AEC-6643

Fanless Embedded Controller

Intel® NM10 Chipset

2 Gigabit Ethernet

6 USB2.0, 4 COM

1 Mini Card

1 VGA, 1 DVI-D

AEC-6643 Manual 1st Ed.
Nov 2013

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Packing List

Before you begin operating the product, please make sure that the following materials are enclosed:

- 1 AEC-6643 Embedded Controller
- 2 Wallmount Brackets
- 1 Screw Package
- 1 DVD-ROM for manual (in PDF format) and drivers

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

Safety & Warranty

1. Read these safety instructions carefully.
2. Keep this user's manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Do not use liquid or spray detergents for cleaning. Use a damp cloth.
4. For pluggable equipment, the power outlet must be installed near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a firm surface during installation. Dropping it or letting it fall could cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient over-voltage.
12. Never pour any liquid into an opening. This could cause fire or electrical shock.
13. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
14. If any of the following situations arises, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.

d. The equipment does not work well, or you cannot get it to work according to the user's manual.

e. The equipment has been dropped and damaged.

f. The equipment has obvious signs of breakage.

15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW 0°C (32°F) OR ABOVE 40°C (104°F). IT MAY DAMAGE THE EQUIPMENT.

FCC

This device complies with Part 15 FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

Caution:
There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

Below Table for China RoHS Requirements
产品中有毒有害物质或元素名称及含量

AAEON Boxer/ Industrial System

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板及其电子组件	×	○	○	○	○	○
外部信号连接器及线材	×	○	○	○	○	○
外壳	×	○	○	○	○	○
中央处理器与内存	×	○	○	○	○	○
硬盘	×	○	○	○	○	○
电源	×	○	○	○	○	○

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：
一、此产品所标示之环保使用期限，系指在一般正常使用状况下。
二、上述部件物质中央处理器、内存、硬盘、电源为选购品。

Contents

Chapter

1

General Information

1.1 Introduction

The newest Boxer series AEC-6643 has been introduced by AAEON and it utilizes Intel® Atom™ D2550 B3 Processor. This condensed Embedded Controller is a fanless controller which can be compatible with the latest Intel® processor and chipset. The cutting-edge technology has been equipped to the AEC-6643 to satisfy the versatile demands of Factory Automation, Data processing, Fleet management, and Data management.

The AEC-6643 offers low power consumption system that while operating temperatures ranging from 0° to 40°C. The AEC-6643 is a standalone high performance controller designed for long-life operation and with high reliability. It can replace traditional methods and become the mainstream controller for the Industrial Automation market. If you are looking for a multifunctional embedded controller, the AEC-6643 is definitely your best choice to fit into your vital applications.

1.2 Features

- Intel® Atom™ D2550 B3 Processor
- Intel® NM10 Chipset (PCH)
- COM x 4, USB2.0 x 6
- VGA x 1, DVI-D x 1
- Gigabit Ethernet x 2
- SATA 3.0Gb/s 2.5” HDD bay x 1
- Fanless Operation

1.3 Specifications

CPU		Intel® Atom™ D2550 B3 Processor
Chipset		Intel® NM10
System Memory		DDR3 1066/800 Mhz DIMM X2, Max.4GB
Display Interface	**VGA**	DB-15 x 1
	DVI	DVI-D x 1
	HDMI	—
Storage Device	**SSD**	—
	HDD	SATA 3.0Gb/s 2.5” HDD bay x 1
Network	**LAN**	Gigabit Ethernet
	Wireless	—
Rear I/O	**USB Host**	USB2.0 x 6
	Audio	Mic-in/ Line-out/ Line-in
	Serial Port	rs422/rs485/rs232 x 1, rs232 x 3
	Others	Power input x 1, Power Button x 1
Front I/O	**USB Host**	—
	LAN	—
	Serial Port	—
	Others	Optional antenna hole x 2
Expansion	**Mini Card**	Full-size Mini Card (PCIe[x1]+USB) x 1
Indicator	**Rear**	Power LED x 1, Hard Disk Drive active LED x 1
	Front	—

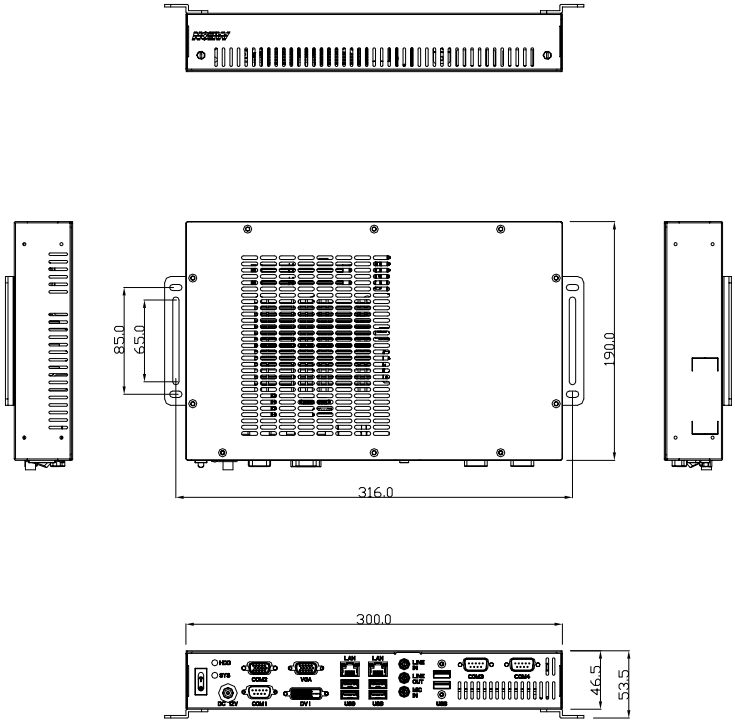
Power Requirement		Lockable DC jack x 1 for DC12V
System Cooling		Passive
Mounting		Wallmount
Operating Temperature		32°F ~ 104°F (0°C ~ 40°C)
Storage Temperature		14°F ~ 140°F (-10°C ~ 60°C)
Anti-Vibration		1g rms / 5~ 500Hz / operation – HDD
Anti-Shock		20 G peak acceleration (11 msec. duration)
Certification	**EMC**	CE/FCC Class A
Dimension		11.81" (W) x 3.05" (H) x 7.84" (D) (300mm x 77.5mm x 190mm)
Gross Weight		—
OS Support		Windows XP Pro, Windows Embedded Standard, Windows 7, Linux by Fedora

