EMB-QM67

Intel® Core™ i7/i5/Celeron®
QC/DC Processor
Mini-ITX
10/100/1000Base-TX Ethernet
8 USB2.0, 6 COM, 8-bit Digital I/O
2 SATA 6.0Gb/s, 2 SATA 3.0 Gb/s
CompactFlash™
1 PCI-E[x4], 1 Mini-PCIe, 1 CFast™

EMB-QM67 Manual Rev.A 3rd Ed.
September 2012

Copyright Notice

Acknowledgments

Packing List

(Standard, not bulk pack)

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

- 1 9657666600 Jumper Cap
- 1 1709070500 Serial ATA Cable
- 1 1702151200 Onboard Serial ATA Power Cable
- 1 1700060152 Keyboard/Mouse Cable
- 1 Product DVD
- 1 EMB-QM67

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

The EMB-QM67 supports Intel® Socket G2 (rPGA998B) 2nd Generation Intel® Core™ i7/i5/Celeron® QC/DC processor which when paired with the Intel® QM67 chipset offers a high performance computing platform with low power consumption. This new product supports two 204-pin dual-channel DDR3 SODIMM at speeds of 1066/1333/1600 MHz, up to 8 GB.

One CompactFlash™, two SATA 6.0Gb/s and two SATA 3.0 Gb/s interfaces provide ample storages. With dual Gigabit Ethernet, six COM ports, and eight USB2.0, the EMB-QM67 meets the requirements of today's demanding applications.

Display requirements are met with an abundance of interfaces such as CRT, DVI, HDMI, and LVDS. The graphic engine adopts 2nd generation Intel® Core™i7/i5/Celeron® integrated Gfx Gen 5.75 graphics to offer high definition display function.

With all of its integrated features, the EMB-QM67 strikes a balance of performance and price. This versatile product targets Industrial Automation, Entertainment, Networking, KIOSK/POS, Transportation, Banking, Healthcare and Digital Signage applications that require high performance and high reliability.

1.2 Features

- Socket G2 (rPGA988B) 2nd Generation for Intel® Core™ i7/ i5/Celeron® QC/ DC Processor Up to 45W
- Intel® QM67
- 204-pin Dual-Channel DDR3 1066/1333/1600 MHz SODIMM x 2, Up to 8 GB
- Gigabit Ethernet x 2
- Intel® Integrated Graphics Engine Supports Dual View by VGA, DVI, HDMI, LVDS
- HD Audio
- SATA 3.0Gb/s x 2, Support RAID 0,1,5,10
- USB2.0 x 8, COM x 6
- PCI-Express [x4] x 1, Mini PCI-Express x 1, CFast™ x 1, TPM x 1 (Optional)

1.3 Specifications

System

From Factor	Mini-ITX
Processor	Socket G2 (rPGA988B) 2nd Generation for Intel® Core™ i7 / i5 / Celeron® QC /DC processor, up to 45W
System Memory	204-pin Dual Channel DDR3 1066/1333/1600 MHz SODIMM x 2, up to 8GB
Chipset	Intel® Core i7/i5 QM67
Ethernet	10/100/1000Base-TX, RJ-45 x 2
BIOS	AMI BIOS 64Mbit SPI ROM
Wake On LAN	Yes
Watchdog Timer	Reset: 1 sec. ~ 255 min. and 1 sec. or 1 min./step
H/W Status Monitoring	Monitoring system temperature, voltage, and cooling fan status
Expansion Interface	PCI-E [x4] x 1, Mini-PCIe socket x 1, CFast™ x 1, TPM Module x 1 (Optional)
Battery	Lithium Battery
Power Requirement	ATX
Board Size	6.7" x 6.7" (170mm x 170mm)
Gross Weight	1.32 lb (0.6Kg)
Operating Temperature	32°F~140°F (0°C~60°C)
Storage Temperature	-4°F~158°F (-20°C~70°C)
Operating Humidity	5% ~ 95% relative humidity, non-condensing
MTBF	70,000

Display: Supports CRT/LCD simultaneous / dual view displays

● Chipset	Intel® Core i7/i5 + QM67
● Memory	2nd Generation Intel® Core™ i7 / i5 / Celeron® integrated Gfx Gen 5.75 graphics
● Resolution	Up to 2048x1536 @ 60 Hz for CRT
	Up to 1366 x 768 @ 60 Hz for LCD
● Output Interface	DB-15 x 1, DVI-D x 1, HDMI x 1, LVDS x 1

I/O: ITE IT8728F+ Fintek F81216DG

● Storage	SATA 6.0Gb/s x 2 , SATA 3.0Gb/s x 2, CompactFlash™ Type II x 1
● Serial Port	RS-232 x 5 (box headers)
	RS-232/422/485 x 1, supports 5/12V on the 9th (on I/O)
● USB	USB2.0 x 8
● PS/2 Port	Keyboard x 1, Mouse x 1
● Digital I/O	8-bit Programmable
● Audio	HD Audio Realtek ALC 892 Codec with phone Jack

Chapter

2

Quick Installation Guide

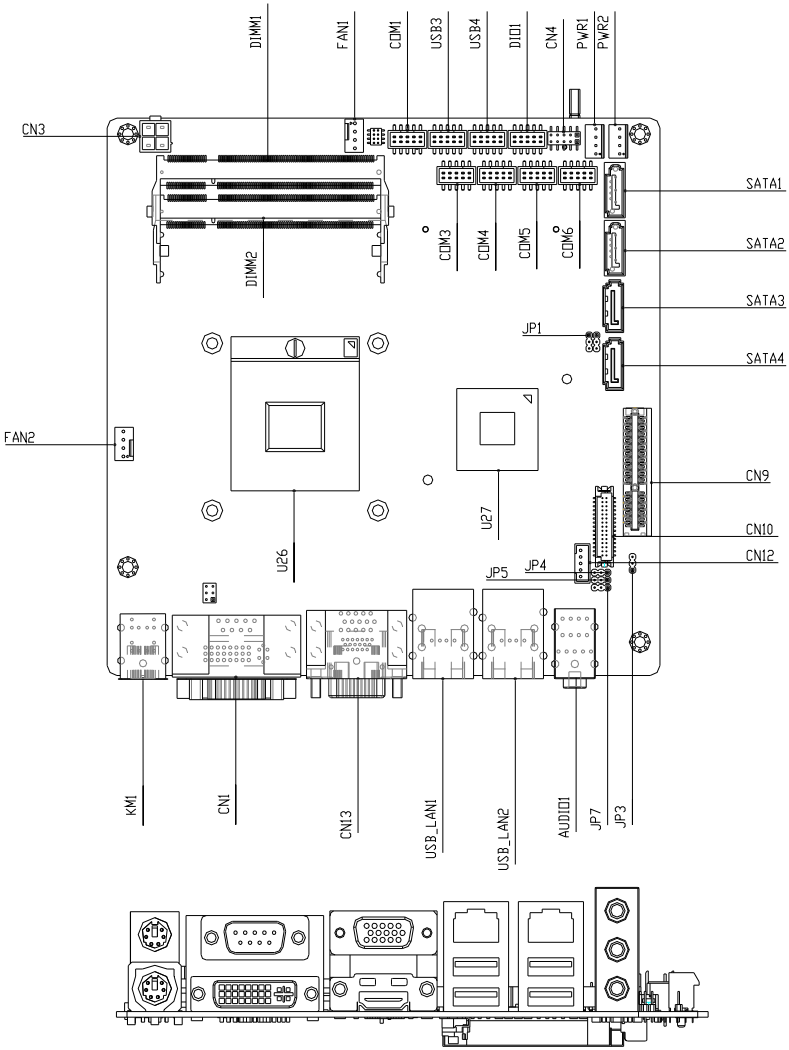
2.1 Safety Precautions

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.

