

COM-QM87

Intel® 4th Generation
Core™ i7/i5/i3 Processor

Intel® QM87

Gigabit Ethernet

4 SATA 3.0Gb/s

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

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

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

COM-QM87 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 3.0Gb/s are configured on the COM-QM87. COM-QM87 also equips eight USB2.0 (included four USB3.0) for flexible I/O expansions.

The display of COM-QM87 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

- 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, DDI x 3, eDP x 1/ LVDS x 1 (18/24-bit Dual-channel LVDS LCD) (Shared Between eDP and LVDS)
- High Definition Audio Interface
- SATA 3.0Gb/s 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 SODIMM x 2, Max. 16GB (DDR3 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
- **TPM** v1.2 (Optional)
- **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[®] 7, Windows[®] 8, Linux Fedora

Display

- **Chipset** 4th Generation Intel[®] 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, DDI x 3, eDP x 1 / LVDS x 1
(18/24 bits dual-channel) (shared between eDP and LVDS)

I/O

- **Storage** SATA 3.0Gb/s 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!

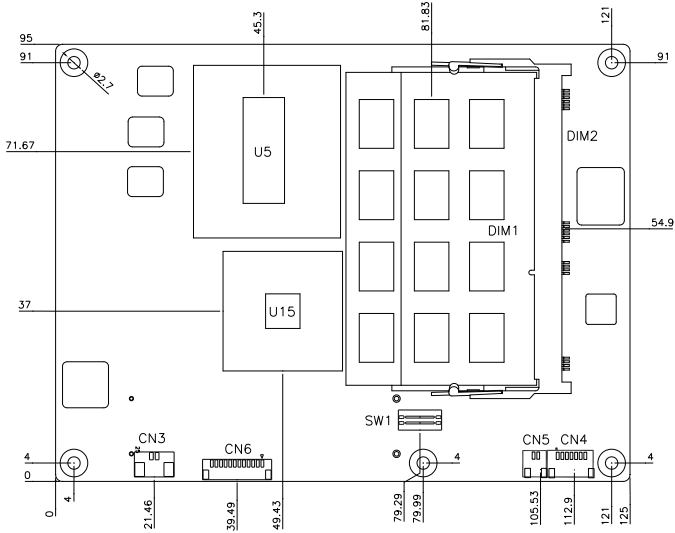
Always completely disconnect the power cord from your board whenever you are working on it. Do not make connections while the power is on, because a sudden rush of power can damage sensitive electronic components.

Caution!

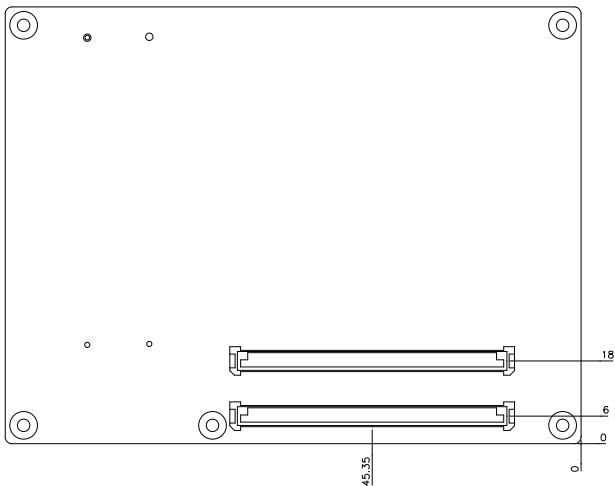
Always ground yourself to remove any static charge before touching the board. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not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

2.2 Mechanical Drawings of Connectors and Switches

Component Side



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
SW1	ME Setting

2.4 List of Connectors

There are a number of connectors of the board that allow you to configure your system to suit your application. The table below shows the function of each connector in the board:

Label	Function
DIMM1	SODIMM COM
DIMM2	SODIMM COM
CN1	Express ROW C/D Connector
CN2	Express ROW A/B Connector
CN3	RTC Battery Connector
CN4	SPI Flash Programming Connector
CN5	RSVD Connector
CN6	LPC Debug Card Connector

2.5 AT/ATX Setting Switch (SW1)

	ON	OFF
1	AT Selection	ATX Selection
2	ME_EN	ME_DIS

2.6 COM Express ROW C/D Connector (CN1)

Row C		Row D	
C1	GND (FIXED)	D1	GND (FIXED)
C2	GND (FIXED)	D2	GND (FIXED)
C3	USB_SSRX0-	D3	USB_SSTX0-
C4	USB_SSRX0+	D4	USB_SSTX0+
C5	GND (FIXED)	D5	GND (FIXED)
C6	USB_SSRX1-	D6	USB_SSTX1-
C7	USB_SSRX1+	D7	USB_SSTX1+
C8	GND (FIXED)	D8	GND (FIXED)
C9	USB_SSRX2-	D9	USB_SSTX2-
C10	USB_SSRX2+	D10	USB_SSTX2+
C11	GND (FIXED)	D11	GND (FIXED)
C12	USB_SSRX3-	D12	USB_SSTX3-
C13	USB_SSRX3+	D13	USB_SSTX3+
C14	GND (FIXED)	D14	GND (FIXED)
C15	RSVD	D15	DDI1_CTRLCLK_AU X+
C16	RSVD	D16	DDI1_CTRLDATA_A UX-

C17	RSVD	D17	RSVD
C18	RSVD	D18	RSVD
C19	PCIE_RX6+	D19	PCIE_TX6+
C20	PCIE_RX6-	D20	PCIE_TX6-
C21	GND (FIXED)	D21	GND (FIXED)
C22	RSVD	D22	RSVD
C23	RSVD	D23	RSVD
C24	DDI1_HPD	D24	RSVD
C25	RSVD	D25	RSVD
C26	RSVD	D26	RSVD
C27	RSVD	D27	DDI1_PAIR0-
C28	RSVD	D28	RSVD
C29	RSVD	D29	RSVD
C30	RSVD	D30	RSVD
C31	GND (FIXED)	D31	GND (FIXED)
C32	DDI2_CTRLCLK_A UX+	D32	DDI1_PAIR2+
C33	DDI2_CTRLDATA_ AUX-	D33	DDI1_PAIR2-
C34	DDI2_DDC_AUX_ SEL	D34	DDI1_DDC_AUX_SE L
C35	RSVD	D35	RSVD
C36	DDI3_CTRLCLK_A UX+	D36	DDI1_PAIR3+
C37	DDI3_CTRLDATA_ AUX-	D37	DDI1_PAIR3-
C38	DDI3_DDC_AUX_ SEL	D38	RSVD
C39	DDI3_PAIR0+	D39	DDI2_PAIR0+

