) 7 Series/C216 Chipset Family PCI Express Root Port 2 - 1E12
[0000F000 - 0000F03F]	Intel(R) HD Graphics
[0000F040 - 0000F05F]	Intel(R) 7 Series/C216 Chipset Family SMBus Host Controller - 1E22
[0000F080 - 0000F08F]	Intel(R) 7 Series/C216 Chipset Family 2 port Serial ATA Storage Controller - 1E09
[0000F090 - 0000F09F]	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 - 0000F0C3]	Intel(R) 7 Series/C216 Chipset Family 2 port Serial ATA Storage Controller - 1E09
[0000F0D0 - 0000F0D7]	Intel(R) 7 Series/C216 Chipset Family 2 port Serial ATA Storage Controller - 1E09
[0000F0E0 - 0000F0EF]	Intel(R) 7 Series/C216 Chipset Family 4 port Serial ATA Storage Controller - 1E01
[0000F0F0 - 0000F0FF]	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
[0000F120 - 0000F123]	Intel(R) 7 Series/C216 Chipset Family 4 port Serial ATA Storage Controller - 1E01
[0000F130 - 0000F137]	Intel(R) 7 Series/C216 Chipset Family 4 port Serial ATA Storage Controller - 1E01
[0000FFFF - 0000FFFF]	Motherboard resources
[0000FFFF - 0000FFFF]	Motherboard resources

B.2 Memory Address Map

Address Range	Device
[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 - FEFFFFFF]	PCI bus
[E0000000 - EFFFFFFF]	Intel(R) HD Graphics
[F7800000 - F7BFFFFF]	Intel(R) HD Graphics
[F7C00000 - F7C1FFFF]	Intel(R) 82574L Gigabit Network Connection
[F7C00000 - F7CFFFFF]	Intel(R) 7 Series/C216 Chipset Family PCI Express Root Port 2 - 1E12
[F7C20000 - F7C23FFF]	Intel(R) 82574L Gigabit Network Connection
[F7D00000 - F7D1FFFF]	Intel(R) 82579LM Gigabit Network Connection
[F7D20000 - F7D2FFFF]	Intel(R) USB 3.0 eXtensible Host Controller
[F7D30000 - F7D33FFF]	High Definition Audio Controller
[F7D35000 - F7D350FF]	Intel(R) 7 Series/C216 Chipset Family SMBus Host Controller - 1E22
[F7D36000 - F7D363FF]	Intel(R) 7 Series/C216 Chipset Family USB Enhanced Host Controller - 1E26
[F7D37000 - F7D373FF]	Intel(R) 7 Series/C216 Chipset Family USB Enhanced Host Controller - 1E2D
[F7D38000 - F7D38FFF]	Intel(R) 82579LM Gigabit Network Connection
[F7D3B000 - F7D3B00F]	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
[FFF00000 - 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) 0x00000005 (05)	Communications Port (COM5)	
(ISA) 0x00000005 (05)	Communications Port (COM6)	
(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 (L21)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007A (L22)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007B (L23)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007C (L24)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007D (L25)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007E (L26)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007F (L27)	Microsoft ACPI-Compliant System
	(ISA) 0x00000080 (L28)	Microsoft ACPI-Compliant System
	(ISA) 0x00000081 (L29)	Microsoft ACPI-Compliant System
	(ISA) 0x00000082 (L30)	Microsoft ACPI-Compliant System
	(ISA) 0x00000083 (L31)	Microsoft ACPI-Compliant System
	(ISA) 0x00000084 (L32)	Microsoft ACPI-Compliant System
	(ISA) 0x00000085 (L33)	Microsoft ACPI-Compliant System
	(ISA) 0x00000086 (L34)	Microsoft ACPI-Compliant System
	(ISA) 0x00000087 (L35)	Microsoft ACPI-Compliant System
	(ISA) 0x00000088 (L36)	Microsoft ACPI-Compliant System
	(ISA) 0x00000089 (L37)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008A (L38)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008B (L39)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008C (L40)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008D (L41)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008E (L42)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008F (L43)	Microsoft ACPI-Compliant System
	(ISA) 0x00000090 (L44)	Microsoft ACPI-Compliant System
	(ISA) 0x00000091 (L45)	Microsoft ACPI-Compliant System
	(ISA) 0x00000092 (L46)	Microsoft ACPI-Compliant System
	(ISA) 0x00000093 (L47)	Microsoft ACPI-Compliant System
	(ISA) 0x00000094 (L48)	Microsoft ACPI-Compliant System
	(ISA) 0x00000095 (L49)	Microsoft ACPI-Compliant System
	(ISA) 0x00000096 (L50)	Microsoft ACPI-Compliant System
	(ISA) 0x00000097 (L51)	Microsoft ACPI-Compliant System
	(ISA) 0x00000098 (L52)	Microsoft ACPI-Compliant System
	(ISA) 0x00000099 (L53)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009A (L54)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009B (L55)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009C (L56)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009D (L57)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009E (L58)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009F (L59)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A0 (L60)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A1 (L61)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A2 (L62)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A3 (L63)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A4 (L64)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A5 (L65)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A6 (L66)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A7 (L67)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A8 (L68)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A9 (L69)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AA (L70)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AB (L71)	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) 0x00000016 (22)	High Definition Audio Controller
(PCI) 0x00000017 (23)	Intel(R) 7 Series/C216 Chipset Family USB Enhanced Host Controller - 1E26
(PCI) 0xFFFFFFF8 (-8)	Intel(R) 82574L Gigabit Network Connection
(PCI) 0xFFFFFFF9 (-7)	Intel(R) 82574L Gigabit Network Connection
(PCI) 0xFFFFF9FA (-6)	Intel(R) 82574L Gigabit Network Connection
(PCI) 0xFFFFF9FB (-5)	Intel(R) 82574L Gigabit Network Connection
(PCI) 0xFFFFF9FC (-4)	Intel(R) 82579LM Gigabit Network Connection
(PCI) 0xFFFFF9FD (-3)	Intel(R) USB 3.0 eXtensible Host Controller
(PCI) 0xFFFFF9FE (-2)	Intel(R) HD Graphics