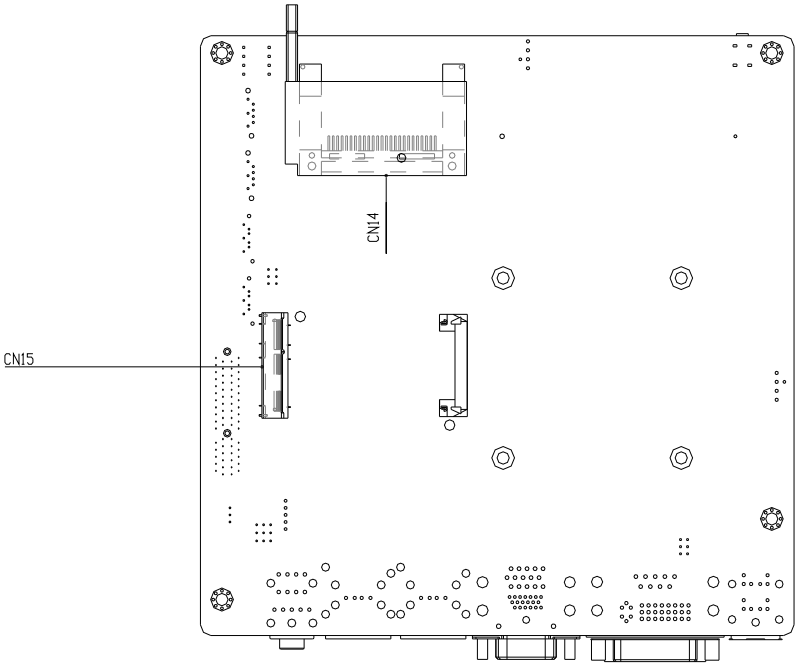
Always ground yourself to remove any static charge before touching the board. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not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

2.2 Location of Connectors and Jumpers

Component Side

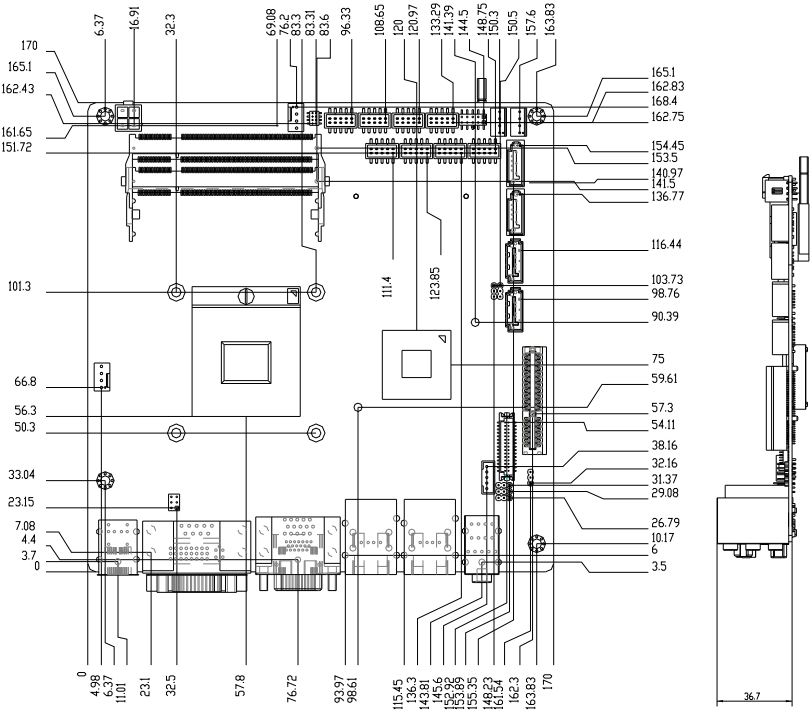


Solder Side

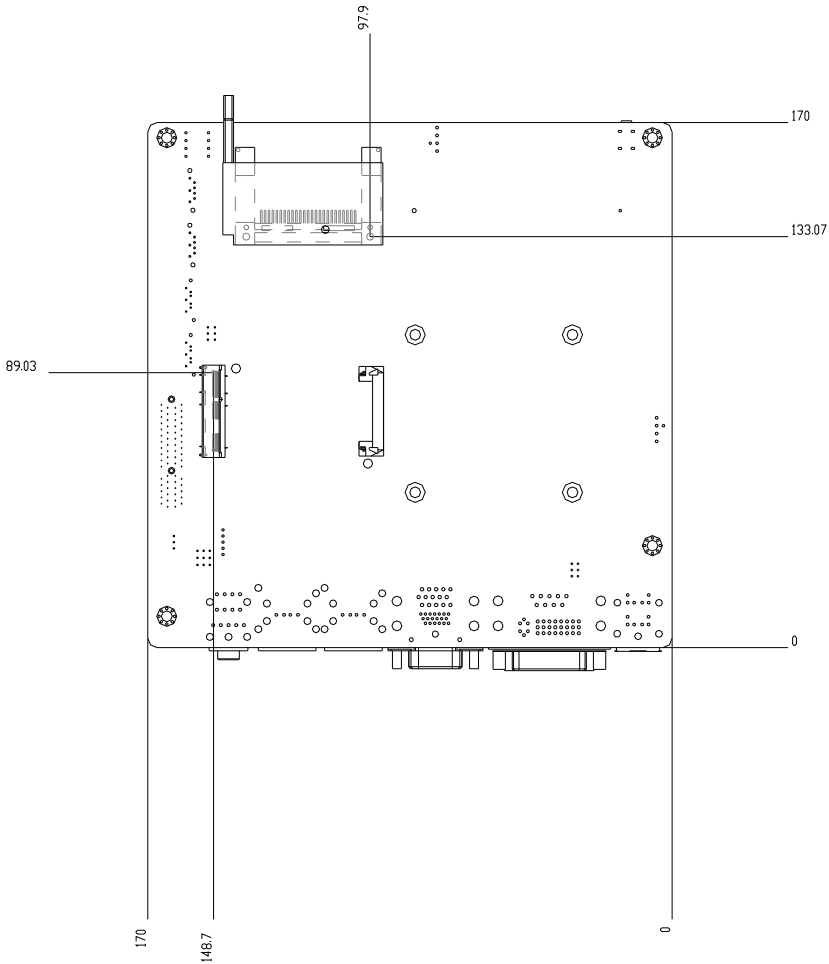


2.3 Mechanical Drawing

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	Auto Power Button
JP4	LVDS Voltage Selection
JP6	+12V/+5V/RING Selection
JP7	Inverter Power 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 of the board's connectors:

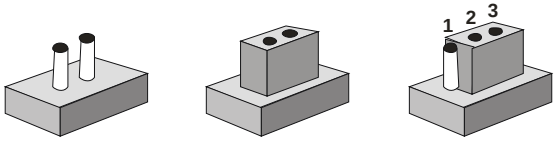
Label	Function
DIO1	Digital I/O
PWR1 ~ PWR2	SATA POWER
CN1	COM2 / DVI Connector
CN3	4-pin ATX Power +12V Connector
CN4	Front Panel Connector 1
CN9	PCIE*4 Connector
CN10	LVDS Connector
CN12	LVDS Inverter / Backlight Connector
CN13	VGA / HDMI Connector
CN14	CFast™ Connector

CN15	Mini Card Connector
KM1	Keyboard/Mouse Connector
COM1	RS-232 Box Header
COM2	RS-232/422/485 Pin Header
COM3 ~ COM6	RS-232 Box Header
SATA1~SATA2	SATA 3.0 Connector
SATA3~SATA4	SATA Connector
USB_LAN1 ~ USB_LAN2	LAN / USB Connector
DIMM1,DIMM2	DDR3 DIMM Slot
USB3 ~ USB4	USB Box Header
FAN1~ FAN2	4 Pin Fan Connector
AUDIO1	AUDIO 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 Clear CMOS (JP1)

