GENE-QM57

Intel® Core™i7/i5 Mobile/Celeron®
Processor
Intel® QM57/HM55
10/100/1000Base-TX
2 SATA 3.0Gb/s, CompactFlash™
2 COM, 8 USB2.0, Digital I/O
1 Mini Card

GENE-QM57 Manual Rev.A 2nd Ed.
July 2012

Copyright Notice

Acknowledgments

All other products' name or trademarks are properties of their respective owners.

- AMI is a trademark of American Megatrends Inc.

- CFast™ is a trademark of the CompactFlash Association (CFA).

- Intel®, Core™ and Celeron® are trademarks of Intel® Corporation.

- Microsoft Windows® is a registered trademark of Microsoft Corp.

- ITE is a trademark of Integrated Technology Express, Inc.

- IBM, PC/AT, PS/2, and VGA are trademarks of International Business Machines Corporation.

- SoundBlaster is a trademark of Creative Labs, Inc.

All other product names or trademarks are properties of their respective owners.

Packing List

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

- DVD-ROM for manual (in PDF format) and drivers
- GENE-QM57

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

Contents

Chapter

1

General Information

1.1 Introduction

AAEON, a leading embedded boards manufacturer, is pleased to announce the debut of their new generation 3.5" SubCompact Board—GENE-QM57. The GENE-QM57 is a cutting-edge product that provides high performance and low power consumption in the embedded market.

GENE-QM57 adopts the latest Intel® Core™ i7/i5 Mobile/ Celeron® (32nm) processor. The system memory deploys with 204-pin DDR3 SODIMM up to 4 GB.   In addition, Intel® 82574L & 82577LM supports two 10/100/100Base-TX that allow faster network connections.   One Mini Card, two SATA 3.0Gb/s and one CFast™ are configured on the GENE-QM57. Moreover, GENE-QM57 also equips eight USB2.0, two COM, one keyboard and one mouse ports for flexible I/O expansions.

The display of GENE-QM57 supports CRT/LCD, DVI/LCD simultaneous/ dual view displays and up to 24-bit dual channel LVDS. This brand new SubCompact board is developed to cater to the requirements of Automation, Medical, ticket machine, transportation, gaming, KIOSK, and POS/POI applications.

1.2 Features

- Intel® Core™ i7/i5 Mobile/ Celeron® (32nm) Processor
- Intel® QM57/HM55
- SODIMM DDR3 800/1066, Max. 4 GB
- Gigabit Ethernet x 2
- CRT,24-Bit Dual-Channel LVDS LCD, DVI
- 2CH HD Audio
- SATA 3.0Gb/s x 2 (Optional RAID), CompactFlash™ x 1
- USB2.0 x 8, COM x 2, 8-Bit Digital I/O
- Mini Card x 1
- +12V Only Operation

1.3 Specifications

System

- Form Factor — 3.5"
- Processor — Intel® Core™ i7/i5/ Celeron® (32nm) up to 2.66 GHz
- System Memory — 204-pin DDR3 SODIMM x 1, Max. 4 GB
- Chipset — Intel® QM57/HM55
- I/O Chipset — ITE IT8712
- Ethernet — Intel® 82577LM & 82574L, 10/100/1000Base-TX, RJ-45 x 2
- BIOS — AMI BIOS – 8 MB SPI Flash
- Wake On LAN — Yes
- Watchdog Timer — Generates a time-out system reset
- H/W Monitor Chipset — Supports power supply voltages and temperature monitoring
- Expansion Interface — Mini Card x 1, LPC Bus
- Battery — Lithium battery
- Power Requirement — +12V, AT/ATX
- Power Consumption — Intel® Core™ i7 620M, 2.66 GHz, DDR3 4G 1066MHz, 3.64A@+12V
- Board Size — 5.75"(L) x 4"(W) (146mm x 101.6mm)
- Gross Weight — 0.88 lb (0.4 kg)

SubCompact Board	GENE-QM57

- 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
- MTBF (Hours) — 50,000

Display: Supports CRT/LCD, DVI/LCD simultaneous/dual view displays

- Chipset — Intel® QM57/HM55 integrated
- Memory — Shared system memory up to 512 MB
- Resolution — Up to 1920x1440 for VGA
  Up to 1920 x 1200 for LCD, DVI
- LCD Interface — Up to 24-bit dual channel LVDS

I/O

- Storage — SATA 3.0Gb/s x 2
  CFast x 1
- Serial Port — RS-232 x 1, RS-232/422/485 (auto flow) x 1
- USB Port — USB2.0 x 8
- PS/2 Port — Keyboard x 1, Mouse x 1
- Digital I/O — Supports 8-bit (Programmable)
- Audio — Line-in, Line-out, Mic-in

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 Location of Connectors and Jumpers

Component Side

Solder Side

CN1

CN11

PCIE1A1
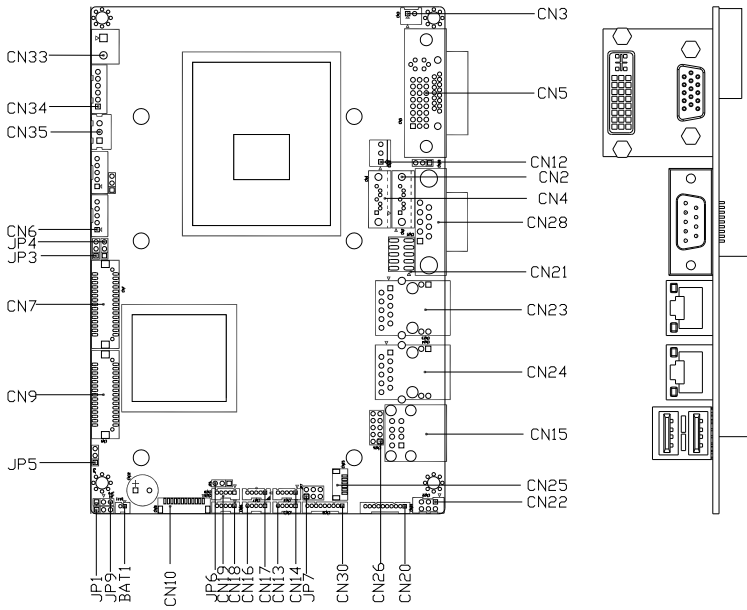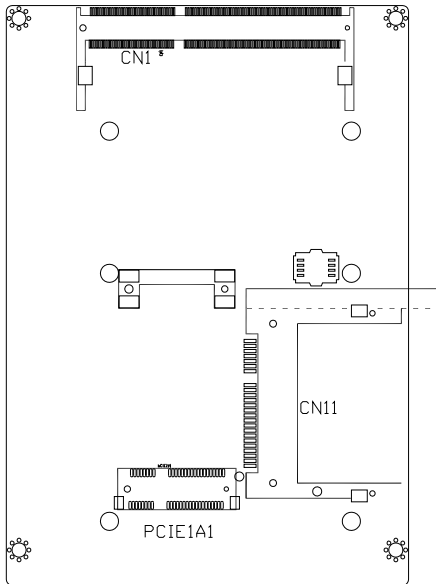
2.3 Mechanical Drawing

Component Side
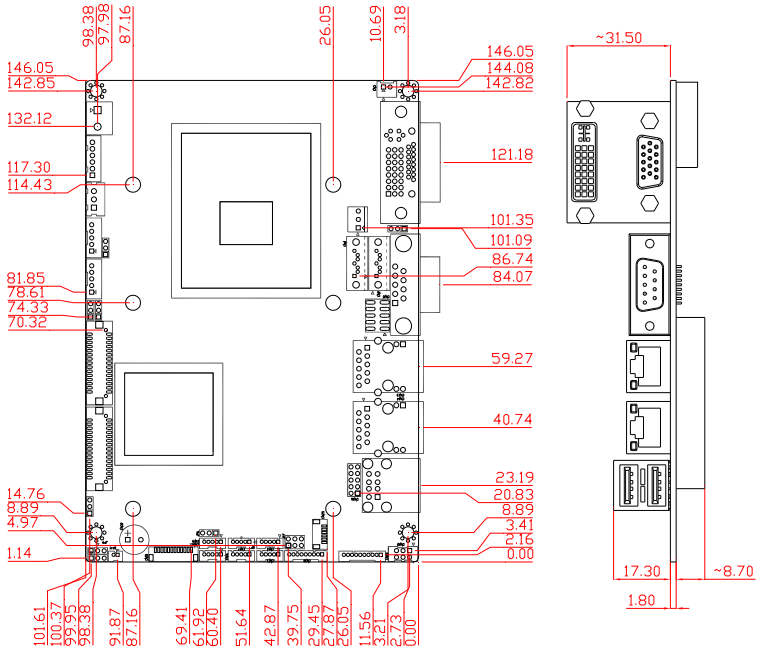
Solder Side
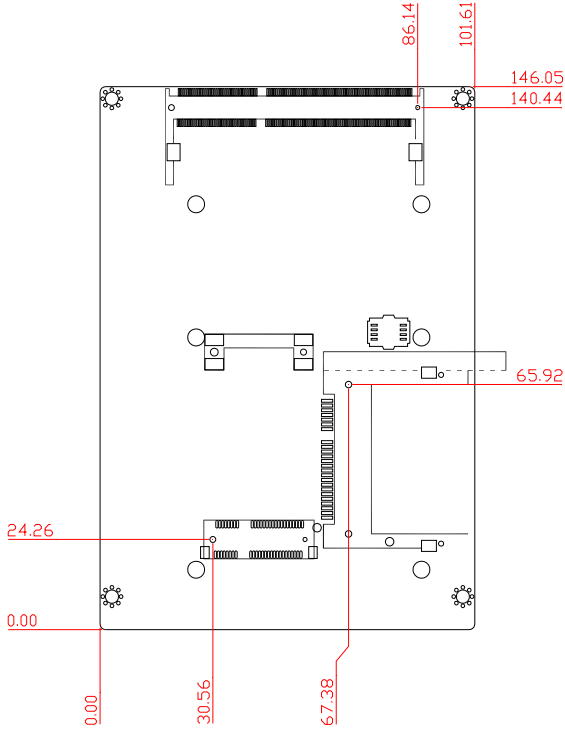
2.4 List of Jumpers