B.4 DMA Channel Assignments

Direct memory access (DMA)
4 Direct memory access controller

Appendix

C

RAID & AHCI Settings

C.1 Setting RAID

OS installation to setup RAID Mode

Step 1: Copy the files below from “**Driver CD ->Step 6 - RAID&AHCI**” to

Disk



iaAHCI
安全性目錄
8 KB



iaAHCI
安裝資訊
9 KB



iaStorA
系統檔案
496 KB



iaStorAC
安全性目錄
8 KB



iaStorAC
安裝資訊
7 KB



iaStorF
系統檔案
21 KB



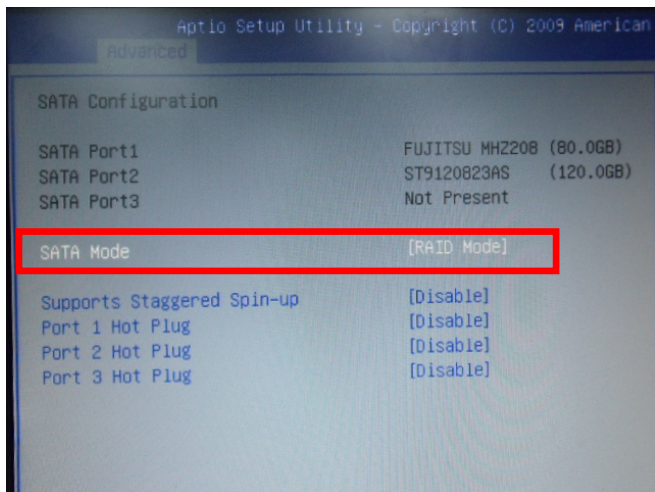
bdssetup.oem
OEM 檔案
8 KB

Step 2: Connect the USB Floppy (disk with RAID files) to the board



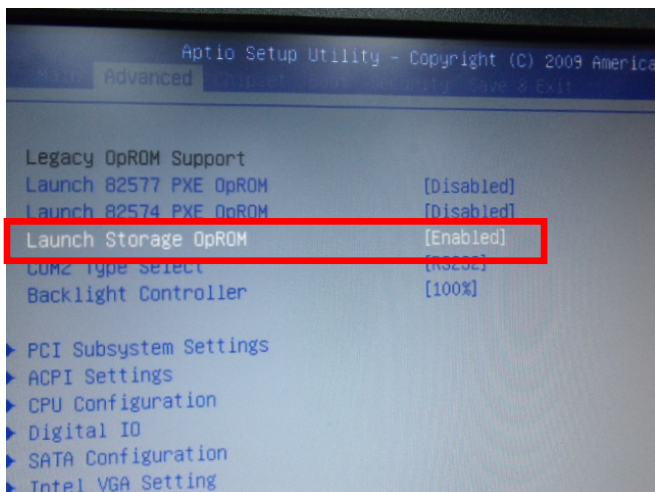
Step 3: The setting procedures “In BIOS Setup Menu”

