AEC-6646

Fanless Embedded Controller

Intel® Core™ H61 Chipset

2 Gigabit Ethernet

6 USB2.0, 4 COM

1 Mini Card

1 VGA, 1 DVI, 1 HDMI

AEC-6646 Manual 1st Ed.
April 2013

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Packing List

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

- 1 AEC-6646 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-6646 has been introduced by AAEON and it utilizes Intel® LGA1155 Socket Processor (Maximum 65W CPU). 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-6646 to satisfy the versatile demands of Factory Automation, Data processing, Fleet management, and Data management.

The AEC-6646 offers low power consumption system that while operating temperatures ranging from 0° to 40°C. The AEC-6646 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-6646 is definitely your best choice to fit into your vital applications.

1.2 Features

- Intel® LGA1155 Socket Processor (Maximum 65W CPU) Processor
- Intel® H61 Chipset
- COM x 4, USB2.0 x 6
- VGA x 1, DVI x 1, HDMI x 1
- Gigabit Ethernet x 2
- 2.5” SATA Hard Disk Drive Bay
- Fanless Operation

1.3 Specifications

CPU		Intel® LGA1155 socket CPU (Maximum 65w) Example such as: Intel® Pentium CPU G540T @ 2.10GHz Intel® Pentium CPU G620 @ 2.60GHz Intel® Core™ i3-2120 Processor (3M Cache, 3.30 GHz) Intel® Core™ i3-2105 Processor (3M Cache, 3.10 GHz)
Chipset		Intel® H61
System Memory		204-pin DDR3 SODIMM 1333/1066 SODIMM x 2, Max. 16GB
Display Interface	**VGA**	DB-15 x 1
	DVI	DVI-D x 1
	HDMI	1
Storage Device	**SSD**	—
	HDD	2.5” SATA Hard Disk Drive Bay x 1
Network	**LAN**	Gigabit Ethernet
	Wireless	Optional Wi-Fi/Bluetooth kit (Factory Installed)
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	—

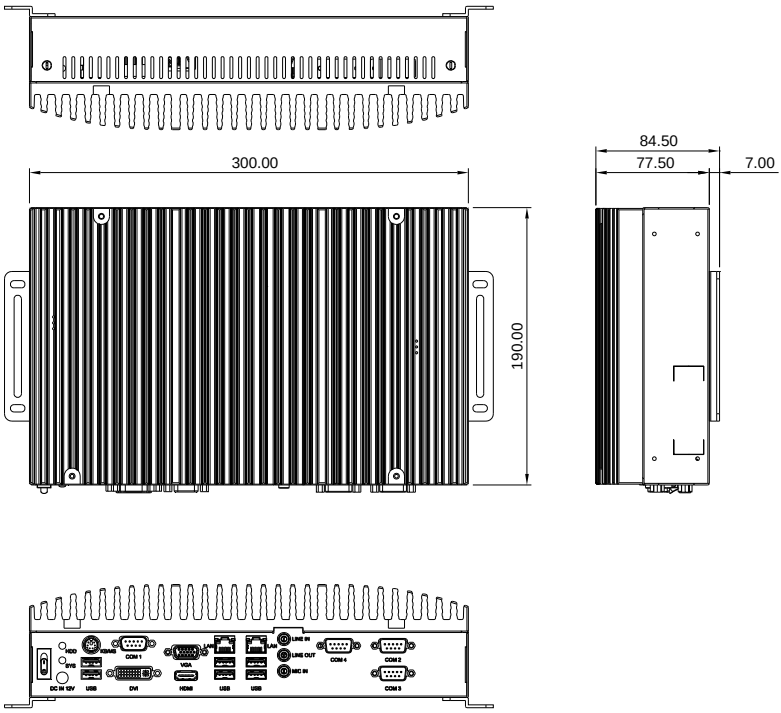
	Serial Port	—
	Others	SMA Antenna hole x 2
Expansion	**Mini Card**	1
Indicator	**Rear**	Power LED x 1, Hard Disk Drive active LED x 1
	Front	—
Power Requirement		Lockable DC jack x 1 for DC12V
System Cooling		Passive
Mounting		Wallmount
Operating Temperature		32°F ~ 104°F (0°C ~ 40°C)
Storage Temperature		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, Windows Embedded Standard, Windows Embedded Standard 7, Windows 7, Linux kernel 2.6.x or above

Chapter

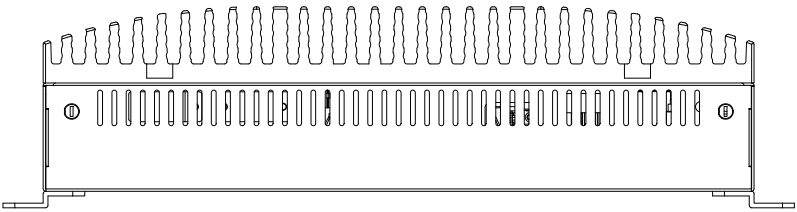
2

Hardware Installation

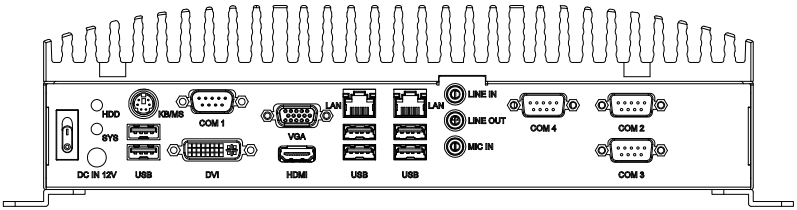
2.1 Dimension & Connectors of AEC-6646



Connectors on the front panel

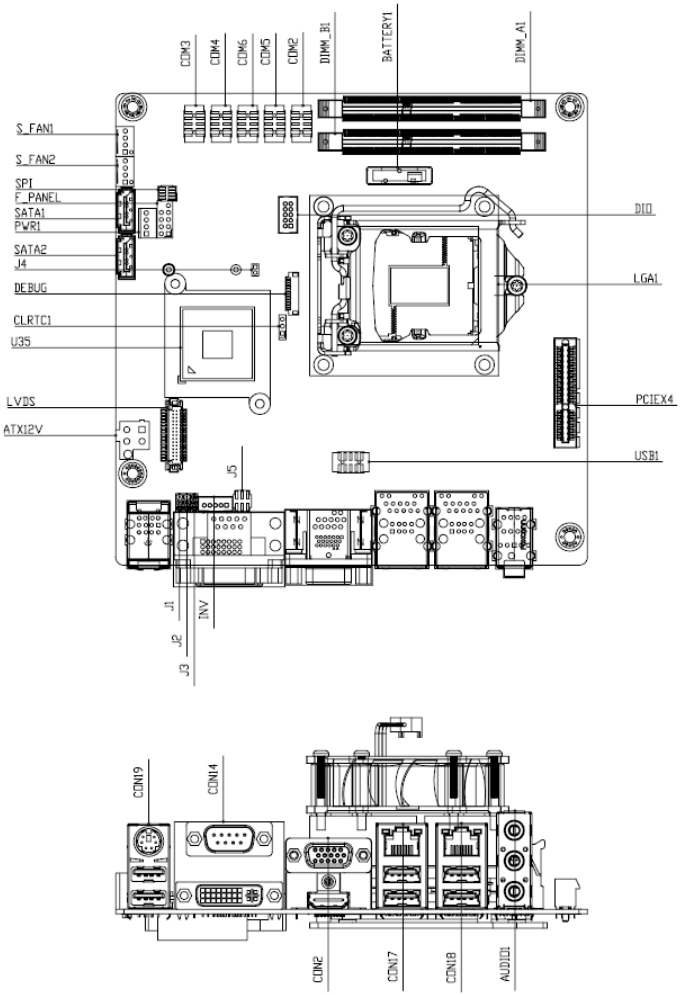


Connectors on the rear panel

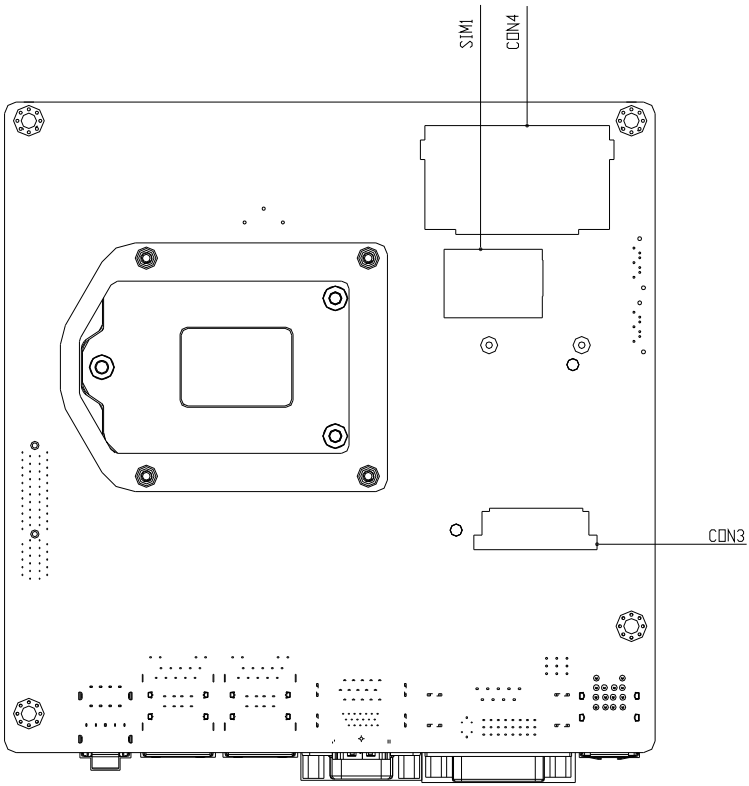


2.2 Connectors and Jumpers of The Main Board

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
CLRTC1	Clear CMOS
J4	AT/ATX mode Selection
J5	COM1 Ring/+5V/+12V Selection