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

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

Label	Function
JP1	Clear CMOS
JP3	LVDS(1)-Inverter +5V/+12V Selection
JP4	LVDS(1)-Inverter Voltage/PWM Control Selection
JP5	LVDS-LCD +5V/+3.3V Selection
JP6	Auto Power Button / Front Panel Button Selection
JP7	COM2 +5V/+12V/Ring Selection
JP10	PWM Signal Inverter/Non-Inverter Selection

2.5 List of Connectors

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

Label	Function
CN1	DDR3 SODIMM Connector
CN2	Serial ATA Connector
CN3	Output Power Connector
CN4	Serial ATA Connector
CN5	DVI + VGA Connector
CN6	LVDS(1)-Inverter +5V/+12V Connector
CN7	LVDS(1) Panel Connector
CN10	LPC Connector (Optional)
CN11	CFast Connector
CN12	Fan Connector
CN13 (USB)	USB Connector
CN14 (USB)	USB Connector
CN15 (USB)	USB Connector
CN16 (USB)	USB Connector
CN17 (USB)	USB Connector
CN18 (USB)	USB Connector
CN19 (USB)	USB Connector
CN20	Audio 2.1 Channel Connector
CN21	Front Panel Connector
CN22	Keyboard/Mouse Connector
CN23 (LAN1)	LAN Connector

CN24 (LAN2)	LAN Connector
CN25	UIM Connector
CN26	Digital I/O Connector
CN28 (COM1)	RS-232 Serial Port Connector
CN30 (COM2)	RS-232/422/485 Serial Port Connector
CN32	DVI Connector (Optional)
CN33	12V Input Power Jack Connector
CN34	Output +5V_DUAL / PSON# /SM Bus Connector
CN35	+5VSB External Input Connector
PCIE1	Mini Card Slot
BAT1	Battery Connector

2.6 Setting Jumpers

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

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

Open   **Closed**   **Closed 2-3**
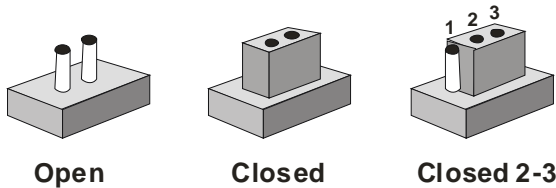
A pair of needle-nose pliers may be helpful when working with jumpers.

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

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

2.7 CMOS Selection (JP1)

JP1	Function
1-2	Protected (Default)
2-3	Clear

2.8 LVDS(1)-Inverter Voltage/PWM Control Selection (JP4)

JP4	Function
1-2	Voltage Control (Default)
2-3	PWM Control

2.9 LVDS Panel +5V/+3.3V Selection (JP5)

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

2.10 Auto Power Button / Front Panel Button Selection (JP6)

JP6	Function
1-2	Auto power button (Default)
2-3	Front panel button

2.11 COM2 Ring/+5V/+12V Selection (JP7)

JP7	Function
1-2	+12V
3-4	+5V
5-6	Ring (Default)

2.12 PWM Signal Inverter/Non-Inverter Selection (JP10)

JP10	Function
1-2	Non-Inverter (Default)
2-3	Inverter

2.13 Output Power Connector (CN3)

Pin	Signal
1	+5V
2	GND

Note: The max. rating of Pin 1 of CN3 is 1A @ 5V

2.14 VGA / DVI Display Connector (CN5)

Pin	Signal	Pin	Signal
1	TMDSC_DATA2_B-	2	TMDSC_DATA2_B
3	GND	4	CRT_DDC_CLK
5	CRT_DDC_DATA	6	DDC_C_CLK
7	DDC_C_DATA	8	CRT_OVSYNCF
9	TMDSC_DATA1_B-	10	TMDSC_DATA1_B
11	GND	12	NC
13	NC	14	+5V_DAC
15	GND	16	OB_HPD
17	TMDSC_DATA0_B-	18	TMDSC_DATA0_B
19	GND	20	NC
21	NC	22	GND
23	TMDSC_CLK_B	24	TMDSC_CLK_B-
25	GND	26	GND
27	NC	28	NC

29	CRT_DDC_CLK	30	NC
31	+5V_DAC	32	CRT_OHSYNCF
33	CRT_GREEN	34	GND
35	NC	36	GND
37	CRT_PLUG#	38	CRT_OVSYNCF
39	CRT_BLUE	40	GND
41	CRT_DDC_DATA	42	CRT_RED
43	GND		
C1	CRT_RED	C2	CRT_GREEN
C3	CRT_BLUE	C4	CRT_OHSYNCF
C5	GND	CG	GND

2.15 LVDS (1)- Inverter +5V/+12V Connector (CN6)

Pin	Signal
1	VCC-Inverter
2	BKL_CON
3	GND
4	GND
5	INV_EN

Note: The max. rating of Pin 1 of CN6 is 1A @ 5V or 12V.

2.16 LVDS (1) LCD Connector (CN7)

Pin	Signal	Pin	Signal
1	L_BKLT_EN	2	BKL_CON
3	LVDSVCC	4	GND
5	LA_CLK-	6	LA_CLK
7	LVDSVCC	8	GND
9	LA_DATA0-	10	LA_DATA0

11	LA_DATA1-	12	LA_DATA1
13	LA_DATA2-	14	LA_DATA2
15	LA_DATA3-	16	LA_DATA3
17	LVDS_DDC_DATA	18	LVDS_DDC_CLK
19	LB_DATA0-	20	LB_DATA0
21	LB_DATA1-	22	LB_DATA1
23	LB_DATA2-	24	LB_DATA2
25	LB_DATA3-	26	LB_DATA3
27	LVDSVCC	28	GND
29	LB_CLK-	30	LB_CLK

Note: The max. rating of Pin 3, Pin 7, Pin 27 of CN7 is 1A @ 3.3V or 5V.

2.17 LPC Connector (CN10) (Optional)

Pin	Signal
1	LPC_AD0
2	LPC_AD0
3	LPC_AD0
4	LPC_AD0
5	+3.3V
6	LPC_FRAME#
7	PCI_RST#
8	GND
9	CLK_PCI_CON
10	NC
11	NC
12	NT_SERIRQ

2.18 Fan Connector (CN12)

Pin	Signal
1	GND
2	+12V
3	Speed Sense

2.19 USB Connector (CN13)

Pin	Signal
1	+5V_DUAL
2	USB2_L1-
3	USB2_L+
4	GND
5	GND

2.20 USB Connector (CN14)

Pin	Signal
1	+5V_DUAL
2	USB3_L1-
3	USB3_L+
4	GND
5	GND

2.21 USB Connector (CN16)

Pin	Signal
1	+5V_DUAL
2	USB4_L1-
3	USB4_L+

4	GND
5	GND

2.22 USB Connector (CN17)

Pin	Signal
1	+5V_DUAL
2	USB5_L1-
3	USB5_L+
4	GND
5	GND

2.23 USB Connector (CN18)

Pin	Signal
1	+5V_DUAL
2	USB10_L1-
3	USB10_L+
4	GND
5	GND

2.24 USB Connector (CN19)

Pin	Signal
1	+5V_DUAL
2	USB11_L1-
3	USB11_L+
4	GND
5	GND

2.25 Audio 2.1 Channel Connector (CN20)

Pin	Signal
1	MIC_L
2	MIC_R
3	AUD_GND
4	LIN_L
5	LIN_R
6	AUD_GND
7	LOUT_L
8	AUD_GND
9	LOUT_R
10	V5_AUD_S0

2.26 Front Panel (CN21)

Pin	Signal	Pin	Signal
1	Power On Button(-)	2	Power On Button(+)
3	IDE LED(-)	4	IDE LED(+)
5	External Buzzer(-)	6	External Buzzer(+)
7	Power LED(-)	8	Power LED(+)
9	Reset Switch(-)	10	Reset Switch(+)

2.27 PS2 Keyboard/Mouse Connector (CN22)

Pin	Signal	Pin	Signal
1	KBDAT	2	KBCLK
3	KB_GND	4	+5V_DUAL
5	MSDAT	6	MSCLK

2.28 UIM Connector (CN25)

Pin	Signal
1	UIM_PWR
2	UIM_RST
3	UIM_CLK
4	GND
5	UIM_VPP
6	UIM_DAT

2.29 Digital I/O Connector (CN26)

This connector offers 4-pair of digital I/O functions and address is A41h. The pin definitions are illustrated below:

Pin	Signal	Pin	Signal
1	DIO_P#1	2	DIO_P#2
3	DIO_P#3	4	DIO_P#4
5	DIO_P#5	6	DIO_P#6
7	DIO_P#7	8	DIO_P#8
9	+5V	10	GND

Note: The max. rating of Pin 9 of CN26 are 1A @ 5V.