A: Advanced -> SATA Configuration -> SATA Mode -> RAID Mode



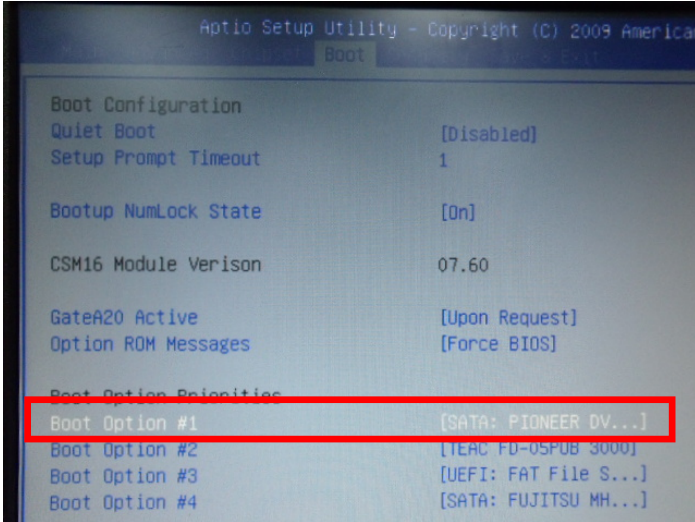
Step 4: The setting procedures “In BIOS Setup Menu”

B: Advanced -> Launch Storage OpROM -> Enabled



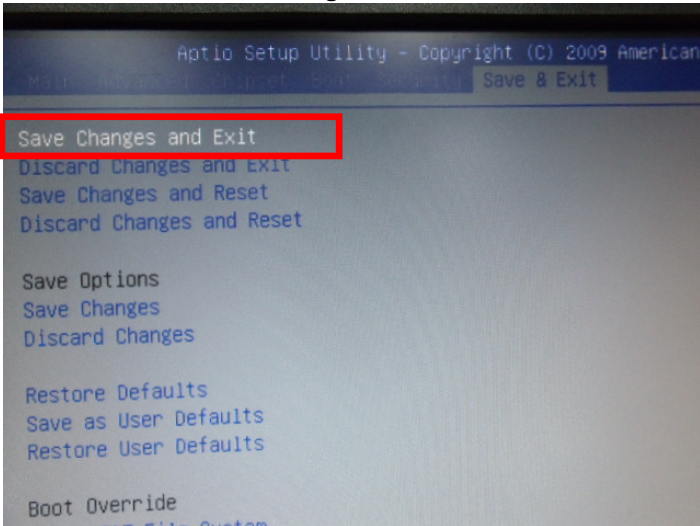
Step 5: The setting procedures "In BIOS Setup Menu"

C: Boot -> Boot Option #1 -> DVD-ROM Type

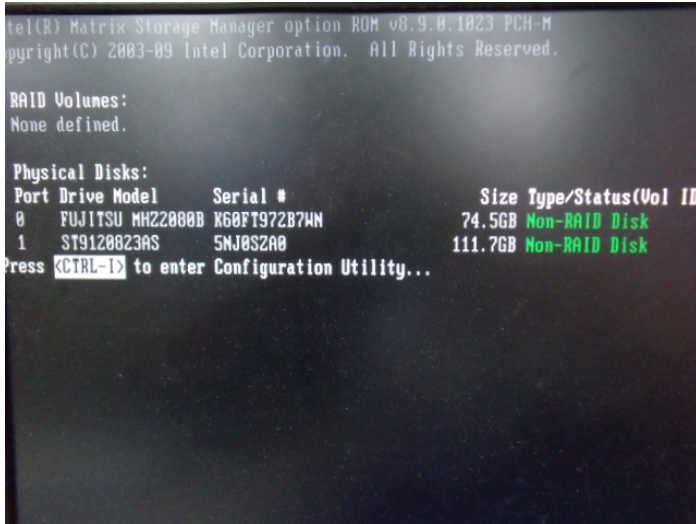


Step 6: The setting procedures "In BIOS Setup Menu"