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 board's connectors:

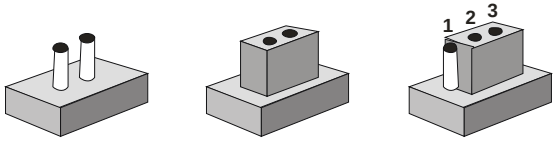
Label	Function
ATX12V	ATX 4P Power Connector
AUDIO1	Audio jack Connector
BATTERY1	RTC - Coin Battery Holder
COM1	COM1 Connector
COM2	COM2 Connector
COM3	COM3 Connector
COM4	COM4 Connector
CON14	COM1 & DVI-D Connector
CON17	LAN1 and USB1/2 Connector
CON18	LAN2 and USB3/4 Connector
CON19	PS/2 KB&MS and USB5/6 Connector
CON2	D-Sub15_VGA Connector with HDMI Connector
CON3	mini PCI-E Slot
DIMM_A1	DIMM1 Slot
DIMM_B1	DIMM2 Slot
F_PANEL	Front Panel Connector
LGA1	CPU Socket - LGA-1155P
PWR1	SATA Power Connector
SATA1	SATA II Connector

SATA2	SATA II Connector
SIM1	SIM Card Socket
SPI	BIOS Programmable Connector

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 Clear CMOS (CLRTC1)

CLRTC1	Function
1-2	Protected (Default)
2-3	Clear

2.7 AT/ATX Mode Selection (J4)

J4	Function
1-2	AT Mode (Default)
Empty	ATX Mode

2.8 COM1 Ring/+5V/+12V Selection (J5)

J5	Function
1-2	+12V
3-4	+5V
5-6	Ring (Default)

2.9 On board COM RS232/RS422/RS485 Serial Port Connector (COM1)

RS-232 Mode

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

RS-422 Mode

Pin	Signal	Pin	Signal

1	TXD-	2	RXD+
3	TXD+	4	RXD-
5	Ground	6	N/C
7	N/C	8	N/C
9	N/C / +5 Volt. / (+12 Volt.)		

RS-485 Mode

Pin	Signal	Pin	Signal
1	D-	2	N/C
3	D+	4	N/C
5	Ground	6	N/C
7	N/C	8	N/C
9	N/C / +5 Volt. / (+12 Volt.)		

2.10 Internal COM Serial Port Connector (COM2 ~ COM6)

Pin	Signal	Pin	Signal
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	(NC)

2.11 PS/2 Keyboard/Mouse Connector with Dock USB 2.0 Connector (CON19)

Pin	Signal	Pin	Signal
1	GND	2	USB2_DP1
3	USB2_DN1	4	+5V
5	GND	6	USB2_DP2

7	USB2_DN2	8	+5V
9	GND	10	KB_DATA
11	MS_DATA	12	+5V
13	KB_CLK	14	MS_CLK
15	GND	16	GND
17	GND	18	GND

2.12 1000Base-T Ethernet Connector with Dock USB 2.0 Connector (CON17/CON18)

Pin	Signal	Pin	Signal
1	+5V	2	USB2_DN2
3	USB2_DP2	4	GND
5	+5V	6	USB2_DN1
7	USB2_DP1	8	GND
9	LAN_CTR	10	LAN_MDI_DP0
11	LAN_MDI_DN0	12	LAN_MDI_DP1
13	LAN_MDI_DN1	14	LAN_MDI_DP2
15	LAN_MDI_DN2	16	LAN_MDI_DP3
17	LAN_MDI_DN3	18	GND
19	LAN_LED_ACT	20	LAN_LED_ACT#
21	LAN_LED_LINK100#	22	LAN_LED_LINK1000#
23	GND	24	GND
25	GND	26	GND
27	GND	28	GND
29	GND	30	GND

2.13 Front Panel Connector (F_PANEL)

Pin	Signal	Pin	Signal
1	HDLED+	2	PLED+
3	HDLED-	4	PLED-
5	GND	6	PANSWH#
7	HWRST#	8	GND
9	(NC)	10	(kill pin)

2.14 SATA Power Connector (PWR1)

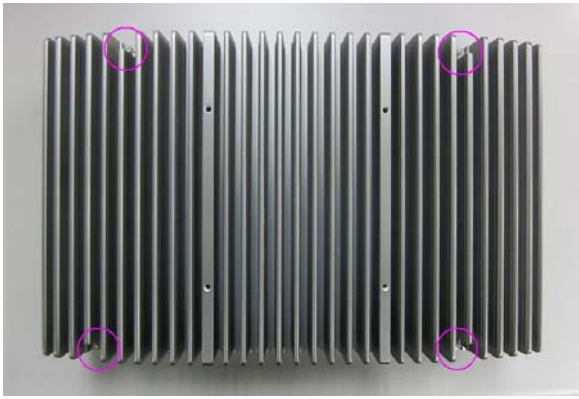
Pin	Signal
1	+5V
2	GND
3	GND
4	+12V

2.15 BIOS Programmable Connector (SPI)

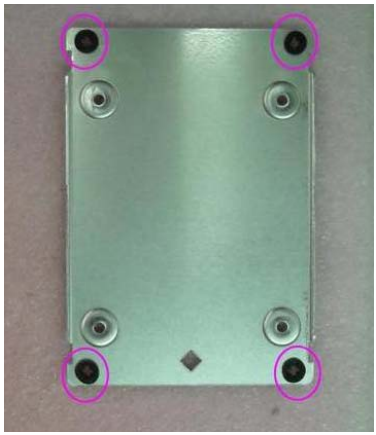
Pin	Signal	Pin	Signal
1	+V3.3SPI	2	GND
3	SPI_CS#	4	SPI_CLK
5	SPI_MISO	6	SPI_MOSI
7	(NC)	8	(NC)

2.16 Hard Disk Drive (HDD) Installation

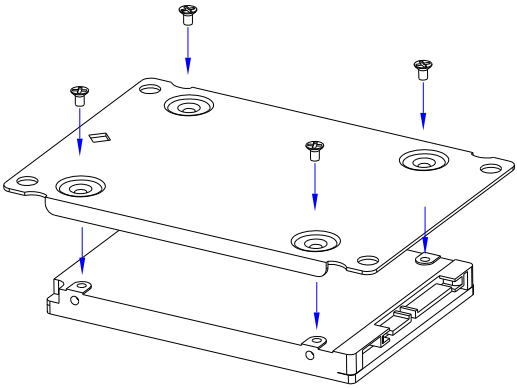
Step 1: Unfasten the four screws of the AEC-6646



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



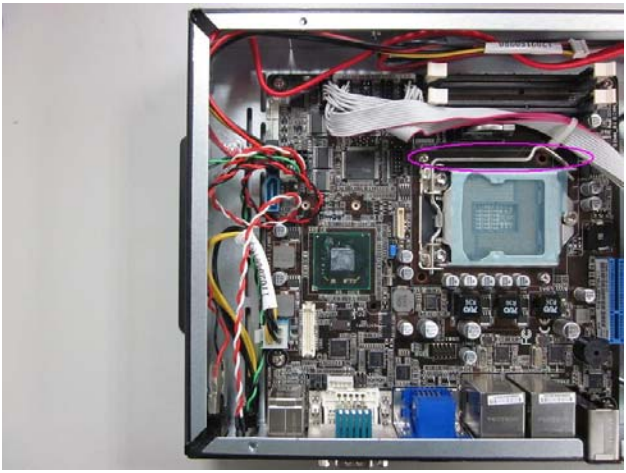
Step 4: Fasten the four screws to install the HDD and HDD Bracket to the chasis, then connect the SATA cable to the HDD.

Step 5: Close the cover of the AEC-6646 and fasten the screws and copper cylinders.

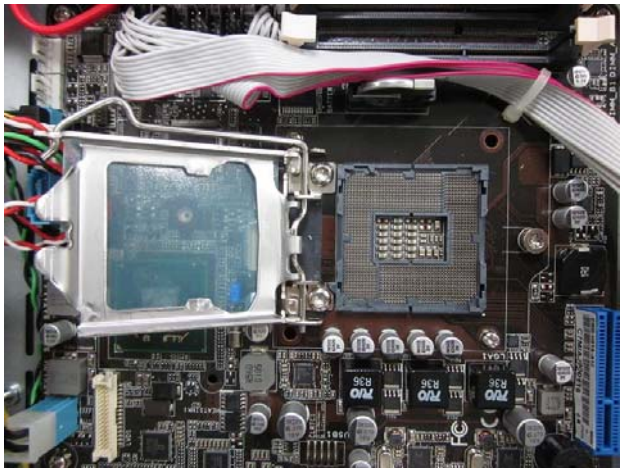
2.17 CPU Installation

Step 1: Unfasten the four screws of the AEC-6646

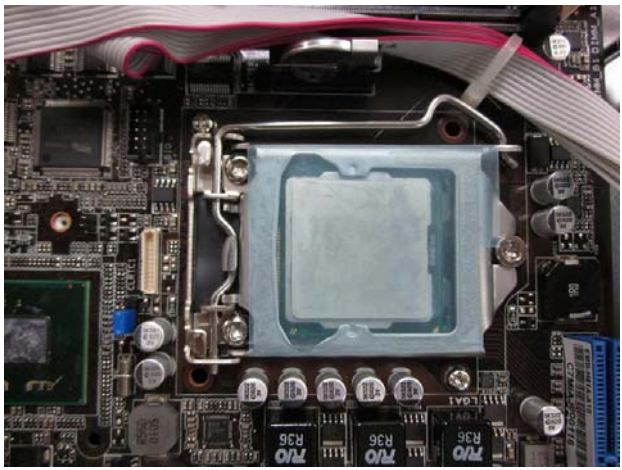
Step 2: Gently press down the latch on the side of the CPU socket and then lift it.