BIOS Setting	Connector Definition	Address	IT8712F GPIO Setting
Port 8 @A41h	Pin 8	GPIO Set 2 / Bit 7	U03 Pin 20 (GPIO 27)
Port 7 @A41h	Pin 7	GPIO Set 2 / Bit 6	U03 Pin 21 (GPIO 26)
Port 6 @A41h	Pin 6	GPIO Set 2 / Bit 5	U03 Pin 22 (GPIO 25)
Port 5 @A41h	Pin 5	GPIO Set 2 / Bit 4	U03 Pin 23 (GPIO 24)

Port 4 @A41h	Pin 4	GPIO Set 2 / Bit 3	U03 Pin 24 (GPIO 23)
Port 3 @A41h	Pin 3	GPIO Set 2 / Bit 2	U03 Pin 25 (GPIO 22)
Port 2 @A41h	Pin 2	GPIO Set 2 / Bit 1	U03 Pin 26 (GPIO 21)
Port 1 @A41h	Pin 1	GPIO Set 2 / Bit 0	U03 Pin 27 (GPIO 20)

2.30 RS-232 Serial Port Connector (CN28)
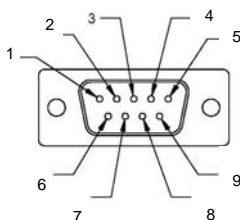
Pin	Signal	Pin	Signal
1	DCDA	2	RXA
3	TXA	4	DTRA
5	GND	6	DSRA
7	RTSA	8	CTSA
9	RIA		

2.31 RS-232/422/485 Serial Port Connector (CN30)

RS-232

Pin	Signal	Pin	Signal
1	DCDB	2	DSRB
3	RXB	4	RTSB
5	TXB	6	CTSB
7	DTRB	8	RIB
9	GND		

RS-422

Pin	Signal	Pin	Signal
1	TX-	2	NC
3	RX+	4	NC
5	TX+	6	NC
7	RX-	8	NC
9	GND		

RS-485

Pin	Signal	Pin	Signal
1	D-	2	NC
3	NC	4	NC
5	D+	6	NC
7	NC	8	NC
9	GND		

2.32 DVI Connector (CN32) (Optional)

Pin	Signal	Pin	Signal
1	TMDSD_DATA_B1	2	TMDSD_DATA_B1-
3	GND	4	GND
5	TMDSD_CLK_B	6	TMDSD_CLK_B-
7	GND	8	+5V_DAC_2
9	DVI_HPD	10	+5V_DAC_2
11	TMDSD_DATA_B2	12	TMDSD_DATA_B2-
13	GND	14	GND
15	TMDSD_DATA_B0	16	TMDSD_DATA_B0-
17	NC	18	NC
19	DDC_D_DATA_B	20	DDC_D_CLK_B

2.33 12V Power Jack Connector (CN33)

Pin	Signal
1	+12V_EXT
2	GND

2.34 Output +5V_DUAL / PSON# /SM Bus Connector (CN34)

Pin	Signal
1	SMB_DAT_A1
2	GND
3	SMB_CLK_A1
4	GND
5	PS_ON#
6	+5V_DUAL

2.35 +5VSB External Input Connector (CN35)

Pin	Signal
1	PS_ON#
2	GND
3	+5VSB_IN

Below Table for China RoHS Requirements
產品中有毒有害物質或元素名稱及含量

AAEON Main Board/ Daughter Board/ Backplane

部件名稱	有毒有害物質或元素					
	鉛 (Pb)	汞 (Hg)	鎘 (Cd)	六價鉻 (Cr(VI))	多溴聯苯 (PBB)	多溴二苯醚 (PBDE)
印刷電路板 及其電子元件	×	○	○	○	○	○
外部信號 連接器及線材	×	○	○	○	○	○

O：表示該有毒有害物質在該部件所有均質材料中的含量均在
  SJ/T 11363-2006 標準規定的限量要求以下。

X：表示該有毒有害物質至少在該部件的某一均質材料中的含量超出
  SJ/T 11363-2006 標準規定的限量要求。

備註：此產品所標示之環保使用期限，系指在一般正常使用狀況下。

Chapter

3

AMI
BIOS Setup

3.1　System Test and Initialization

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

System configuration verification

These routines check the current system configuration against the values stored in the CMOS memory. If they do not match, the program outputs an error message. You will then need to run the BIOS setup program to set the configuration information in memory.

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

1.　You are starting your system for the first time

2.　You have changed the hardware attached to your system

3.　The CMOS memory has lost power and the configuration information has been erased.

The GENE-QM57 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 so that it retains the Setup information when the power is turned off.

Entering Setup

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

Main

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

Advanced

Enable disable boot option for legacy network devices.

Chipset

host bridge parameters.

Boot

Enables/disable quiet boot option.

Security

Set setup administrator password.

Save&Exit

Exit system setup after saving the changes.

Chapter

4

Driver
Installation

.

The GENE-QM57 comes with a CD-ROM that contains all drivers your need.

Follow the sequence below to install the drivers:

Step 1 – Install Chipset Driver

Step 2 – Install VGA Driver

Step 3 – Install LAN Driver

Step 4 – Install ME Driver

Step 5 – Install AUDIO Driver

Step 6 – Install RAID Driver

Step 7 – Install TPM Driver

Please read following instructions for detailed installations.

4.1 Installation:

Insert the GENE-QM57 DVD-ROM into the DVD-ROM Drive. And install the drivers from Step 1 to Step 7 in order.

Step 1 – Install Chipset Driver

1. Click on the **STEP1-CHIPSET** folder and select the OS 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 to install the driver automatically

Step 2 – Install VGA Driver

1. Click on the **STEP2-VGA** folder and select the OS your system is

2. Double click on **Setup.exe** file located in each OS folder

3. Follow the instructions that the window shows

4. The system will help you to install the driver automatically

Step 3 – Install LAN Driver

1. Click on the **STEP3-LAN** folder and select the OS your system is

2. Double click on **Autorun.exe** file located in each OS folder

3. Follow the instructions that the window shows

4. The system will help you to install the driver automatically

Step 4 – Install ME Driver

1. Click on the *STEP4-ME* folder and select the OS your system is

2. Double click on *Setup.exe* file located in each OS folder

3. Follow the instructions that the window shows

4. The system will help you to install the driver automatically

Step 5 – Install AUDIO Driver

1. Click on the *STEP5-AUDIO* folder and select the OS your system is

2. Double click on *Setup.exe* file located in each OS folder

3. Follow the instructions that the window shows

4. The system will help you to install the driver automatically

Step 6 – Install RAID Driver

Please refer to Appendix D RAID & AHCI Settings

Step 7 – Install TPM Driver

1. Click on the *SETP7-TPM* folder and select the OS your system is

2. Select the folder of *TPM_DRIVER* located in each OS folder and double click on the *setup.exe* file

3. After done installing the driver above, click on the folder of *TPM_HostSW_3.0_SP2_IFX*, and then double click on the *setup.exe* file

4. Follow the instructions that the window shows you

5. The system will help you install the driver automatically

Appendix

A

Programming the Watchdog Timer

A.1 Programming

GENE-QM57 utilizes ITE 8712 chipset as its watchdog timer controller. Below are the procedures to complete its configuration and the AAEON intial watchdog timer program is also attached based on which you can develop customized program to fit your application.

Configuring Sequence Description

After the hardware reset or power-on reset, the ITE 8712 enters the normal mode with all logical devices disabled except KBC. The initial state (enable bit) of this logical device (KBC) is determined by the state of pin 121 (DTR1#) at the falling edge of the system reset during power-on reset.
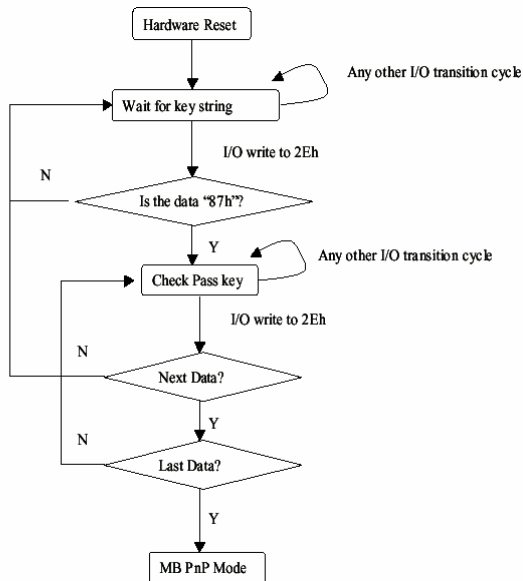
There are three steps to complete the configuration setup: (1) Enter the MB PnP Mode; (2) Modify the data of configuration registers; (3) Exit the MB PnP Mode. Undesired result may occur if the MB PnP

Mode is not exited normally.