C40	DDI3_PAIR0-	D40	DDI2_PAIR0-
C41	GND (FIXED)	D41	GND (FIXED)
C42	DDI3_PAIR1+	D42	DDI2_PAIR1+
C43	DDI3_PAIR1-	D43	DDI2_PAIR1-
C44	DDI3_HPD	D44	DDI2_HPD
C45	RSVD	D45	RSVD
C46	DDI3_PAIR2+	D46	DDI2_PAIR2+
C47	DDI3_PAIR2-	D47	DDI2_PAIR2-
C48	RSVD	D48	RSVD
C49	DDI3_PAIR1-	D49	DDI2_PAIR3+
C50	DDI3_PAIR3-	D50	DDI2_PAIR3-
C51	GND (FIXED)	D51	GND (FIXED)
C52	PEG_RX0+	D52	PEG_TX0+
C53	PEG_RX0-	D53	PEG_TX0-
C54	TYPE0#	D54	PEG_LAN_RV#
C55	PEG_RX1+	D55	PEG_TX1+
C56	PEG_RX1-	D56	PEG_TX1-
C57	TYPE1#	D57	TYPE2#
C58	PEG_RX2+	D58	PEG_TX2+
C59	PEG_RX2-	D59	PEG_TX2-
C60	GND (FIXED)	D60	GND (FIXED)
C61	PEG_RX3+	D61	PEG_TX3+
C62	PEG_RX3-	D62	PEG_TX3-
C63	RSVD	D63	RSVD

C64	RSVD	D64	RSVD
C65	PEG_RX4+	D65	PEG_TX4+
C66	PEG_RX4-	D66	PEG_TX4-
C67	RSVD	D67	GND (FIXED)
C68	PEG_RX5+	D68	PEG_TX5+
C69	PEG_RX5-	D69	PEG_TX5-
C70	GND (FIXED)	D70	GND (FIXED)
C71	PEG_RX6+	D71	PEG_TX6+
C72	PEG_RX6-	D72	PEG_TX6-
C73	GND (FIXED)	D73	GND (FIXED)
C74	PEG_RX7+	D74	PEG_TX7+
C75	PEG_RX7-	D75	PEG_TX7-
C76	GND (FIXED)	D76	GND (FIXED)
C77	RSVD	D77	RSVD
C78	PEG_RX8+	D78	PEG_TX8+
C79	PEG_RX8-	D79	PEG_TX8-
C80	GND (FIXED)	D80	GND (FIXED)
C81	PEG_RX9+	D81	PEG_TX9+
C82	PEG_RX9-	D82	PEG_TX9-
C83	RSVD	D83	RSVD
C84	GND (FIXED)	D84	GND (FIXED)
C85	PEG_RX10+	D85	PEG_TX10+
C86	PEG_RX10-	D86	PEG_TX10-
C87	GND (FIXED)	D87	GND (FIXED)

C88	PEG_RX11+	D88	PEG_TX11+
C89	PEG_RX11-	D89	PEG_TX11-
C90	GND (FIXED)	D90	GND (FIXED)
C91	PEG_RX12+	D91	PEG_TX12+
C92	PEG_RX12-	D92	PEG_TX12-
C93	GND	D93	GND
C94	PEG_RX13+	D94	PEG_TX13+
C95	PEG_RX13-	D95	PEG_TX13-
C96	GND (FIXED)	D96	GND (FIXED)
C97	RSVD	D97	RSVD
C98	PEG_RX14+	D98	PEG_TX14+
C99	PEG_RX14-	D99	PEG_TX14-
C100	GND (FIXED)	D100	GND (FIXED)
C101	PEG_RX15+	D101	PEG_TX15+
C102	PEG_RX15-	D102	PEG_TX15-
C103	GND (FIXED)	D103	GND
C104	VCC_12V	D104	VCC_12V
C105	VCC_12V	D105	VCC_12V
C106	VCC_12V	D106	VCC_12V
C107	VCC_12V	D107	VCC_12V
C108	VCC_12V	D108	VCC_12V
C109	VCC_12V	D109	VCC_12V
C110	GND (FIXED)	D110	GND (FIXED)

2.7 COM Express ROW A/B Connector (CN2)

Row A		Row B	
A1	GND (FIXED)	B1	GND (FIXED)
A2	GBE0_MDI3-	B2	GBE0_ACT#
A3	GBE0_MDI3+	B3	LPC_FRAME#
A4	GBE0_LINK100#	B4	LPC_AD0
A5	GBE0_LINK1000#	B5	LPC_AD1
A6	GBE0_MDI2-	B6	LPC_AD2
A7	GBE0_MDI2+	B7	LPC_AD3
A8	GBE0_LINK	B8	LPC_DRQ0#
A9	GBE0_MDI1-	B9	LPC_DRQ1#
A10	GBE0_MDI1+	B10	LPC_CLK
A11	GND (FIXED)	B11	GND (FIXED)
A12	GBE0_MDI0-	B12	PWRBTN#
A13	GBE0_MDI0+	B13	SMB_CK
A14	GBE0_CTREF	B14	SMB_DAT
A15	SUS_S3#	B15	SMB_ALERT#
A16	SATA0_TX+	B16	SATA1_TX+
A17	SATA0_TX-	B17	SATA1_TX-
A18	SUS_S4#	B18	SUS_STAT#
A19	SATA0_RX+	B19	SATA1_RX+
A20	SATA0_RX-	B20	SATA1_RX-
A21	GND (FIXED)	B21	GND (FIXED)

A22	SATA2_TX+	B22	SATA3_TX+
A23	SATA2_TX-	B23	SATA3_TX-
A24	SUS_S5#	B24	PWR_OK
A25	SATA2_RX+	B25	SATA3_RX+
A26	SATA2_RX-	B26	SATA3_RX-
A27	BATLOW#	B27	WDT
A28	ATA_ACT#	B28	AC_SDIN2
A29	AC_SYNC	B29	AC_SDIN1
A30	AC_RST#	B30	AC_SDIN0
A31	GND (FIXED)	B31	GND (FIXED)
A32	AC_BITCLK	B32	SPKR
A33	AC_SDOOUT	B33	I2C_CK
A34	BIOS_DIS0#	B34	I2C_DAT
A35	THRMTRIP#	B35	THRM#
A36	USB6-	B36	USB7-
A37	USB6+	B37	USB7+
A38	USB_6_7_OC#	B38	USB_4_5_OC#
A39	USB4-	B39	USB5-
A40	USB4+	B40	USB5+
A41	GND (FIXED)	B41	GND (FIXED)
A42	USB2-	B42	USB3-
A43	USB2+	B43	USB3+
A44	USB_2_3_OC#	B44	USB_0_1_OC#
A45	USB0-	B45	USB1-