Step 3: Open the CPU lid.



Step 4: Install the CPU. Orientate the CPU with socket and align the CPU notches with the socket alignment keys. Make sure the CPU is perfectly horizontal and then insert the CPU into the socket. After finishing the above procedures, close the CPU lid.



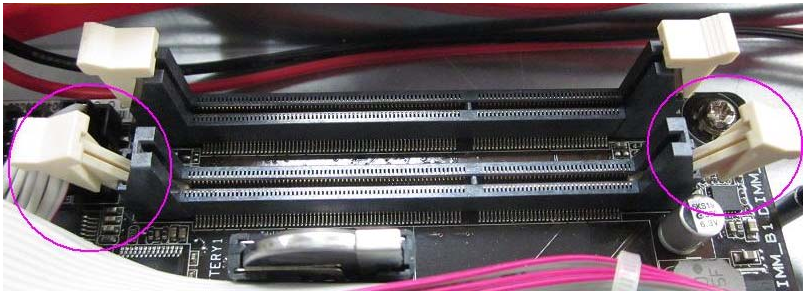
Step 5: Remove the protective Mylar slice from the CPU socket.

Step 6: Spread thermal paste evenly on the CPU surface.

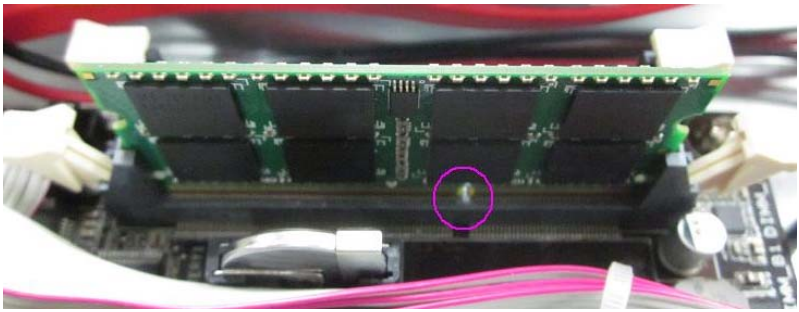
2.18 Memory Card Installation

Step 1: Unfasten the four screws of the AEC-6646

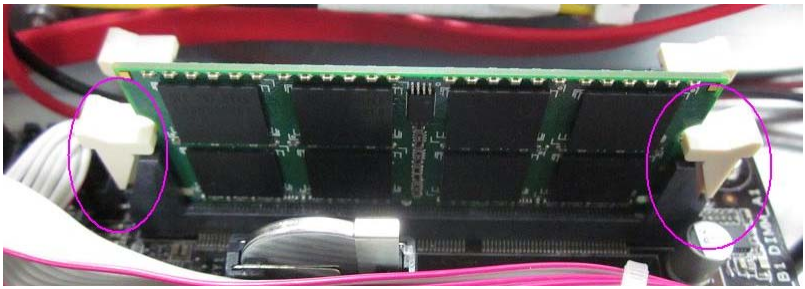
Step 2: Gently push down on the tabs on either side of the DIMM slot in tandem.



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

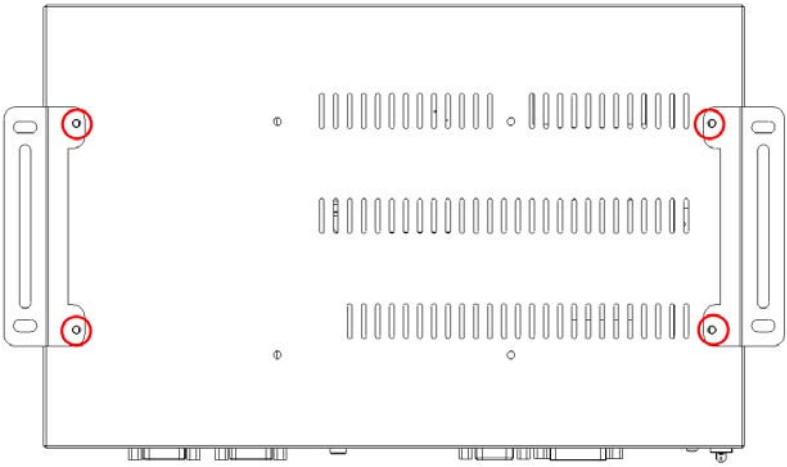


Step 4: Snap the DIMM slot tabs shut, locking the Memory Card in place.



2.19 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-6646, the wallmount kit installation has been finished.



Chapter

3

AMI BIOS Setup

3.1 System Test and Iinitialization

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-6646 CMOS memory has an integral lithium battery backup for data retention. However, you will need to replace the complete unit when it finally runs down.

3.2 AMI BIOS Setup

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

Entering Setup

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

Main

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

Advanced

Enable disable boot option for legacy network devices.

Chipset

Host bridge parameters.

Boot

Enables/disable quiet boot option.

Security

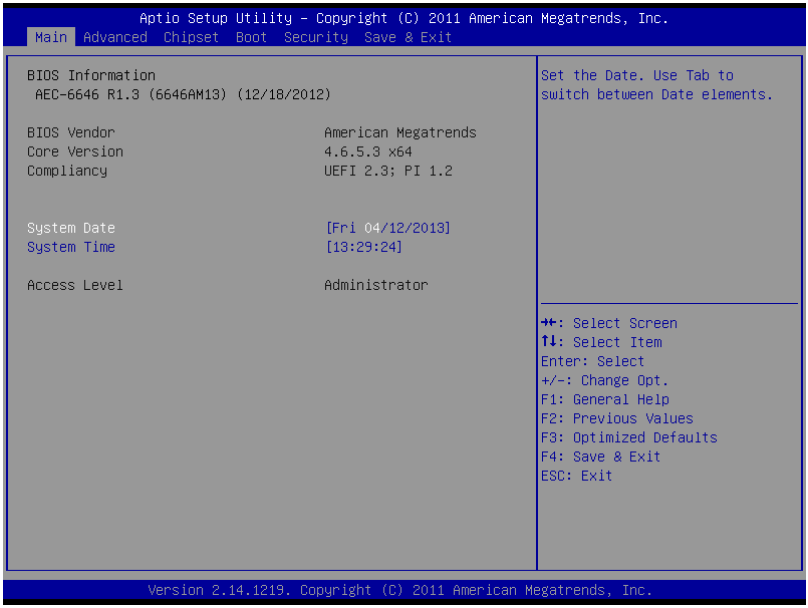
Set setup administrator password.

Save & Exit

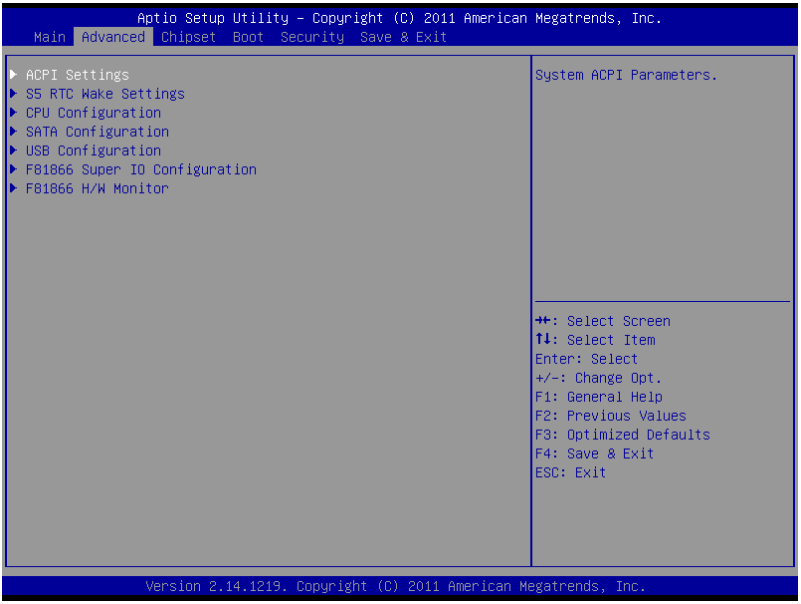
Exit system setup after saving the changes.