(1) Enter the MB PnP Mode

To enter the MB PnP Mode, four special I/O write operations are to be performed during Wait for Key state. To ensure the initial state of the key-check logic, it is necessary to perform four write opera-tions to the Special Address port (2EH). Two different enter keys are provided to select configuration ports (2Eh/2Fh) of the next step.

	Address Port	Data Port
87h, 01h, 55h, 55h:	2Eh	2Fh

(2) Modify the Data of the Registers

All configuration registers can be accessed after entering the MB PnP Mode. Before accessing a selected register, the content of Index 07h must be changed to the LDN to which the register belongs, except some Global registers.

(3) Exit the MB PnP Mode

Set bit 1 of the configure control register (Index=02h) to 1 to exit the MB PnP Mode.

WatchDog Timer Configuration Registers

LDN	Index	R/W	Reset	Configuration Register or Action
All	02H	W	N/A	Configure Control
07H	71H	R/W	00H	WatchDog Timer Control Register
07H	72H	R/W	00H	WatchDog Timer Configuration Register
07H	73H	R/W	00H	WatchDog Timer Time-out Value Register

Configure Control (Index=02h)

This register is write only. Its values are not sticky; that is to say, a hardware reset will automatically clear the bits, and does not require the software to clear them.

Bit	Description
7-2	Reserved
1	Returns to the Wait for Key state. This bit is used when the configuration sequence is completed
0	Resets all logical devices and restores configuration registers to their power-on states.

WatchDog Timer Control Register (Index=71h, Default=00h)

Bit	Description
7	WDT is reset upon a CIR interrupt
6	WDT is reset upon a KBC (mouse) interrupt
5	WDT is reset upon a KBC (keyboard) interrupt
4	WDT is reset upon a read or a write to the Game Port base address
3-2	Reserved
1	Force Time-out. This bit is self-clearing
0	WDT Status
	1: WDT value reaches 0.
	0: WDT value is not 0

WatchDog Timer Configuration Register (Index=72h, Default=00h)

Bit	Description
7	WDT Time-out value select
	1: Second
	0: Minute
6	WDT output through KRST (pulse) enable
5-4	Reserved
3-0	Select the interrupt level[Note] for WDT

WatchDog Timer Time-out Value Register (Index=73h, Default=00h)

Bit	Description
7-0	WDT Time-out value 7-0

A.2 ITE8712 Watchdog Timer Initial Program

```
        .MODEL SMALL
        .CODE
Main:
        CALL Enter_Configuration_mode
        CALL Check_Chip
        mov cl, 7
        call Set_Logic_Device
        ;time setting
        mov cl, 10 ; 10 Sec
        dec al
Watch_Dog_Setting:
        ;Timer setting
        mov al, cl
        mov cl, 73h
        call Superio_Set_Reg
        ;Clear by keyboard or mouse interrupt
        mov al, 0f0h
        mov cl, 71h
        call Superio_Set_Reg
        ;unit is second.
        mov al, 0C0H
        mov cl, 72h
        call Superio_Set_Reg
```

```
; game port enable
mov cl, 9
call Set_Logic_Device


Initial_OK:
CALL Exit_Configuration_mode
MOV AH,4Ch
INT 21h


Enter_Configuration_Mode PROC NEAR
MOV SI,WORD PTR CS:[Offset Cfg_Port]


MOV DX,02Eh
MOV CX,04h
Init_1:
MOV AL,BYTE PTR CS:[SI]
OUT DX,AL
INC SI
LOOP Init_1
RET
Enter_Configuration_Mode ENDP


Exit_Configuration_Mode PROC NEAR
MOV AX,0202h
CALL Write_Configuration_Data
```

```
        RET
        Exit_Configuration_Mode ENDP


        Check_Chip PROC NEAR


        MOV AL,20h
        CALL Read_Configuration_Data
        CMP AL,87h
        JNE Not_Initial


        MOV AL,21h
        CALL Read_Configuration_Data
        CMP AL,12h
        JNE Not_Initial


Need_Initial:
        STC
        RET
Not_Initial:
        CLC
        RET
        Check_Chip ENDP
        Read_Configuration_Data PROC NEAR
        MOV DX,WORD PTR CS:[Cfg_Port+04h]
        OUT DX,AL
```

```
MOV DX,WORD PTR CS:[Cfg_Port+06h]
IN AL,DX
RET
Read_Configuration_Data ENDP


Write_Configuration_Data PROC NEAR
MOV DX,WORD PTR CS:[Cfg_Port+04h]
OUT DX,AL
XCHG AL,AH
MOV DX,WORD PTR CS:[Cfg_Port+06h]
OUT DX,AL
RET
Write_Configuration_Data ENDP


Superio_Set_Reg proc near
push ax
MOV DX,WORD PTR CS:[Cfg_Port+04h]
mov al,cl
out dx,al
pop ax
inc dx
out dx,al
ret
Superio_Set_Reg endp.Set_Logic_Device proc near
```

```
Set_Logic_Device   proc   near
push ax
push cx
xchg al,cl
mov cl,07h
call Superio_Set_Reg
pop cx
pop ax
ret
Set_Logic_Device endp


;Select 02Eh->Index Port, 02Fh->Data Port
Cfg_Port DB 087h,001h,055h,055h
DW 02Eh,02Fh
```

END Main

Note: Interrupt level mapping

0Fh-Dh: not valid

0Ch: IRQ12

.

.

03h: IRQ3

02h: not valid

01h: IRQ1

00h: no interrupt selected

Appendix

B

I/O Information

B.1 I/O Address Map

```
☐ ▓▓ Input/output (IO)
  ☐ � [00000000 - 00000CF7] PCI bus
      💾 [00000000 - 0000000F] Direct memory access controller
      💾 [00000010 - 0000001F] Motherboard resources
      💾 [00000020 - 00000021] Programmable interrupt controller
      💾 [00000022 - 0000003F] Motherboard resources
      💾 [00000040 - 00000043] System timer
      💾 [00000044 - 0000005F] Motherboard resources
      ⌨ [00000060 - 00000060] Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
      💾 [00000061 - 00000061] System speaker
      💾 [00000062 - 00000063] Motherboard resources
      ⌨ [00000064 - 00000064] Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
      💾 [00000065 - 0000006F] Motherboard resources
      💾 [00000070 - 00000071] System CMOS/real time clock
      💾 [00000072 - 0000007F] Motherboard resources
      💾 [00000080 - 00000080] Motherboard resources
      💾 [00000081 - 00000083] Direct memory access controller
      💾 [00000084 - 00000086] Motherboard resources
      💾 [00000087 - 00000087] Direct memory access controller
      💾 [00000088 - 00000088] Motherboard resources
      💾 [00000089 - 0000008B] Direct memory access controller
      💾 [0000008C - 0000008E] Motherboard resources
      💾 [0000008F - 0000008F] Direct memory access controller
      💾 [00000090 - 0000009F] Motherboard resources
      💾 [000000A0 - 000000A1] Programmable interrupt controller
      💾 [000000A2 - 000000BF] Motherboard resources
      💾 [000000C0 - 000000DF] Direct memory access controller
      💾 [000000E0 - 000000EF] Motherboard resources
      💾 [000000F0 - 000000FF] Numeric data processor
      💾 [00000274 - 00000277] ISAPNP Read Data Port
      💾 [00000279 - 00000279] ISAPNP Read Data Port
      💬 [000002F8 - 000002FF] Communications Port (COM2)
      💾 [000003B0 - 000003BB] Intel(R) Graphics Media Accelerator HD
      💾 [000003C0 - 000003DF] Intel(R) Graphics Media Accelerator HD
      💬 [000003F8 - 000003FF] Communications Port (COM1)
      💾 [00000400 - 0000047F] System board
      💾 [000004D0 - 000004D1] Motherboard resources
      💾 [00000500 - 0000057F] System board
      💾 [00000A00 - 00000A1F] Motherboard resources
      💾 [00000A79 - 00000A79] ISAPNP Read Data Port
  ☐ 💾 [00000D00 - 0000FFFF] PCI bus
      💾 [00001180 - 0000119F] System board
    ☐ 💾 [0000E000 - 0000EFFF] Intel(R) 5 Series/3400 Series Chipset Family PCI Express Root Port 5 - 3B4A
      💾 [0000F000 - 0000F01F] Intel(R) 5 Series/3400 Series Chipset Family SMBus Controller - 3B30
      🖧 [0000F020 - 0000F03F] Intel(R) 82577LM Gigabit Network Connection
      💿 [0000F040 - 0000F04F] Intel(R) 5 Series/3400 Series Chipset Family 2 port Serial ATA Storage Controller - 3B2D
      💿 [0000F050 - 0000F05F] Intel(R) 5 Series/3400 Series Chipset Family 2 port Serial ATA Storage Controller - 3B2D
      💿 [0000F060 - 0000F063] Intel(R) 5 Series/3400 Series Chipset Family 2 port Serial ATA Storage Controller - 3B2D
      💿 [0000F070 - 0000F077] Intel(R) 5 Series/3400 Series Chipset Family 2 port Serial ATA Storage Controller - 3B2D
      💿 [0000F080 - 0000F083] Intel(R) 5 Series/3400 Series Chipset Family 2 port Serial ATA Storage Controller - 3B2D
      💿 [0000F090 - 0000F097] Intel(R) 5 Series/3400 Series Chipset Family 2 port Serial ATA Storage Controller - 3B2D
      💿 [0000F0A0 - 0000F0AF] Intel(R) 5 Series/3400 Series Chipset Family 4 port Serial ATA Storage Controller - 3B2E
      💿 [0000F0B0 - 0000F0BF] Intel(R) 5 Series/3400 Series Chipset Family 4 port Serial ATA Storage Controller - 3B2E
      💿 [0000F0C0 - 0000F0C3] Intel(R) 5 Series/3400 Series Chipset Family 4 port Serial ATA Storage Controller - 3B2E
      💿 [0000F0D0 - 0000F0D7] Intel(R) 5 Series/3400 Series Chipset Family 4 port Serial ATA Storage Controller - 3B2E
      💿 [0000F0E0 - 0000F0E3] Intel(R) 5 Series/3400 Series Chipset Family 4 port Serial ATA Storage Controller - 3B2E
      💿 [0000F0F0 - 0000F0F7] Intel(R) 5 Series/3400 Series Chipset Family 4 port Serial ATA Storage Controller - 3B2E
      💾 [0000F100 - 0000F107] Intel(R) Graphics Media Accelerator HD
```