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

2.8 Auto Power Button (JP3)

JP3	Function
1-2	ATX (Default)
2-3	AT

2.9 LCD Voltage Selection (JP4)

JP4	Function
1-2	+5V
2-3	+3.3V (Default)

2.10 +12V/+5V/Ring Selection (JP6)

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

2.11 Inverter Power Selection (JP7)

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

2.12 Digital I/O (DIO1)

This connector offers 4-pair of digital I/O functions and address is A00H. The pin definitions are illustrated below:

Pin	Signal	Pin	Signal
1	Digital- IN/OUT(Port1 Bit 1)	2	Digital- IN/OUT (Port1 Bit 2)

3	Digital- IN/OUT (Port1 Bit 4)	4	Digital- IN/OUT (Port3 Bit 4)
5	Digital- IN/OUT (Port3 Bit 5)	6	Digital- IN/OUT (Port3 Bit 6)
7	Digital- IN/OUT (Port3 Bit 7)	8	Digital- IN/OUT (Port6 Bit 3)
9	+3.3V	10	GND

The pin definitions and registers mapping are illustrated below:

Address: A00H

4 in / 4 out

Pin1	Pin2	Pin3	Pin4	Pin5	Pin6	Pin7	Pin8
GPI 11	GPI 12	GPI 14	GPI 34	GPO 35	GPO 36	GPO 37	GPO 63

8 in

Pin1	Pin2	Pin3	Pin4	Pin5	Pin6	Pin7	Pin8
GPI 11	GPI 12	GPI 14	GPI 34	GPO 35	GPO 36	GPO 37	GPO 63

8 out

Pin1	Pin2	Pin3	Pin4	Pin5	Pin6	Pin7	Pin8
GPI 11	GPI 12	GPI 14	GPI 34	GPO 35	GPO 36	GPO 37	GPO 63

2.13 SATA Power (PWR1~PWR2)

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

2.14 Front Panel Connector (CN4)

Pin	Signal	Pin	Signal
1	Power On Button (-)	2	Power On Button (+)

3	HDD LED (-)	4	HDD LED (+)
5	SPEAKER(-)	6	SPEAKER(+)
7	Power LED (-)	8	Power LED (+)
9	Reset Switch (-)	10	Reset Switch (+)

2.15 LAN1~LAN2 Active /Link/ Speed LED (CN6)

Pin	Signal	Pin	Signal
1	LAN1_LED_D2	2	LAN1_LED_LNK#_ACT
3	LAN1_LED_1000#	4	LAN1_LED_100#
5	LAN2_LED_D2	6	LAN2_LED_LNK#_ACT
7	LAN2_LED_1000#	8	LAN2_LED_100#

2.16 LVDS Connector (CN10)

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

2.17 LVDS Inverter/ Backlight Connector (CN12)

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

2.18 RS-232 Box Header (COM1)

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

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

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

2.20 RS-232 Box Header (COM3~COM6)

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

2.21 USB Box Header (USB3~USB4)

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

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	×	○	○	○	○	○

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。

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。

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。

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 EMB-QM67 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

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The EMB-QM67 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 LAN Driver

Step 4 – Install Audio Driver

Step 5 – Install ME Driver

Step 6 – Install RAID & AHCI Driver

Step 7 – Install TPM Driver

Step 8 – Install Serial Port Driver (Optional)

Note: If you got compatible issue for COM port, please find its driver under STEP 8 folder and then install it by administrative login permission.

Please read instructions below for further detailed installations.

4.1 Installation:

Insert the EMB-QM67 DVD-ROM into the DVD-ROM drive. And install the drivers from Step 1 to Step 8 in order.

Step 1 – Install Chipset Driver

1. Click on the ***STEP 1-CHIPSET*** folder and select the OS folder your system is
2. Double click on the ***infinst_autol.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 2 – Install VGA Driver

1. Click on the ***STEP2-VGA*** 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

Note 1:

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

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

Step 3 –Install LAN Driver

1. Click on the ***STEP3-LAN*** folder and select the OS folder your system is
2. 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 4 –Install Audio Driver

1. Click on the ***STEP4-AUDIO*** folder and select the OS folder your system is
2. Double click on the ***Setup.exe*** located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 5 – Install ME Driver

1. Click on the ***STEP5-ME*** folder and select the folder of OS folder your system is
2. Double click on the ***Setup.exe*** 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

Please refer to the ***Appendix D RAID & AHCI Settings***

Step 7 – Install TPM Driver

1. Click on the ***STEP7-TPM*** folder and select the folder of OS folder your system is
2. Double click on the ***Setup.exe*** located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 8 –Install Serial Port Driver (Optional)

1. Click on the ***STEP8-Serial Port Driver (Optional)*** folder and select the folder of OS folder your system is
2. Double click on the ***patch.bat*** located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Appendix

A

Programming the Watchdog Timer

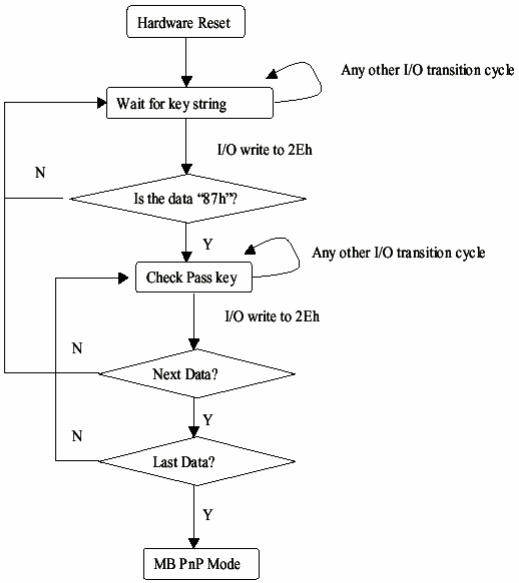
A.1 Programming

EMB-QM67 utilizes ITE IT8728 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 8728 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 operations 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 ITE8728 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