Setup Menu

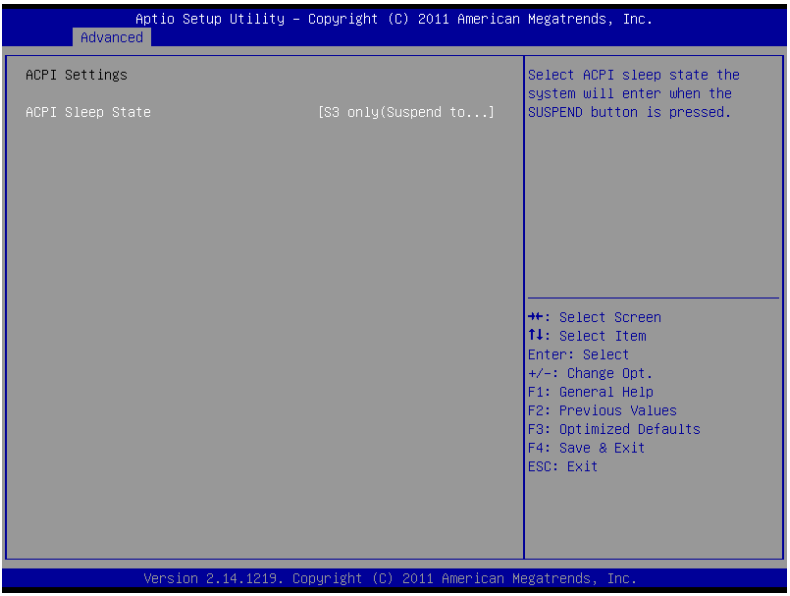
Setup submenu: Main



Setup submenu: Advanced



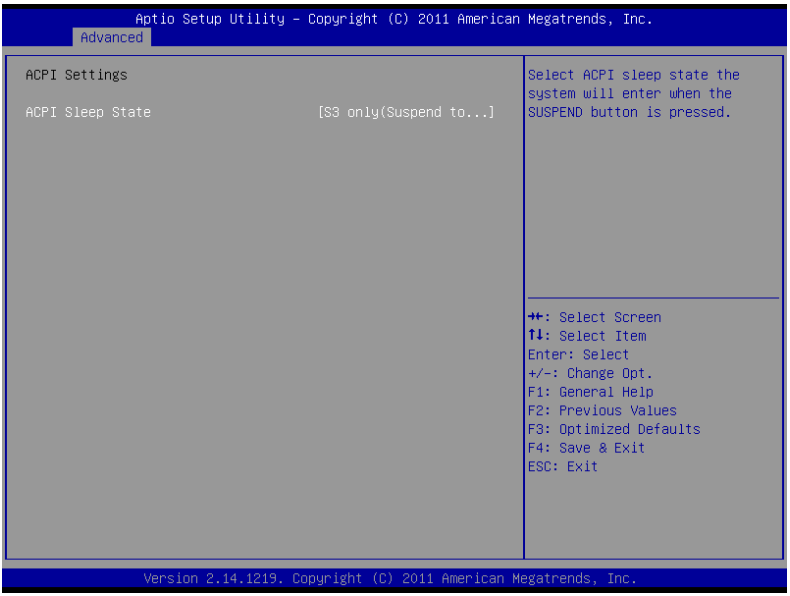
ACPI Settings



Options summary:

Suspend mode	S1 only (CPU Stop Clock)	Optimal Default, Failsafe Default
	S3 only (Suspend to RAM)	
Select the ACPI state used for System Suspend		

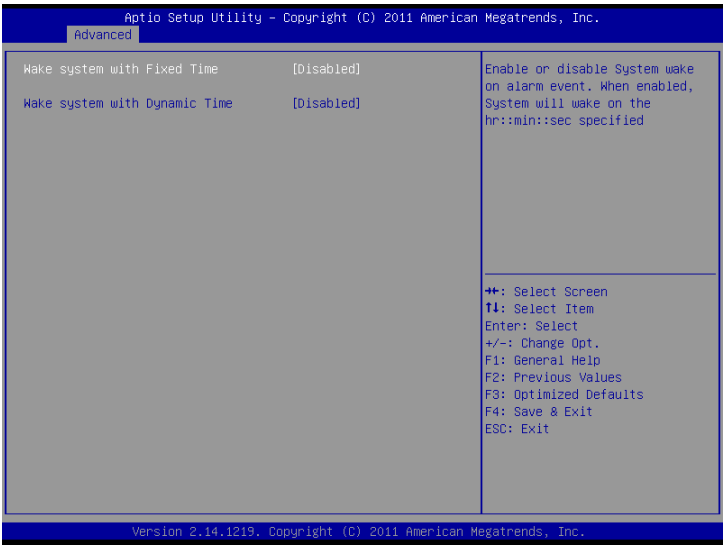
ACPI Settings

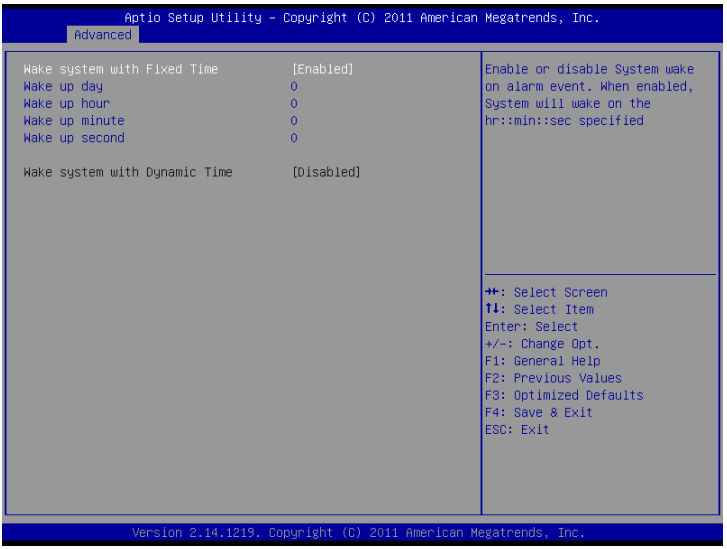


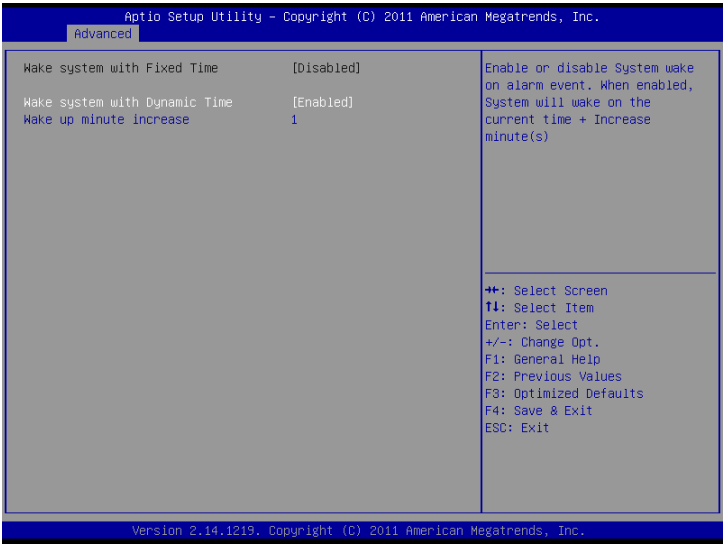
Options summary:

Suspend mode	S1 only (CPU Stop Clock)	Optimal Default, Failsafe Default
	S3 only (Suspend to RAM)	
Select the ACPI state used for System Suspend		

S5 RTC Wake Settings



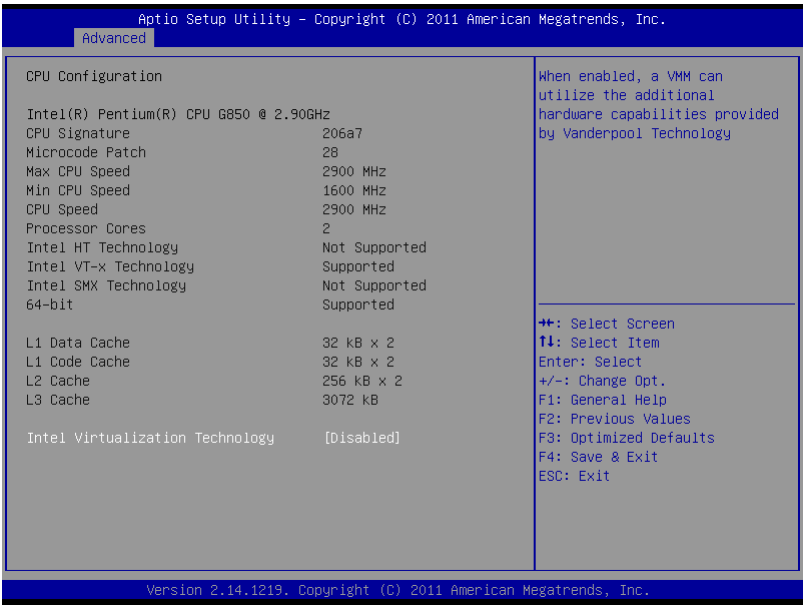




Options summary:

Wake system with Fixed Time	Disabled	Default
	Enabled	
Enable or disable System wake on alarm event. When enabled, System will wake on the hr::min::sec specified.		
Wake up day	0	Default
Select 0 for daily system wake up, 1-31 for which day of the month that you would like the system to wake up.		
Wake up hour	0	Default
Select 0-23 For example enter 3 for 3am and 15 for 3pm.		
Wake up minute	0	Default
0 - 59		
Wake up second	0	Default
0 - 59		
Wake system with Dynamic Time	Disabled	Default
	Enabled	
Enable or disable System wake on alarm event. When enabled, System will wake on the current time + Increase minute(s)		
Wake up day	1	Default
1-5		