A46	USB0+	B46	USB1+
A47	VCC_RTC	B47	EXCD1_PERST#
A48	EXCD0_PERST#	B48	EXCD1_CPPE#
A49	EXCD0_CPPE#	B49	SYS_RESET#
A50	LPC_SERIRQ	B50	CB_RESET#
A51	GND (FIXED)	B51	GND (FIXED)
A52	PCIE_TX5+	B52	PCIE_RX5+
A53	PCIE_TX5-	B53	PCIE_RX5-
A54	GPI0	B54	GPO1
A55	PCIE_TX4+	B55	PCIE_RX4+
A56	PCIE_TX4-	B56	PCIE_RX4-
A57	GND	B57	GPO2
A58	PCIE_TX3+	B58	PCIE_RX3+
A59	PCIE_TX3-	B59	PCIE_RX3-
A60	GND (FIXED)	B60	GND (FIXED)
A61	PCIE_TX2+	B61	PCIE_RX2+
A62	PCIE_TX2-	B62	PCIE_RX2-
A63	GPI1	B63	GPO3
A64	PCIE_TX1+	B64	PCIE_RX1+
A65	PCIE_TX1-	B65	PCIE_RX1-
A66	GND	B66	WAKE0#
A67	GPI2	B67	WAKE1#
A68	PCIE_TX0+	B68	PCIE_RX0+
A69	PCIE_TX0-	B69	PCIE_RX0-

A70	GND (FIXED)	B70	GND (FIXED)
A71	LVDS_A0+	B71	LVDS_B0+
A72	LVDS_A0-	B72	LVDS_B0-
A73	LVDS_A1+	B73	LVDS_B1+
A74	LVDS_A1-	B74	LVDS_B1-
A75	LVDS_A2+	B75	LVDS_B2+
A76	LVDS_A2-	B76	LVDS_B2-
A77	LVDS_VDD_EN	B77	LVDS_B3+
A78	LVDS_A3+	B78	LVDS_B3-
A79	LVDS_A3-	B79	LVDS_BKLT_EN
A80	GND (FIXED)	B80	GND (FIXED)
A81	LVDS_A_CK+	B81	LVDS_B_CK+
A82	LVDS_A_CK-	B82	LVDS_B_CK-
A83	LVDS_I2C_CK	B83	LVDS_BKLT_CTRL
A84	LVDS_I2C_DAT	B84	VCC_5V_SBY
A85	GPI3	B85	VCC_5V_SBY
A86	RSVD	B86	VCC_5V_SBY
A87	RSVD	B87	VCC_5V_SBY
A88	PCIE0_CK_REF+	B88	BISO_DIS1#
A89	PCIE0_CK_REF-	B89	VGA_RED
A90	GND (FIXED)	B90	GND (FIXED)
A91	SPI_POWER	B91	VGA_GRN
A92	SPI_MISO	B92	VGA_BLU
A93	GPO0	B93	VGA_HSYNC

A94	SPI_CLK	B94	VGA_VSYNC
A95	SPI_MOSI	B95	VGA_I2C_CK
A96	GND	B96	VGA_I2C_DAT
A97	TYPE10#	B97	SPI_CS#
A98	RSVD	B98	RSVD
A99	RSVD	B99	RSVD
A100	GND (FIXED)	B100	GND (FIXED)
A101	RSVD	B101	RSVD
A102	RSVD	B102	RSVD
A103	RSVD	B103	RSVD
A104	VCC_12V	B104	VCC_12V
A105	VCC_12V	B105	VCC_12V
A106	VCC_12V	B106	VCC_12V
A107	VCC_12V	B107	VCC_12V
A108	VCC_12V	B108	VCC_12V
A109	VCC_12V	B109	VCC_12V
A110	GND (FIXED)	B110	GND (FIXED)

2.8 RTC Battery Connector (CN3)

Pin	Signal
1	RTC
2	GND

2.9 SPI Flash Programming Connector (CN4)

Pin	Signal
1	SPI_SO
2	GND
3	SPI_CLK
4	+V3.3M_SPI
5	SPI_SI
6	SPI_CS1
7	SPI_CS2

2.10 LPC Debug Card Connector (CN6)

Pin	Signal
1	LPC_AD0
2	LPC_AD1
3	LPC_AD2
4	LPC_AD3
5	+V3.3S
6	LPC_FRAME#
7	LPC_RST
8	GND
9	LPC_CLK
10	PCH_DRQ#0
11	PCH_DRQ#1
12	LPC_SERIRQ

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>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: 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 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 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

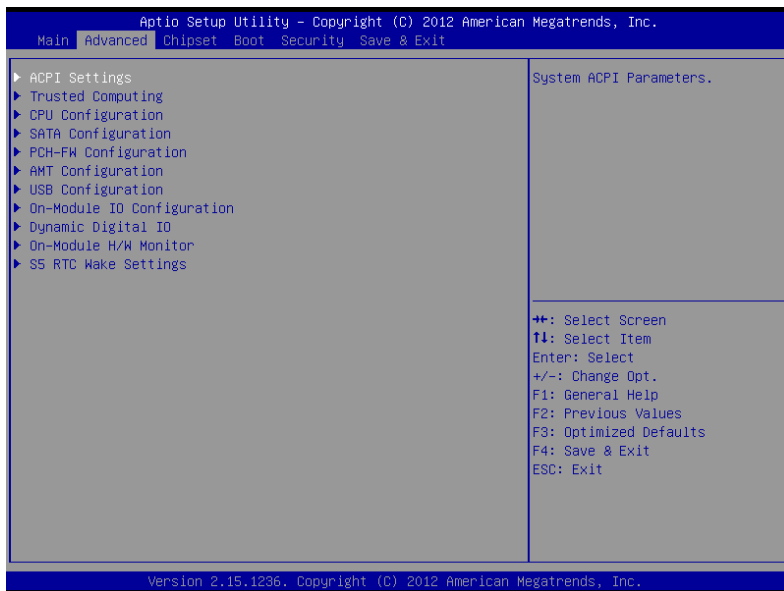
Exit system setup after saving the changes.