Chapter

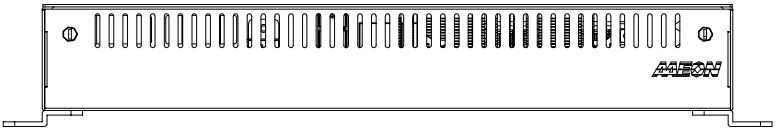
2

Hardware Installation

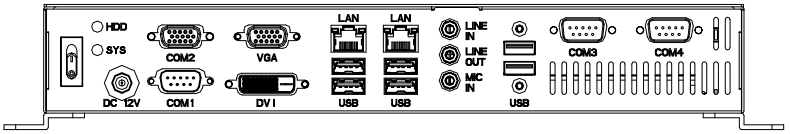
2.1 Dimension & Connectors of AEC-6643



Connectors on the front panel

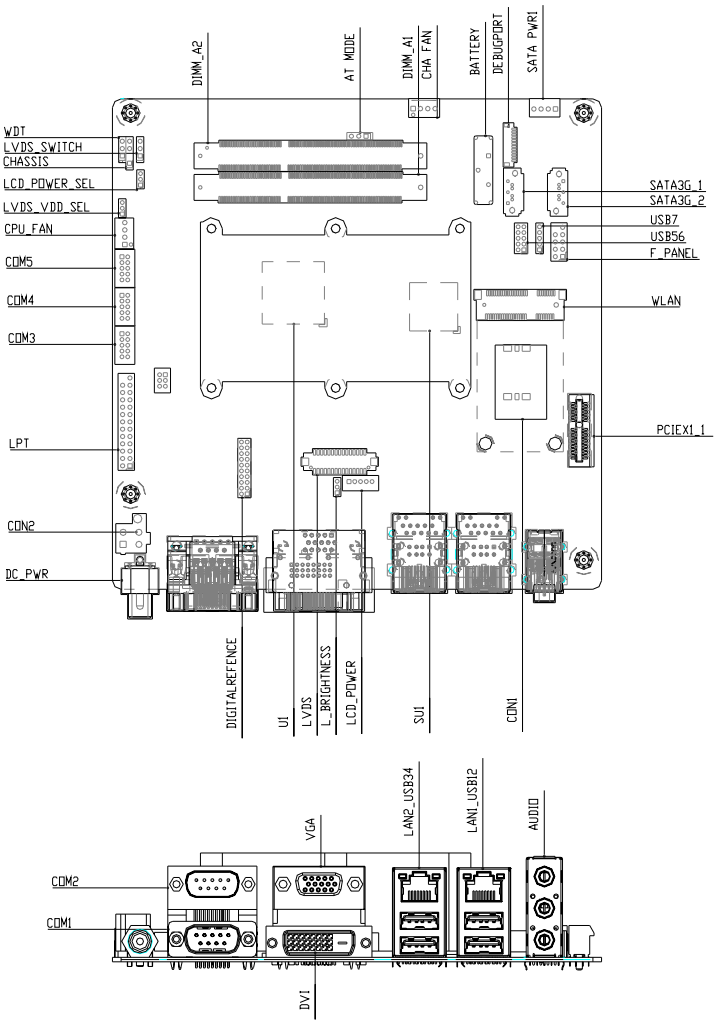


Connectors on the rear panel

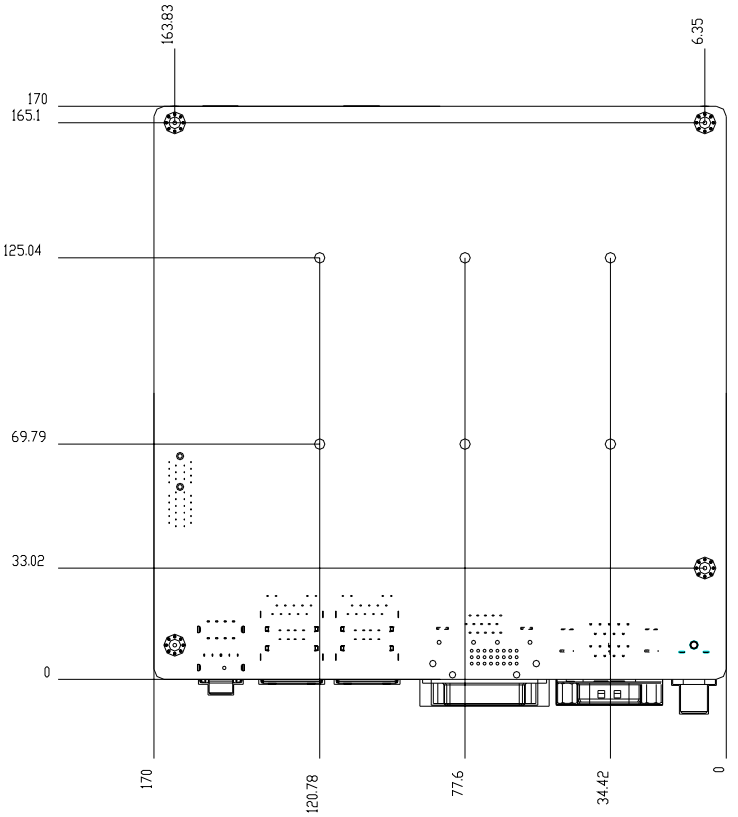


2.2 Connectors and Jumpers of The Main Board

Component Side



Solder Side



2.3 List of Jumpers

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

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

Label	Function
ATMODE	AT/ATX Mode Selection
CLRTC	Clear COMS
DIGITALREFENCE	COM2 External Power Selection
LVDS_VDD_SEL	LVDS Panel Power Selection
L_BRIGHTNESS	LVDS Brightness Control Type Selection
LVDS_SWITCH	LVDS Function Enable
LCD_POWER_SEL	LVDS Panel Backlight Power Selection
WDT	Watchdog Timer Function Switch

2.4 List of Connectors

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

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

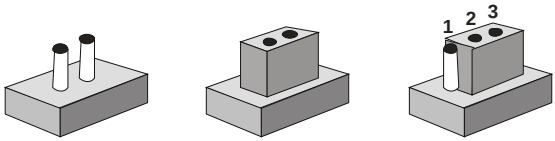
Label	Function
CON2	+12V AUX Power Connector
CHA_FAN	System FAN Connector
COM3	COM 3 Connector
COM4	COM 4 Connector
COM5	COM 5 Connector
CON1	SIM Card Socket

CPU_FAN	CPU FAN Connector
DIGITALREFENCE	GPIO/SM BUS/COM2/ COM2 External Power Selection
F_PANEL	Front Panel Pin Header
KB/Ms	PS/2 Keyboard / Mouse Connector
LCD_POWE	LVDS Panel Power Connector
LPT	Parallel Port Connector
LVDS	LVDS Panel Connector
PCIEX1_1	PCI-E [x1] Slot
SATA_PWR1	Serial ATA Power Connector
SATA3G_1	SATA 0 Connector
SATA3G_2	SATA 1 Connector
USB56	USB 5 & 6 Pin Header
USB7	USB 7 Pin Header
WLAN	Mini PCI-E Slot

2.5 Setting Jumpers

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

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



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.

2.6 AT/ATX Mode Selection (ATMODE)

ATOMODE	Function
Close 1-2	AT
Close 2-3	ATX Mode (Default)

2.7 Clear COMS (CLRTC)

CLRTC	Function
Close 1-2	Protected (Default)
Close 2-3	Clear

2.8 COM2 External Power Selection (DIGITALREFENCE)

DIGITALREFENCE	Function
Close 15-16	+12V
Close 17-18	RI# (Default)
Close 19-20	+5V

2.9 Watchdog Timer Function Switch (WDT)

WDT	Function
Close 1-2	Disable (Default)
Close 2-3	Enable

2.10 COM3/COM4/COM5 RS-232 Serial Port PIN HEADER (COM3/COM4/COM5)

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

9	RI

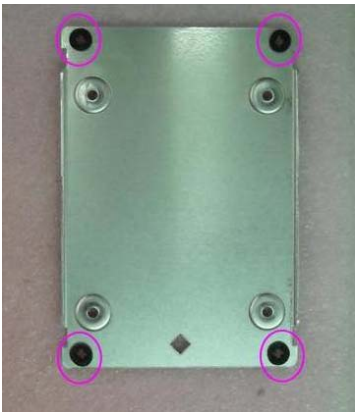
2.11 Serial ATA Power Connector (SATA_PWR1)

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

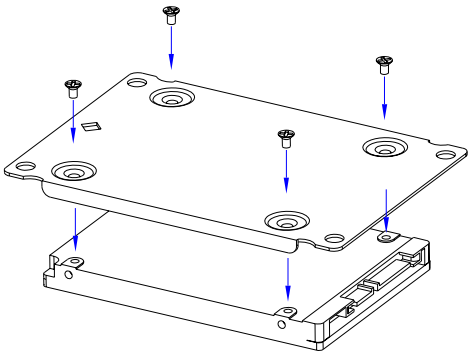
2.12 Hard Disk Drive (HDD) Installation

Step 1: Unfasten the four screws of the AEC-6643

Step 2: Get the HDD and HDD Bracket ready. Fasten four shock washers to the HDD Bracket.



Step 3: Fasten the four screws to fix the HDD and HDD bracket



Step 4: Fasten the four screws to install the HDD and HDD Bracket to the chasis, then connect the SATA cable to the HDD.

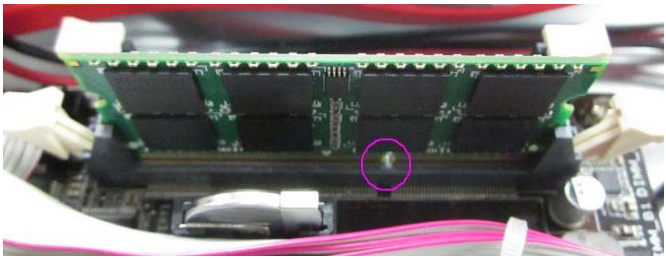
Step 5: Close the cover of the AEC-6643 and fasten the screws and copper cylinders.

2.13 Memory Card Installation

Step 1: Unfasten the four screws of the AEC-6643.

Step 2: Gently push down on the tabs on either side of the DIMM slot in tandem.