B.2 Memory Address Map

```
Memory
    [000A0000 - 000BFFFF] PCI bus
        [000A0000 - 000BFFFF] Intel(R) Graphics Media Accelerator HD
    [7C000000 - FFFFFFFF] PCI bus
        [D0000000 - DFFFFFFF] Intel(R) Graphics Media Accelerator HD
        [E0000000 - EFFFFFFF] System board
        [FE000000 - FE3FFFFF] Intel(R) Graphics Media Accelerator HD
        [FE400000 - FE4FFFFF] Intel(R) 5 Series/3400 Series Chipset Family PCI Express Root Port 5 - 3B4A
            [FE400000 - FE41FFFF] Intel(R) 82574L Gigabit Network Connection
            [FE420000 - FE423FFF] Intel(R) 82574L Gigabit Network Connection
        [FE500000 - FE51FFFF] Intel(R) 82577LM Gigabit Network Connection
        [FE520000 - FE523FFF] Microsoft UAA Bus Driver for High Definition Audio
        [FE524000 - FE524FFF] Intel(R) Turbo Boost Technology Driver
        [FE525000 - FE5250FF] Intel(R) 5 Series/3400 Series Chipset Family SMBus Controller - 3B30
        [FE526000 - FE5263FF] Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B34
        [FE527000 - FE5273FF] Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B3C
        [FE528000 - FE528FFF] Intel(R) 82577LM Gigabit Network Connection
        [FE529000 - FE52900F] Intel(R) Management Engine Interface
        [FEC00000 - FECFFFFF] System board
        [FED00000 - FED003FF] High precision event timer
        [FED08000 - FED08FFF] System board
        [FED14000 - FED19FFF] System board
        [FED1C000 - FED1FFFF] System board
        [FED20000 - FED3FFFF] System board
        [FED90000 - FED93FFF] System board
        [FEE00000 - FEE0FFFF] System board
        [FF000000 - FFFFFFFF] System board
```

B.3 IRQ Mapping Chart

```
Interrupt request (IRQ)
    (ISA)  0    System timer
    (ISA)  1    Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
    (ISA)  3    Communications Port (COM2)
    (ISA)  4    Communications Port (COM1)
    (ISA)  8    System CMOS/real time clock
    (ISA)  9    Microsoft ACPI-Compliant System
    (ISA) 12    Microsoft PS/2 Mouse
    (ISA) 13    Numeric data processor
    (PCI)  5    Intel(R) 5 Series/3400 Series Chipset Family SMBus Controller - 3B30
    (PCI) 16    Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B3C
    (PCI) 16    Intel(R) 82574L Gigabit Network Connection
    (PCI) 16    Intel(R) Graphics Media Accelerator HD
    (PCI) 16    Intel(R) Management Engine Interface
    (PCI) 17    Intel(R) 5 Series/3400 Series Chipset Family PCI Express Root Port 1 - 3B42
    (PCI) 17    Intel(R) 5 Series/3400 Series Chipset Family PCI Express Root Port 5 - 3B4A
    (PCI) 18    Intel(R) Turbo Boost Technology Driver
    (PCI) 19    Intel(R) 5 Series/3400 Series Chipset Family 2 port Serial ATA Storage Controller - 3B2D
    (PCI) 19    Intel(R) 5 Series/3400 Series Chipset Family 4 port Serial ATA Storage Controller - 3B2E
    (PCI) 20    Intel(R) 82577LM Gigabit Network Connection
    (PCI) 22    Microsoft UAA Bus Driver for High Definition Audio
    (PCI) 23    Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B34
```

B.4 DMA Channel Assignments

```
Direct memory access (DMA)
    4    Direct memory access controller
```

Appendix

C

Mating Connecotor

C.1 List of Mating Connectors and Cables

The table notes mating connectors and available cables.

Connector Label	Function	Mating Connector		Available Cable	Cable P/N
		Vendor	Model no.		
CN2	SATA Connector	Molex	67582-0000	SATA Cable	1709070500
CN3	+5Vout Connector	N/A	N/A	2 Pins For SATA Power	1702150155
CN4	SATA Connector	Molex	67582-0000	SATA Cable	1709070500
CN6	LVDS Inverter Connector	JST	ZHR-5	Invertor Cable	1705050153
CN7	LVDS Connector	HIROSE	DF13-30DS-1.25C	N/A	N/A
CN12	System Fan Connector	Molex	22-28-0030	N/A	N/A
CN13	USB Port Connector	Molex	51021-0500	USB Wafer Cable	1700050207
CN14	USB Port Connector	Molex	51021-0500	USB Wafer Cable	1700050207
CN16	USB Port Connector	Molex	51021-0500	USB Wafer Cable	1700050207
CN17	USB Port Connector	Molex	51021-0500	USB Wafer Cable	1700050207
CN18	USB Port Connector	Molex	51021-0500	USB Wafer Cable	1700050207
CN19	USB Port Connector	Molex	51021-0500	USB Wafer Cable	1700050207
CN20	Audio In/Out/CD-in	N/A	N/A	Audio Cable	1709100254

	and MIC Connector				
CN22	Keyboard / Mouse Connector	Wafer	B6B-PHDSS	KB/MS Cable	1700060152
CN23	RJ-45 Ethernet#1 Connector	Neltron	7001-8P8C	N/A	N/A
CN24	RJ-45 Ethernet#1 Connector	Neltron	7001-8P8C	N/A	N/A
CN25	Uim Connector	Molex	51021-0600	N/A	N/A
CN26	Digital I/O Connector	Neltron	2026B-10	N/A	N/A
CN30	COM Port 2 Connector	Molex	51021-0900	UART Wafer Cable	1701090150
CN33	+12V Vin Connector			Power Cable	1702002010
CN34	External AUX Power and PS_ON#	JST	B6B-PH-KS	ATX External 5VSB Cable	External AUX Power and PS_ON#
CN35	External +5VSB Power Input and PS_ON#	N/A	N/A	ATX Cable	170220020B
BAT1	External RTC Connector	Molex	51021-0200	Battery Cable	175011901C