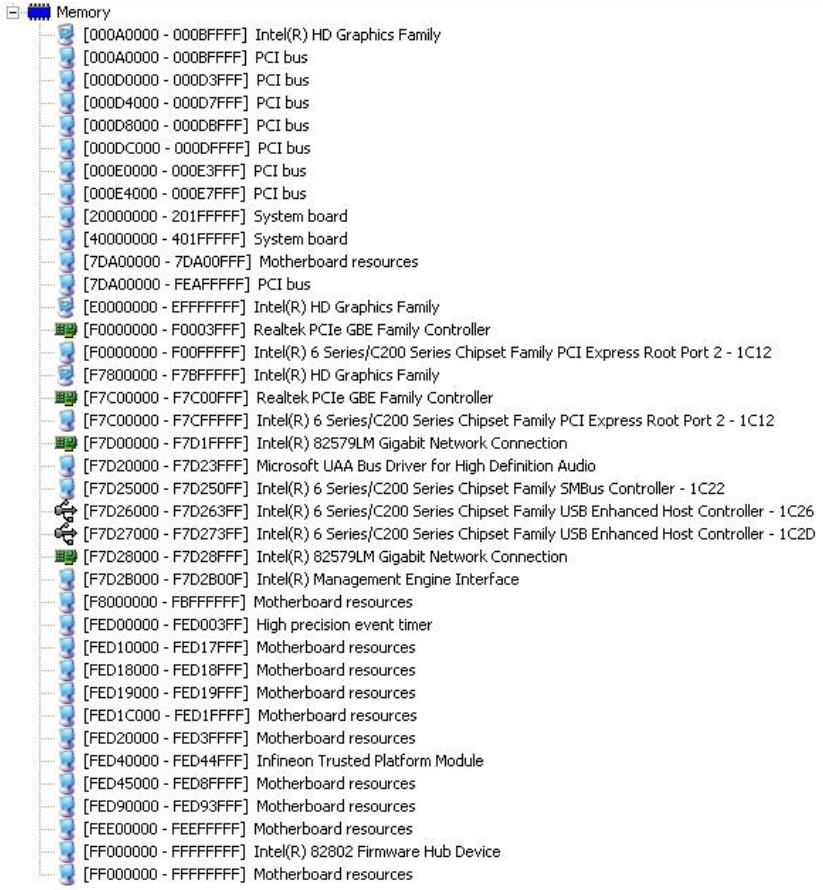
I/O Information

B.1 I/O Address Map

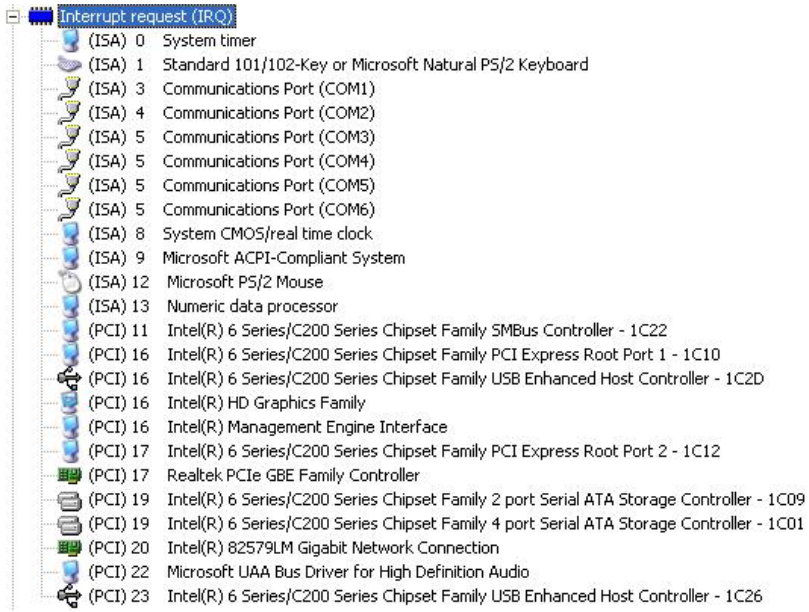
- Input/output (IO)
  - [00000000 - 0000001F] Direct memory access controller
  - [00000000 - 00000CF7] PCI bus
  - [00000010 - 0000001F] Motherboard resources
  - [00000020 - 00000021] Programmable interrupt controller
  - [00000022 - 0000003F] Motherboard resources
  - [00000024 - 00000025] Programmable interrupt controller
  - [00000028 - 00000029] Programmable interrupt controller
  - [0000002C - 0000002D] Programmable interrupt controller
  - [0000002E - 0000002F] Motherboard resources
  - [00000030 - 00000031] Programmable interrupt controller
  - [00000034 - 00000035] Programmable interrupt controller
  - [00000038 - 00000039] Programmable interrupt controller
  - [0000003C - 0000003D] Programmable interrupt controller
  - [00000040 - 00000043] System timer
  - [00000044 - 0000005F] Motherboard resources
  - [0000004E - 0000004F] Motherboard resources
  - [00000050 - 00000053] System timer
  - [00000060 - 00000060] Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
  - [00000061 - 00000061] Motherboard resources
  - [00000063 - 00000063] Motherboard resources
  - [00000064 - 00000064] Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
  - [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 - 000000FF] Numeric data processor

[00000274 - 00000277] ISAPNP Read Data Port
[00000279 - 00000279] ISAPNP Read Data Port
[000002B0 - 000002B7] Communications Port (COM5)
[000002B8 - 000002BF] Communications Port (COM6)
[000002C0 - 000002C7] Communications Port (COM3)
[000002C8 - 000002CF] Communications Port (COM4)
[000002F8 - 000002FF] Communications Port (COM1)
[000003B0 - 000003BB] Intel(R) HD Graphics Family
[000003C0 - 000003DF] Intel(R) HD Graphics Family
[000003F8 - 000003FF] Communications Port (COM2)
[00000400 - 00000453] Motherboard resources
[00000454 - 00000457] Motherboard resources
[00000458 - 0000047F] Motherboard resources
[000004D0 - 000004D1] Motherboard resources
[000004D0 - 000004D1] Programmable interrupt controller
[00000500 - 0000057F] Motherboard resources
[00000680 - 0000069F] Motherboard resources
[00000A00 - 00000A1F] Motherboard resources
[00000A20 - 00000A2F] Motherboard resources
[00000A30 - 00000A3F] Motherboard resources
[00000A79 - 00000A79] ISAPNP Read Data Port
[00000D00 - 0000FFFF] PCI bus
[00001000 - 0000100F] Motherboard resources
[0000164E - 0000164F] Motherboard resources
[0000E000 - 0000E0FF] Realtek PCIe GBE Family Controller
[0000E000 - 0000EFFF] Intel(R) 6 Series/C200 Series Chipset Family PCI Express Root Port 2 - 1C12
[0000F000 - 0000F03F] Intel(R) HD Graphics Family
[0000F040 - 0000F05F] Intel(R) 6 Series/C200 Series Chipset Family SMBus Controller - 1C22
[0000F060 - 0000F07F] Intel(R) 82579LM Gigabit Network Connection
[0000F080 - 0000F08F] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C09
[0000F090 - 0000F09F] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C09
[0000F0A0 - 0000F0A3] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C09
[0000F0B0 - 0000F0B7] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C09
[0000F0C0 - 0000F0C3] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C09
[0000F0D0 - 0000F0D7] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C09
[0000F0E0 - 0000F0EF] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C01
[0000F0F0 - 0000F0FF] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C01
[0000F100 - 0000F103] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C01
[0000F110 - 0000F117] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C01
[0000F120 - 0000F123] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C01
[0000F130 - 0000F137] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C01
[0000FFFF - 0000FFFF] Motherboard resources
[0000FFFF - 0000FFFF] Motherboard resources

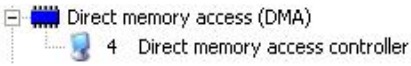
B.2 Memory Address Map



B.3 IRQ Mapping Chart



B.4 DMA Channel Assignments



Appendix

C

Mating Connector

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.		
CN1	COM2 Port / DVI Connector	TechBest	1121-700-04 S	N/A	N/A
CN3	+12V V-IN Connector	CATCH	1121-700-04 S	N/A	N/A
CN9	PCIEx4 Connector	FOX-CONN	2EG03217-D2D-DF	N/A	N/A
CN10	LVDS Connector	E-call	0110-01-553 -300	N/A	N/A
CN12	LVDS Inverter Connector	CATCH	1192-700-05 S	N/A	N/A
CN13	CRT / HDMI Connector	TechBest	D211HA310 1012PN	N/A	N/A
CN14	CFast Connector	3M	N7G24-A0B 2RA-10-0HT -DY	N/A	N/A
CN15	MiniCard Connector	FOX-CONN	AS0B226-S6 8K-7 F	N/A	N/A
FAN1	FAN Connector	CATCH	1190-700-04 2	N/A	N/A
FAN2	FAN Connector	CATCH	1190-700-04 2	N/A	N/A
PWR1	SATA PWR Connector	HO-BASE	P201-04	SATA PWR Cable	1702151200
PWR2	SATA PWR Connector	HO-BASE	P201-04	SATA PWR Cable	1702151200
COM1	COM1 Port Connector	CATCH	1147-000-10 MSP	N/A	N/A
COM3	COM3 Port Connector	CATCH	1147-000-10 MSP	N/A	N/A