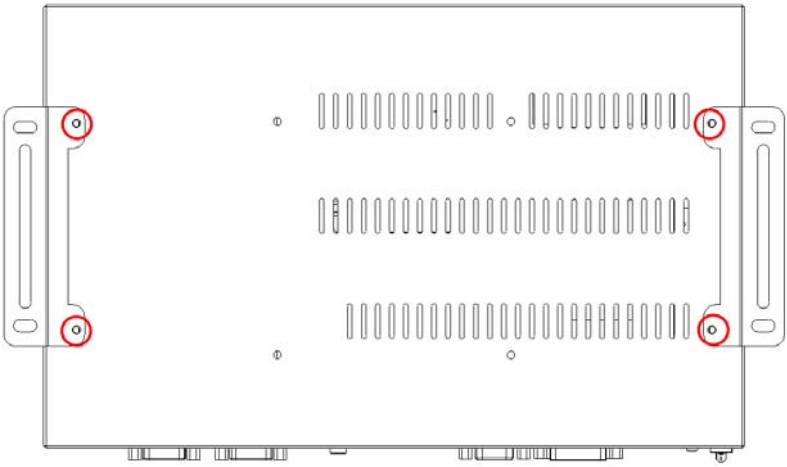
Step 3: Line up the pins and firmly (but not roughly) press on the outside of Memory Card to install.



Step 4: Snap the DIMM slot tabs shut, locking the Memory Card in place.

2.14 Wallmount Kit Installation

Get the brackets ready and fasten appropriate four screws on each bracket. After fastening the two brackets on the bottom lid of AEC-6643, the wallmount kit installation has been finished.



Chapter

3

AMI BIOS Setup

3.1 System Test and Initialization

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

System configuration verification

These routines check the current system configuration stored in the CMOS memory and BIOS NVRAM. If system configuration is not found or system configuration data error is detected, system will load optimized default and re-boot with this default system configuration automatically.

There are four situations in which you will need to setup system configuration:

1. You are starting your system for the first time
2. You have changed the hardware attached to your system
3. The system configuration is reset by Clear-CMOS jumper
4. The CMOS memory has lost power and the configuration information has been erased.

The AEC-6643 memory has an integral lithium battery

backup for data retention. You have to replace the battery when it finally runs down.

3.2 AMI BIOS Setup

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

Entering Setup

Power on the computer and press <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.

Monitor

Show the environment information.

Boot

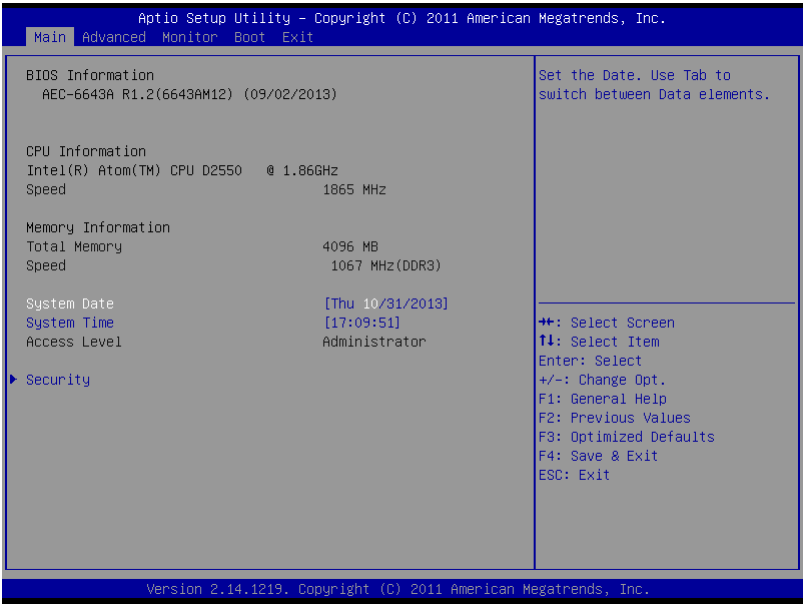
Enables/disable quiet boot option.

Save&Exit

Exit system setup after saving the changes.

Setup Menu

Setup submenu: Main



Security


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
Administrator Password Not Installed
User Password Not Installed
Administrator Password
User Password
Set Setup Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Change User/Supervisor Password

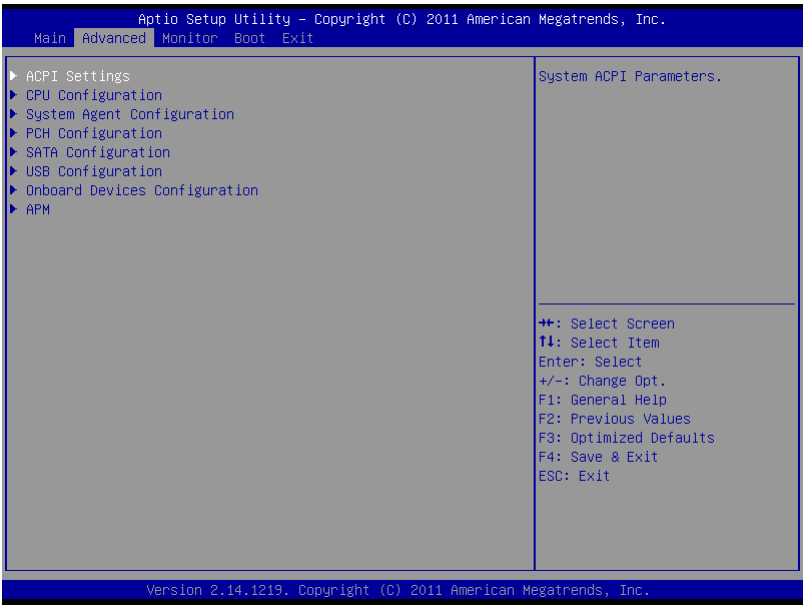
You can install a Supervisor password, and if you install a supervisor password, you can then install a user password. A user password does not provide access to many of the features in the Setup utility.

If you highlight these items and press Enter, a dialog box appears which lets you enter a password. You can enter no more than six letters or numbers. Press Enter after you have typed in the password. A second dialog box asks you to retype the password for confirmation. Press Enter after you have retyped it correctly. The password is required at boot time, or when the user enters the Setup utility.

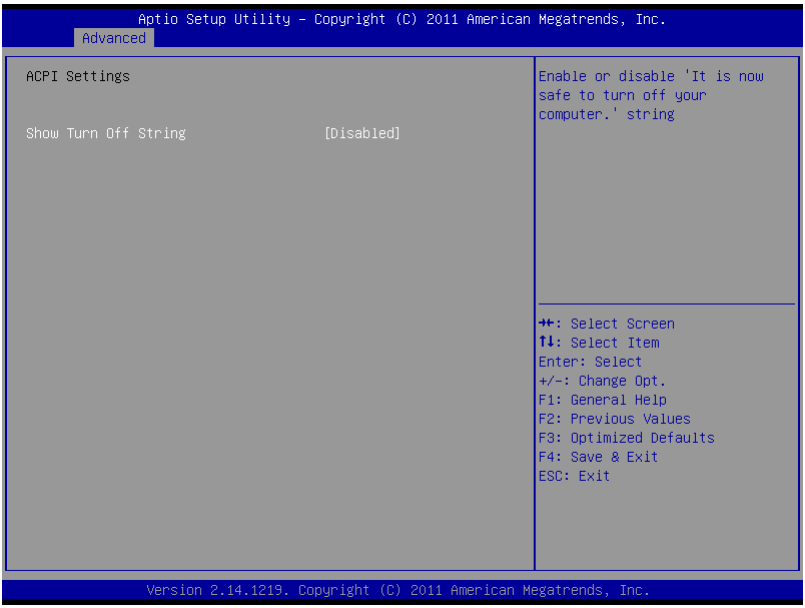
Removing the Password

Highlight this item and type in the current password. At the next dialog box press Enter to disable password protection.

