

## **COM-QM87 Rev.B**

Intel® 4th Generation  
Core™i7/i5/i3 Processor  
Intel® QM87  
Gigabit Ethernet  
4 SATA  
8 USB2.0, up to 4 USB3.0  
1 PCI-E[x16], 7 PCI-E[x1]  
COM Express Basic Module

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## Packing List

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

- 4 M2.5 Screw
- 1 DVD-ROM for manual (in PDF format) and drivers
- 1 COM-QM87 Rev.B

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

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Chapter

1

# General Information

## 1.1 Introduction

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AAEON, a leading embedded board manufacturer, is pleased to announce the debut of their new generation COM Express Module--COM-QM87 Rev..B. The COM-QM87 Rev.B is a cutting-edge product that provides high performance and low power consumption in the embedded market.

COM-QM87 Rev.B adopts the latest Intel® 4th generation Core™ i7/i5/i3 processor. The system memory deploys with two SODIMM 204-pin DDR3/DDR3L 1333/1600 memory up to 16 GB. In addition, Intel® I217LM supports Gigabit Ethernet that allows faster network connections. This model applies seven PCI-Express[x1], one PCI-Express[x16], one LPC bus, one SMBus, one I2C, and two UART. Moreover, four SATA are configured on the COM-QM87 Rev.B. COM-QM87 Rev.B also equips eight USB2.0 (included four USB3.0) for flexible I/O expansions.

The display of COM-QM87 Rev.B supports up to three independent displays simultaneously. This brand new COM Express Module is developed to cater to the requirements of Automation, Medical, ticket machine, transportation, gaming, KIOSK, and POS/POI applications.



## 1.2 Features

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- Onboard 4th Generation Intel® Core™ i7/ i5/ i3 Processor
- Intel® QM87 PCH
- Dual-channel SODIMM DDR3/DDR3L 1333/1600 Memory, Max. 16 GB
- Gigabit Ethernet (iAMT 9.0 Support)
- VGA x 1, eDP x 1
- High Definition Audio Interface
- SATA x 4
- USB2.0 x 8 (Included USB3.0 x 4)
- PCI-Express [x16] x 1 (Gen. 3.0), PCI-Express [x1] x 7 (Gen. 2.0)

**Note:** Configurable to PCI-Express[x8] Port x 2; Configurable to PCI-Express[x8] Port x 1 and PCI-Express[x4] Port x 2

- DC Input Range, +12V
- COM Express Basic Module, Pin-out Type 6, COM.0 Rev. 2.1

## 1.3 Specifications

---

### System

- **Form Factor** COM Express Basic module, Pin-out Type 6, COM. 0 Rev. 2.1
- **Processor** Onboard 4th Generation Intel® Core™ i7/i5/i3 Processor
- **System Memory** 204-pin DDR3/DDR3L SODIMM x 2, Max. 16GB (DDR3/DDR3L 1333/1600), support dual-channel function
- **Chipset** Intel® QM87 PCH
- **I/O Chipset** Intel® QM87 (Winbond SIO on the carrier board)
- **Ethernet** Intel® I217LM, 10/100/1000Base-TX PHY
- **BIOS** AMI BIOS  
SPI type, 16MB ROM
- **EEPROM** Atmel® AT24C02, save BIOS and configuration data
- **Wake On LAN** Yes
- **Watchdog Timer** ITE8518, 255 levels
- **H/W Status Monitoring** Supports CPU Temperature Monitoring
- **Expansion Interface** PCI-Express [x16] x 1  
PCI-Express [x1] x 7  
LPC bus x 1  
SMBus x 1  
UART x 2 (TX/RX only)
- **Power Requirement** +12V only  
2-pin wafer for RTC battery
- **Board Size** 4.92" (L) x 3.75"(W) (125mm x 95mm)

- **Gross Weight** 0.66lb (0.3kg)
- **Operating Temperature** 32°F ~ 140°F (0°C ~ 60°C)
- **Storage Temperature** -40°F ~ 176°F (-40°C ~ 80°C)
- **Operating Humidity** 0% ~ 90% relative humidity, non-condensing
- **OS Support** Windows<sup>®</sup> 7, Windows<sup>®</sup> 8, Linux Fedora

## Display

- **Chipset** 4th Generation Intel<sup>®</sup> Core™ i7/i5/i3 Processor Integrated
- **Memory** Shared system memory up to 512MB/ DVMT 5.0
- **Resolution** Up to 2560 x 2048 for CRT  
Up to 1920 x 1200 for LCD
- **LCD Interface** VGA x 1, eDP x 1

## I/O

- **Storage** SATA x 4
- **Serial Port** From LPC to EC, then to the carrier board (EC x 2, CB x 2)
- **USB** USB2.0 x 8 (included USB 3.0 x 4)
- **Audio** High definition audio
- **GPIO** Up to 4 in and 4 out

Chapter

2

**Quick  
Installation  
Guide**

## 2.1 Safety Precautions

---

**Warning!**

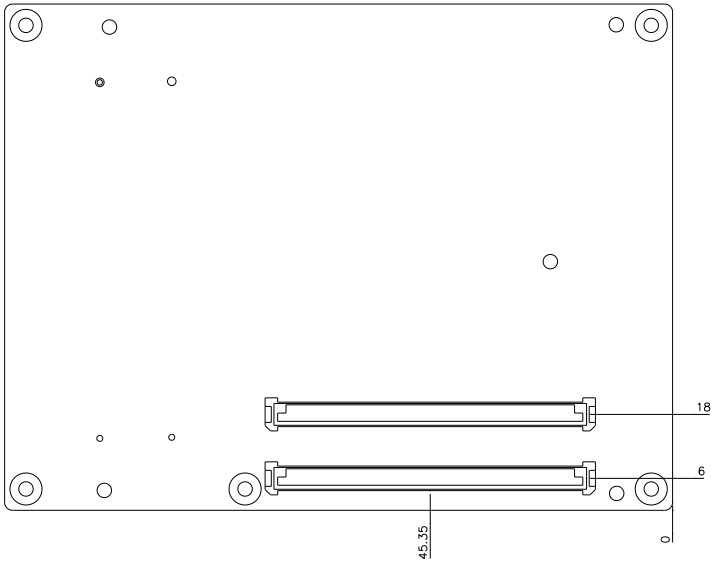
*Always completely disconnect the power cord from your board whenever you are working on it. Do not make connections while the power is on, because a sudden rush of power can damage sensitive electronic components.*

**Caution!**

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



**Solder Side**



## 2.3 List of Switch

---

There is a switch on the board that allows you to configure your system to suit your application. The table below shows the function of the switch.

Label	Function
SW1	AT/ATX Setting Switch

## 2.4 AT/ATX Setting Switch (SW1)

---

	ON	OFF
1	AT Selection	ATX Selection
2	ME_EN	ME_DIS



## Below Table for China RoHS Requirements

产品中有毒有害物质或元素名称及含量

## AAEON Main Board/ Daughter Board/ Backplane

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板 及其电子组件	×	○	○	○	○	○
外部信号 连接器及线材	×	○	○	○	○	○
<p><b>O:</b> 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 <b>SJ/T 11363-2006</b> 标准规定的限量要求以下。</p> <p><b>X:</b> 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 <b>SJ/T 11363-2006</b> 标准规定的限量要求。</p> <p>备注：此产品所标示之环保使用期限，系指在一般正常使用状况下。</p>						

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 these tests, you will either hear a few short beeps or see an error message on the screen. There are two kinds of errors: fatal or 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 COM-QM87 Rev.B CMOS memory has an integral lithium battery backup for data retention. However, you will need to replace the complete unit when it finally runs down.

## 3.2 AMI BIOS Setup

---

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

### Entering Setup

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

### Main

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

### Advanced

Enable/disable boot option for legacy network devices.

### Chipset

Host bridge parameters.

### Boot

Enables/disables quiet boot option.

### Security

Set setup administrator password.