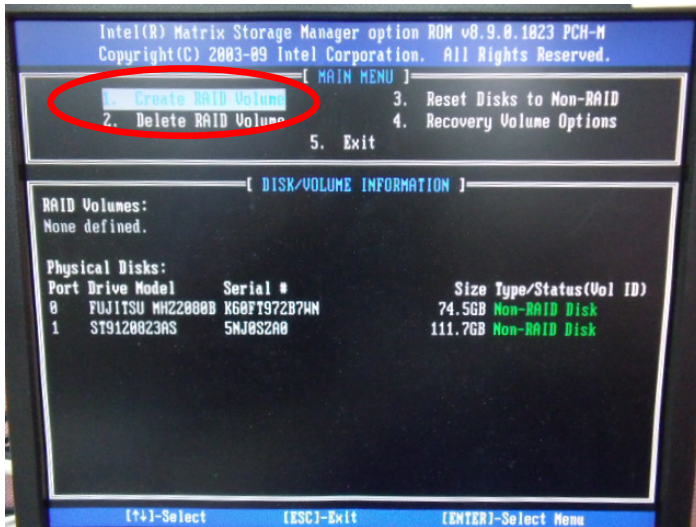
D: Save & Exit -> Save Changes and Exit



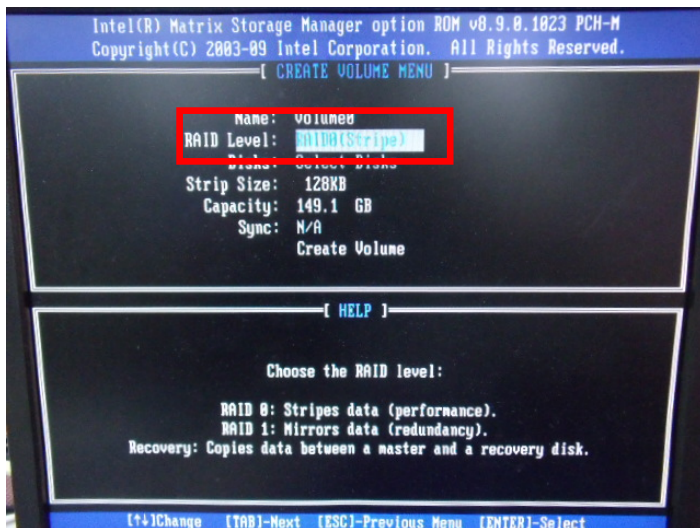
Step 7: Press **Ctrl-I** to enter **MAIN MENU**



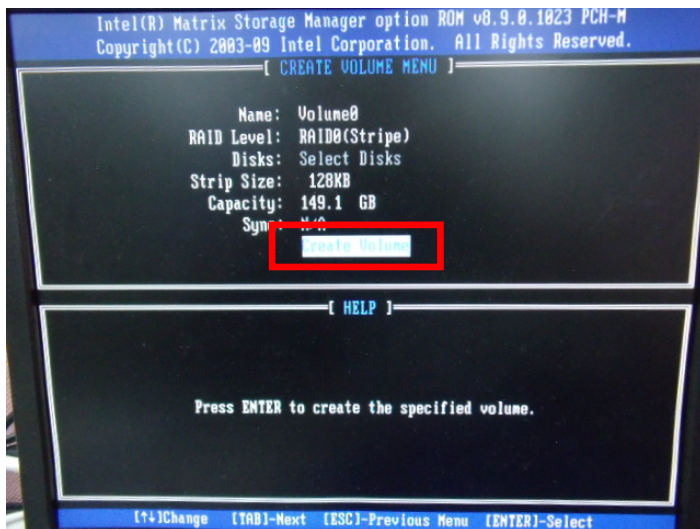
Step 8: Choose "1.Create RAID Volume"



Step 9: RAID Level -> RAID0(Stripe)



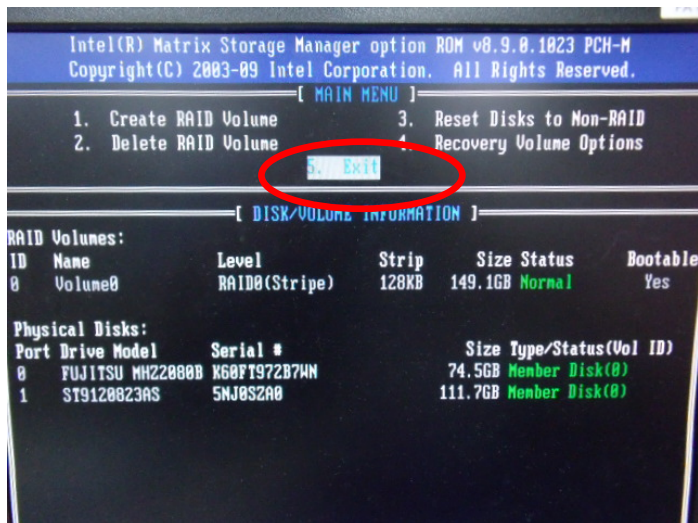
Step 10: Choose "Create Volume"