Setup submenu: Advanced



ACPI Settings



Options summary :

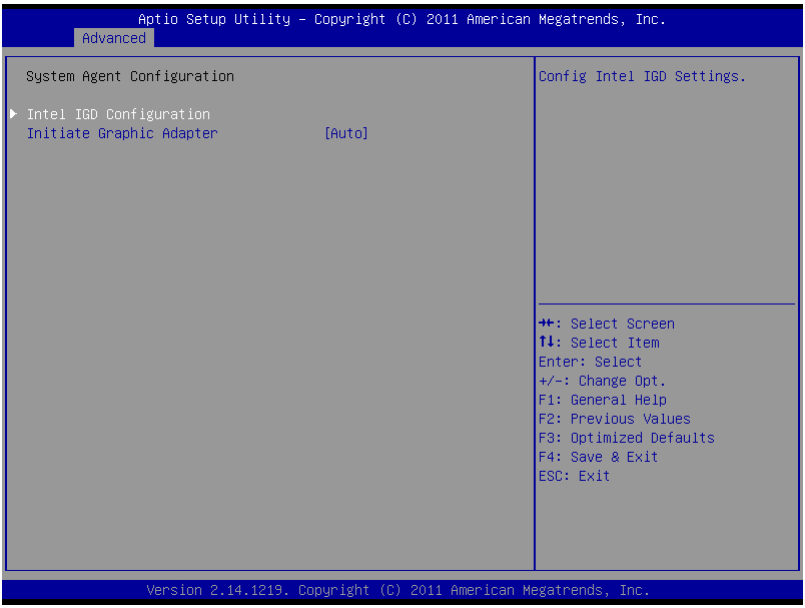
Show Turn Off String	Disabled	Default
	Enabled	
Enable or disable ‘It is now safe to turn off your computer.” String		

CPU Configuration

Options summary :

Hyper-Threading	Disabled	Optimal Default, Failsafe Default
	Enabled	
En/Disable CPU Hyper-Threading function		
Execute Disable Bit	Disabled	Optimal Default, Failsafe Default
	Enabled	
XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3.)		
Limit CPUID Maximum	Disabled	Optimal Default, Failsafe Default
	Enabled	
Disabled for Windows XP		

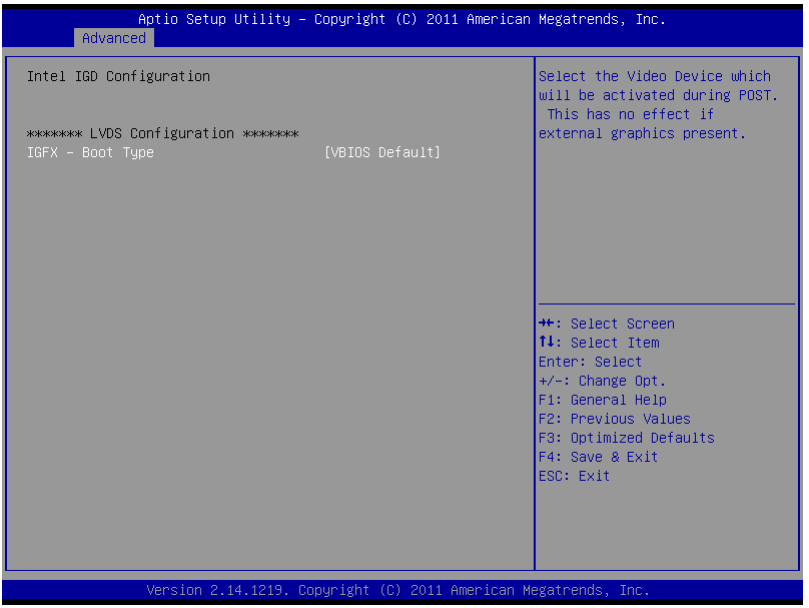
System Agent Configuration



Options summary :

Initiate Graphic Adapter	Auto	Optimal Default, Failsafe Default
	Enabled	
En/Disable CPU Hyper-Threading function		

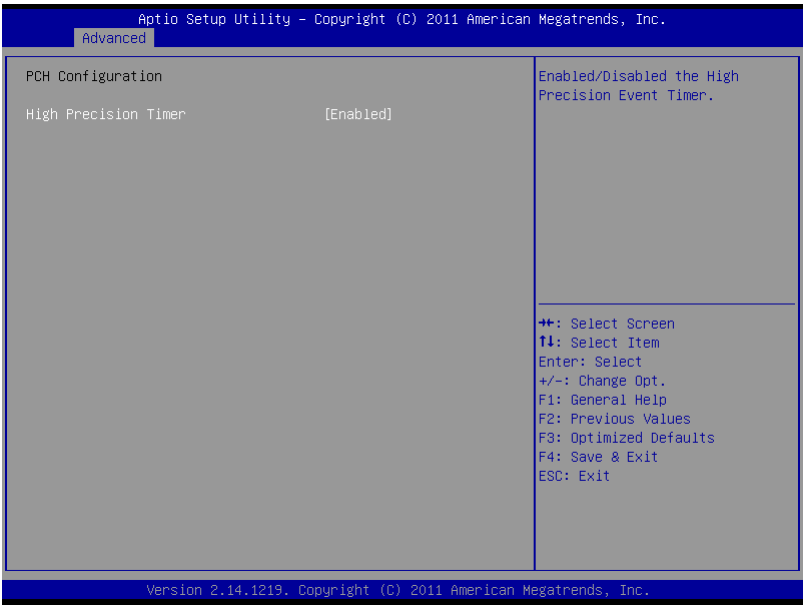
Intel IGD Configuration



Options summary :

IGFX – Boot Type	VBIOS Default	Optimal Default, Failsafe Default
	CRT	
	DVI	
Select the video Device which will be activated during POST. This has no effect if external graphics present.		

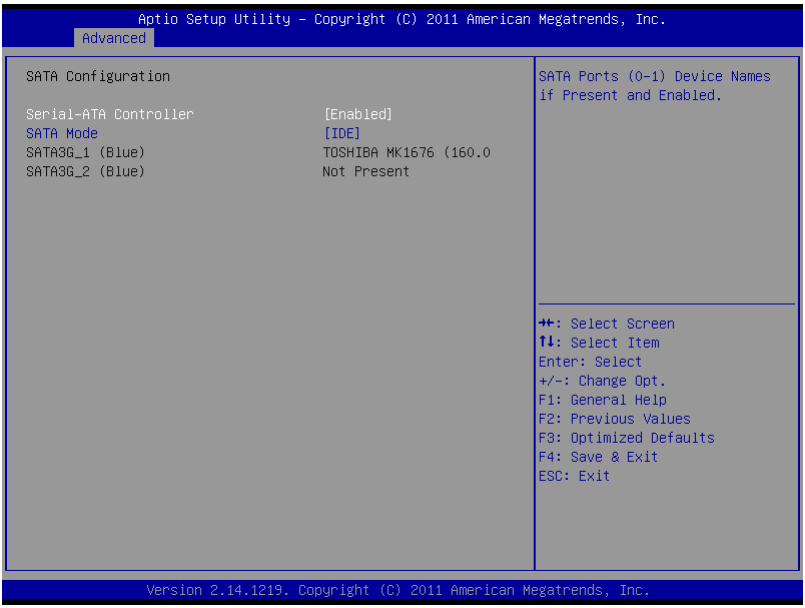
PCH Configuration



Options summary :

High Precision Timer	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled/Disabled the High Precision Event Timer.		

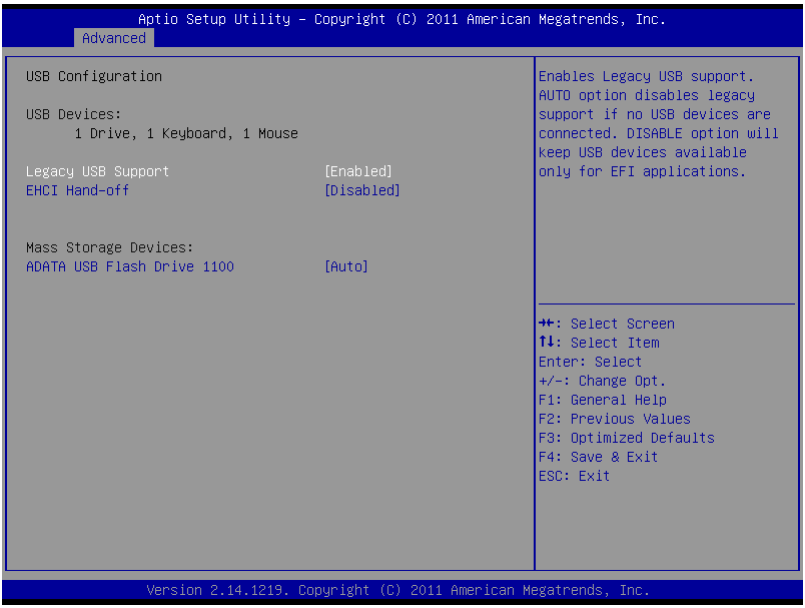
SATA Configuration



Options summary :

SATA Controllers	Disabled	
	Enabled	Default
SATA Ports (0-1) Device Names if Present and Enabled.		
SATA Mode	IDE	Default
	AHCI	
(1) IDE Mode. (2) AHCI Mode.		