### Save&Exit

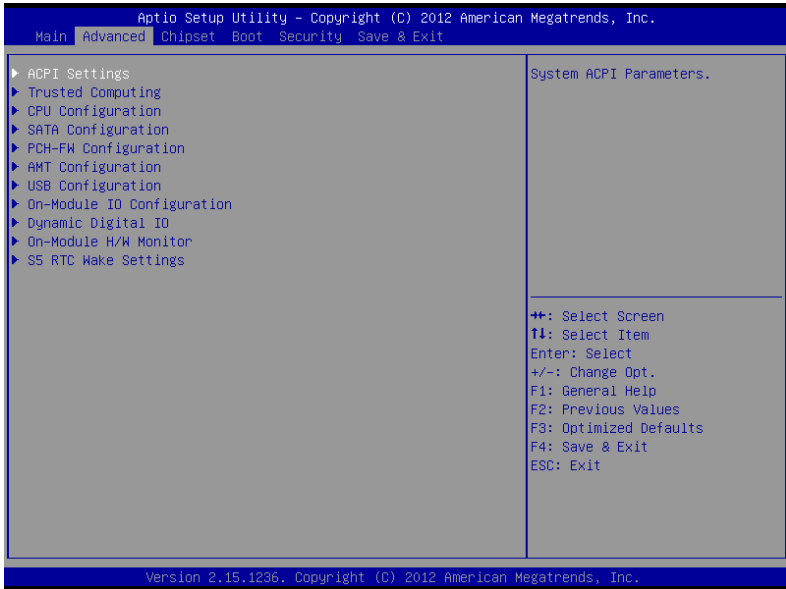
Exit system setup after saving the changes.

## Setup Menu

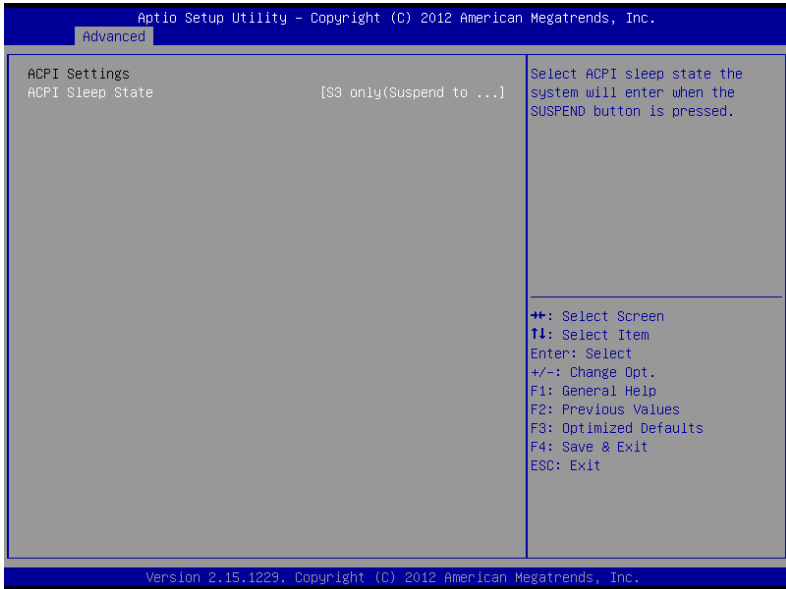
### Main

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Main   Advanced   Chipset   Boot   Security   Save & Exit		
BIOS Information COM-QM87 R1.0(CM87AM10) (07/18/2013)		Set the Date. Use Tab to switch between Date elements.
BIOS Vendor Core Version Compliancy	American Megatrends 4.6.5.4 UEFI 2.3.1; PI 1.2	
Firmware Vendor Firmware Information Firmware Version Build Date	AAEDN Mother Board CM87AE03 1/9/2013	
System Date System Time	[Thu 01/01/2009] [00:11:41]	+/: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Access Level	Administrator	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

## Advanced



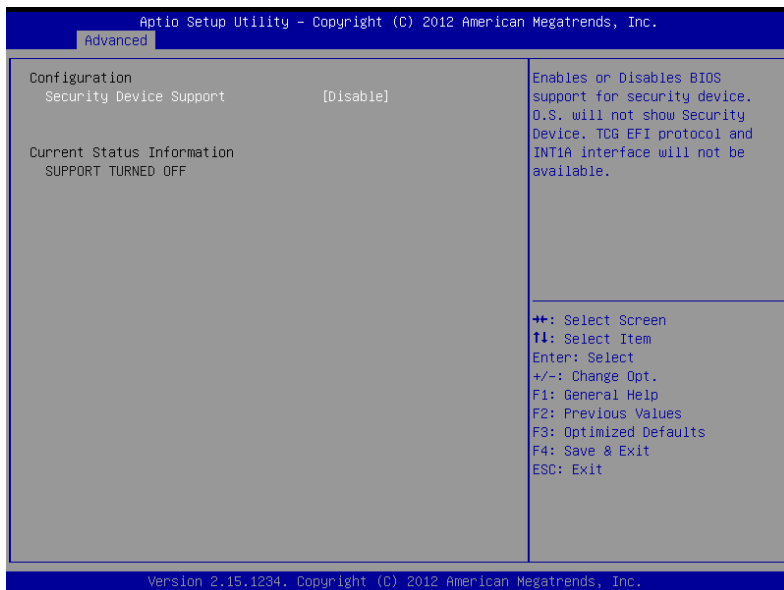
## ACPI Settings



### Options Summary:

Suspend mode	Suspend Disabled	Default
	S3 (Suspend to RAM)	
Select the ACPI state used for System Suspend		

## Trusted Computing

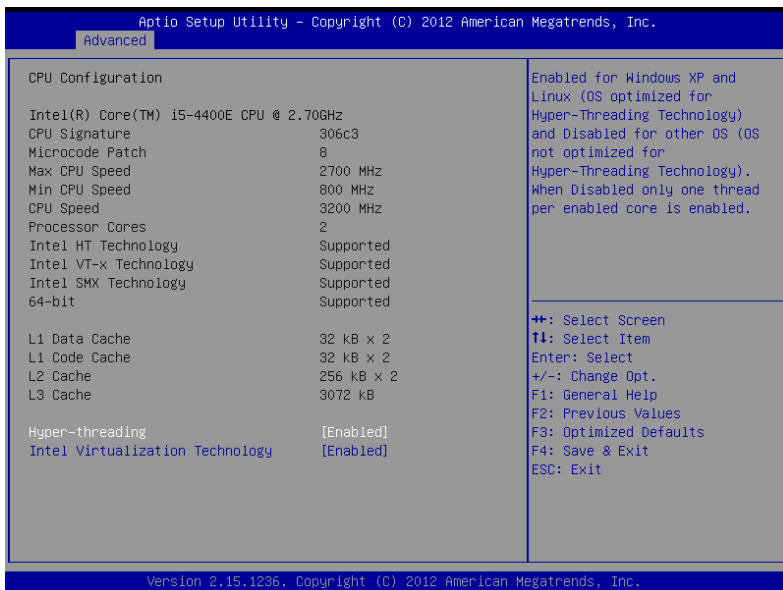


### Options Summary:

Security Device Support	Disabled	Default
	Enabled	
Enable or Disable BIOS support for security device.		



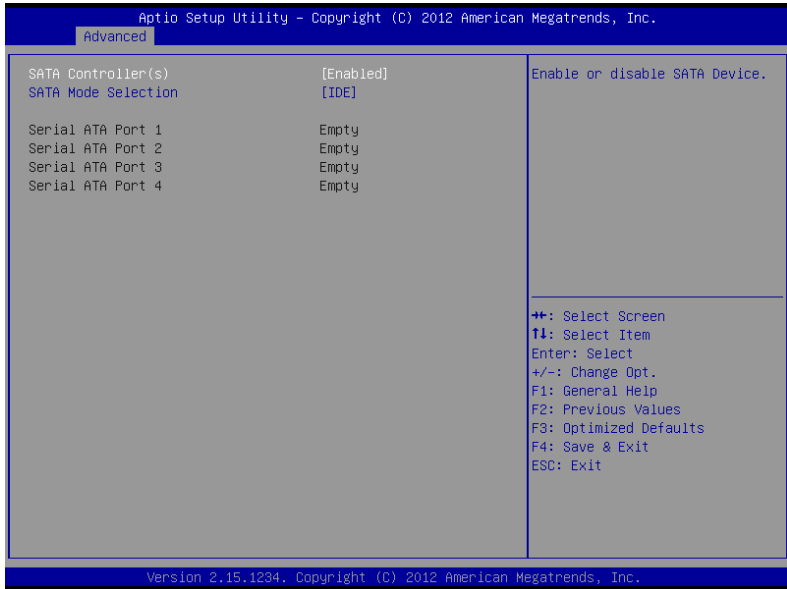
## CPU Configuration



### Options Summary:

Hyper-Threading	Disabled	Default
	Enabled	
En/Disable Intel Hyper-Threading Technology.		
Intel Virtualization Technology	Disabled	Default
	Enabled	
En/Disable Intel Virtualization Technology.		