Setup Menu

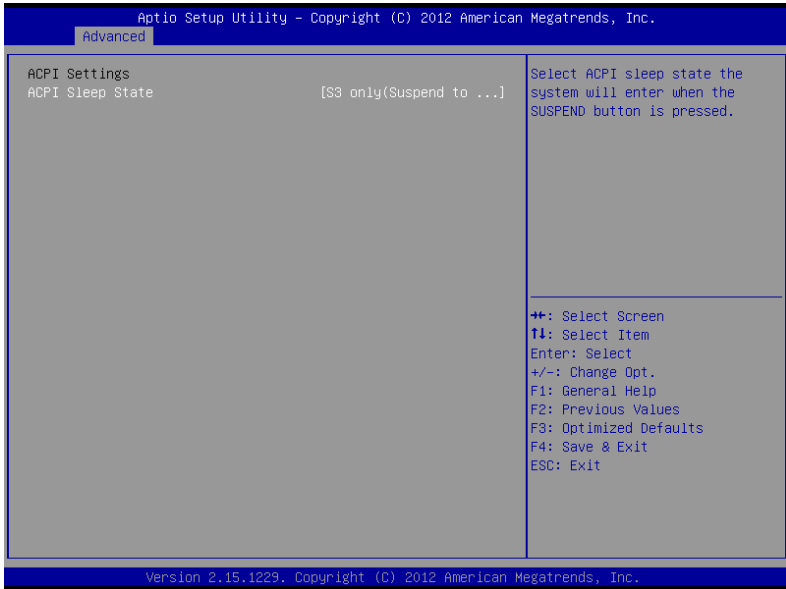
Main

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: American Megatrends	
Core Version: 4.6.5.4	
Compliance: UEFI 2.3.1; PI 1.2	
Firmware Vendor: AAEDN	
Firmware Information: Mother Board	
Firmware Version: CM87AE03	
Build Date: 1/9/2013	
System Date: [Thu 01/01/2009]	
System Time: [00:11:41]	+/: Select Screen F1: 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



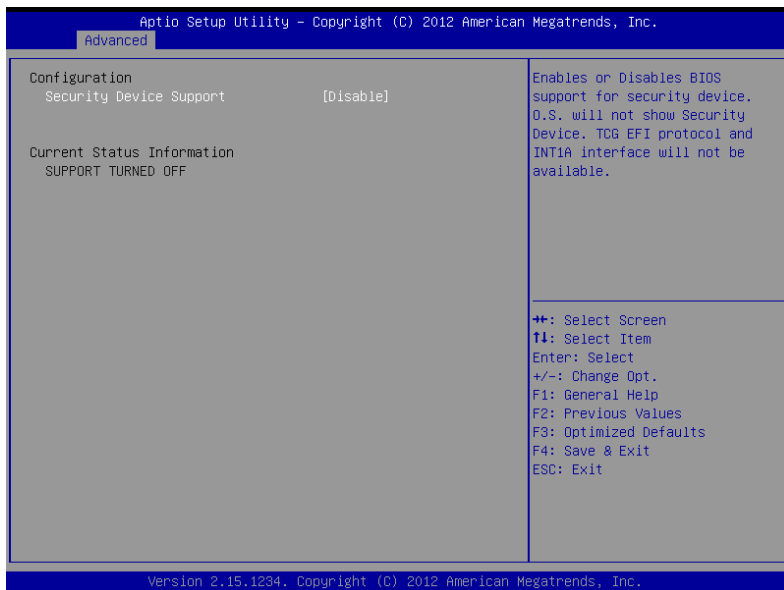
ACPI Settings



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

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

Advanced

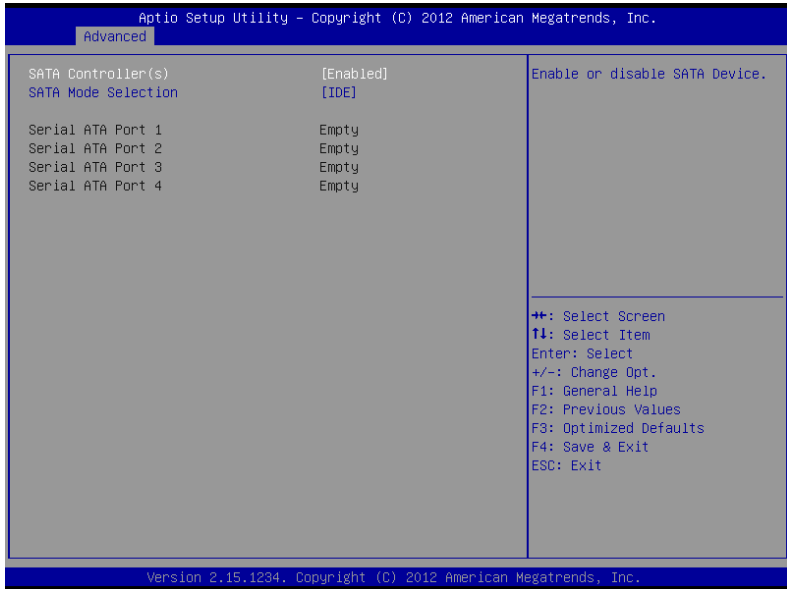
CPU Configuration		Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When Disabled only one thread per enabled core is enabled.
Intel(R) Core(TM) i5-4400E CPU @ 2.70GHz		
CPU Signature	306c3	
Microcode Patch	8	
Max CPU Speed	2700 MHz	
Min CPU Speed	800 MHz	
CPU Speed	3200 MHz	
Processor Cores	2	
Intel HT Technology	Supported	
Intel VT-x Technology	Supported	
Intel SMX Technology	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	3072 kB	
Hyper-threading	[Enabled]	
Intel Virtualization Technology	[Enabled]	
		++: 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:

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

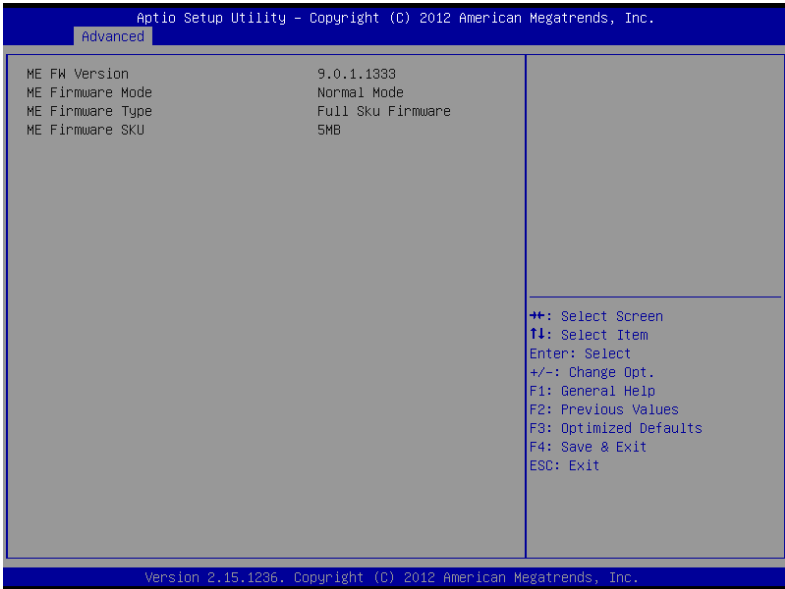
SATA Configuration



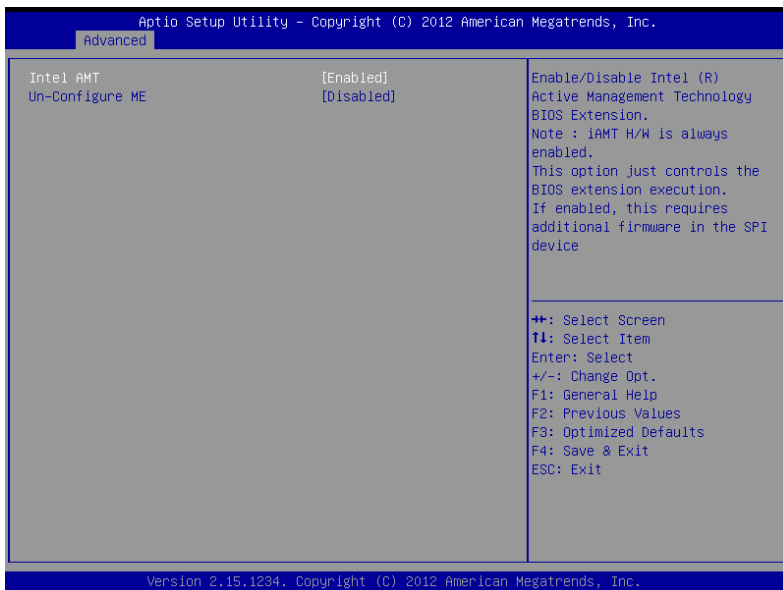
Options Summary:

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



AMT Configuration

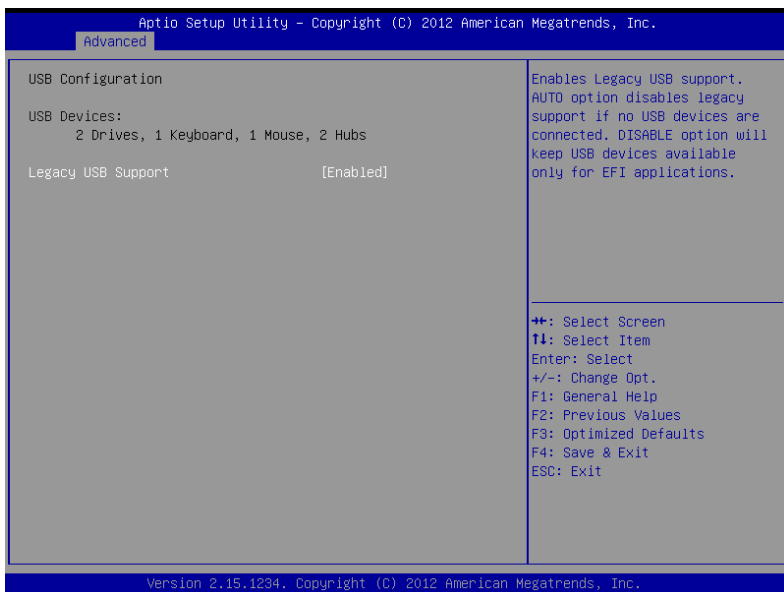


Options Summary:

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

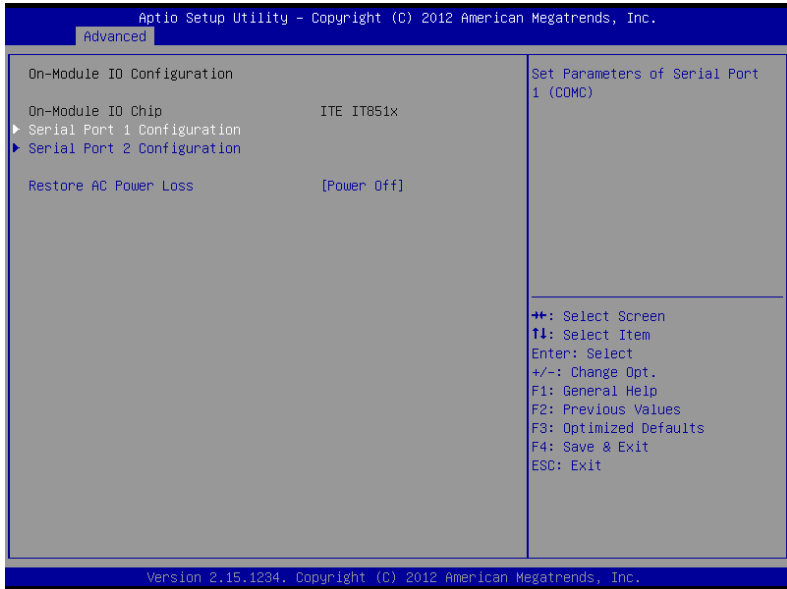
Configuration



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.

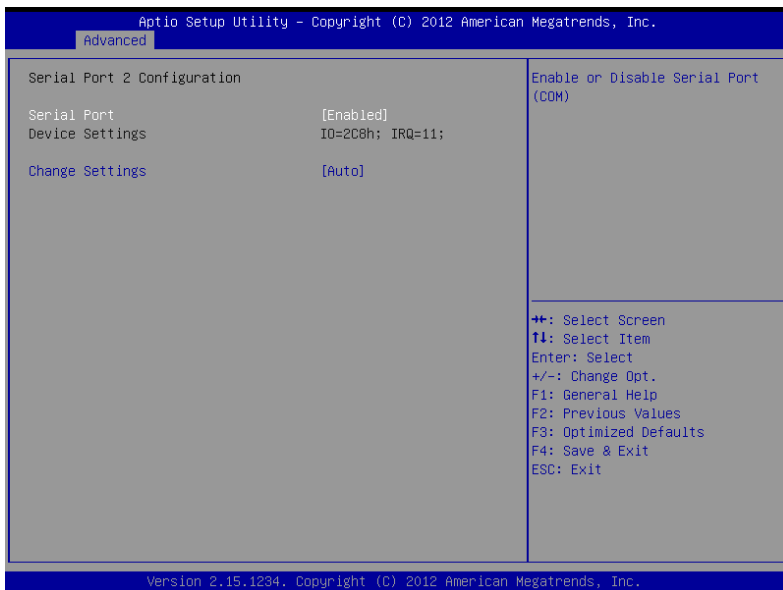
Advanced

Serial Port 1 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	ID=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



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.