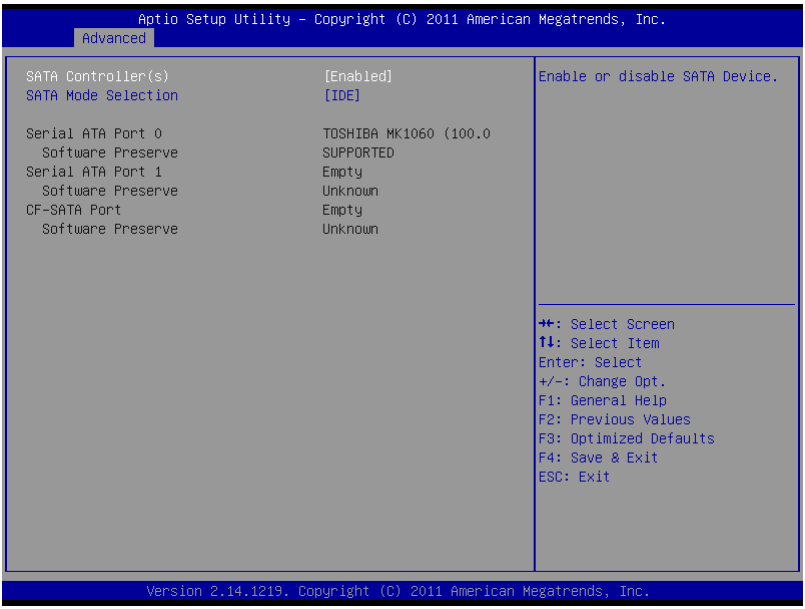
CPU Configuration



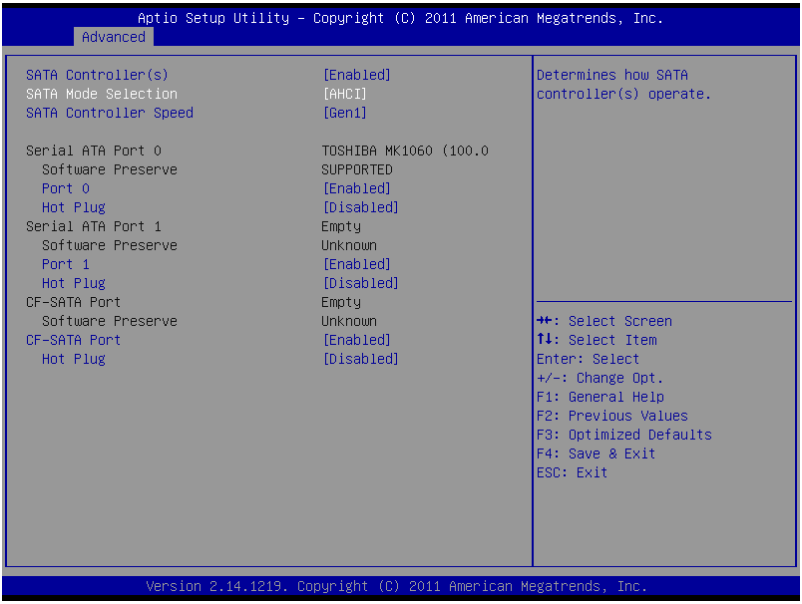
Options summary:

Hyper-Threading	Disabled	Optimal Default, Failsafe Default
	Enabled	
En/Disable CPU Hyper-Threading function		
Intel Virtualization Technology	Disabled	Optimal Default, Failsafe Default
	Enabled	
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology		

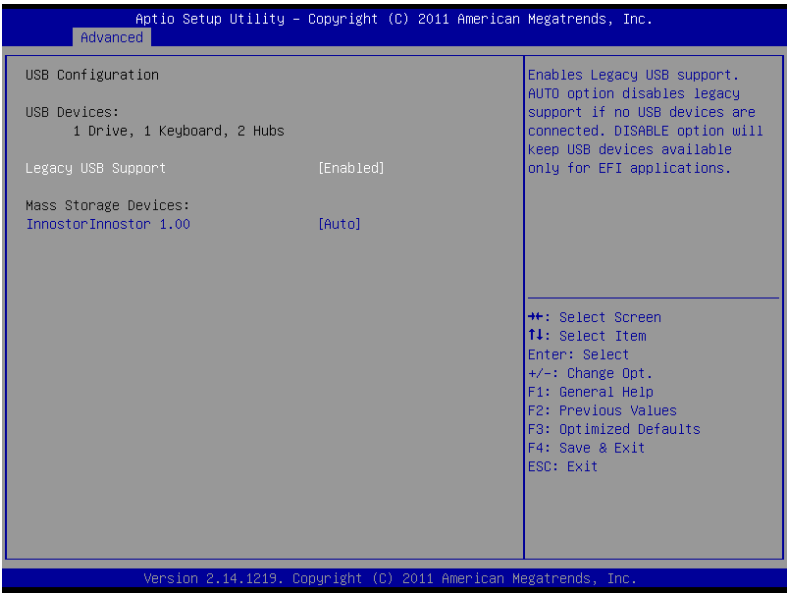
IDE Configuration (IDE)



IDE Configuration (AHCI)



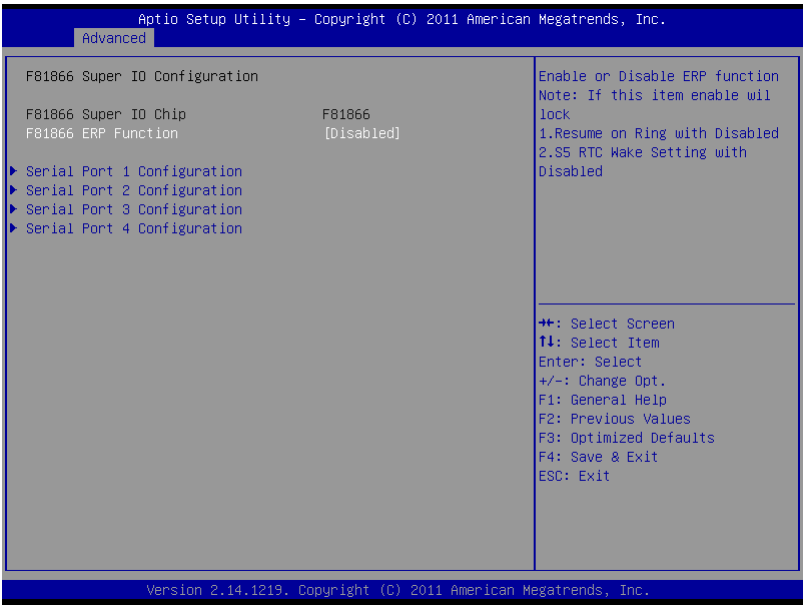
USB Configuration



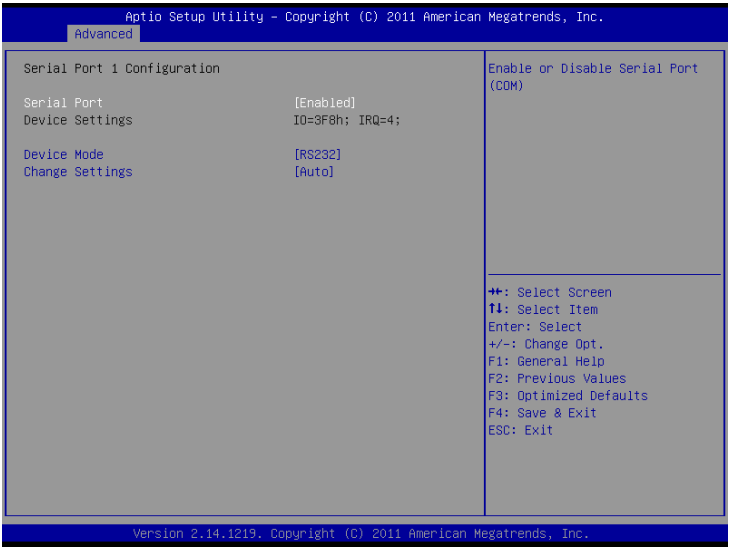
Options summary:

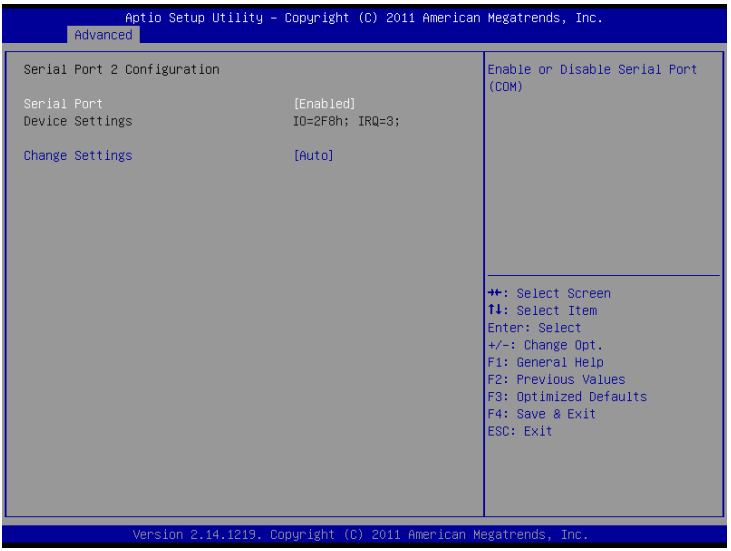
Legacy USB Support	Enabled	Optimal Default, Failsafe Default
	Disabled	
	Auto	
Enables BIOS Support for Legacy USB Support. When enabled, USB can be functional in legacy environment like DOS. AUTO option disables legacy support if no USB devices are connected		
Device Name (Emulation Type)	Auto	Optimal Default, Failsafe Default
	Floppy	
	Forced FDD	
	Hard Disk	
	CDROM	
If Auto. USB devices less than 530MB will be emulated as Floppy and remaining as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD(Ex. ZIP drive)		