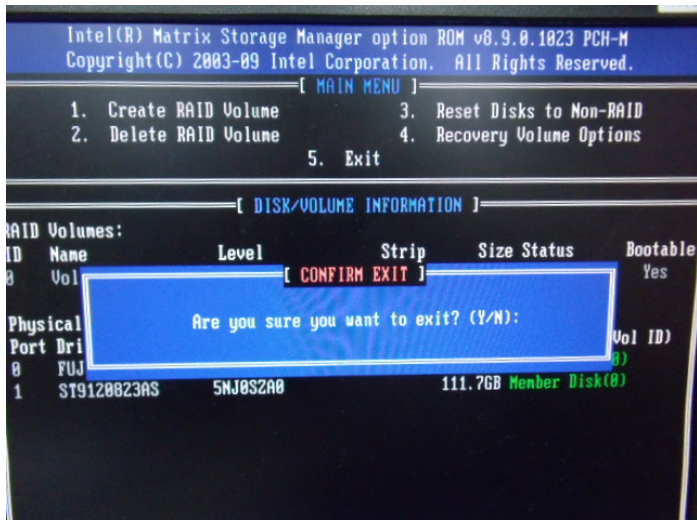
Step 11: Choose "Y"



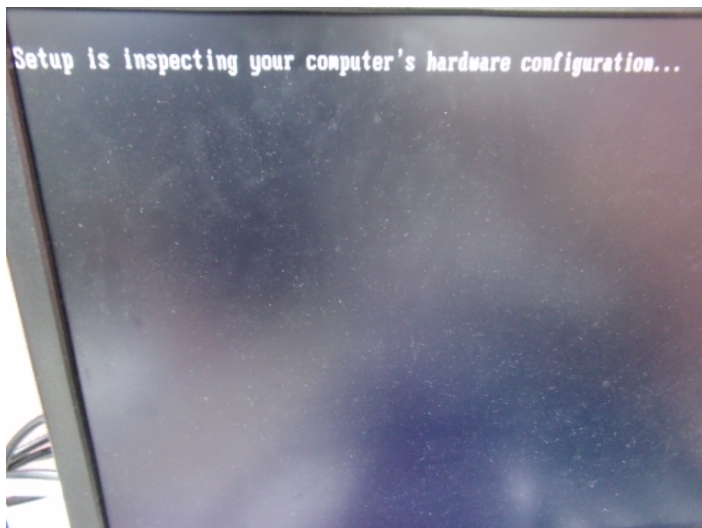
Step 12: Choose "5. Exit"



Step 13: Choose “Y”



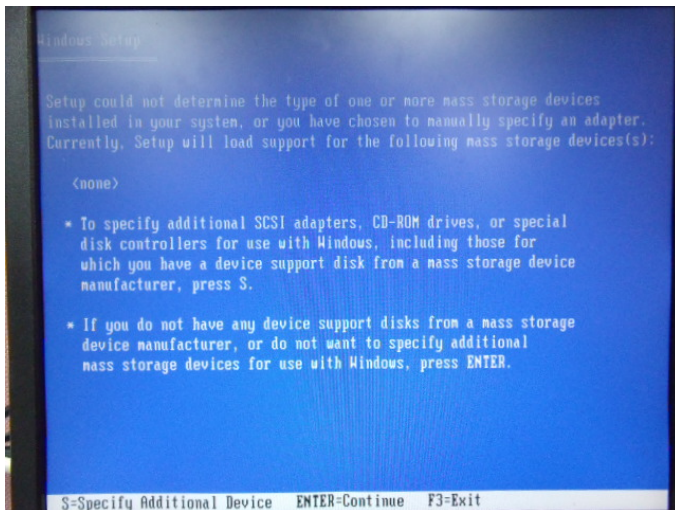
Step 14: Setup OS

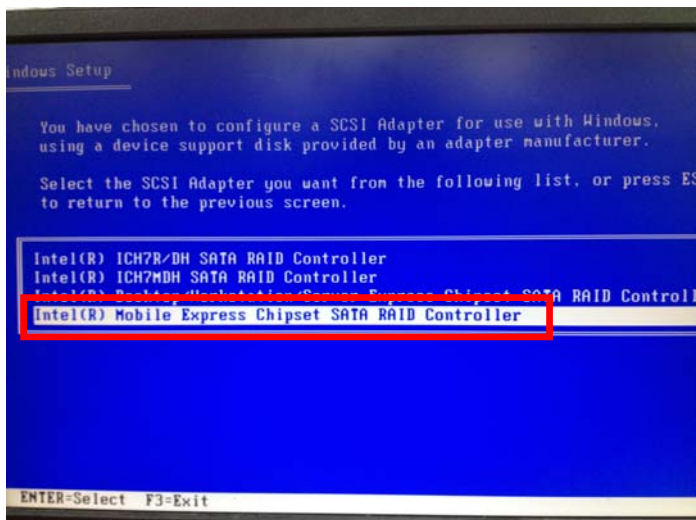


Step 15: Press “F6”