Appendix

D

RAID & AHCI Settings

D.1 Setting RAID

OS installation to setup RAID Mode

Step 1: Copy the files below from "**Driver CD -> Raid Driver -> F6 Floppy -**

x86" to Disk

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

Step 3: The setting procedures " **In BIOS Setup Menu**"
A: Advanced -> SATA Configuration -> SATA Mode -> RAID Mode
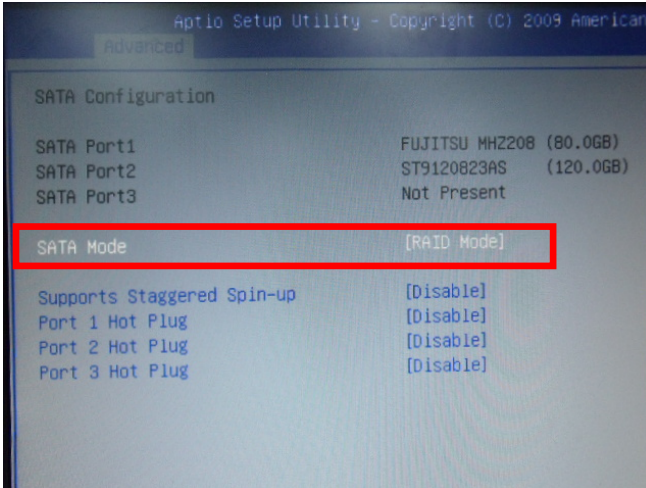
Step 4: The setting procedures "**In BIOS Setup Menu**"
B: Advanced -> Launch Storage OpROM -> Enabled
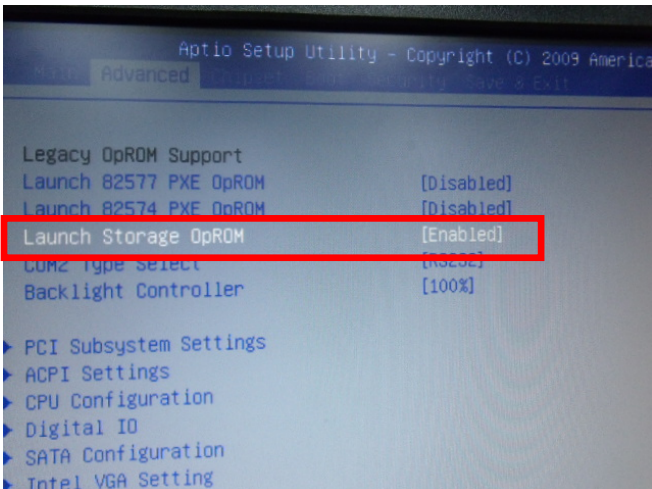
Step 5: The setting procedures "**In BIOS Setup Menu**"
C: Boot -> Boot Option #1 -> DVD-ROM Type
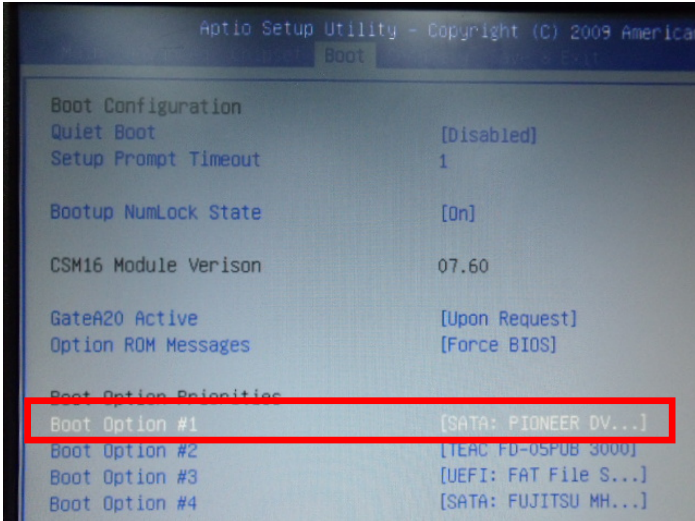
Step 6: The setting procedures "**In BIOS Setup Menu**"
D: Save & Exit -> Save Changes and Exit
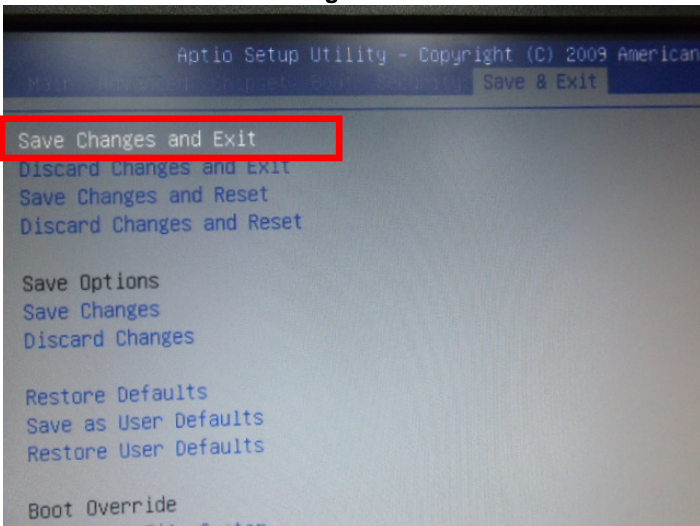
Step 7: Press **Ctrl-I** to enter **MAIN MENU**
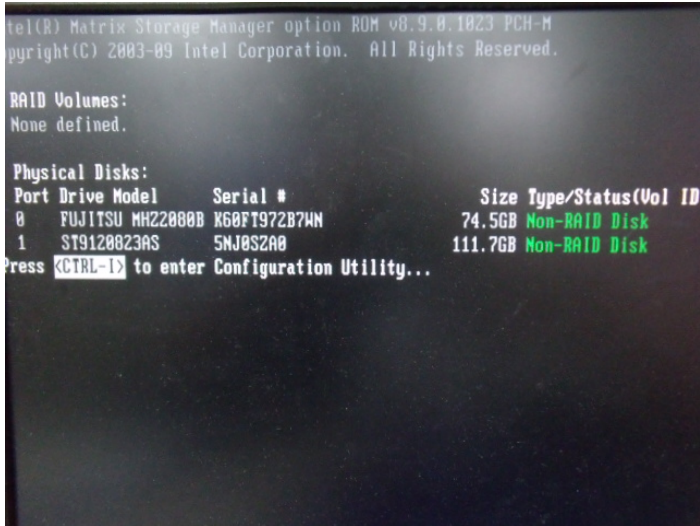
Step 8: Choose "**1.Create RAID Volume**"
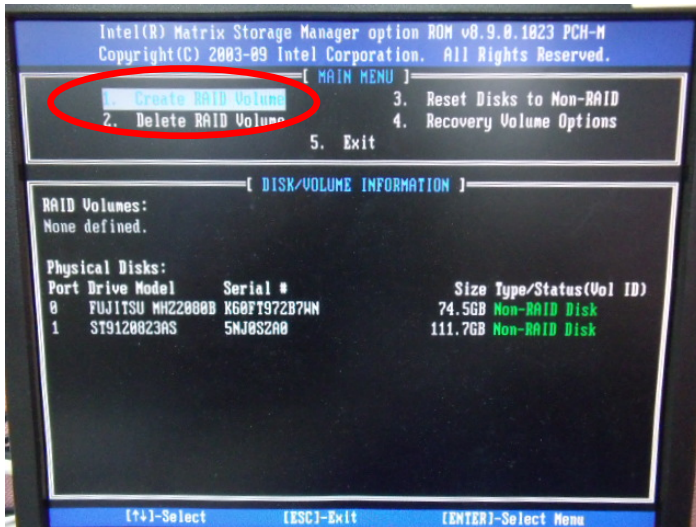
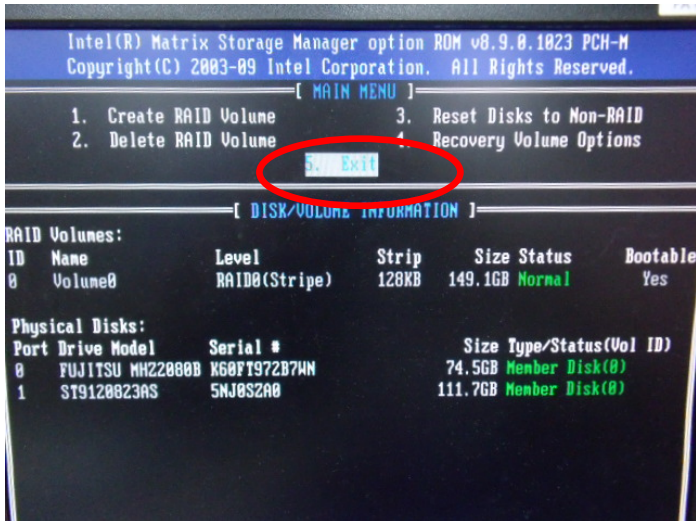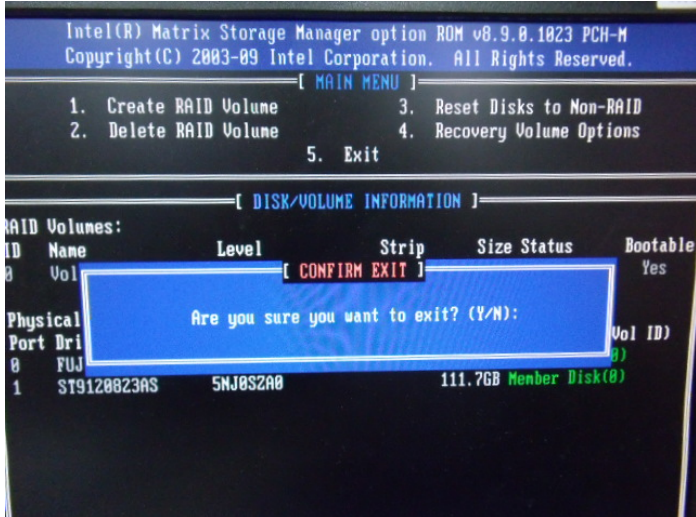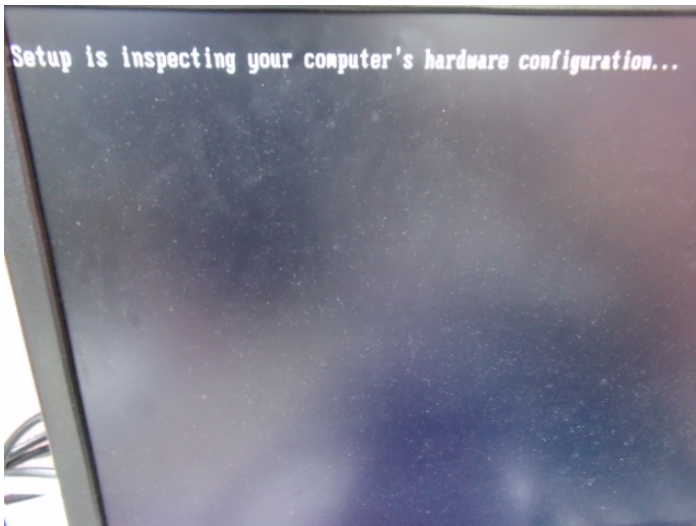Step 9: RAID Level -> RAID0(Stripe)
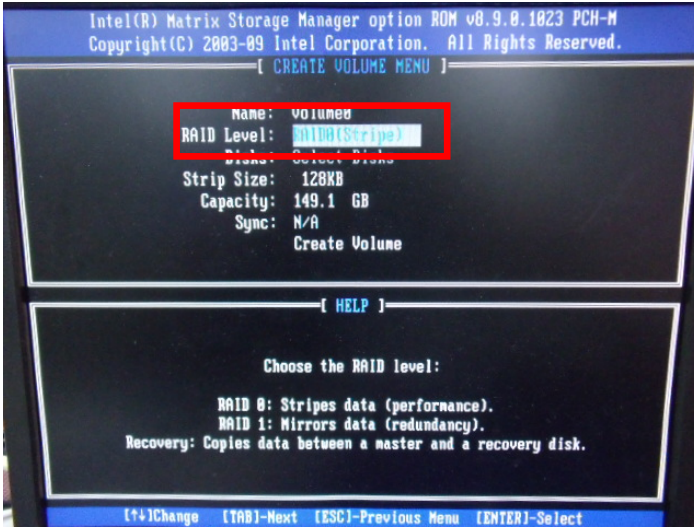
Step 10: Choose "**Create Volume**"
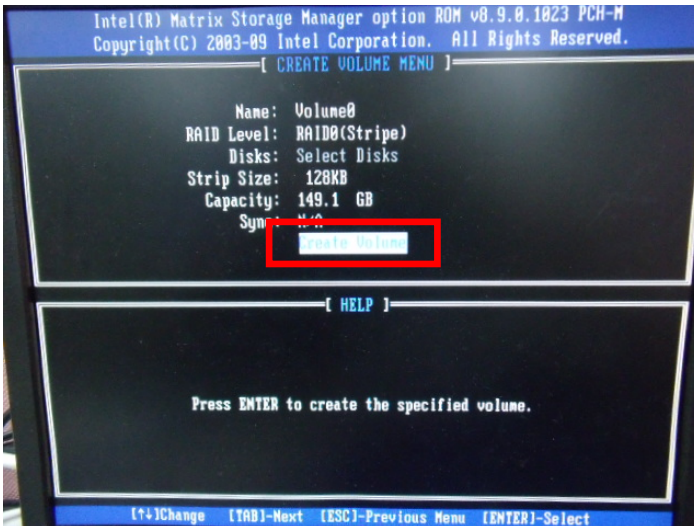
Step 11: Choose "**Y**"
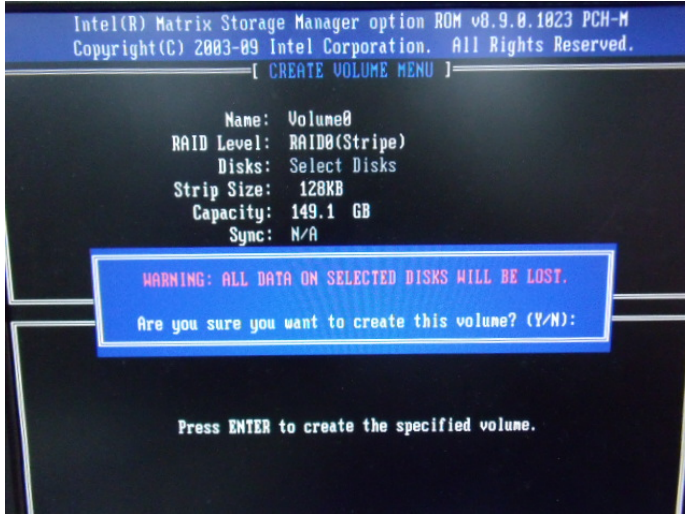
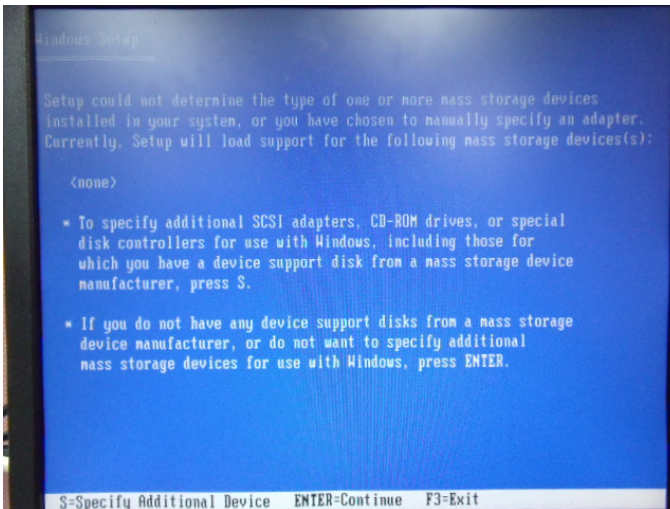Step 12: Choose "**5. Exit**"