## SATA Configuration



### Options Summary:

SATA Controller(s)	Disabled	Default
	Enabled	
En/Disable SATA Controller(s)		
SATA Mode Selection	IDE	Default
	AHCI	
	RAID	
Determines how SATA controller(s) operate		

## PCH-FW Configuration

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

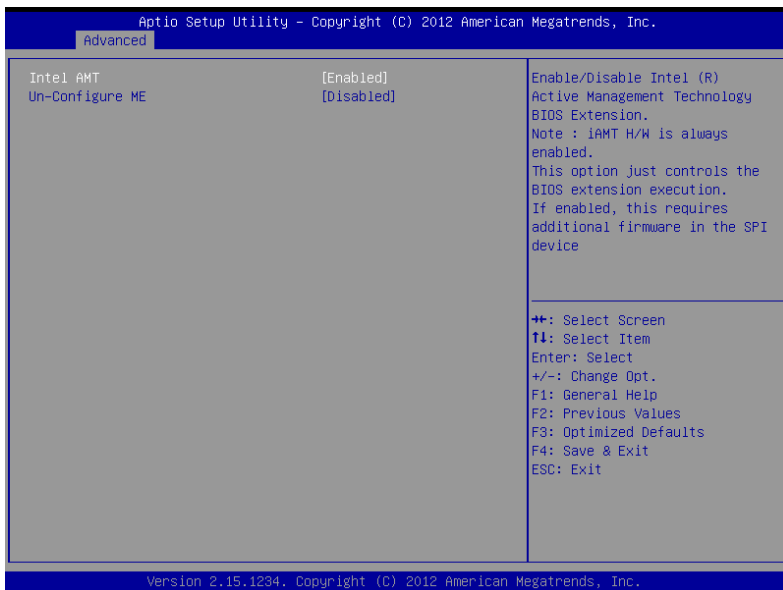
Advanced

ME FW Version	9.0.1.1939
ME Firmware Mode	Normal Mode
ME Firmware Type	Full Sku Firmware
ME Firmware SKU	5MB

++: 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

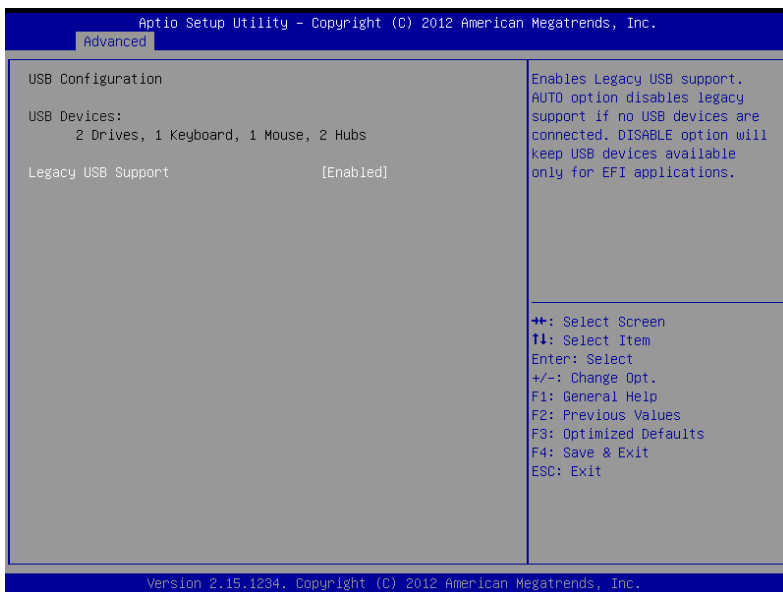


### Options Summary:

Intel AMT	Disabled	Default
	Enabled	
Enable/Disable Intel(R) Active Management Technology BIOS Extension.		
Un-Configure ME	Disabled	Default
	Enabled	
OEMFlag Bit 15 : Un-Configure ME without password.		

## USB

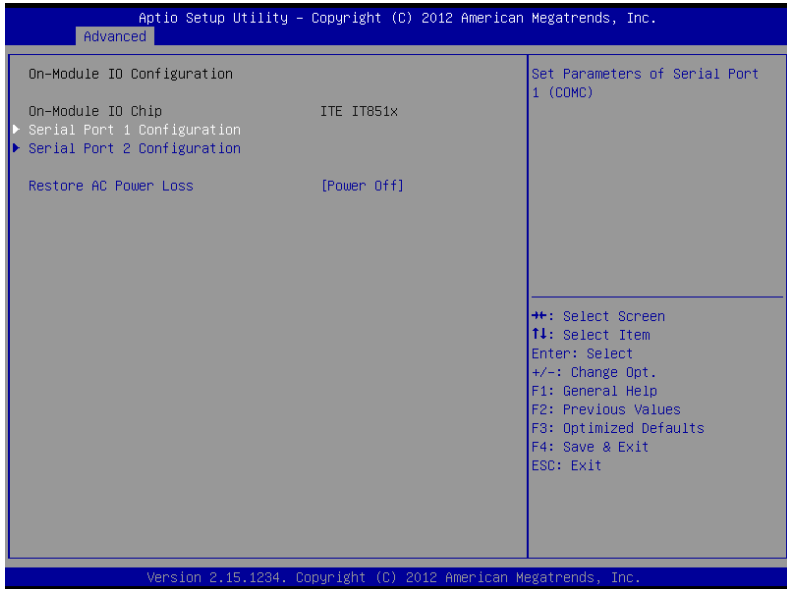
### Configuration



#### Options Summary:

Legacy USB Support	Enabled	Default
	Disabled	
	Auto	
<p>Enables BIOS Support for Legacy USB Support. When enabled, USB can be functional in legacy environment like DOS.</p> <p>AUTO option disables legacy support if no USB devices are connected</p>		

## On-Module IO Configuration



## Options Summary:

Restore AC Power Loss	Power Off	Default
	Power On	
	Last State	
Select AC power state when power is re-applied after a power failure.		

## Serial Port 1 Configuration

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

Advanced

Serial Port 1 Configuration	Enable or Disable Serial Port (COM)
Serial Port [Enabled]	
Device Settings IO=208h; IRQ=10;	
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

Version 2.15.1234. Copyright (C) 2012 American Megatrends, Inc.

## Serial Port 2 Configuration

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

Advanced

Serial Port 2 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	IO=2C8h; IRQ=11;	
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

Version 2.15.1234. Copyright (C) 2012 American Megatrends, Inc.

## Options Summary:

Serial Port	Disabled	
	Enabled	Default
Allows BIOS to En/Disable corresponding serial port.		
Change Settings (Serial Port 1)	Auto	Default
	IO=3F8h; IRQ=3;	
	IO=3F8h; IRQ=3,4,5,7,10,11;	
	IO=2F8h; IRQ=3,4,5,7,10,11;	
	IO=3E8h; IRQ=3,4,5,7,10,11;	
	IO=2E8h; IRQ=3,4,5,7,10,11;	



Allows BIOS to Select Serial Port resource.

Change Settings (Serial Port 2)	Auto	Default
	IO=2F8h; IRQ=4;	
	IO=3F8h; IRQ=3,4,5,7,10,11;	
	IO=2F8h; IRQ=3,4,5,7,10,11;	
	IO=3E8h; IRQ=3,4,5,7,10,11;	
	IO=2E8h; IRQ=3,4,5,7,10,11;	

Allows BIOS to Select Serial Port resource.

## Dynamic Digital IO



### Options Summary:

Dynamic Digital IO	Disabled	Default
Support	Enabled	
Enable or Disable Dynamic Digital IO Support.		