COM4	COM4 Port Connector	CATCH	1147-000-10 MSP	N/A	N/A
COM5	COM5 Port Connector	CATCH	1147-000-10 MSP	N/A	N/A
COM6	COM6 Port Connector	CATCH	1147-000-10 MSP	N/A	N/A
DIO1	Digital I/O Connector	CATCH	1147-000-10 MSP	N/A	N/A
USB3	USB Port Connector	CATCH	1147-000-10 MSP	N/A	N/A
USB4	USB Port Connector	CATCH	1147-000-10 MSP	N/A	N/A
SATA1	SATA Connector	FOX-CONN	LE18077-Z50D-4F	SATA Cable	1709070800
SATA2	SATA Connector	FOX-CONN	LE18077-Z50D-4F	SATA Cable	1709070800
SATA3	SATA Connector	TechBest	161S01-025A	SATA Cable	1709070800
SATA4	SATA Connector	TechBest	161S01-025A	SATA Cable	1709070800
KM1	Keyboard / Mouse Connector	FOX-CONN	MH11061-P36-4F	N/A	N/A
USB_LAN1	RJ-45 Ethernet#1 / USB Connector	UDE	07-000939YV3-1	N/A	N/A
USB_LAN2	RJ-45 Ethernet#2/ USB Connector	UDE	07-000939YV3-1	N/A	N/A
Audio1	Audio In/Out/CD-in and MIC Connector	LOTES	ABA-JAK-028-K06	N/A	N/A

Appendix

D

RAID & AHCI Settings

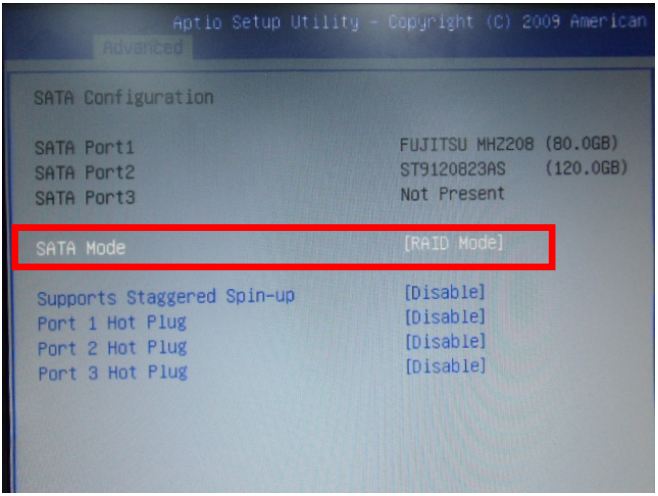
D.1 Setting RAID

OS installation to setup RAID Mode

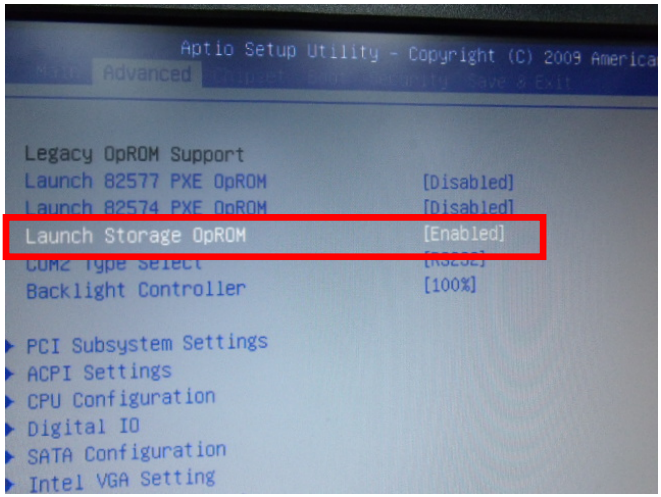
Step 1: Copy the files below from "***Driver CD -> Raid Driver -> F6 Floppy - x86***" to Disk

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

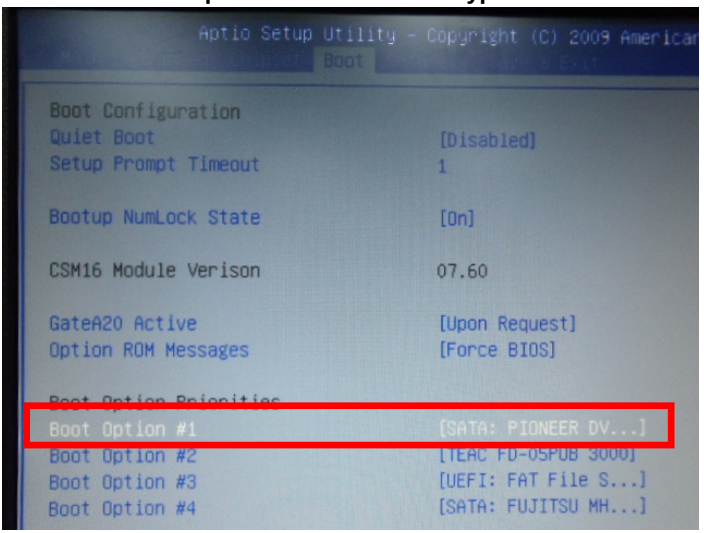
Step 3: The setting procedures " **In BIOS Setup Menu**"
A: Advanced -> SATA Configuration -> SATA Mode -> RAID Mode



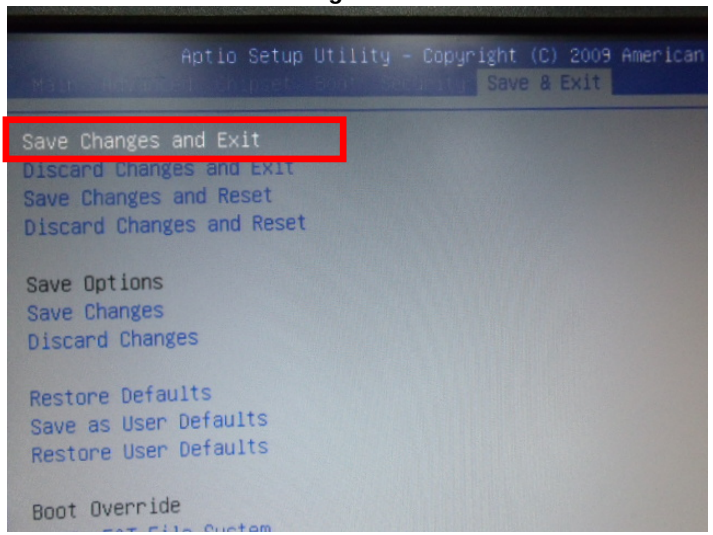
Step 4: The setting procedures "**In BIOS Setup Menu**"
B: Advanced -> Launch Storage OpROM -> Enabled



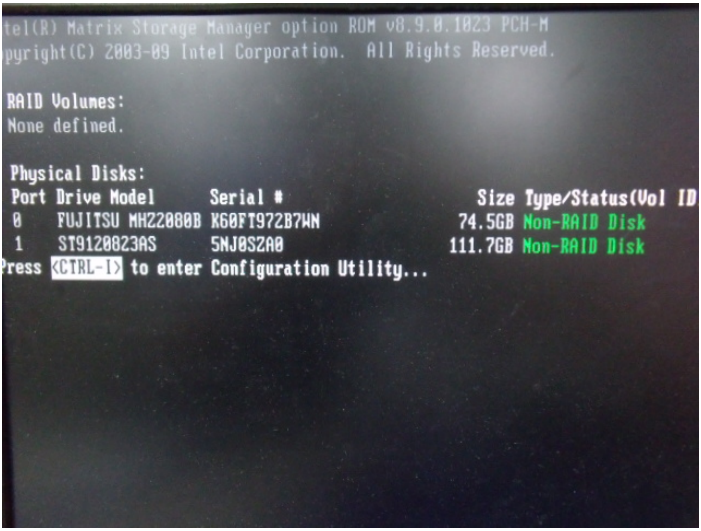
Step 5: The setting procedures "**In BIOS Setup Menu"**
C: Boot -> Boot Option #1 -> DVD-ROM Type