Step 13: Choose "**Y**"

Step 14: Setup OS

Setup is inspecting your computer's hardware configuration...

Step 15: Press "**F6**"

Press F6 if you need to install a third party SCSI or RAID driver...

Step 16: Choose "**S**"

Windows Setup

Setup could not determine the type of one or more mass storage devices
installed in your system, or you have chosen to manually specify an adapter.
Currently, Setup will load support for the following mass storage devices(s):

    <none>

* To specify additional SCSI adapters, CD-ROM drives, or special
  disk controllers for use with Windows, including those for
  which you have a device support disk from a mass storage device
  manufacturer, press S.

* If you do not have any device support disks from a mass storage
  device manufacturer, or do not want to specify additional
  mass storage devices for use with Windows, press ENTER.

S=Specify Additional Device   ENTER=Continue   F3=Exit
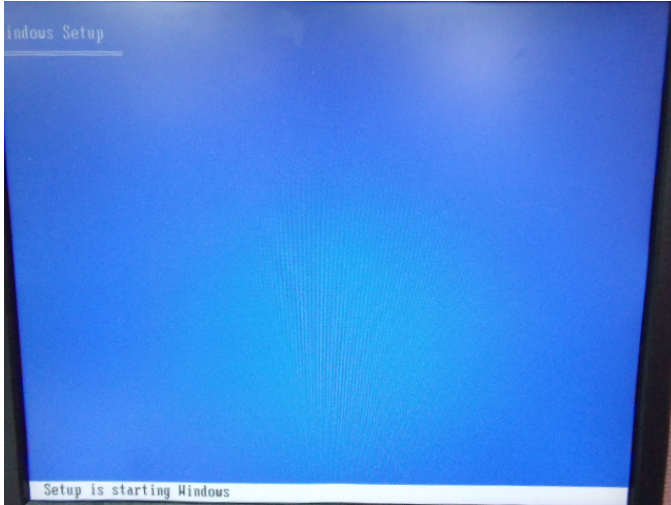
Step 17: Choose "**Intel(R) ICH8M-E/ICH9M-E/5 Series SATA RAID Controller**"
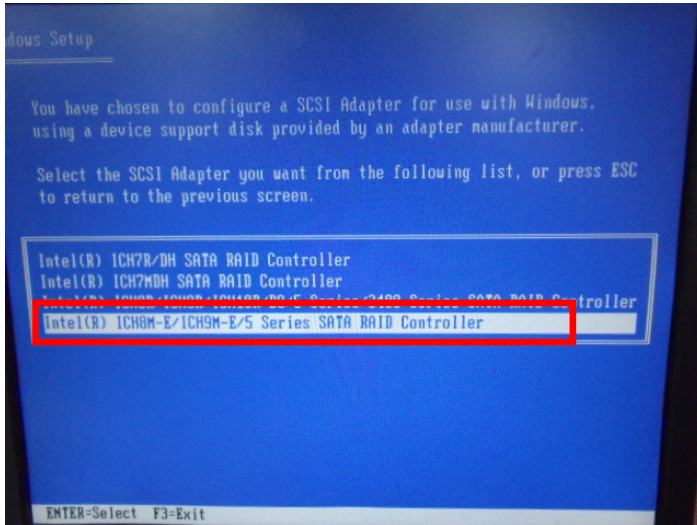
Step 18: It will show the model number you select and then press "**ENTER**"