## On-Module HW Monitor

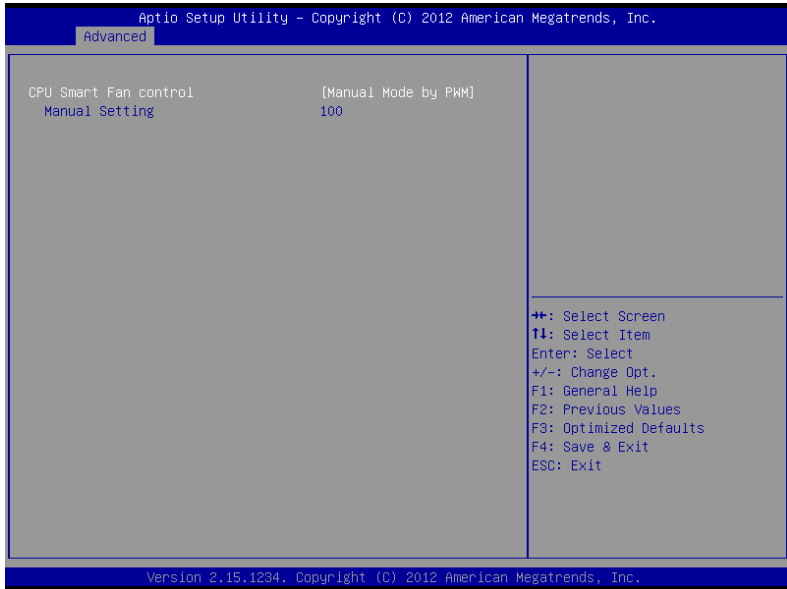
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.

Advanced

Pc Health Status		Smart Fan Configuration
CPU Temperature	: +100 C	
SYS Temperature	: +42 C	
System FAN Speed	: N/A	
VAC_IN	: +11.923 V	
V5A2	: +5.174 V	
V3.3S	: +3.261 V	
VDDR	: +1.362 V	
V5A	: +4.956 V	
VDDRE	: +1.824 V	
▶ Smart Fan Mode Configuration		
		+/: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Version 2.15.1234. Copyright (C) 2012 American Megatrends, Inc.

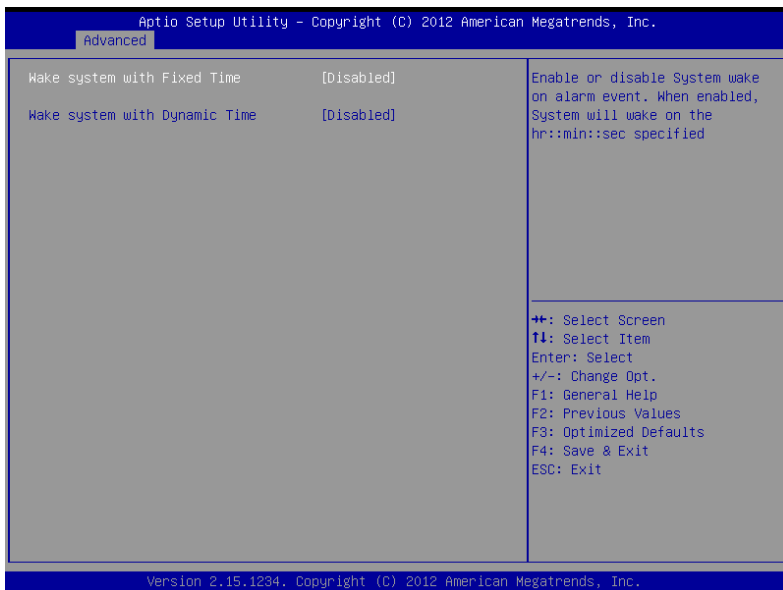
## Smart Fan Mode Configuration



### Options Summary:

CPU Smart Fan Control	Full Mode	Default
	Manual Mode by PWM	
	Auto Mode by PWM	
Select Fan1 Control Mode.		

## S5 RTC Wake Settings

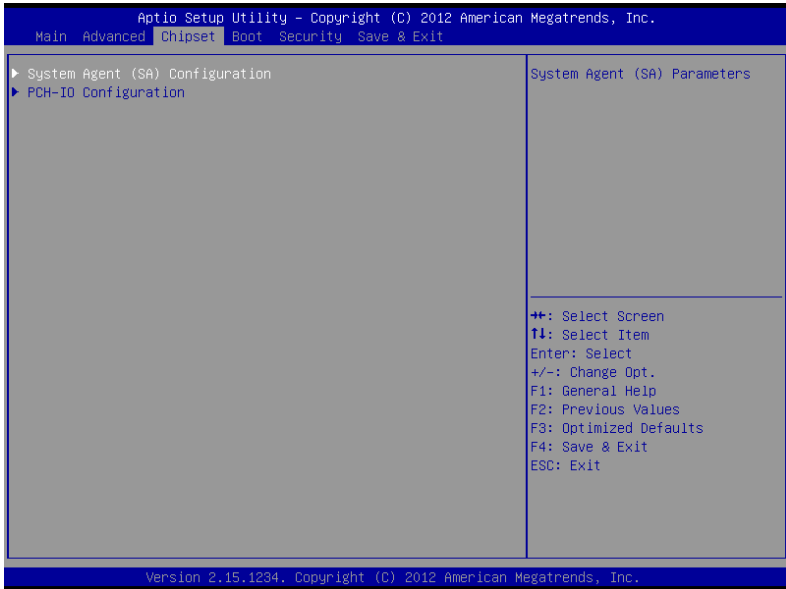


### Options Summary:

Wake system with Fixed Time	Disabled	Default
	Enabled	
Enable or disable System wake on alarm event. When enabled, System will wake on the hr::min::sec specified.		
Wake up day	0 (Default)	
Select 0 for daily system wake up 1-31 for which day of the month that you would like the system to wake up		
Wake up hour	0 (Default)	
select 0-23 For example enter 3 for 3am and 15 for 3pm		

Wake up minute	0 (Default)	
select 0-59 for minute of an hour.		
Wake up second	0 (Default)	
select 0-59 for second of a minute.		
Wake system with	Disabled	Default
Dynamic Time	Enabled	
Enable or disable System wake on alarm event. When enabled, System will wake on the current time + Increase minute(s)		
Wake up minute increase	0 (Default)	
select 1 - 5 for minute(s).		

## Chipset



## System Agent (SA) Configuration

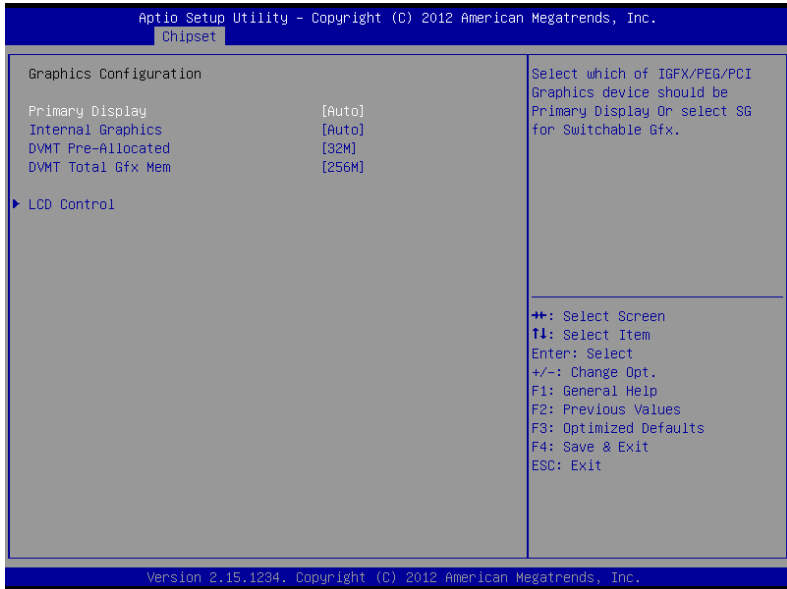
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Chipset		
VT-d Capability	Supported	Check to enable VT-d function on MCH.
VT-d	[Enabled]	
▶ Graphics Configuration		
++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit		
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