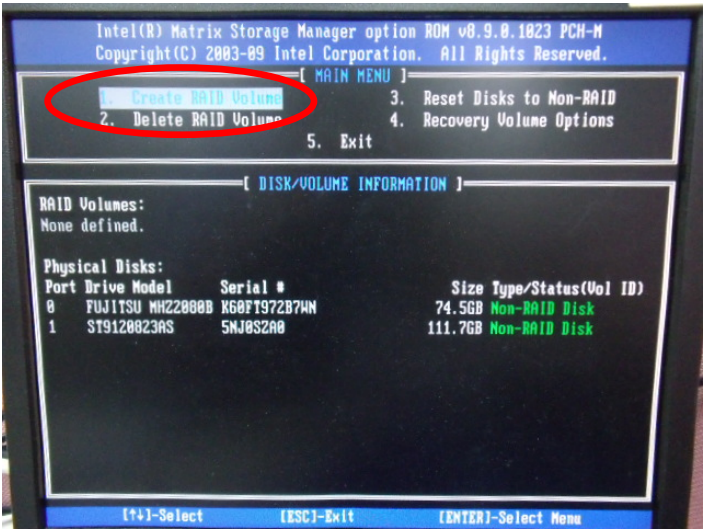
Step 6: The setting procedures "**In BIOS Setup Menu"**
D: Save & Exit -> Save Changes and Exit



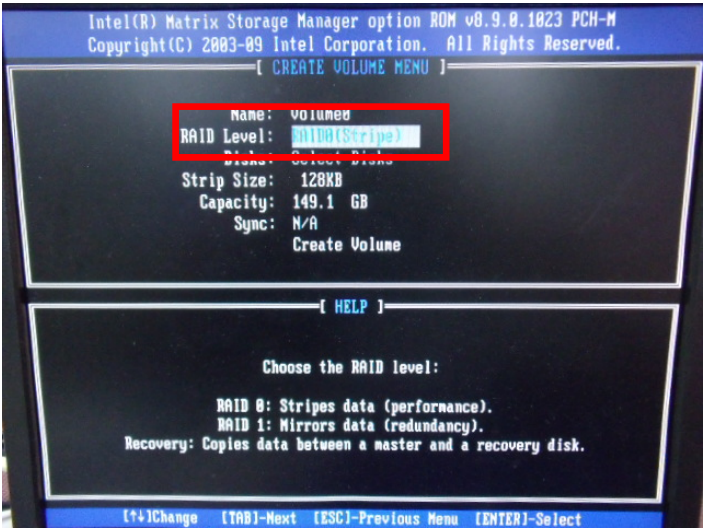
Step 7: Press **Ctrl-I** to enter **MAIN MENU**



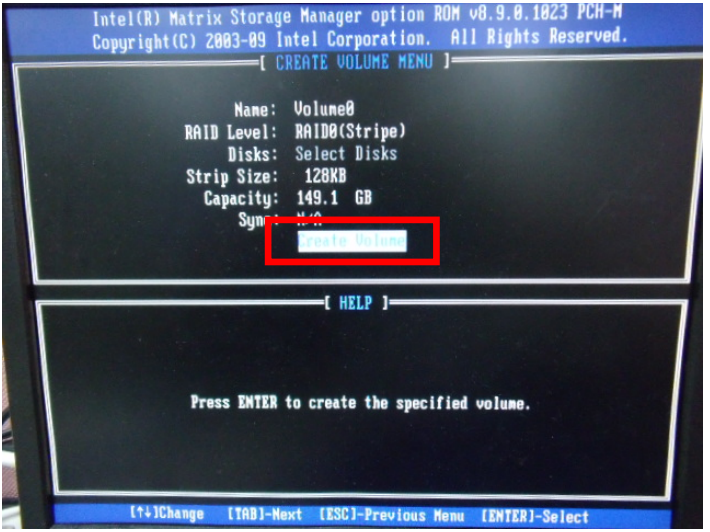
Step 8: Choose "**1.Create RAID Volume**"



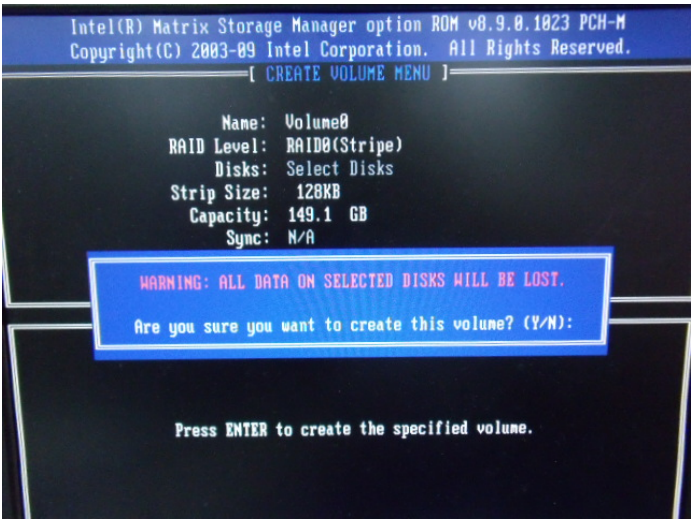
Step 9: RAID Level -> RAID0(Stripe)



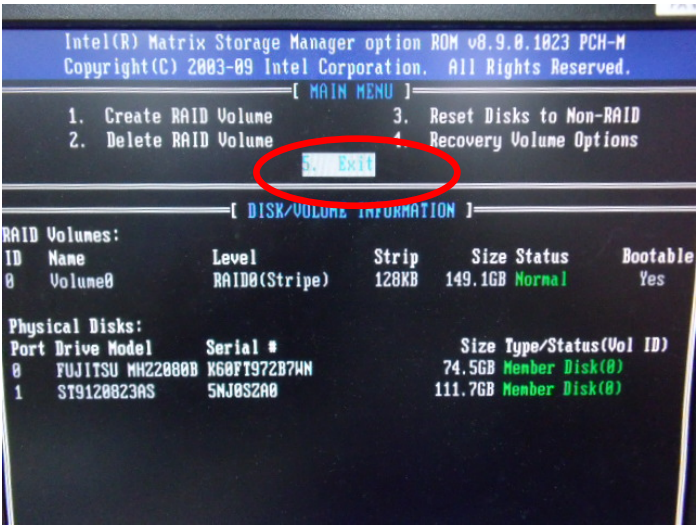
Step 10: Choose "**Create Volume**"



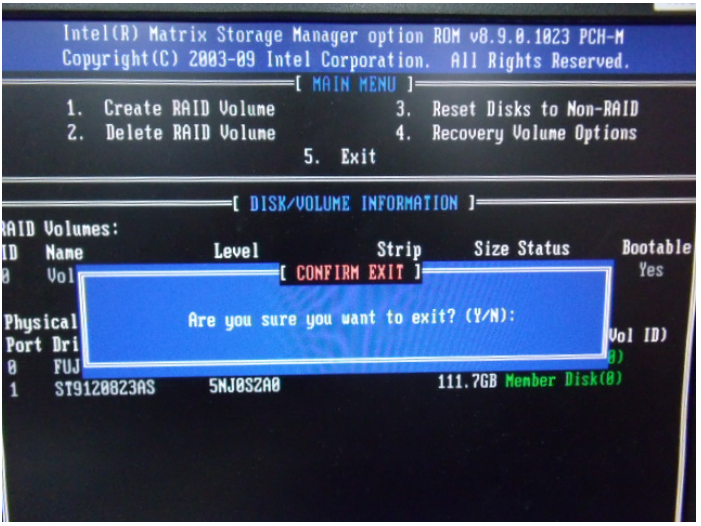
Step 11: Choose "**Y**"