F81866 Super IO Configuration



Serial Port Configuration



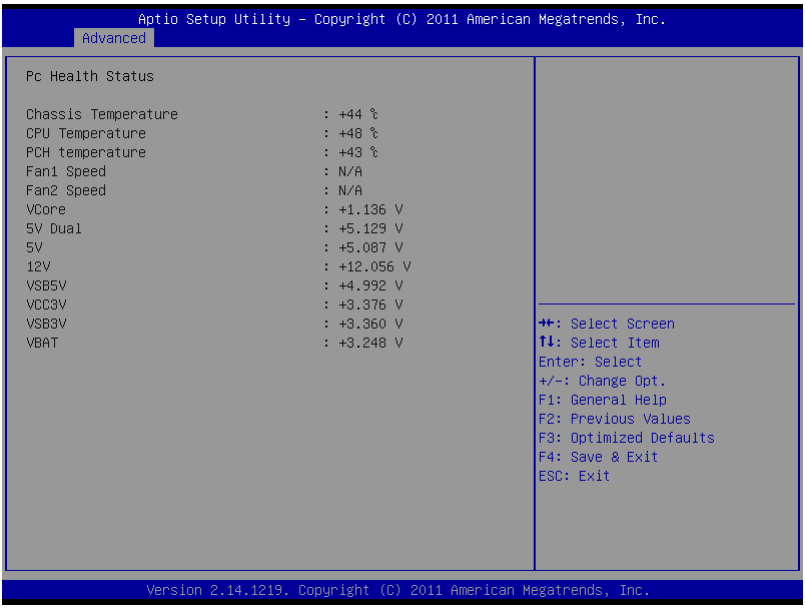


Options summary:

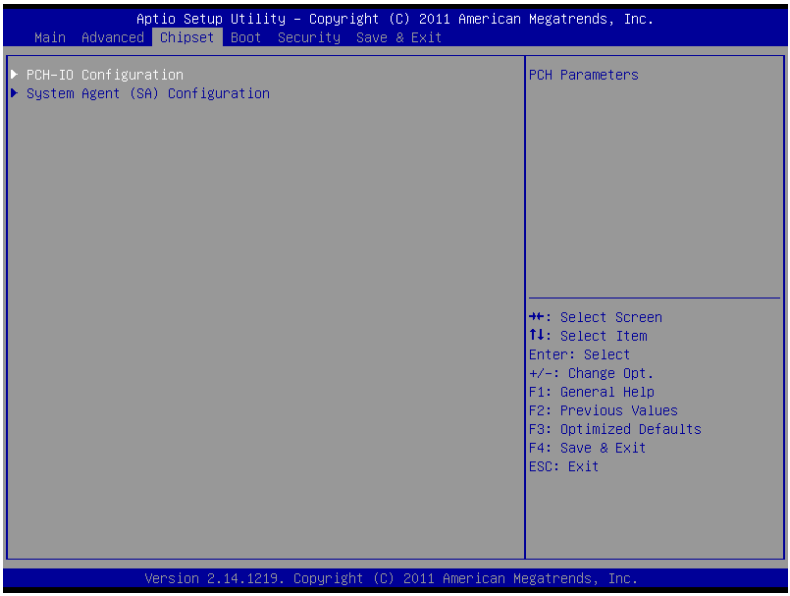
F81866 ERP Function	Disabled	
	Enabled	Default
Enable or Disable ERP function.		
Device Mode	RS232	Default
	RS422	
	RS485	

Serial Port	Disabled	
	Enabled	Default
Allows BIOS to En/Disable correspond serial port.		
Device Mode	RS232	Default
	RS422	
	RS485	
Select working model.		
Change Settings (Serial Port1)	Auto	Default
	IO=3F8h; IRQ=4;	
	IO=3F8h; IRQ=3,4;	
	IO=2F8h; IRQ=3,4;	
	IO=3E8h; IRQ=10.11;	
	IO=2E8h; IRQ=10.11;	
Allows BIOS to Select Serial Port resource.		
Change Settings (Serial Port2)	Auto	Default
	IO=2F8h; IRQ=3;	
	IO=3F8h; IRQ=3,4;	
	IO=2F8h; IRQ=3,4;	
	IO=3E8h; IRQ=10.11;	
	IO=2E8h; IRQ=10.11;	
Allows BIOS to Select Serial Port resource.		
Change Settings (Serial Port3)	Auto	Default
	IO=3E8h; IRQ=10;	
	IO=3E8h; IRQ=10.11;	
	IO=2E8h; IRQ=10.11;	
	IO=2D0h; IRQ=10.11;	
	IO=2D8h; IRQ=10.11;	
Allows BIOS to Select Serial Port resource.		
Change Settings (Serial Port4)	Auto	Default
	IO=2E8h; IRQ=10	
	IO=3E8h; IRQ=10.11;	
	IO=2E8h; IRQ=10.11;	
	IO=2D0h; IRQ=10.11;	
	IO=2D8h; IRQ=10.11;	
Allows BIOS to Select Serial Port resource.		

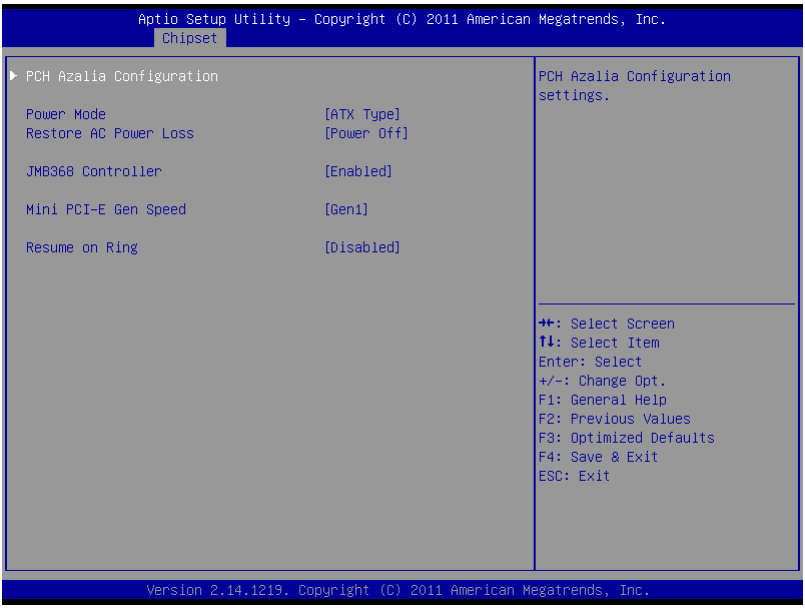
F81866 H/W Monitor



Setup submenu: Chipset



PCH-IO Configuration

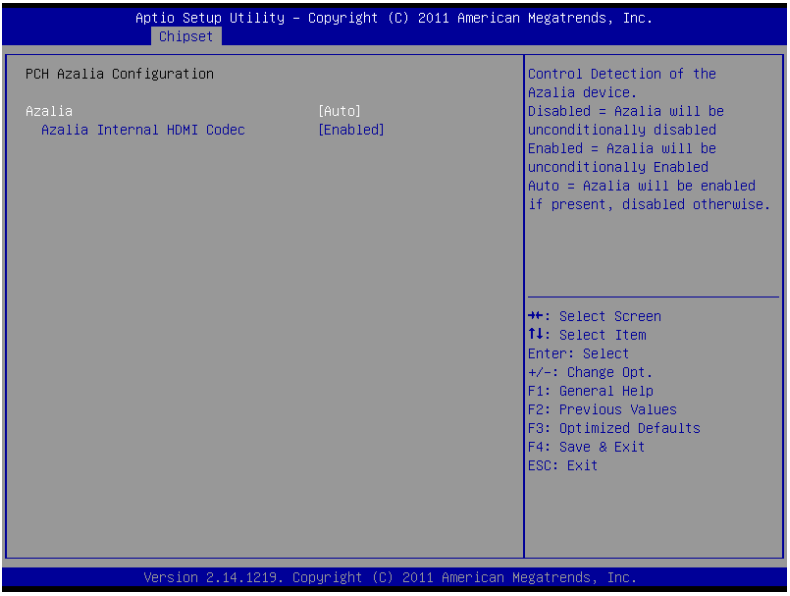


Options summary:

Power Mode	ATX Type	
	AT Type	Default
Select power supply mode. Note: If this item set AT Type will lock 1.Restore AC Power Loss with Power on. 1. Restore AC Power Loss with Power On. 2. Resume on Ring with Disabled 3. S5 RTC Wake Setting with Disable 4. F81866 ERP Function with Disable.		
Restore AC Power Loss	Always OFF	
	Always ON	
	Last State	Default
Select AC power state when power is re-applied after a power failure.		

JMB368 Controller	Enabled	Default
	Disabled	
En/Disable JMB368 Controller		
Mini PCI-E Gen Speed	Gen1	Default
	Gen2	
Select PCI Express port speed.		
Resume on Ring	Enabled	
	Disabled	Default
Enabled/Disabled resuming from RI# signal.		

PCH Azalia Configuration

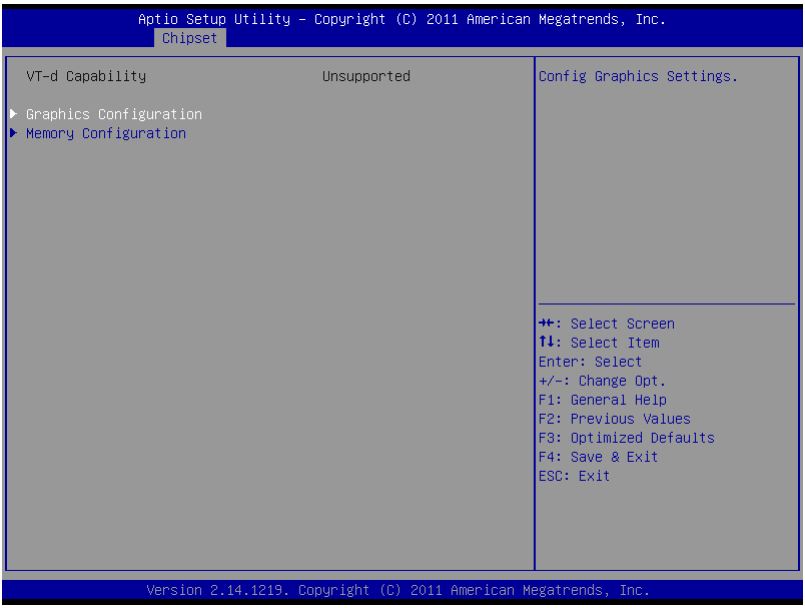


Options summary:

Azalia	Disabled	
	Enabled	
	Auto	Default
Control Detection of the Azalia device. Disabled = Azalia will be unconditionally disabled; Enabled = Azalia will be unconditionally enabled; Auto = Azalia will be enabled if present, disabled otherwise.		