## Options Summary:

VT-d	Disabled	Default
	Enabled	
Check to enable VT-d function on MCH		



## Graphics Configuration

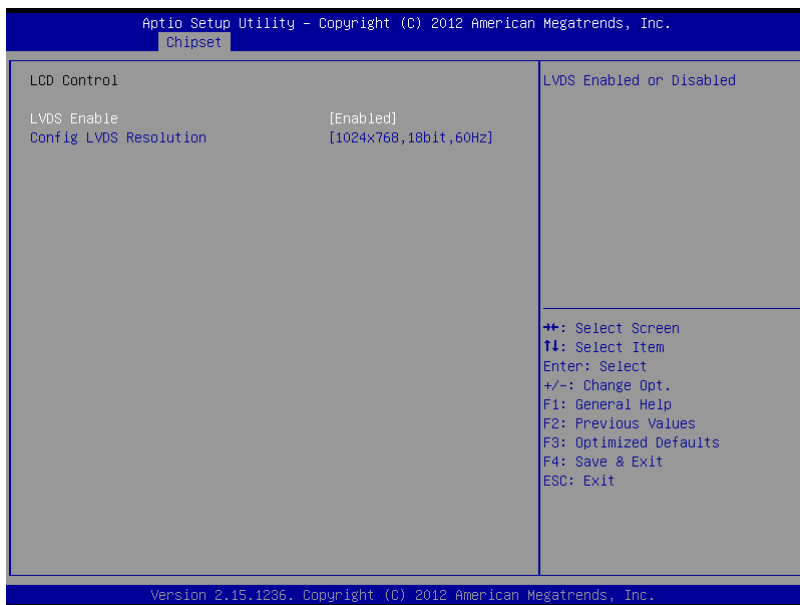


### Options Summary:

Primary Display	Auto	Default
	IGFX	
	PEG	
Select which of IGFX/PEG/PCI Graphics device should be Primary Display or select SG for Switchable Gfx.		
Internal Graphics	Auto	Default
	Disabled	
	Enabled	
Keep IGD enabled based on the setup options.		

DVMT Pre-Allocated	32M	Default
	64M	
	96M	
	128M	
	160M	
	192M	
	224M	
	256M	
	288M	
	320M	
	352M	
	384M	
	416M	
	448M	
	480M	
512M		
1024M		
Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.		
DVMT Total Gfx Memory	128M	Default
	256M	
	Max	
Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.		

## LCD Control



## Options Summary:

LVDS Enable	Disabled	Default
	Enabled	
Enable / Disable LVDS function on LCD control.		
Config LVDS Resolution	800x600, 18bit, 60Hz	Default
	1024x768, 18bit, 60Hz	
	1024x768, 24bit, 60Hz	
	1280x768, 24bit, 60Hz	
	1366x768, 24bit, 60Hz	
	1600x1200, 48bit, 60Hz	

	1920x1080, 48bit, 60Hz	
LVDS Panel Config Select.		

## PCH-IO Configuration

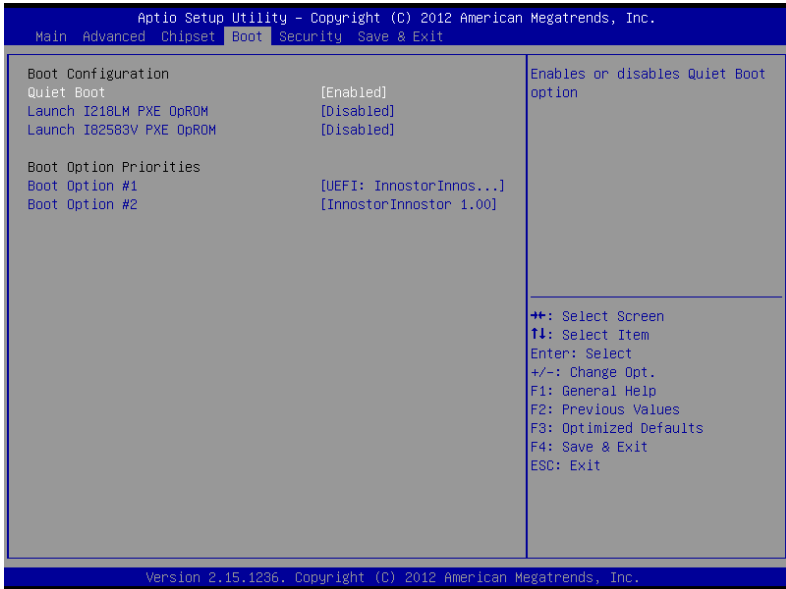
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Chipset		
Power Mode	[ATX Type]	Select Power Supply Mode.
Resume on Ring	[Enabled]	
PCH LAN Controller	[Enabled]	
Wake on LAN	[Enabled]	
Azalia	[Auto]	
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1234. Copyright (C) 2012 American Megatrends, Inc.		

## Options Summary:

Power Mode	ATX Type	Default
	AT Type	
Select Power supply mode:		
ATX: Normal ACPI support		
AT: Suspend/Sleep disabled, and Always On when restoring from power failure.		
Resume On Ring	Enabled	Default
	Disabled	
Enable or disable wake on ring.		
PCH LAN Controller	Enabled	Default

	Disabled	
Enable or disable onboard NIC.		
Wake on Lan	Enabled	Default
	Disabled	
Enable or disable integrated LAN to wake the system.		
Azalia	Disabled	Default
	Enabled	
	Auto	
Control Detection of the Azalia device.		

## Boot



### Options Summary:

Quiet Boot	Disabled	Default
	Enabled	
En/Disable showing boot logo.		
Launch I218LM PXE OpROM	Disabled	Default
	Enabled	
En/Disable I218LM PXE OpROM		
Launch I82583V PXE OpROM	Disabled	Default
	Enabled	
En/Disable I82583V PXE OpROM		

## Security



### Options summary:

Set User Password/	Not set	
Set Administrator Password		

You can install a Master and User password. Before booting to OS, HDD will be set to frozen state. On S3 resume HDD will be unlocked using the HDD Password we entered while system booting.

#### *Install the Password:*

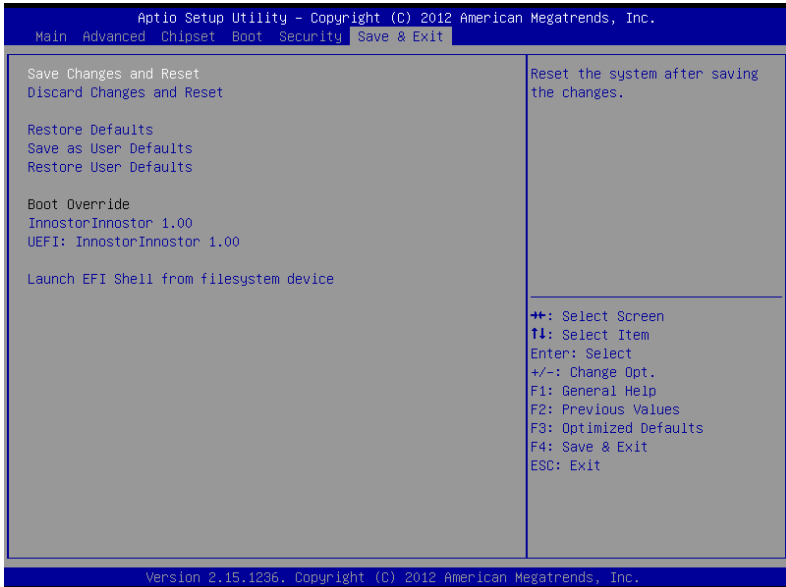
Press Enter on this item, a dialog box appears which lets you enter a password. You can enter no more than six letters or numbers. Press Enter after you have typed in the password. A second dialog box asks you to retype the password for



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.

**Exit****Options Summary:**

Save Changes and Reset		
Reset the system after saving the changes		
Discard Changes and Reset		
Reset system setup without saving any changes		
Restore Defaults		
Restore/Load Default values for all the setup options.		
Save as User Defaults		
Save the changes done so far as User Defaults		
Restore User Defaults		
Restore the User Defaults to all the setup options		

Chapter

4

**Driver  
Installation**

The COM-QM87 Rev.B 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 USB3.0 Driver
- Step 4 – Install Audio Driver
- Step 5 – Install LAN Driver
- Step 6 – Install RAID & AHCI Driver
- Step 7 – Install ME Driver
- Step 8 – Install TPM Driver (Optional)
- Step 9 – Install UART\_ITE Driver

Please read instructions below for further detailed installations.