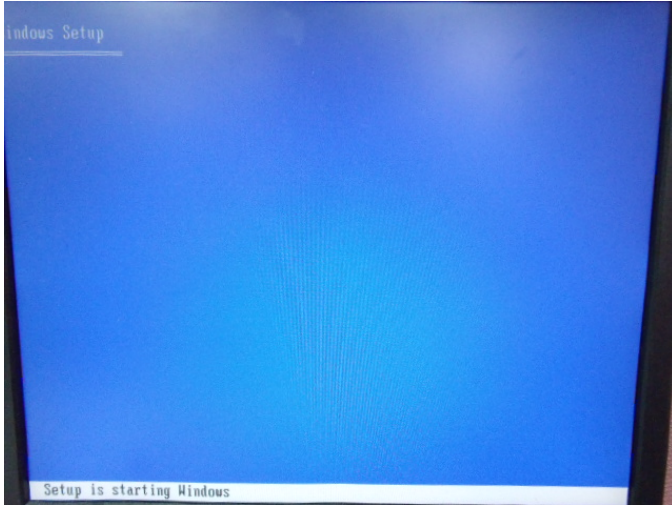


Step 16: Choose “S”



Step 17: Choose “Intel(R) Mobile Express Chipset SATA RAID Controller”**Step 18: It will show the model number you select and then press “ENTER”**

Step 19: Setup is starting Windows



C.2 Setting AHCI

OS installation to setup AHCI Mode

Step 1: Copy the files below from “**Driver CD ->Step 6 - RAID&AHCI**” to Disk

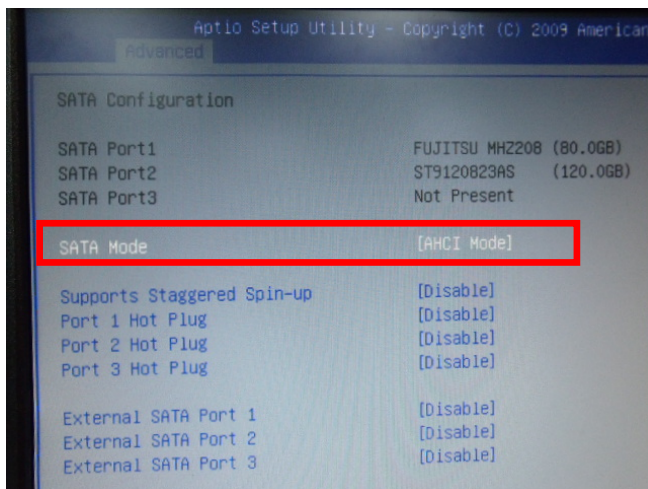


Step 2: Connect the USB Floppy (disk with AHCI files) to the board



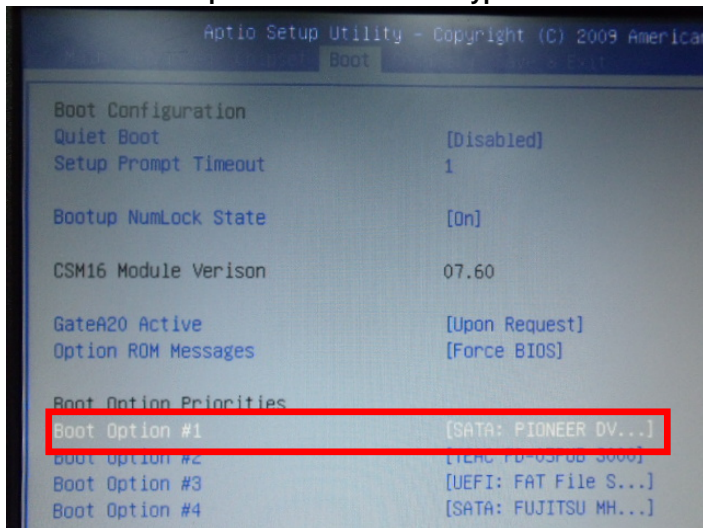
Step 3: The setting procedures “In BIOS Setup Menu”

A: Advanced -> SATA Configuration -> SATA Configuration -> SATA Mode -> AHCI Mode