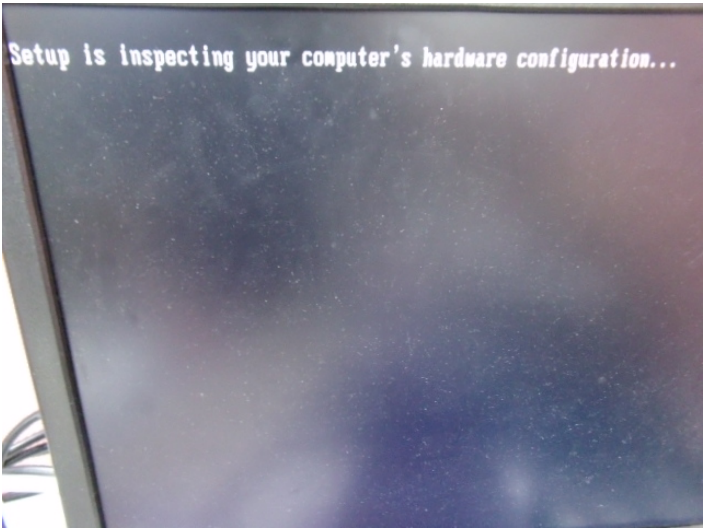
Step 12: Choose "**5. Exit**"



Step 13: Choose "**Y**"

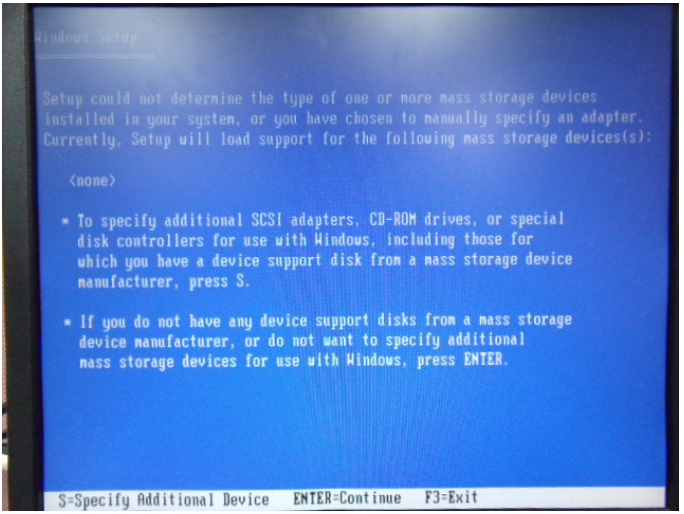


Step 14: Setup OS

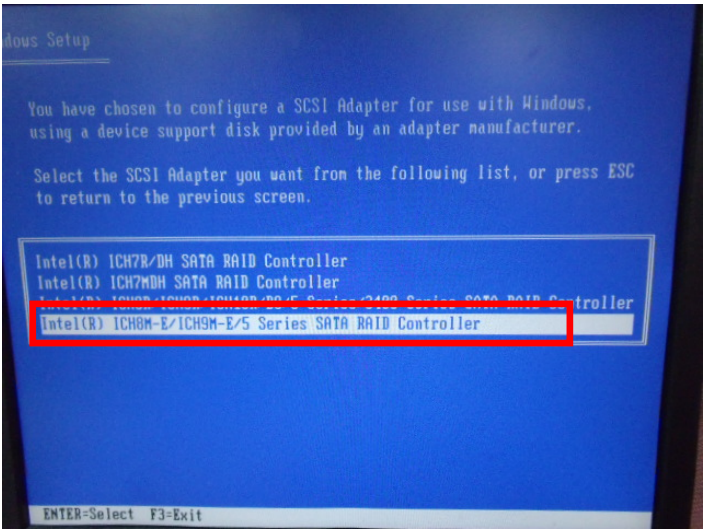


Step 15: Press "**F6**"

Step 16: Choose "**S**"

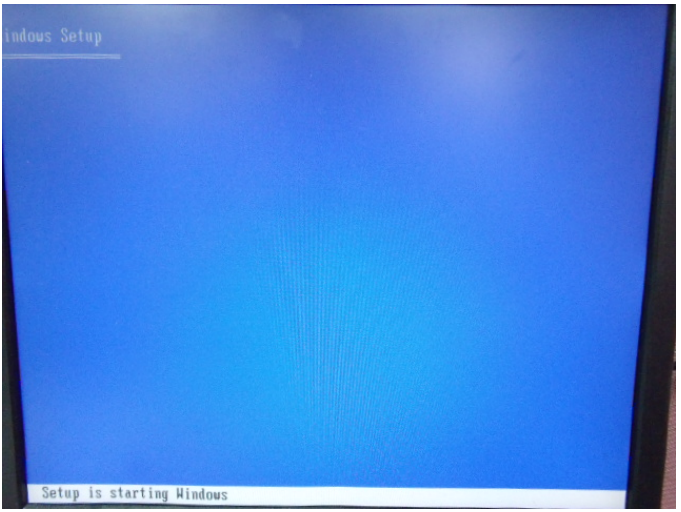


Step 17: Choose "**Intel(R) ICH8M-E/ICH9M-E/5 Series SATA RAID Controller**"



Step 18: It will show the model number you select and then press "**ENTER**"