## 4.1 Installation:

---

Insert the COM-QM87 Rev.B 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. Click on the **Step1 - INF** folder and double click on the ***infinst\_autol.exe*** file
2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

### Step 2 – Install VGA Driver

1. Click on the **Step2 - VGA** folder and select the **Step2.2 - Intel driver** folder
2. Select the OS folder your system is and double click on the **Setup.exe** file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

### Step 3 –Install USB3.0 Driver

1. Click on the **Step3 - USB3.0** folder and double click on the **Setup.exe** file
2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

### Step 4 –Install Audio Driver

1. Click on the **Step4 - Audio** folder and select the **Win7\_8**

folder

2. Double click on the **Setup.exe** file
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

#### Step 5 –Install LAN Driver

1. Click on the **Step5 - LAN** folder and select the OS folder your system is
2. Double click on the **.exe** file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

#### Step 6 – Install RAID & AHCI Driver

##### **For AHCI Driver**

1. Click on the **Step6 - RAID&AHCI** folder and double click on the **SetupRST.exe** file
2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

##### **For RAID Driver**

Please refer to Appendix D RAID Setting

#### Step 7 – Install ME Driver

1. Click on the **Step7 - ME** folder and double click on the **Setup.exe** file
2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

### Step 8 – Install TPM Driver (Optional)

1. Click on the **Step8 - TPM (Optional)** folder and double click on the **Setup.exe** file
2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

### Step 9 – Install UART\_ITE Driver

1. Click on the **Step9 - UART\_ITE** folder
2. Follow the step instructions (**patch install step1.jpg** to **patch install step5.jpg**) that the window shows
3. The system will help you install the driver successfully

Appendix

**A**

# Programming the Watchdog Timer



## A.1 Watchdog Timer Initial Program

Table 1 : Embedded BRAM relative register table		
	Default Value	Note
Index	0x284 <sup>(Note1)</sup>	BRAM Index Register
Data	0x285 <sup>(Note2)</sup>	BRAM Data Register
Logical Device Number	0xA8 <sup>(Note3)</sup>	Watch dog Logical Device Number
Function and Device Number	0x00 <sup>(Note4)</sup>	Watch dog Function/Device Number

Table 2 : Watchdog relative register table				
	Option Register	BitNum	Value	Note
Timer Counter	0x00 <sup>(Note5)</sup>		(Note10)	Time of watchdog timer (0~255)
Counting Unit	0x01 <sup>(Note6)</sup>	0 <sup>(Note7)</sup>	0 <sup>(Note11)</sup>	Select time unit. 0: second 1: minute
Watchdog RST pulse width	0x01 <sup>(Note8)</sup>	[3:2] <sup>(Note9)</sup>	0 <sup>(Note12)</sup>	0: 20ms 1: 60ms 2: 100ms 3: 250ms

```
*****
// Embedded BRAM relative definition (Please reference to Table 1)
#define byte EcBRAMIndex //This parameter is represented from Note1
#define byte EcBRAMData //This parameter is represented from Note2
#define byte BRAMLDRReg //This parameter is represented from Note3
#define byte BRAMFnDataReg //This parameter is represented from Note4
#define void EcBRAMWriteByte(byte Offset, byte Value);
#define byte EcBRAMReadByte(byte Offset);
#define void IOWriteByte(byte Offset, byte Value);
#define byte IOReadByte(byte Offset);
// Watch Dog relative definition (Please reference to Table 2)
#define byte TimerReg //This parameter is represented from Note5
#define byte TimerVal // This parameter is represented from Note10
#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 Note11
#define byte RSTReg //This parameter is represented from Note8
#define byte RSTBit //This parameter is represented from Note9
#define byte RSTVal //This parameter is represented from Note12
*****
```

```
*****
```

```
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(1);
}

// Procedure : AaeonWDTConfig
VOID AaeonWDTConfig (){
    // Disable WDT counting
    WDTEnableDisable(0);
    // WDT relative parameter setting
    WDTParameterSetting();
}

VOID WDTEnableDisable(byte Value){
    ECBRAMWriteByte(TimerReg , Value);
}

VOID WDTParameterSetting(){
    Byte TempByte;

    // Watchdog Timer counter setting
    ECBRAMWriteByte(TimerReg , TimerVal);
    // WDT counting unit setting
    TempByte = ECBRAMReadByte(UnitReg);
    TempByte |= (UnitVal << UnitBit);
    ECBRAMWriteByte(UnitReg , TempByte);
    // WDT RST pulse width setting
    TempByte = ECBRAMReadByte(RSTReg);
    TempByte |= (RSTVal << RSTBit);
    ECBRAMWriteByte(RSTReg , TempByte);
}
*****
```

\*\*\*\*\*

```
VOID ECBRAMWriteByte(byte OPReg, byte OPBit, byte Value){
    IOWriteByte(EcBRAMIndex, 0x10);
    IOWriteByte(EcBRAMData, BRAMLDRReg);
    IOWriteByte(EcBRAMIndex, 0x11);
    IOWriteByte(EcBRAMData, BRAMFnDataReg);

    IOWriteByte(EcBRAMIndex, 0x13 + OPReg);
    IOWriteByte(EcBRAMData, Value);

    IOWriteByte(EcBRAMIndex, 0x12);
    IOWriteByte(EcBRAMData, 0x30);    //Write start
}
```

```
Byte ECBRAMReadByte(byte OPReg){
    IOWriteByte(EcBRAMIndex, 0x10);
    IOWriteByte(EcBRAMData, BRAMLDRReg);
    IOWriteByte(EcBRAMIndex, 0x11);
    IOWriteByte(EcBRAMData, BRAMFnDataReg);

    IOWriteByte(EcBRAMIndex, 0x12);
    IOWriteByte(EcBRAMData, 0x10);    //Read start

    IOWriteByte(EcBRAMIndex, 0x13 + OPReg);
    Return IOReadByte(EcBRAMData, Value);
}
```

\*\*\*\*\*

Appendix

































**B**

# I/O Information

## B.1 I/O Address Map

---

Input/output (IO)	
[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
[00000061 - 00000061]	Motherboard resources
[00000063 - 00000063]	Motherboard resources
[00000065 - 00000065]	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 - 000000F0]	Numeric data processor
	[000002C8 - 000002CF]	Communications Port (COM10)
	[000002D8 - 000002DF]	Communications Port (COM9)
	[000003B0 - 000003BB]	Intel(R) HD Graphics 4600
	[000003C0 - 000003DF]	Intel(R) HD Graphics 4600
	[000004D0 - 000004D1]	Motherboard resources
	[000004D0 - 000004D1]	Programmable interrupt controller
	[00000680 - 0000069F]	Motherboard resources
	[00000D00 - 0000FFFF]	PCI bus
	[0000164E - 0000164F]	Motherboard resources
	[00001800 - 000018FE]	Motherboard resources
	[00001854 - 00001857]	Motherboard resources
	[00001C00 - 00001CFE]	Motherboard resources
	[00001D00 - 00001DFE]	Motherboard resources
	[00001E00 - 00001EFE]	Motherboard resources
	[00001F00 - 00001FFE]	Motherboard resources
	[0000F000 - 0000F03F]	Intel(R) HD Graphics 4600
	[0000F040 - 0000F05F]	Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
	[0000F080 - 0000F08F]	Intel(R) 8 Series 4 port Serial ATA Storage Controller - 8C01
	[0000F090 - 0000F09F]	Intel(R) 8 Series 4 port Serial ATA Storage Controller - 8C01
	[0000F0A0 - 0000F0A3]	Intel(R) 8 Series 4 port Serial ATA Storage Controller - 8C01
	[0000F0B0 - 0000F0B7]	Intel(R) 8 Series 4 port Serial ATA Storage Controller - 8C01
	[0000F0C0 - 0000F0C3]	Intel(R) 8 Series 4 port Serial ATA Storage Controller - 8C01
	[0000F0D0 - 0000F0D7]	Intel(R) 8 Series 4 port Serial ATA Storage Controller - 8C01
	[0000F0E0 - 0000F0E7]	Intel(R) Active Management Technology - SOL (COM3)
	[0000FFFF - 0000FFFF]	Motherboard resources
	[0000FFFF - 0000FFFF]	Motherboard resources
	[0000FFFF - 0000FFFF]	Motherboard resources


























































