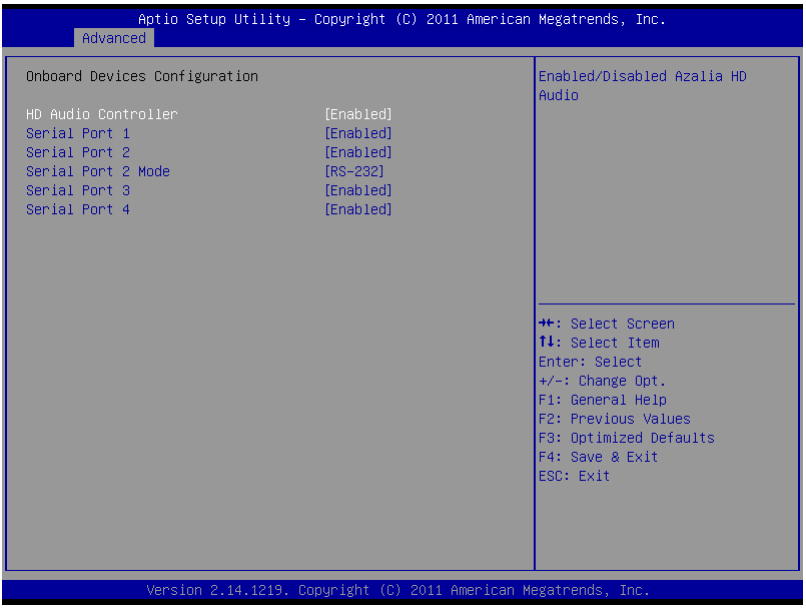
USB Configuration



Options summary :

Legacy USB Support	Enabled	Optimal Default, Failsafe Default
	Auto	
Enables Legacy USB support. AUTO option disables legacy support if no USB device are connected. DISABLE option will keep USB devices available only for EFI applications.		
EHCI Hand-off	Disabled	Optimal Default, Failsafe Default
	Enabled	
This is a workaround for OSes without EHCI ownership change should be claimed by EHCI driver.		

Onboard Devices Configuration

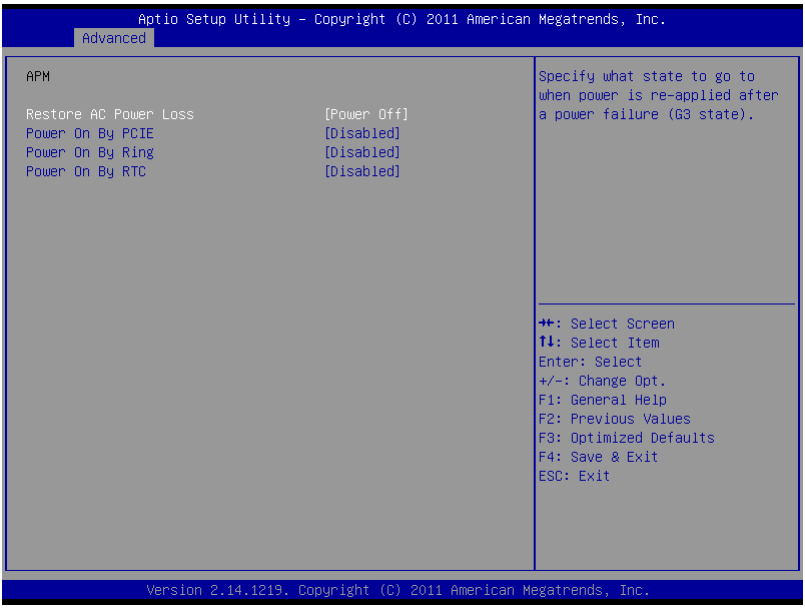


Options summary :

HD Audio Controller	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enabled/Disabled Azalia HD Audio.		
Serial Port 1	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable or Disable Serial Port		
Serial Port 2	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable or Disable Serial Port		
Serial Port 2 Mode	RS-232	Optimal Default, Failsafe Default
	RS-422	
	RS-485	
Select COM2 RS-232/RS-422/RS-485		
Serial Port 3	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable or Disable Serial Port		

Serial Port 4	Enabled Disabled	Optimal Default, Failsafe Default
Enable or Disable Serial Port		

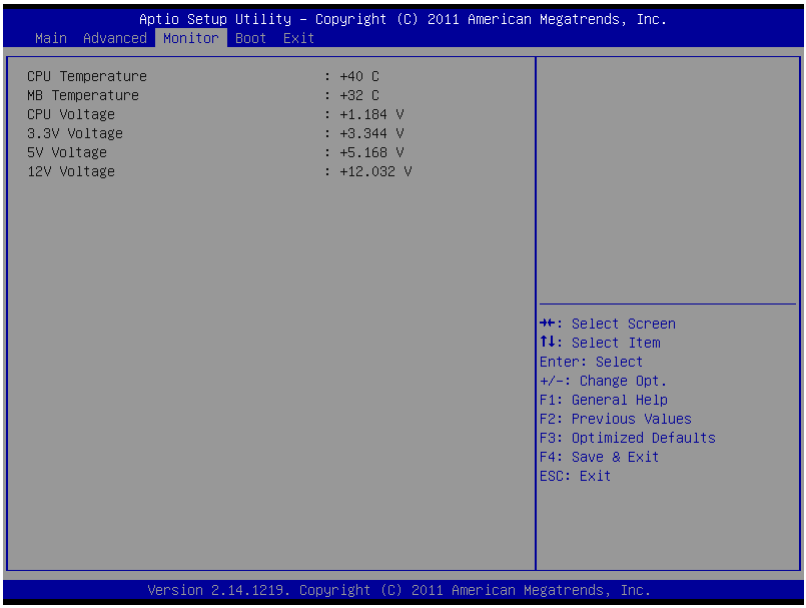
APM



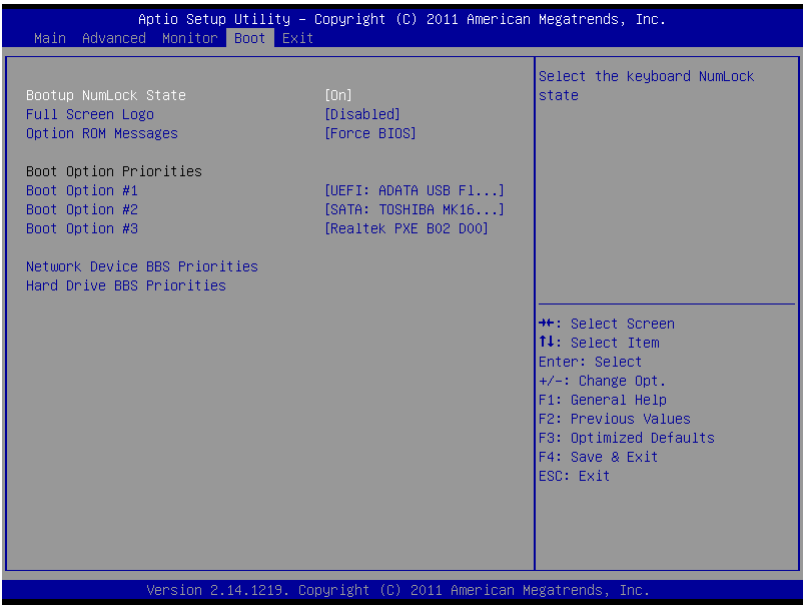
Options summary :

Restore AC Power Loss	Power Off	Optimal Default, Failsafe Default
	Power On	
	Last State	
Specify what state to go when power is re-applied after a power failure (G3 state).		
Power On By PCIE	Disabled	Optimal Default, Failsafe Default
	Enabled	
Power On By PCIE		
Power On By Ring	Disabled	Optimal Default, Failsafe Default
	Enabled	
Power On By Ring Note: This item function only if there is a serial port (COM1) connector on a motherboard.		
Power On By RTC	Disabled	Optimal Default, Failsafe Default
	Enabled	
Power On By RTC		

Monitor


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Monitor Boot Exit
CPU Temperature : +40 C
MB Temperature : +32 C
CPU Voltage : +1.184 V
3.3V Voltage : +3.344 V
5V Voltage : +5.168 V
12V Voltage : +12.032 V
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Boot