Step 19: Setup is starting Windows

D.2 Setting AHCI

OS installation to setup AHCI Mode

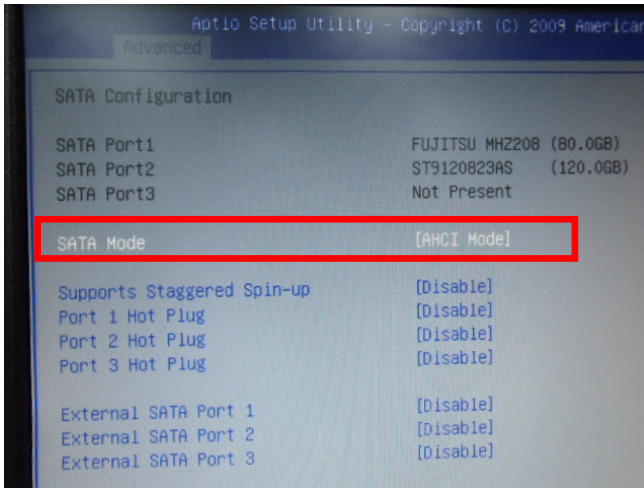Step 1: Copy the files below from "**Driver CD -> Raid Driver -> F6 Floppy - x86**" to Disk

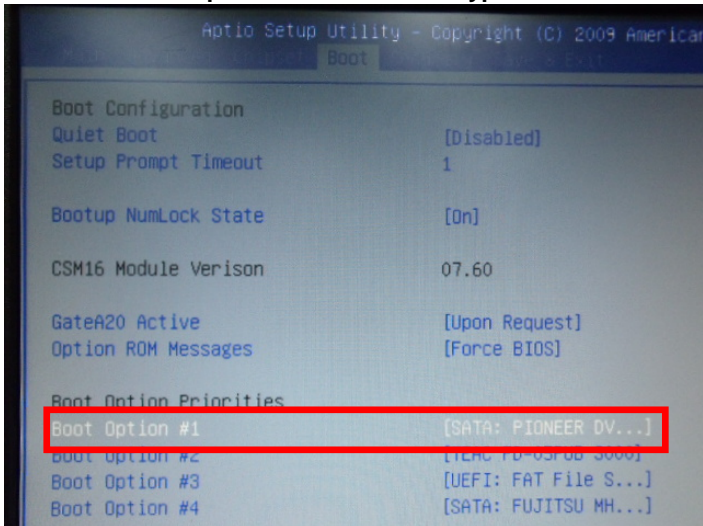Step 2: Connect the USB Floppy (disk with RAID files) to the board

Step 3: The setting procedures " **In BIOS Setup Menu**"
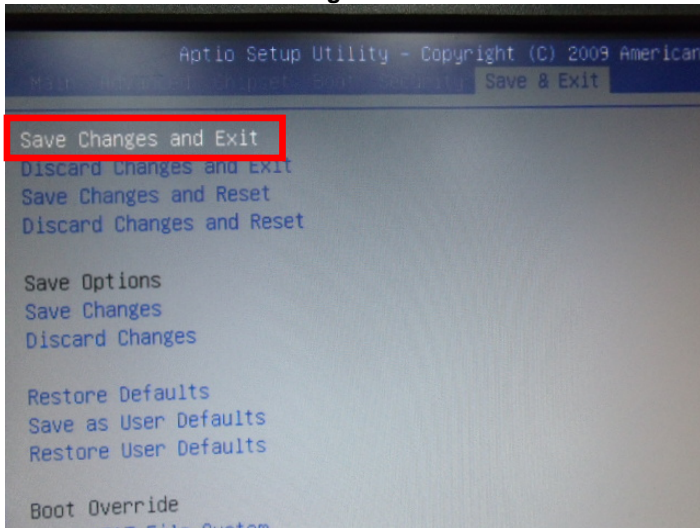**A: Advanced -> SATA Configuration -> SATA Configuration -> SATA Mode -> AHCI Mode**

Step 4: The setting procedures "**In BIOS Setup Menu"**
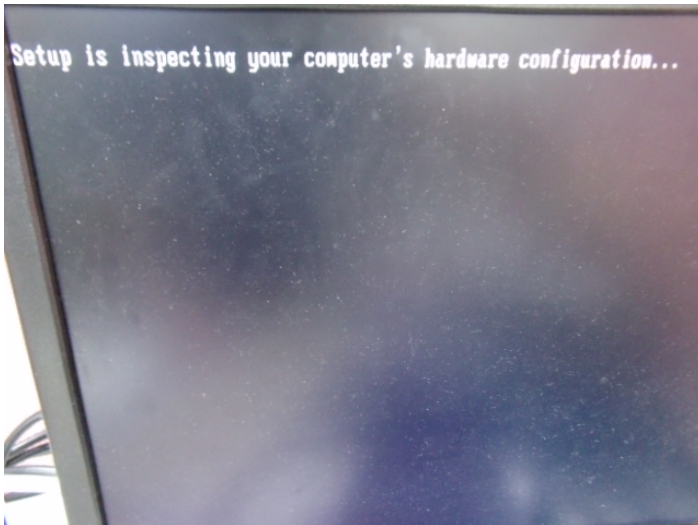**B: Boot -> Boot Option #1 -> DVD-ROM Type**

Step 5: The setting procedures "**In BIOS Setup Menu"**
C: Save & Exit -> Save Changes and Exit
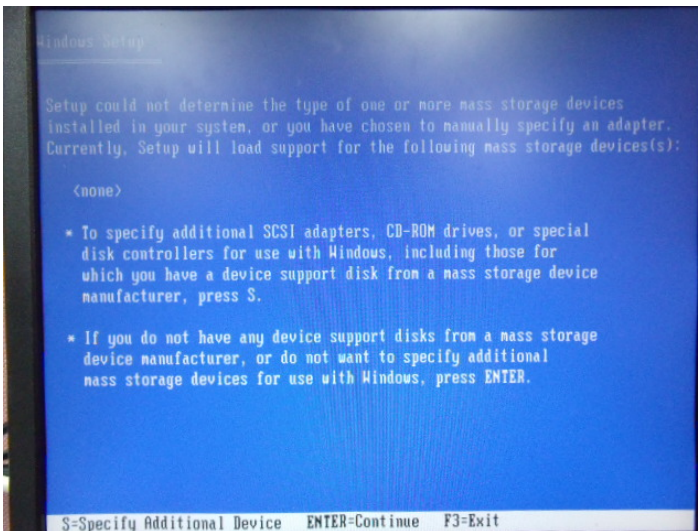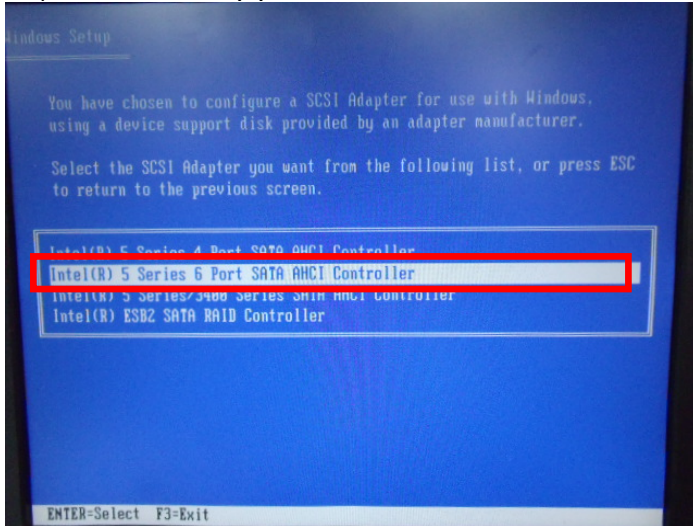

Step 6: Setup OS

Step 7: Press "**F6**"

Press F6 if you need to install a third party SCSI or RAID driver...

Step 8: Choose "**S**"

Windows Setup

Setup could not determine the type of one or more mass storage devices
installed in your system, or you have chosen to manually specify an adapter.
Currently, Setup will load support for the following mass storage devices(s):

   <none>

* To specify additional SCSI adapters, CD-ROM drives, or special
  disk controllers for use with Windows, including those for
  which you have a device support disk from a mass storage device
  manufacturer, press S.

* If you do not have any device support disks from a mass storage
  device manufacturer, or do not want to specify additional
  mass storage devices for use with Windows, press ENTER.

S=Specify Additional Device   ENTER=Continue   F3=Exit

Step 9: Choose "**Intel(R) 5 Series 6 Port SATA AHCI Controller**"

Step 10: It will show the model number you select and then press "**ENTER**"

Step 11: Setup is loading files

Setup is loading files (Compaq Drive Array)...