## B.2 Memory Address Map

Address Range	Device Name
[000A0000 - 000BFFFF]	Intel(R) HD Graphics 4600
[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
[BF200000 - FEAF7FFF]	PCI bus
[E0000000 - EFFFFFFF]	Intel(R) HD Graphics 4600
[F7800000 - F7BFFFFF]	Intel(R) HD Graphics 4600
[F7C00000 - F7C1FFFF]	Intel(R) Ethernet Connection I217-LM
[F7C20000 - F7C2FFFF]	Intel(R) USB 3.0 eXtensible Host Controller
[F7C30000 - F7C33FFF]	High Definition Audio Controller
[F7C34000 - F7C37FFF]	High Definition Audio Controller
[F7C39000 - F7C390FF]	Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
[F7C3A000 - F7C3A3FF]	Intel(R) 8 Series/C220 Series USB Enhanced Host Controller #1 - 8C26
[F7C3B000 - F7C3B3FF]	Intel(R) 8 Series/C220 Series USB Enhanced Host Controller #2 - 8C2D
[F7C3C000 - F7C3CFFF]	Intel(R) Ethernet Connection I217-LM
[F7C3D000 - F7C3DFFF]	Intel(R) Active Management Technology - SOL (COM3)
[F7C3F000 - F7C3F00F]	Intel(R) Management Engine Interface
[F7FEF000 - F7FEFFFF]	Motherboard resources
[F7FF0000 - F7FF0FFF]	Motherboard resources
[F8000000 - FBFFFF7FFF]	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 - FEEFFFFFFF]	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) 0x00000008 (08)	System CMOS/real time clock
(ISA) 0x0000000A (10)	Communications Port (COM9)
(ISA) 0x0000000B (11)	Communications Port (COM10)
(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) 0x00000005 (05)	Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
	(PCI) 0x00000010 (16)	High Definition Audio Controller
	(PCI) 0x00000010 (16)	Intel(R) 8 Series/C220 Series PCI Express Root Port #1 - 8C10
	(PCI) 0x00000010 (16)	Intel(R) 8 Series/C220 Series USB Enhanced Host Controller #2 - 8C2D
	(PCI) 0x00000010 (16)	Intel(R) Management Engine Interface
	(PCI) 0x00000010 (16)	Xeon(R) processor E3-1200 v3/4th Gen Core processor PCI Express x16 Controller - 0C01
	(PCI) 0x00000013 (19)	Intel(R) 8 Series 4 port Serial ATA Storage Controller - 8C01
	(PCI) 0x00000013 (19)	Intel(R) Active Management Technology - SOL (COM3)
	(PCI) 0x00000016 (22)	High Definition Audio Controller
	(PCI) 0x00000017 (23)	Intel(R) 8 Series/C220 Series USB Enhanced Host Controller #1 - 8C26
	(PCI) 0xFFFFFFFF (-4)	Intel(R) Ethernet Connection I217-LM
	(PCI) 0xFFFFFFFF (-3)	Intel(R) USB 3.0 eXtensible Host Controller
	(PCI) 0xFFFFFFFF (-2)	Intel(R) HD Graphics 4600

## B.4 DMA Channel Assignments

Direct memory access (DMA)	
	4 Direct memory access controller

Appendix

C

# Programming the Digital I/O

## **C.1 DIO Programming**

---

COM-QM87 Rev.B utilizes ITE8518 chipset as its Digital I/O controller.

Below are the procedures to complete its configuration which you can develop customized program to fit your application.

## C.2 Digital I/O Register

	Default Value	Note
Index	0x284 <sup>(Note1)</sup>	BRAM Index Register
Data	0x285 <sup>(Note2)</sup>	BRAM Data Register
Logical Device Number	0xA2 <sup>(Note3)</sup>	Watch dog Logical Device Number
Input/Output Function and Device Number	0x00 <sup>(Note4)</sup>	DIO Input/Output Function/Device Number
Output Data Function and Device Number	0x01 <sup>(Note5)</sup>	DIO Output Data Function/Device Number

	Register			
	Option Register	BitNum	Value	Note
GPI0 Pin Status	0x00 <sup>(Note6)</sup>	0 <sup>(Note7)</sup>	<sup>(Note15)</sup>	GPF0
GPI1 Pin Status	0x00 <sup>(Note6)</sup>	1 <sup>(Note8)</sup>	<sup>(Note16)</sup>	GPF1
GPI2 Pin Status	0x00 <sup>(Note6)</sup>	2 <sup>(Note9)</sup>	<sup>(Note17)</sup>	GPF2
GPI3 Pin Status	0x00 <sup>(Note6)</sup>	3 <sup>(Note10)</sup>	<sup>(Note18)</sup>	GPF3
GPO0 Pin Status	0x00 <sup>(Note6)</sup>	4 <sup>(Note11)</sup>	<sup>(Note19)</sup>	GPF4
GPO1 Pin Status	0x00 <sup>(Note6)</sup>	5 <sup>(Note12)</sup>	<sup>(Note20)</sup>	GPF5
GPO2 Pin Status	0x00 <sup>(Note6)</sup>	6 <sup>(Note13)</sup>	<sup>(Note21)</sup>	GPF6
GPO3 Pin Status	0x00 <sup>(Note6)</sup>	7 <sup>(Note14)</sup>	<sup>(Note22)</sup>	GPF7

### C.3 Digital I/O Sample Program

---

```
*****
// Embedded BRAM relative definition (Please reference to Table 1)
#define byte EcBRAMIndex //This parameter is represented from Note1
#define byte EcBRAMData //This parameter is represented from Note2
#define byte BRAMLDNReg //This parameter is represented from Note3
#define byte BRAMFnData0Reg //This parameter is represented from Note4
#define byte BRAMFnData1Reg //This parameter is represented from Note5
#define void EcBRAMWriteByte(byte Offset, byte Value);
#define byte EcBRAMReadByte(byte Offset);
#define void IOWriteByte(byte Offset, byte Value);
#define byte IOReadByte(byte Offset);
// Digital Input Status relative definition (Please reference to Table 2)
#define byte DIO0ToDIO7Reg // This parameter is represented from Note6
#define byte DIO0Bit // This parameter is represented from Note7
#define byte DIO1Bit // This parameter is represented from Note8
#define byte DIO2Bit // This parameter is represented from Note9
#define byte DIO3Bit // This parameter is represented from Note10
#define byte DIO4Bit // This parameter is represented from Note11
#define byte DIO5Bit // This parameter is represented from Note12
#define byte DIO6Bit // This parameter is represented from Note13
#define byte DIO7Bit // This parameter is represented from Note14
#define byte DIO0Val // This parameter is represented from Note15
#define byte DIO1Val // This parameter is represented from Note16
#define byte DIO2Val // This parameter is represented from Note17
#define byte DIO3Val // This parameter is represented from Note18
#define byte DIO4Val // This parameter is represented from Note19
#define byte DIO5Val // This parameter is represented from Note20
#define byte DIO6Val // This parameter is represented from Note21
#define byte DIO7Val // This parameter is represented from Note22
*****
```



```
*****
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(DIO0ToDIO7Reg, DIO3Bit);

    // Procedure : AaeonSetOutputLevel
    // Input :
    //     Example, Set Digital I/O Pin 6 level
    AaeonSetOutputLevel(DIO0ToDIO7Reg, DIO6Bit, DIO6Val);
}
*****
```

\*\*\*\*\*

```
Boolean AaeonReadPinStatus(byte OptionReg, byte BitNum){
    Byte TempByte;

    TempByte = ECBRAMReadByte(BRAMFnData1Reg, OptionReg);
    If (TempByte & BitNum == 0)
        Return 0;
    Return 1;
}
VOID AaeonSetOutputLevel(byte OptionReg, byte BitNum, byte Value){
    Byte TempByte;

    TempByte = ECBRAMReadByte(BRAMFnData1Reg, OptionReg);
    TempByte |= (Value << BitNum);
    ECBRAMWriteByte(OptionReg, BitNum, Value);
}
```

\*\*\*\*\*

\*\*\*\*\*

```
VOID ECBRAMWriteByte(byte OPReg, byte OPBit, byte Value){
    IOWriteByte(EcBRAMIndex, 0x10);
    IOWriteByte(EcBRAMData, BRAMLDRReg);
    IOWriteByte(EcBRAMIndex, 0x11);
    IOWriteByte(EcBRAMData, BRAMFnDataReg);

    IOWriteByte(EcBRAMIndex, 0x13 + OPReg);
    IOWriteByte(EcBRAMData, Value);

    IOWriteByte(EcBRAMIndex, 0x12);
    IOWriteByte(EcBRAMData, 0x30);           //Write start
}
```

```
Byte ECBRAMReadByte(byte FnDataReg, byte OPReg){
    IOWriteByte(EcBRAMIndex, 0x10);
    IOWriteByte(EcBRAMData, BRAMLDRReg);
    IOWriteByte(EcBRAMIndex, 0x11);
    IOWriteByte(EcBRAMData, FnDataReg);

    IOWriteByte(EcBRAMIndex, 0x12);
    IOWriteByte(EcBRAMData, 0x10);         //Read start

    IOWriteByte(EcBRAMIndex, 0x13 + OPReg);
    Return IOReadByte(EcBRAMData, Value);
}
```