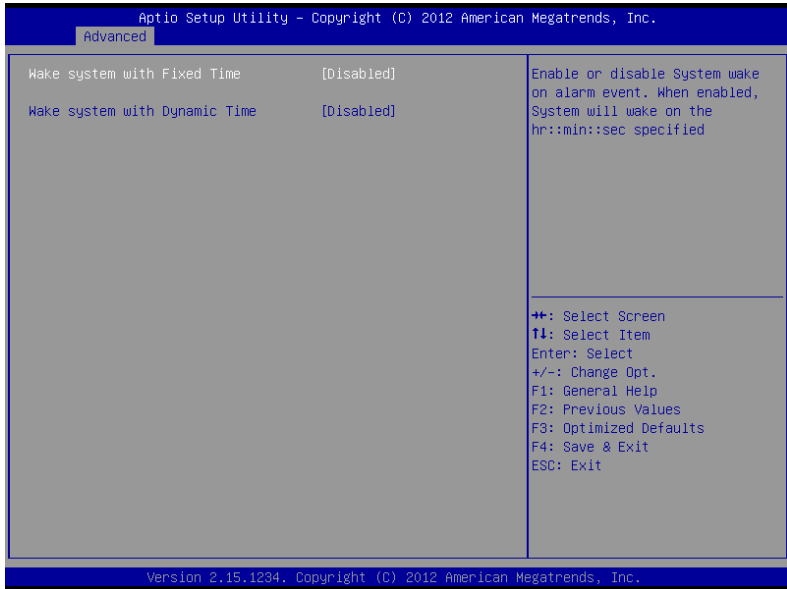
Smart Fan Mode Configuration



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

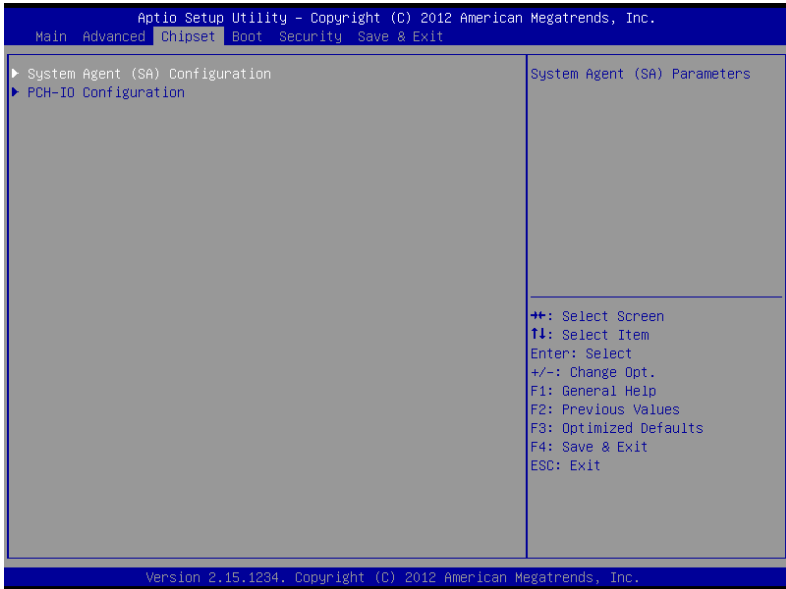


Options Summary:

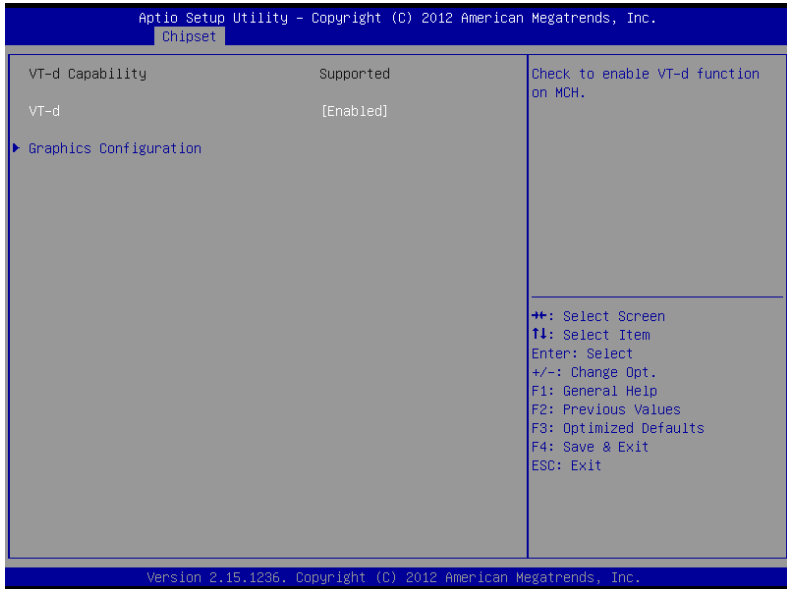
Wake system with Fixed Time	Disabled	Default
	Enabled	
Enable or disable System wake on alarm event. When enabled, System will wake on the hr::min::sec specified.		
Wake up day	0 (Default)	
Select 0 for daily system wake up 1-31 for which day of the month that you would like the system to wake up		
Wake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



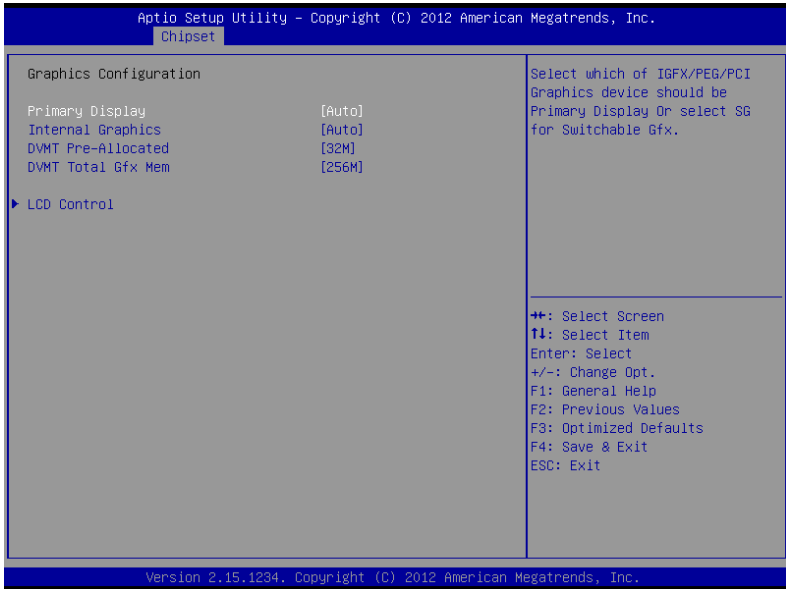
System Agent (SA) Configuration



Options Summary:

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

Graphics Configuration

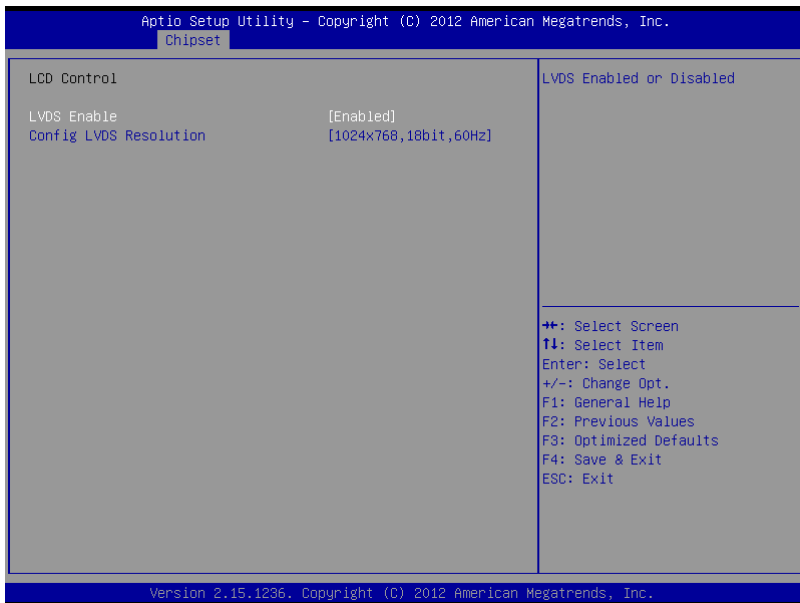


Options Summary:

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	

COM Express Module**COM-QM87**

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

PCH-IO Configuration

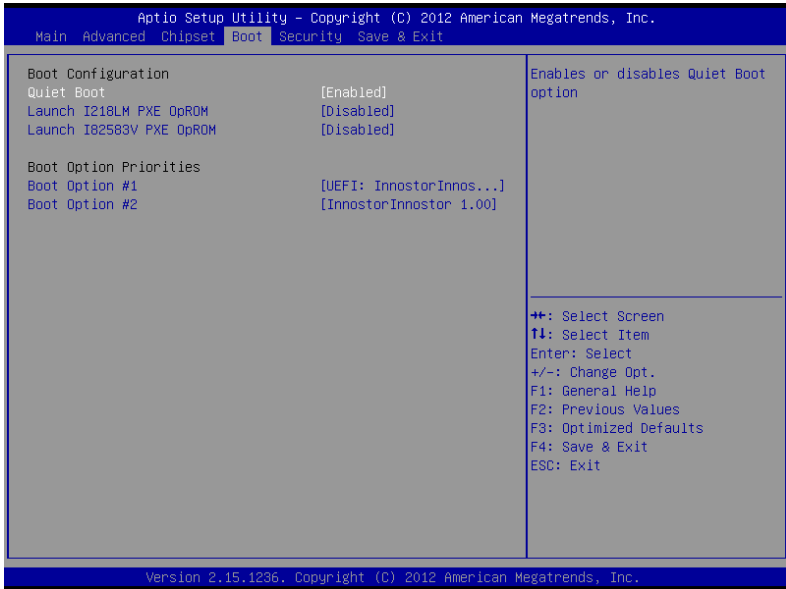
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Chipset		
Power Mode	[ATX Type]	Select Power Supply Mode.
Resume on Ring	[Enabled]	
PCH LAN Controller	[Enabled]	
Wake on LAN	[Enabled]	
Azalia	[Auto]	
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help 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:

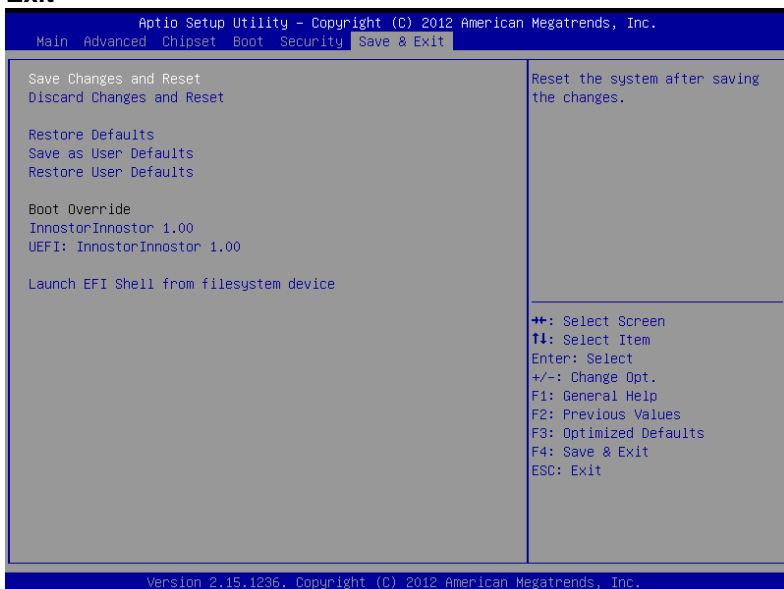
Press Enter on this item, a dialog box appears which lets you enter a password. You can enter no more than six letters or numbers. Press Enter after you have typed in the password. A second dialog box asks you to retype the password for

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 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
- Step 9 – Install UART_ITE Driver

Please read instructions below for further detailed installations.

4.1 Installation:

Insert the COM-QM87 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

1. Click on the **Step8 - TPM** 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 ^(Note1)	BRAM Index Register
Data	0x285 ^(Note2)	BRAM Data Register
Logical Device Number	0xA8 ^(Note3)	Watch dog Logical Device Number
Function and Device Number	0x00 ^(Note4)	Watch dog Function/Device Number

Table 2 : Watchdog relative register table				
	Option Register	BitNum	Value	Note
Timer Counter	0x00 ^(Note5)		(Note10)	Time of watchdog timer (0~255)
Counting Unit	0x01 ^(Note6)	0 ^(Note7)	0 ^(Note11)	Select time unit. 0: second 1: minute
Watchdog RST pulse width	0x01 ^(Note8)	[3:2] ^(Note9)	0 ^(Note12)	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 BRAMLDNReg //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 - FEFFFFFF]	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 - 8C26
[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 - 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 - 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 - 8C2E
	(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 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 ^(Note1)	BRAM Index Register
Data	0x285 ^(Note2)	BRAM Data Register
Logical Device Number	0xA2 ^(Note3)	Watch dog Logical Device Number
Input/Output Function and Device Number	0x00 ^(Note4)	DIO Input/Output Function/Device Number
Output Data Function and Device Number	0x01 ^(Note5)	DIO Output Data Function/Device Number

	Register			
	Option Register	BitNum	Value	Note
GPI0 Pin Status	0x00 ^(Note6)	0 ^(Note7)	^(Note15)	GPF0
GPI1 Pin Status	0x00 ^(Note6)	1 ^(Note8)	^(Note16)	GPF1
GPI2 Pin Status	0x00 ^(Note6)	2 ^(Note9)	^(Note17)	GPF2
GPI3 Pin Status	0x00 ^(Note6)	3 ^(Note10)	^(Note18)	GPF3
GPO0 Pin Status	0x00 ^(Note6)	4 ^(Note11)	^(Note19)	GPF4
GPO1 Pin Status	0x00 ^(Note6)	5 ^(Note12)	^(Note20)	GPF5
GPO2 Pin Status	0x00 ^(Note6)	6 ^(Note13)	^(Note21)	GPF6
GPO3 Pin Status	0x00 ^(Note6)	7 ^(Note14)	^(Note22)	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(){\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(DIO0ToDIO7Reg, DIO3Bit);\n\n    // Procedure : AaeonSetOutputLevel\n    // Input :\n    //     Example, Set Digital I/O Pin 6 level\n    AaeonSetOutputLevel(DIO0ToDIO7Reg, DIO6Bit, DIO6Val);\n}
```