Azalia Internal HDMI Codec	Disabled	Default
	Enabled	
Enable or disable internal HDMI codec for Azalia.		

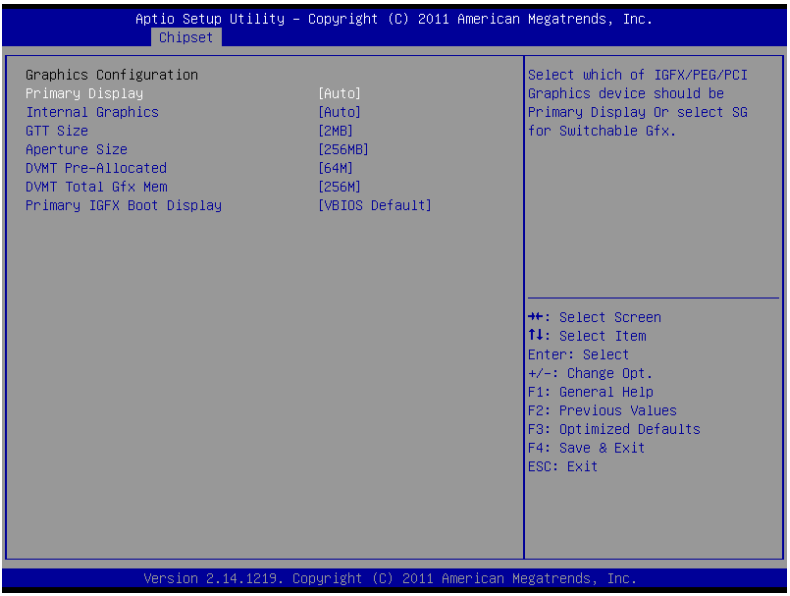
System Agent (SA) Configuration



Options summary:

VT-d	Disabled	
	Enabled	Default
Check to enable VT-d function on MCH		
PCIE x16 Slot Gen	Auto	Default
	Gen1	
	Gen2	
	Gen3	
Configure PEG0 B0D1:F0 Gen1-Gen3		

Graphics Configuration



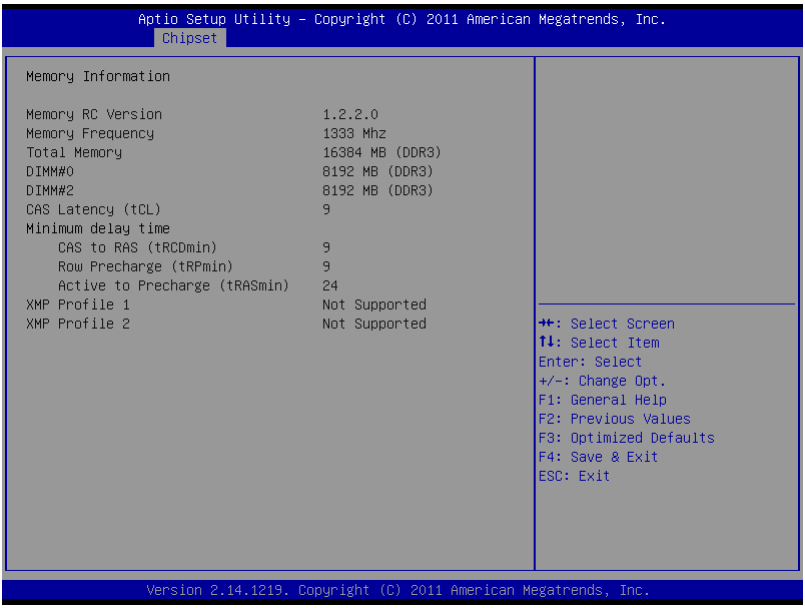
Options summary:

Primary Display	Auto	Default
	IGFX	
	PEG	
Select which of IGFX/PEG Graphics device should be Primary Disable.		
Internal Graphics	Auto	Default
	Disabled	
	Enabled	
Keep IGD enabled based on setup options.		
GTT Size	1MB	
	2MB	Default
Select the GTT Size.		
Aperture Size	128MB	
	256MB	Default
	512MB	
Select the Aperture Size.		

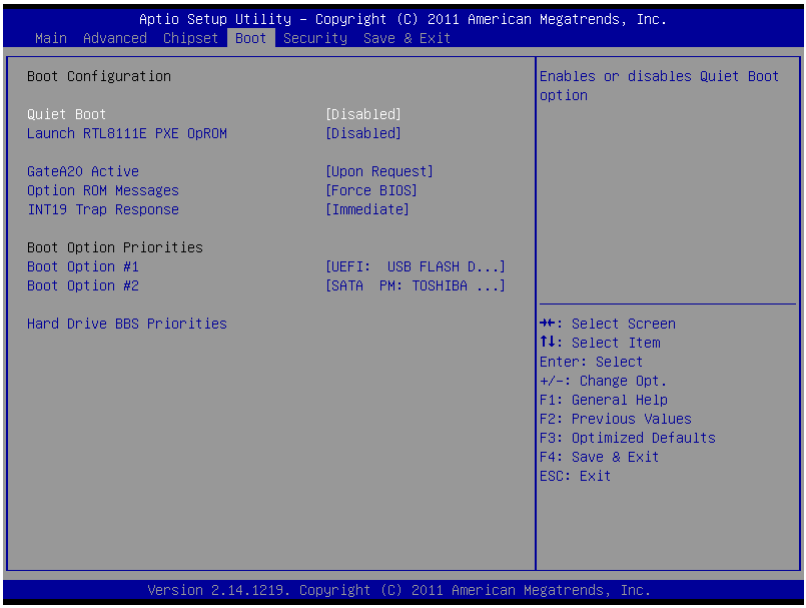
DVMT Pre-Allocated	32MB	

	64MB	Default
	96MB	
	128MB	
	160MB	
	192MB	
	224MB	
	256MB	
	288MB	
	320MB	
	352MB	
	384MB	
	416MB	
	448MB	
	480MB	
	512MB	
	1024MB	
Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.		
DVMT Total Gfx Mem	128MB	
	256MB	Default
	MAX	
Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.		
Primary IGFX Boot Display	Auto	Default
	CRT	
	HDMI	
	DVI	
Select the Video Device which will be activated during POST. For dual-display, select 'Auto' Note: The platform only supports single display in legacy environment (DOS).		

Memory Information



Setup submenu: Boot

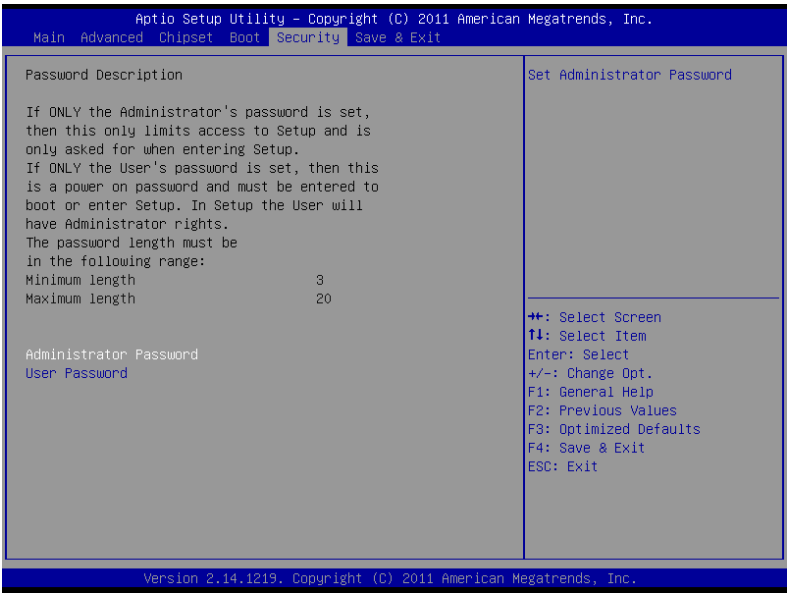


Options summary:

Bootup NumLock State	On	Default
	Off	
Select the keyboard NumLock state		
Quiet Boot	Disabled	
	Enabled	Default
En/Disable showing boot logo.		
Launch RTL8111E PXE OpROM	Disabled	Default
	Enabled	
Enable or Disable Legacy Boot Option for RTL8111E..		
Option ROM Messages	Force BIOS	Default
	Keep Current	
Set display mode for Option ROM.		
INT19 Trap Response	Immediate	Default
	Postponed	
BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE – execute the trap right away; POSTPONED – execute the trap during legacy boot.		