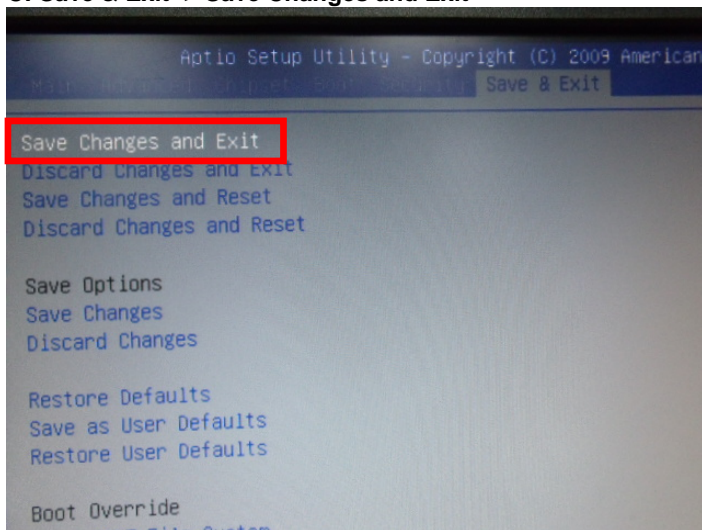
Step 4: The setting procedures “In BIOS Setup Menu”

B: Boot -> Boot Option #1 -> DVD-ROM Type

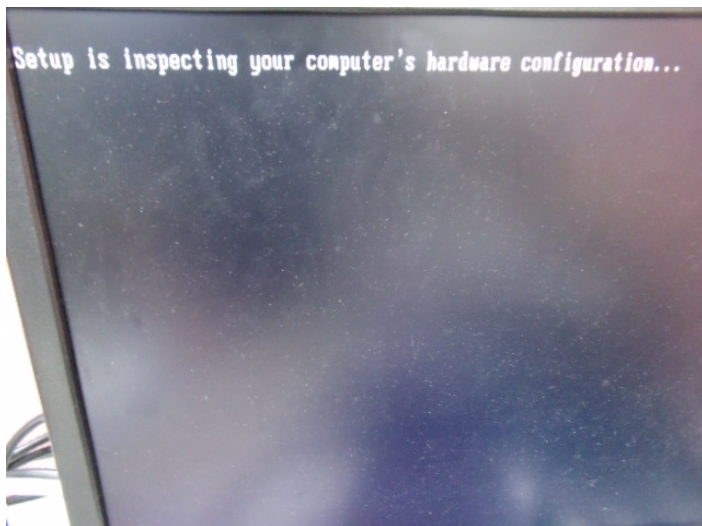


Step 5: The setting procedures "In BIOS Setup Menu"

C: Save & Exit -> Save Changes and Exit



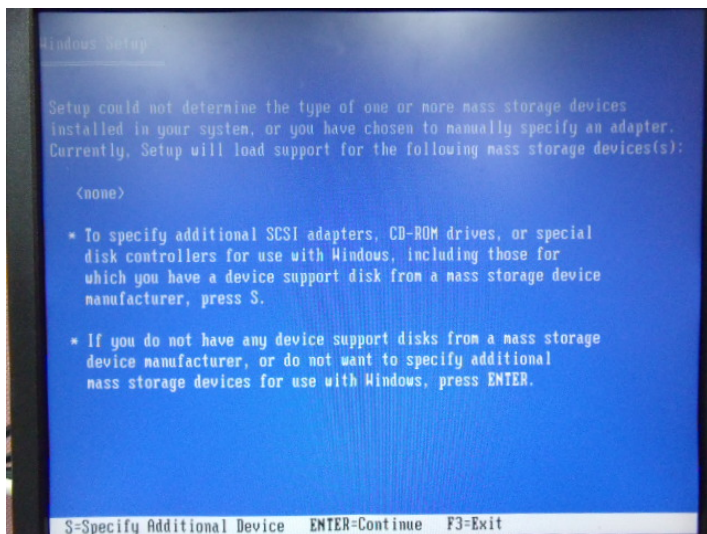
Step 6: Setup OS



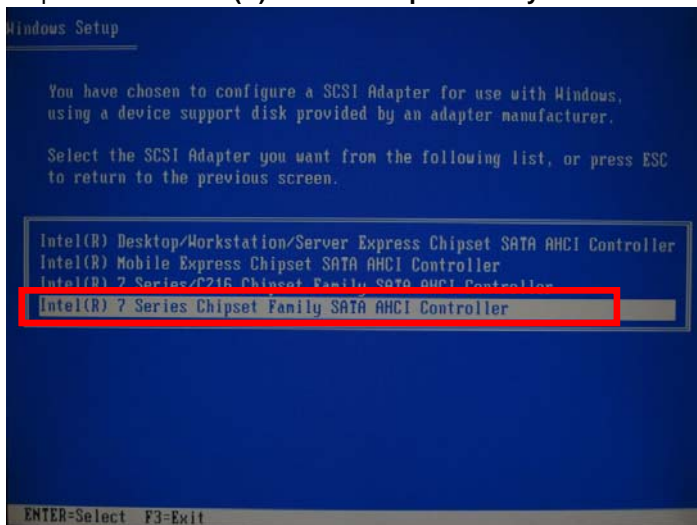
Step 7: Press "F6"