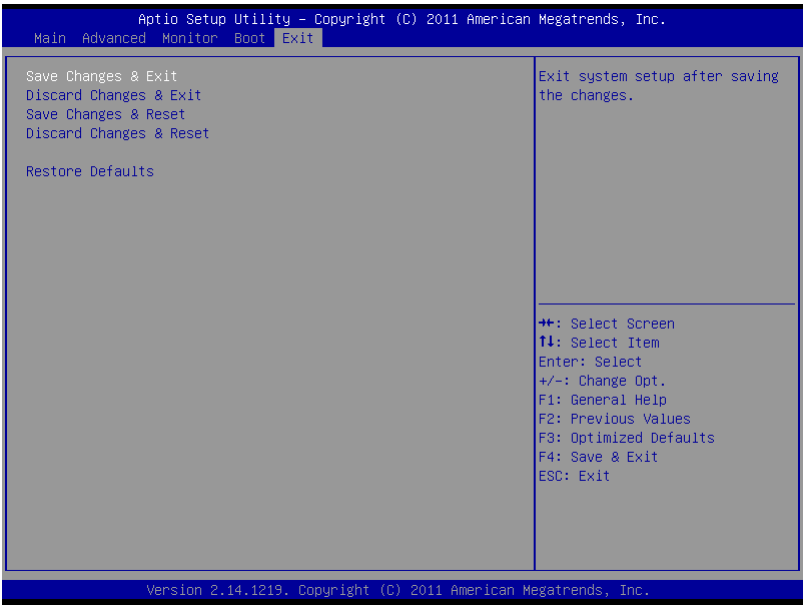


Options summary :

Bootup NumLock State	On	Optimal Default, Failsafe Default
	Off	
Select the key board NumLock state		
Full Screen Logo	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enables/Disables Full Screen Logo		
Option ROM Messages	Force BIOS	Set display mode for Option ROM
	Keep Current	
Set display mode for option ROM		

BBS Priorities

Setup submenu: Exit



Chapter

4

Driver Installation

.

The AEC-6643 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 INF Driver

Step 2 – Install VGA Driver

Step 3 – Install LAN Driver (Realtek LAN Chip)

Step 4 – Install Audio Driver

Step 5 – Install AHCI Driver

Please read instructions below for further detailed installations.

4.1 Installation:

Insert the AEC-6643 DVD-ROM into the DVD-ROM drive. And install the drivers from Step 1 to Step 8 in order.

Step 1 – Install INF Driver

1. Click on the ***STEP 1-INF*** 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 ***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

Note 1: 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 (Realtek Chip)

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*** 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 5 – Install AHCI Driver

Please refer to the ***Appendix C AHCI Settings***

Appendix

A

Programming the Watchdog Timer

A.1 Watchdog Timer Initial Program

Table 1 : SuperIO relative register table		
	Default Value	**Note**
Index	**0x2E**(Note1)	SIO MB PnP Mode Index Register 0x2E or 0x4E
Data	**0x2F**(Note2)	SIO MB PnP Mode Data Register 0x2F or 0x4F

Table 2 : Watchdog relative register table					
	LDN	**Register**	**BitNum**	**Value**	**Note**
Timer Counter	**0x07**(Note3)	**0x73**(Note4)		(Note24)	Time of watchdog timer (0~255) This register is byte access
Counting Unit	**0x07**(Note5)	**0x72**(Note6)	**7**(Note7)	**1**(Note8)	Select time unit. 1: second 0: minute
Watchdog Enable (KRST)	**0x07**(Note9)	**0x72**(Note10)	**6**(Note11)	**1**(Note12)	0: Disable 1: Enable
Timeout Status	**0x07**(Note13)	**0x71**(Note14)	**0**(Note15)	**1**	1: Clear timeout status

```
*********************************************************************************
// SuperIO relative definition (Please reference to Table 1)
#define byte   SIOIndex   //This parameter is represented from Note1
#define byte   SIOData    //This parameter is represented from Note2
#define   void   IOWriteByte(byte IOPort, byte Value);
#define   byte   IOReadByte(byte IOPort);
// Watch Dog relative definition (Please reference to Table 2)
#define byte   TimerLDN    //This parameter is represented from Note3
#define byte   TimerReg    //This parameter is represented from Note4
#define byte   TimerVal    // This parameter is represented from Note24
#define byte   UnitLDN     //This parameter is represented from Note5
#define byte   UnitReg     //This parameter is represented from Note6
#define byte   UnitBit     //This parameter is represented from Note7
#define byte   UnitVal     //This parameter is represented from Note8
#define byte   EnableLDN   //This parameter is represented from Note9
#define byte   EnableReg   //This parameter is represented from Note10
#define byte   EnableBit   //This parameter is represented from Note11
#define byte   EnableVal   //This parameter is represented from Note12
#define byte   StatusLDN   // This parameter is represented from Note13
#define byte   StatusReg   // This parameter is represented from Note14
#define byte   StatusBit   // This parameter is represented from Note15
*********************************************************************************
```

```
*****************************************************************************
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 procudure will enable the WDT counting.
        AaeonWDTEnable();
}
*****************************************************************************
```

```
*****************************************************************************
// Procedure : AaeonWDTEnable
VOID   AaeonWDTEnable (){
        WDTEnableDisable(EnableLDN, EnableReg, EnableBit, 1);
}

// Procedure : AaeonWDTConfig
VOID   AaeonWDTConfig (){
        // Disable WDT counting
        WDTEnableDisable(EnableLDN, EnableReg, EnableBit, 0);
        // Clear Watchdog Timeout Status
        WDTClearTimeoutStatus();
        // WDT relative parameter setting
        WDTParameterSetting();
}

VOID   WDTEnableDisable(byte LDN, byte Register, byte BitNum, byte Value){
        SIOBitSet(LDN, Register, BitNum, Value);
}

VOID   WDTParameterSetting(){
        // Watchdog Timer counter setting
        SIOByteSet(TimerLDN, TimerReg, TimerVal);
        // WDT counting unit setting
        SIOBitSet(UnitLDN, UnitReg, UnitBit, UnitVal);
}

VOID   WDTClearTimeoutStatus(){
        SIOBitSet(StatusLDN, StatusReg, StatusBit, 1);
}
*****************************************************************************
```

```
*****************************************************************************
VOID   SIOEnterMBPnPMode(){
        Switch(SIOIndex){
                Case 0x2E:
                        IOWriteByte(SIOIndex, 0x87);
                        IOWriteByte(SIOIndex, 0x01);
                        IOWriteByte(SIOIndex, 0x55);
                        IOWriteByte(SIOIndex, 0x55);
                        Break;
                Case 0x4E:
                        IOWriteByte(SIOIndex, 0x87);
                        IOWriteByte(SIOIndex, 0x01);
                        IOWriteByte(SIOIndex, 0x55);
                        IOWriteByte(SIOIndex, 0xAA);
                        Break;
        }
}

VOID   SIOExitMBPnPMode(){
        IOWriteByte(SIOIndex, 0x02);
        IOWriteByte(SIOData, 0x02);
}

VOID   SIOSelectLDN(byte LDN){
        IOWriteByte(SIOIndex, 0x07); // SIO LDN Register Offset = 0x07
        IOWriteByte(SIOData, LDN);
}
*****************************************************************************
```

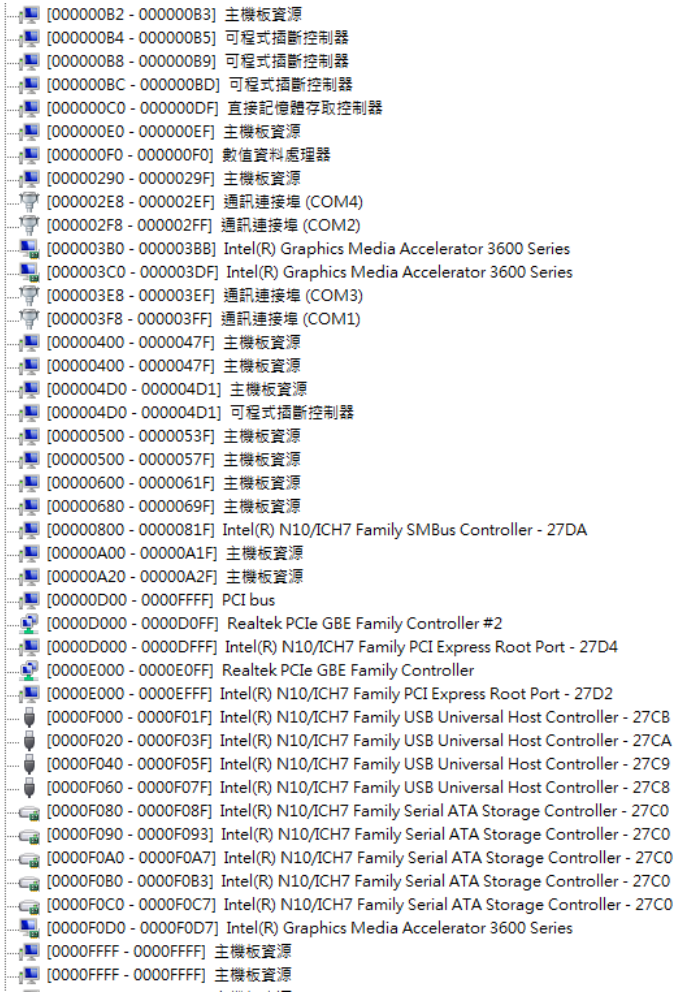
```
*************************************************************************************
VOID    SIOBitSet(byte LDN, byte Register, byte BitNum, byte Value){
        Byte TmpValue;

        SIOEnterMBPnPMode();
        SIOSelectLDN(byte LDN);
        IOWriteByte(SIOIndex, Register);
        TmpValue = IOReadByte(SIOData);
        TmpValue &= ~(1 << BitNum);
        TmpValue |= (Value << BitNum);
        IOWriteByte(SIOData, TmpValue);
        SIOExitMBPnPMode();
}

VOID    SIOByteSet(byte LDN, byte Register, byte Value){
        SIOEnterMBPnPMode();
        SIOSelectLDN(LDN);
        IOWriteByte(SIOIndex, Register);
        IOWriteByte(SIOData, Value);
        SIOExitMBPnPMode();
}
*************************************************************************************
```