```
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, BRAMLNReg);
    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, BRAMLNReg);
    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 ->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



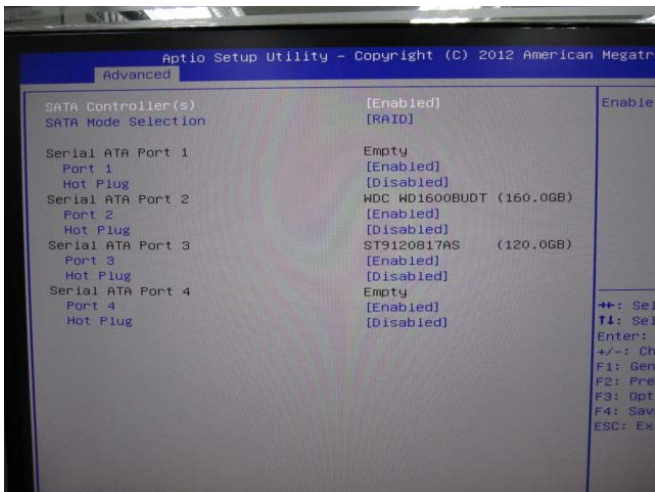
bdssetup.oem
OEM 檔案
8 KB

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



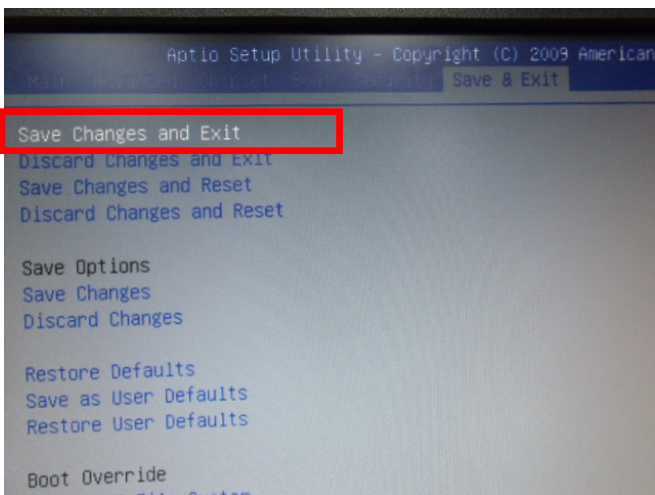
Step 3: The setting procedures “In BIOS Setup Menu”

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



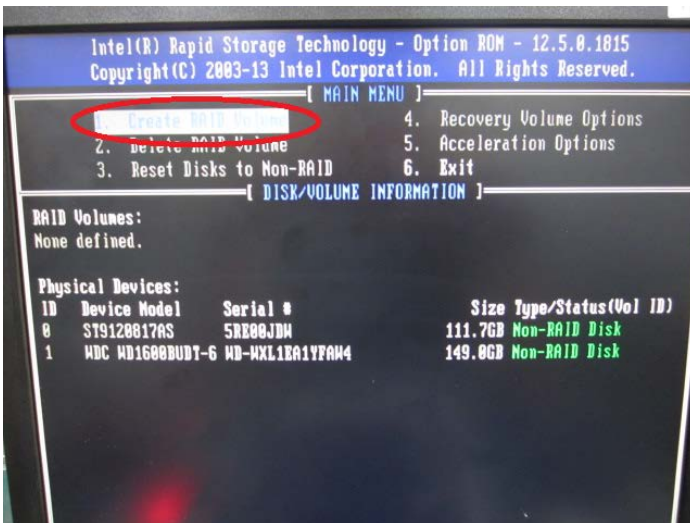
Step 4: The setting procedures “In BIOS Setup Menu”

B: Save & Exit -> Save Changes and Exit

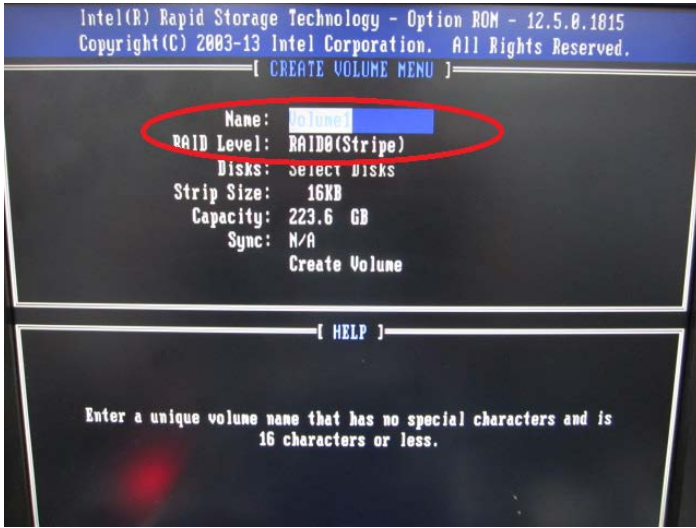


Step 5: Press **Ctrl-I** to enter **MAIN MENU**

Step 6: Choose "1.Create RAID Volume"



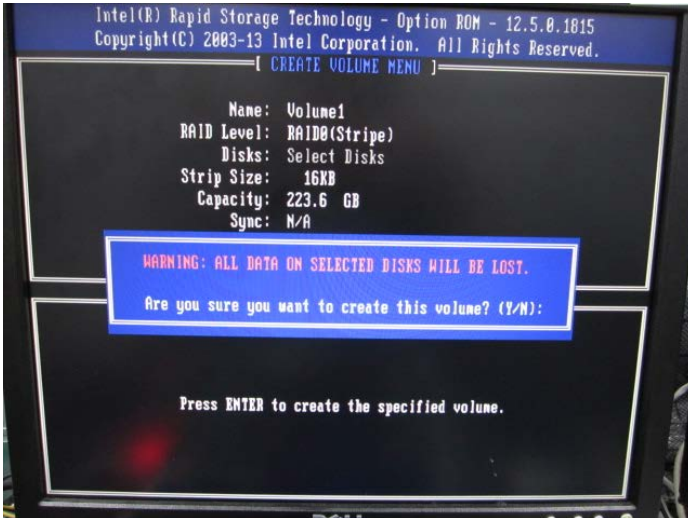
Step 7: RAID Level -> RAID0(Stripe)



Step 8: Choose "Create Volume"



Step 9: Choose “Y”



Step 10: Choose “6. Exit”