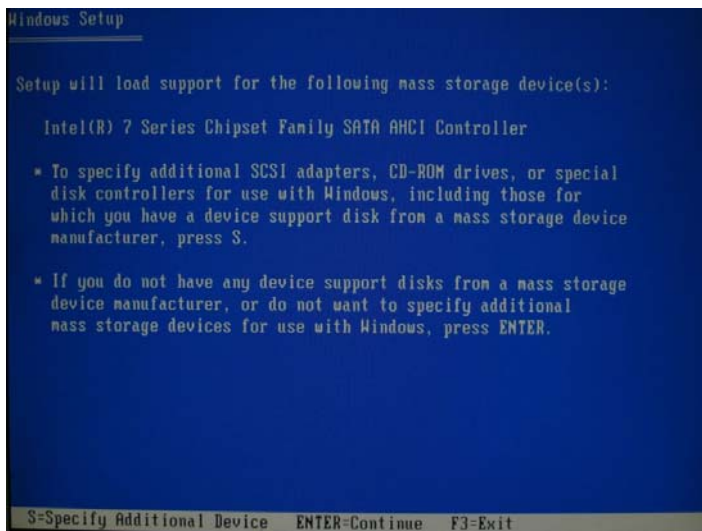
Step 8: Choose "S"



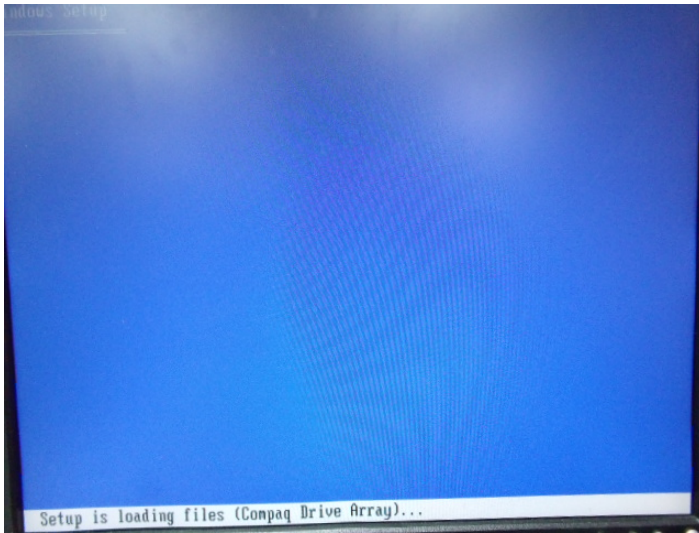
Step 9: Choose “Intel(R) 7 Series Chipset Family SATA AHCI Controller”



Step 10: It will show the model number you select and then press “ENTER”



Step 11: Setup is loading files



Appendix

D

Electrical Specifications for I/O Ports

D.1 DIO Programming

AEC-6977 utilizes FINTEK F81866 chipset as its Digital I/O controller.

Below are the procedures to complete its configuration and the AAEON initial watchdog timer program is also attached based on which you can develop customized program to fit 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. (These three steps are the same as programming WDT)

Please be noted, the Isolation protection DIO is fixed 4 Input / 4 Output type.

DIO_P#1~4 : Input

DIO_P#5~8 : Output

D.2 Digital I/O Register

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

Table 3 : Digital Output relative register table					
	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

D.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(){\n    Boolean PinStatus ;\n\n    // Procedure : AaeonReadPinStatus\n    // Input :\n    //     Example, Read Digital I/O Pin 3 status\n    // Output :\n    //     InputStatus :\n    //         0: Digital I/O Pin level is low\n    //         1: Digital I/O Pin level is High\n    PinStatus = AaeonReadPinStatus(DInput3LDN, DInput3Reg, DInput3Bit);\n\n    // Procedure : AaeonSetOutputLevel\n    // Input :\n    //     Example, Set Digital I/O Pin 6 level\n    AaeonSetOutputLevel(DOutput6LDN, DOutput6Reg, DOutput6Bit, DOutput6Val);\n}\n*****
```

```
*****  
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();
}
```