Appendix

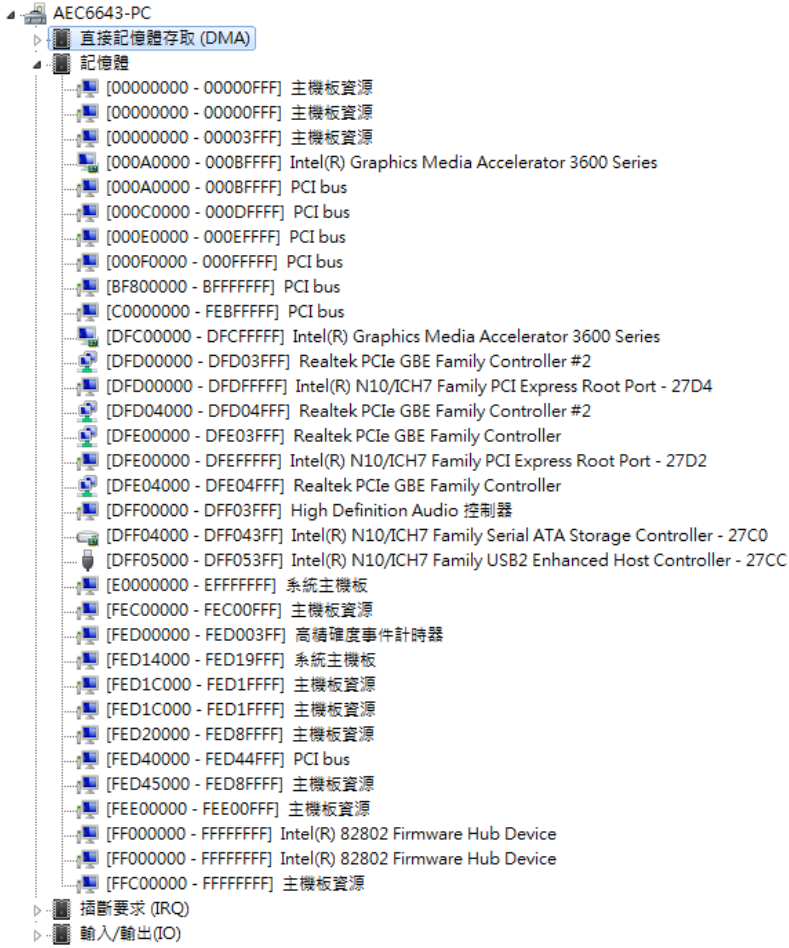
B

I/O Information

B.1 I/O Address Map


[000000B2 - 000000B3] 主機板資源
[000000B4 - 000000B5] 可程式插斷控制器
[000000B8 - 000000B9] 可程式插斷控制器
[000000BC - 000000BD] 可程式插斷控制器
[000000C0 - 000000DF] 直接記憶體存取控制器
[000000E0 - 000000EF] 主機板資源
[000000F0 - 000000F0] 數值資料處理器
[00000290 - 0000029F] 主機板資源
[000002E8 - 000002EF] 通訊連接埠 (COM4)
[000002F8 - 000002FF] 通訊連接埠 (COM2)
[000003B0 - 000003BB] Intel(R) Graphics Media Accelerator 3600 Series
[000003C0 - 000003DF] Intel(R) Graphics Media Accelerator 3600 Series
[000003E8 - 000003EF] 通訊連接埠 (COM3)
[000003F8 - 000003FF] 通訊連接埠 (COM1)
[00000400 - 0000047F] 主機板資源
[00000400 - 0000047F] 主機板資源
[000004D0 - 000004D1] 主機板資源
[000004D0 - 000004D1] 可程式插斷控制器
[00000500 - 0000053F] 主機板資源
[00000500 - 0000057F] 主機板資源
[00000600 - 0000061F] 主機板資源
[00000680 - 0000069F] 主機板資源
[00000800 - 0000081F] Intel(R) N10/ICH7 Family SMBus Controller - 27DA
[00000A00 - 00000A1F] 主機板資源
[00000A20 - 00000A2F] 主機板資源
[00000D00 - 0000FFFF] PCI bus
[0000D000 - 0000D0FF] Realtek PCIe GBE Family Controller #2
[0000D000 - 0000DFFF] Intel(R) N10/ICH7 Family PCI Express Root Port - 27D4
[0000E000 - 0000E0FF] Realtek PCIe GBE Family Controller
[0000E000 - 0000EFFF] Intel(R) N10/ICH7 Family PCI Express Root Port - 27D2
[0000F000 - 0000F01F] Intel(R) N10/ICH7 Family USB Universal Host Controller - 27CB
[0000F020 - 0000F03F] Intel(R) N10/ICH7 Family USB Universal Host Controller - 27CA
[0000F040 - 0000F05F] Intel(R) N10/ICH7 Family USB Universal Host Controller - 27C9
[0000F060 - 0000F07F] Intel(R) N10/ICH7 Family USB Universal Host Controller - 27C8
[0000F080 - 0000F08F] Intel(R) N10/ICH7 Family Serial ATA Storage Controller - 27C0
[0000F090 - 0000F093] Intel(R) N10/ICH7 Family Serial ATA Storage Controller - 27C0
[0000F0A0 - 0000F0A7] Intel(R) N10/ICH7 Family Serial ATA Storage Controller - 27C0
[0000F0B0 - 0000F0B3] Intel(R) N10/ICH7 Family Serial ATA Storage Controller - 27C0
[0000F0C0 - 0000F0C7] Intel(R) N10/ICH7 Family Serial ATA Storage Controller - 27C0
[0000F0D0 - 0000F0D7] Intel(R) Graphics Media Accelerator 3600 Series
[0000FFFF - 0000FFFF] 主機板資源
[0000FFFF - 0000FFFF] 主機板資源

B.2 Memory Address Map



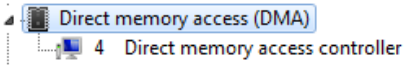
B.3 IRQ Mapping Chart

- 插斷要求 (IRQ)
  - (ISA) 0x00000000 (00) 系統計時器
  - (ISA) 0x00000003 (03) 通訊連接埠 (COM2)
  - (ISA) 0x00000004 (04) 通訊連接埠 (COM1)
  - (ISA) 0x00000007 (07) 通訊連接埠 (COM3)
  - (ISA) 0x00000008 (08) 系統 CMOS/即時時鐘
  - (ISA) 0x0000000A (10) 通訊連接埠 (COM4)
  - (ISA) 0x0000000D (13) 數值資料處理器
  - (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) 0x0000000B (11) Intel(R) N10/ICH7 Family SMBus Controller - 27DA
(PCI) 0x00000010 (16) Intel(R) N10/ICH7 Family PCI Express Root Port - 27D0
(PCI) 0x00000010 (16) Intel(R) N10/ICH7 Family USB Universal Host Controller - 27CB
(PCI) 0x00000011 (17) Intel(R) N10/ICH7 Family PCI Express Root Port - 27D2
(PCI) 0x00000012 (18) Intel(R) N10/ICH7 Family PCI Express Root Port - 27D4
(PCI) 0x00000012 (18) Intel(R) N10/ICH7 Family USB Universal Host Controller - 27CA
(PCI) 0x00000013 (19) Intel(R) N10/ICH7 Family PCI Express Root Port - 27D6
(PCI) 0x00000013 (19) Intel(R) N10/ICH7 Family Serial ATA Storage Controller - 27C0
(PCI) 0x00000013 (19) Intel(R) N10/ICH7 Family USB Universal Host Controller - 27C9
(PCI) 0x00000016 (22) High Definition Audio 控制器
(PCI) 0x00000017 (23) Intel(R) N10/ICH7 Family USB Universal Host Controller - 27C8
(PCI) 0x00000017 (23) Intel(R) N10/ICH7 Family USB2 Enhanced Host Controller - 27CC
(PCI) 0xFFFFFFFC (-4) Realtek PCIe GBE Family Controller #2
(PCI) 0xFFFFFFFD (-3) Realtek PCIe GBE Family Controller
(PCI) 0xFFFFFFFE (-2) Intel(R) Graphics Media Accelerator 3600 Series