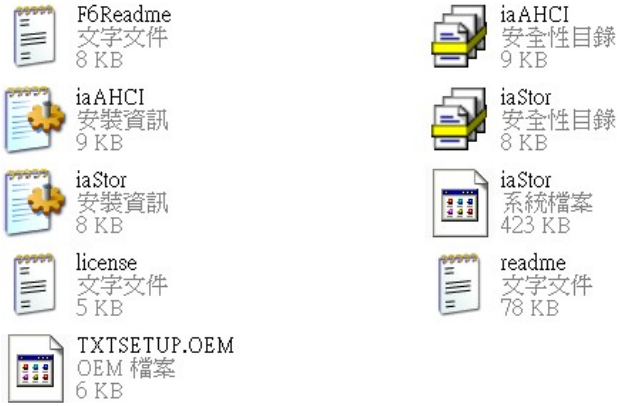
Step 19: Setup is starting Windows



D.2 Setting AHCI

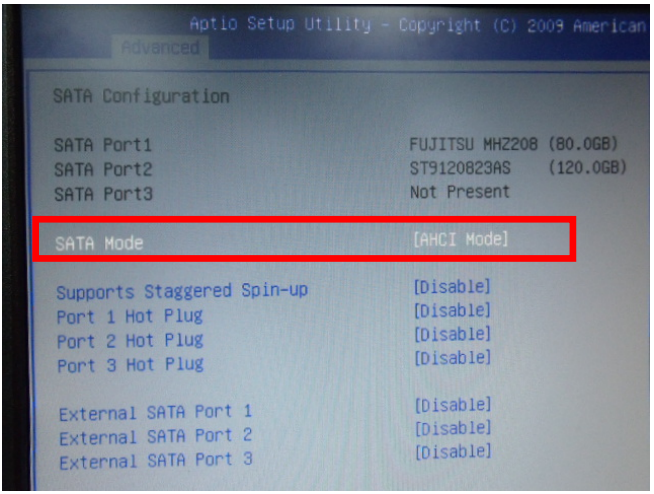
OS installation to setup AHCI Mode

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

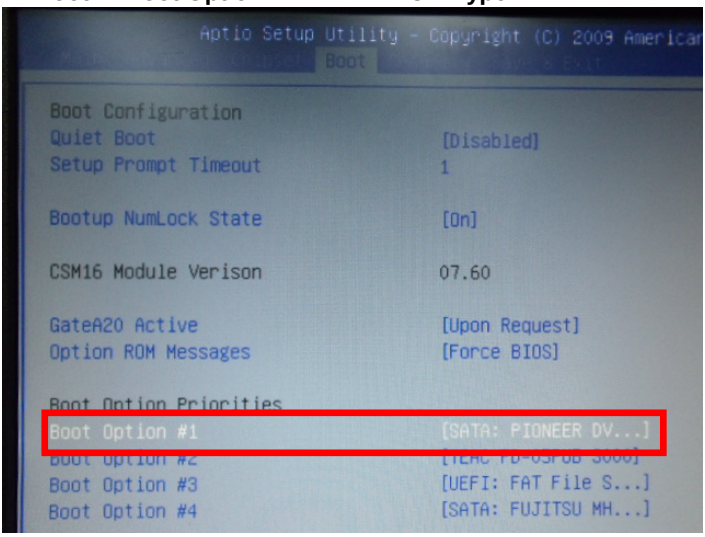


Step 2: Connect the USB Floppy (disk with RAID files) to the board

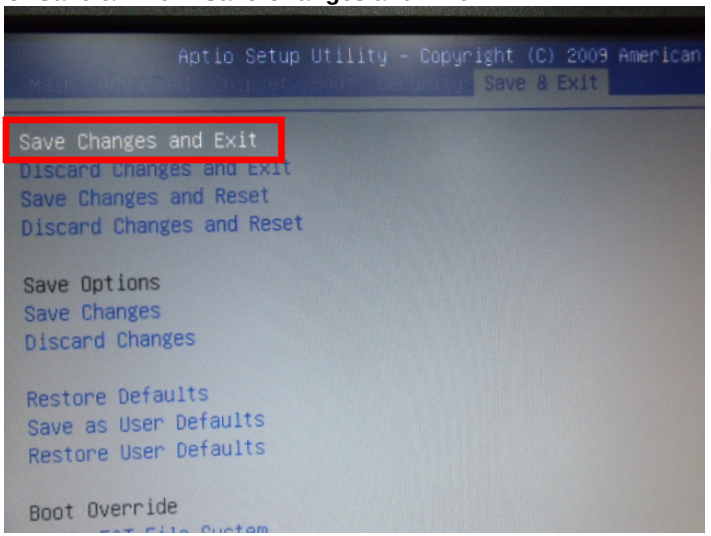
Step 3: The setting procedures " **In BIOS Setup Menu**"
A: Advanced -> SATA Configuration -> SATA Configuration -> SATA Mode -> AHCI Mode



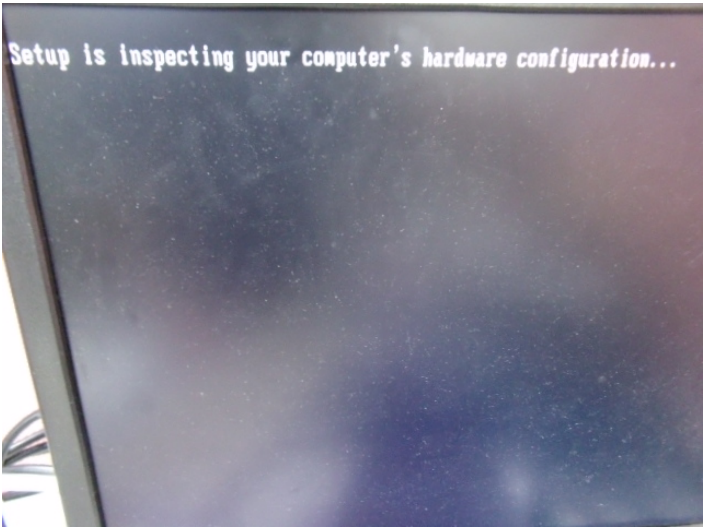
Step 4: The setting procedures "**In BIOS Setup Menu"**
B: Boot -> Boot Option #1 -> DVD-ROM Type



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

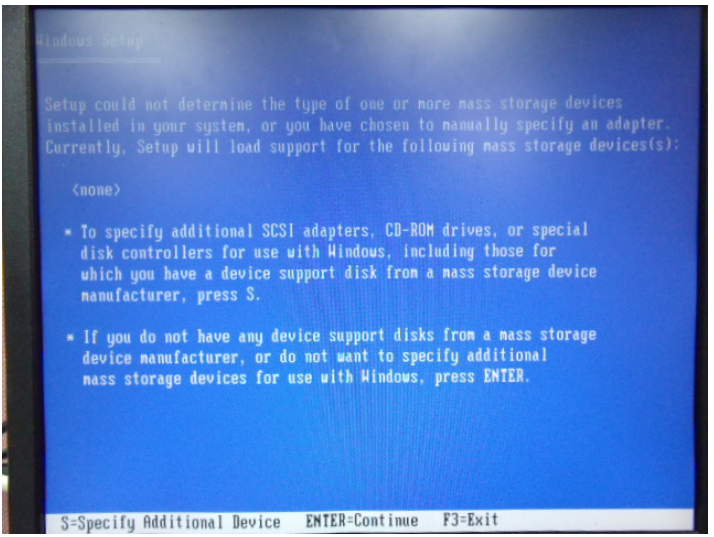


Step 6: Setup OS

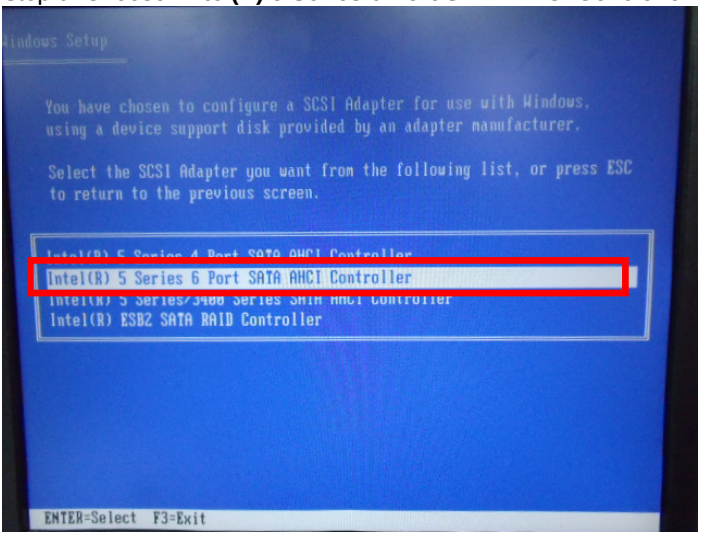


Step 7: Press "**F6**"

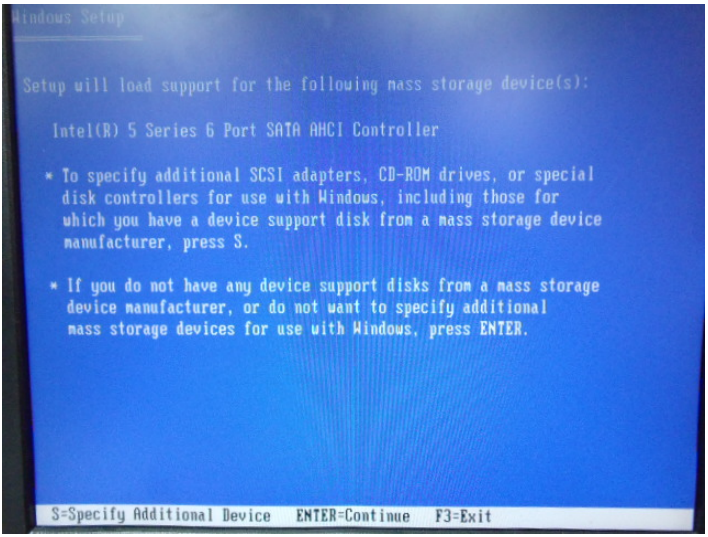
Step 8: Choose "**S**"



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