\*\*\*\*\*

Appendix

**D**

# RAID Setting

## D.1 Setting RAID

---

OS installation to setup RAID Mode

Step 1: Copy the files below from “*Driver CD -> Step6 - 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



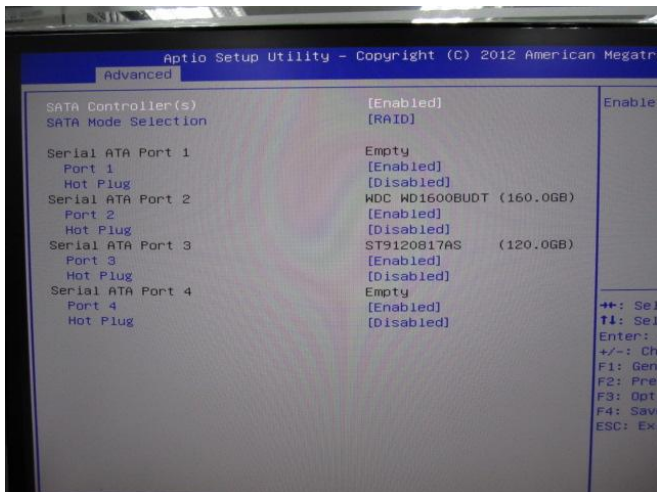
bdssetup.oem  
OEM 檔案  
8 KB

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



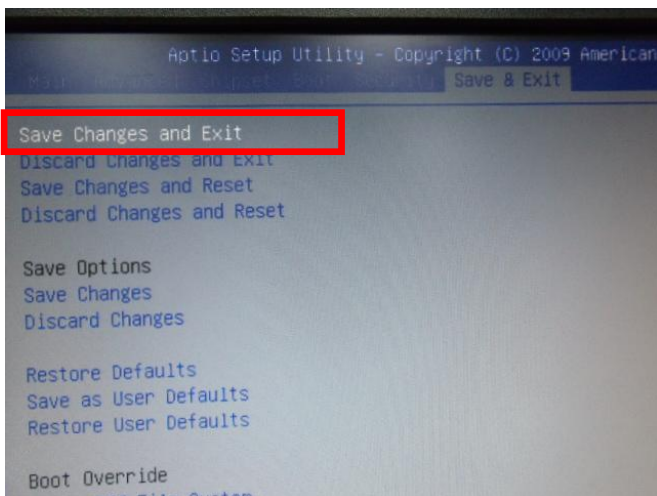
Step 3: The setting procedures “In BIOS Setup Menu”

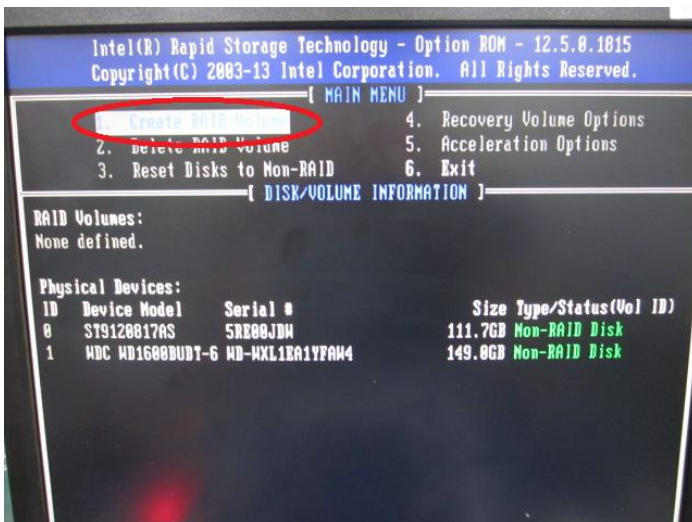
**A: Advanced -> SATA Configuration -> SATA Controller(s) ->Enable -> SATA Mode Selection->Raid**



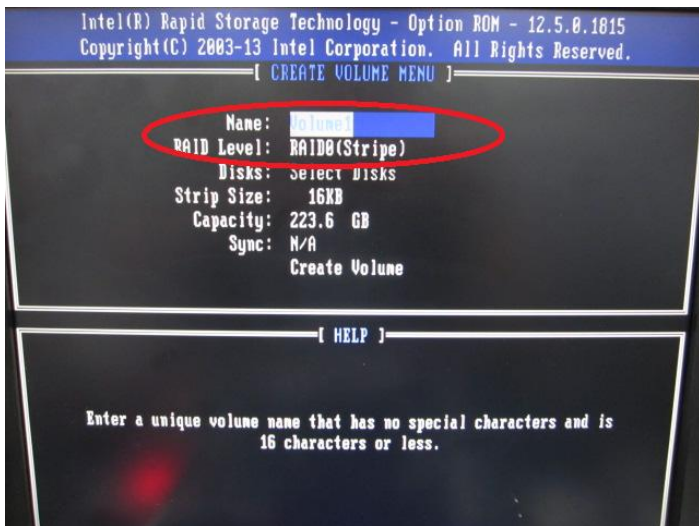
Step 4: The setting procedures “In BIOS Setup Menu”

**B: Save & Exit -> Save Changes and Exit**

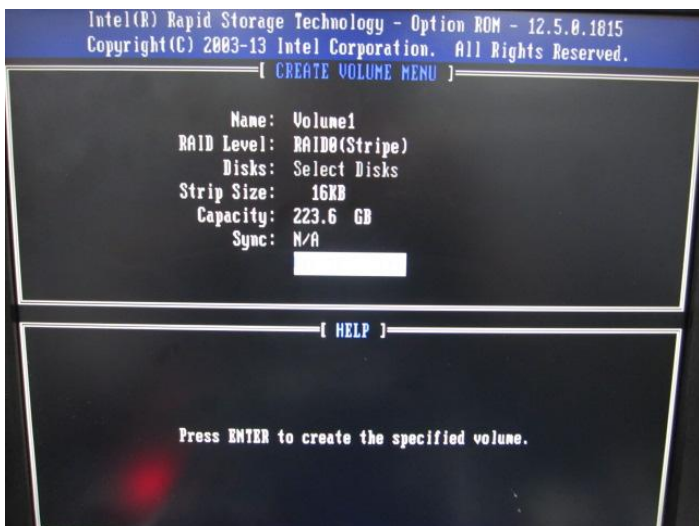


Step 5: Press **Ctrl-I** to enter **MAIN MENU**Step 6: Choose **"1.Create RAID Volume"**

## Step 7: RAID Level -&gt; RAID0(Stripe)

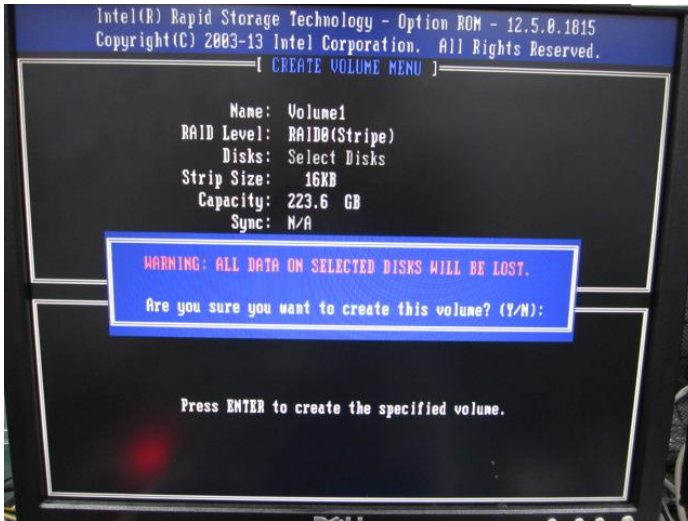


## Step 8: Choose "Create Volume"





Step 9: Choose “Y”



Step 10: Choose “6. Exit”