B.4 DMA Channel Assignments



Appendix

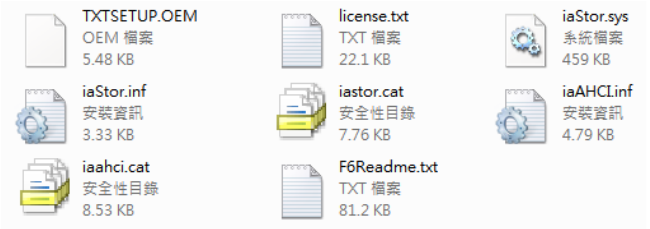
C

AHCI Settings

C.1 Setting AHCI

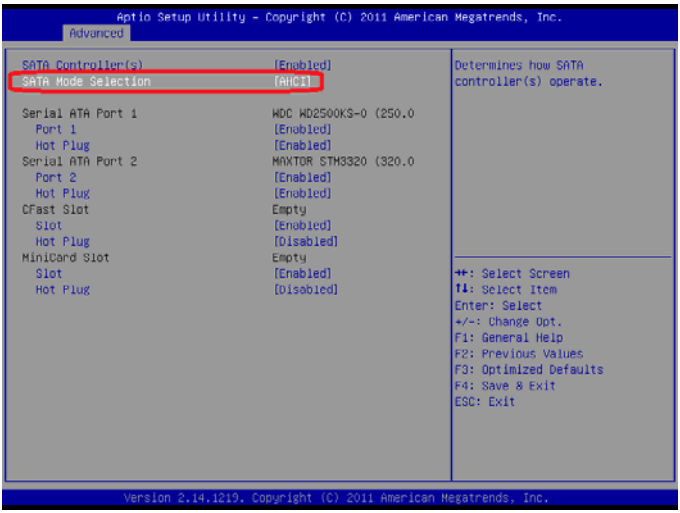
OS installation to SETUP AHCI Mode

Step 1: Copy below files from “Driver CD -> Step7-RAID&AHCI\ WinXP_32” to diskette.

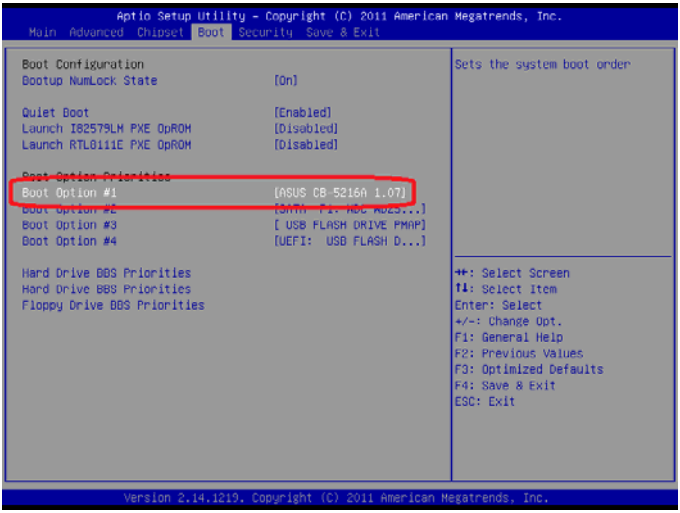


Step 2: Connect the USB Floppy drive to the board and insert the diskette from previous step.

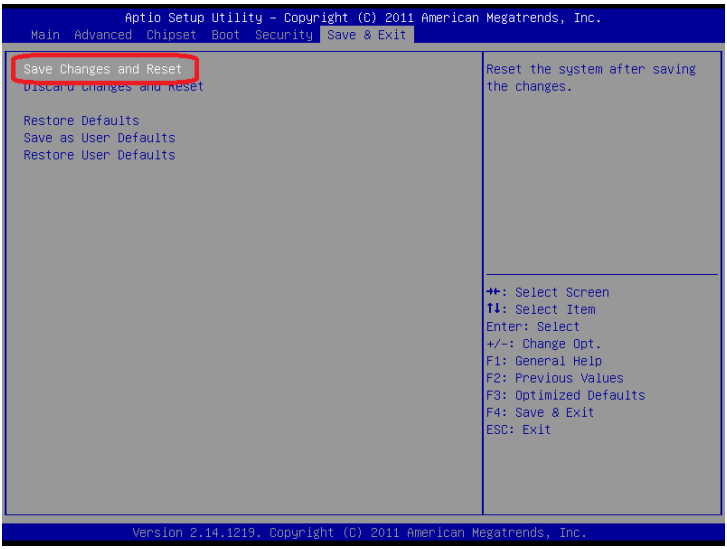
Step 3: Configure SATA Controller to AHCI mode in **BIOS SETUP Menu: Advanced -> SATA Configuration -> SATA Mode -> AHCI Mode**



Step 4: Configure DVD/CD-ROM drive as the first boot device.



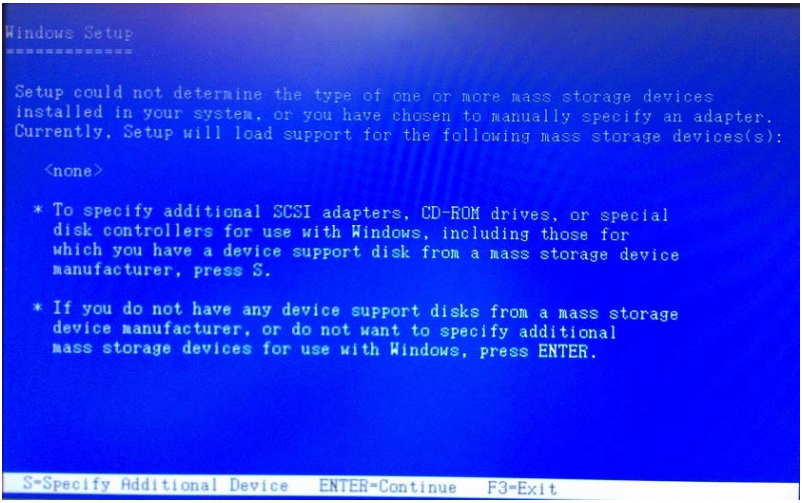
Step 5: Save changes and exit BIOS SETUP



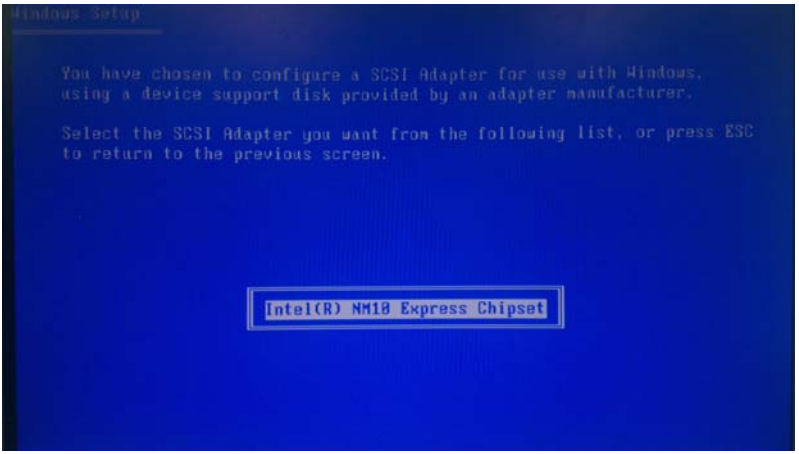
Step 6 – Boot to DVD/CD-ROM device to install OS

Step 7 – Press **"F6"** to install AHCI driver

Step 8 – Press **"S"** to install AHCI driver



Step 9 – Choose **"Intel(R) NM10 Express Chipset".**



Step 10 – The following messages will appear on the screen. Press **"S"** to specify additional SCSI adapters. Press **"ENTER"** and Windows Setup will continue to install OS.