BBS Priorities

Security



Change User/Supervisor Password

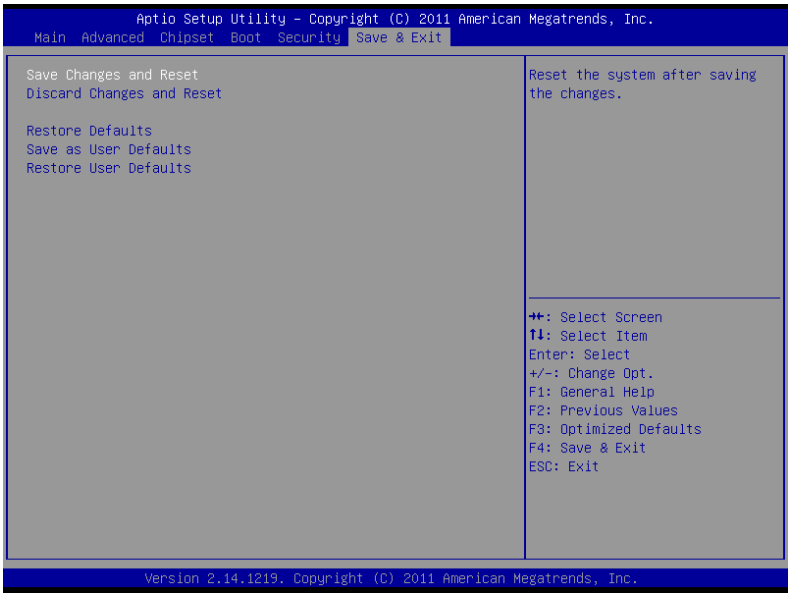
You can install a Supervisor password, and if you install a supervisor password, you can then install a user password. A user password does not provide access to many of the features in the Setup utility.

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: Exit



Chapter

4

Driver Installation

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The AEC-6646 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

Step 6 – Install ME Driver

Step 7 – Install TPM Driver

Step 8 – Install Serial Port Driver

Please read instructions below for further detailed installations.

4.1 Installation:

Insert the AEC-6646 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***

Step 6 – Install ME Driver

1. Click on the ***STEP6-ME SW*** 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

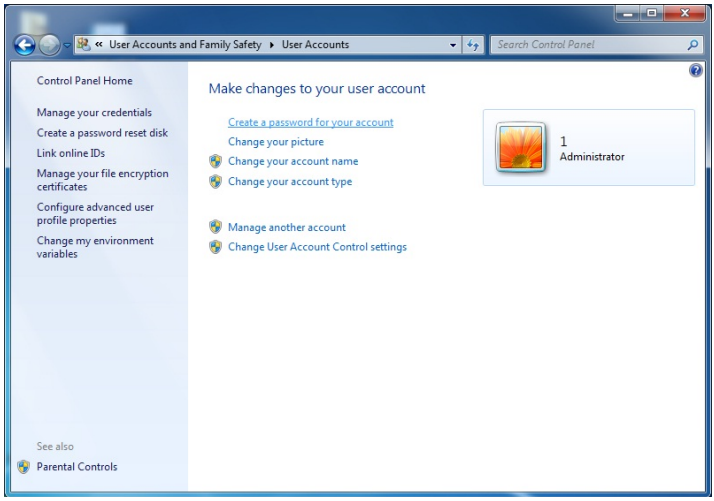
Step 7 – Install TPM Driver

1. Click on the ***STEP7-TPM*** 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

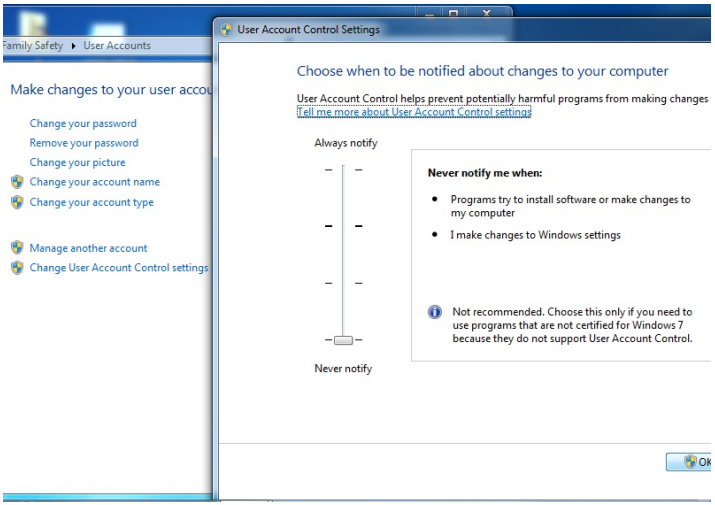
The system will help you install the driver automatically

Step 8 – Install Serial Port Driver

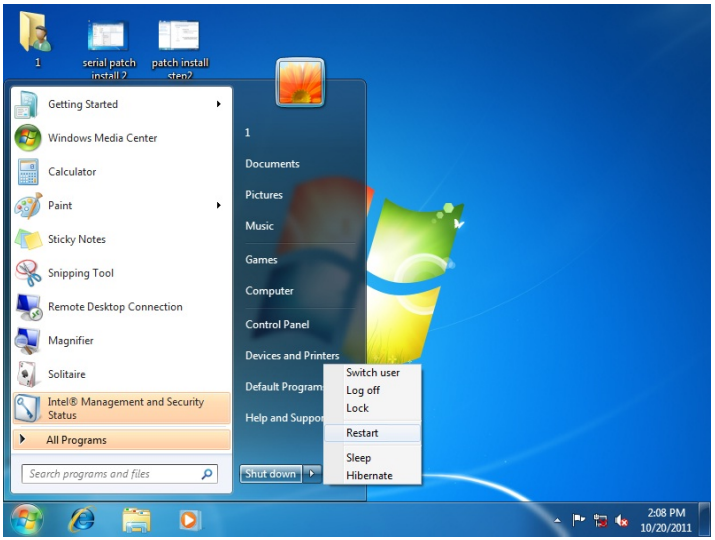
1. Go to **Control Panel > User Accounts and Family > User Accounts** to make changes to your user account.



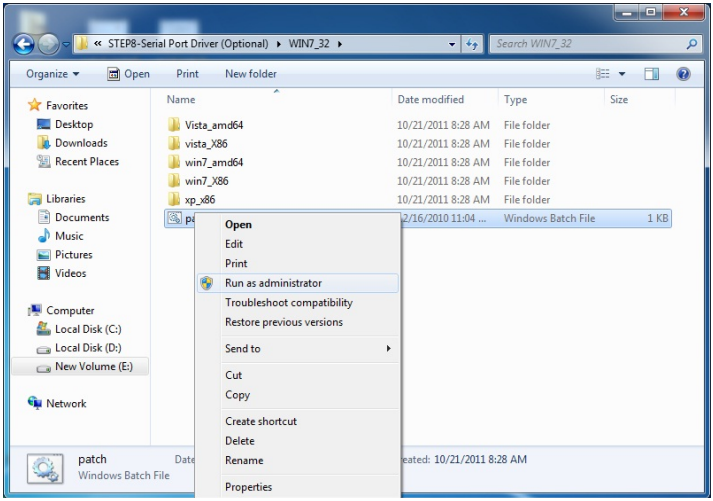
2. Adjust the user account control setting to the lowest level.

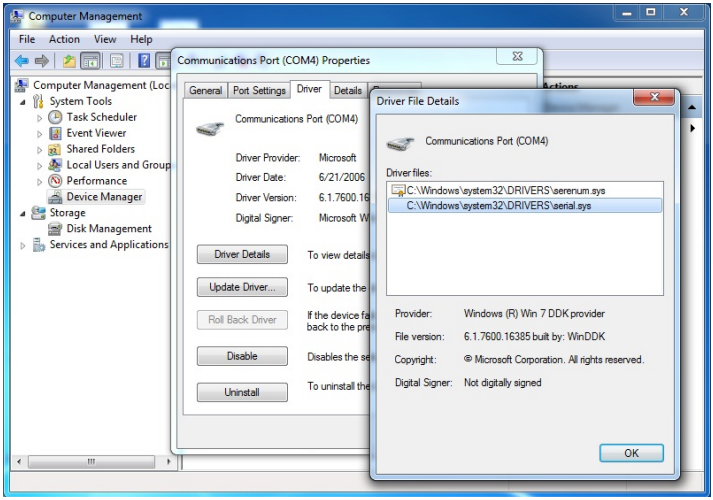


3. Restart the system.



4. After the system restarts, click PATCH.exe to install serial port driver.





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)	**0xF6**(Note4)		(Note24)	Time of watchdog timer (0~255) This register is byte access
Counting Unit	**0x07**(Note5)	**0xF5**(Note6)	**3**(Note7)	**0**(Note8)	Select time unit. 0: second 1: minute
Watchdog Enable	**0x07**(Note9)	**0xF5**(Note10)	**5**(Note11)	**1**(Note12)	0: Disable 1: Enable
Timeout Status	**0x07**(Note13)	**0xF5**(Note14)	**6**(Note15)	**1**	1: Clear timeout status
Output Mode	**0x07**(Note16)	**0xF5**(Note17)	**4**(Note18)	**1**(Note19)	Select WDTRST# output mode 0: level 1: pulse
WDTRST output	**0x07**(Note20)	**0xFA**(Note21)	**0**(Note22)	**1**(Note23)	Enable/Disable time out output via WDTRST# 0: Disable 1: Enable

```
*********************************************************************************
// 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
#define byte   ModeLDN    // This parameter is represented from Note16
#define byte   ModeReg    // This parameter is represented from Note17
#define byte   ModeBit    // This parameter is represented from Note18
#define byte   ModeVal    // This parameter is represented from Note19
#define byte   WDTRstLDN    // This parameter is represented from Note20
#define byte   WDTRstReg    // This parameter is represented from Note21
#define byte   WDTRstBit    // This parameter is represented from Note22
#define byte   WDTRstVal    // This parameter is represented from Note23
*********************************************************************************
```

```
*****************************************************************************
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);
        // WDT output mode setting, level / pulse
        SIOBitSet(ModeLDN, ModeReg, ModeBit, ModeVal);
        // Watchdog timeout output via WDTRST#
        SIOBitSet(WDTRstLDN, WDTRstReg, WDTRstBit, WDTRstVal);
}

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

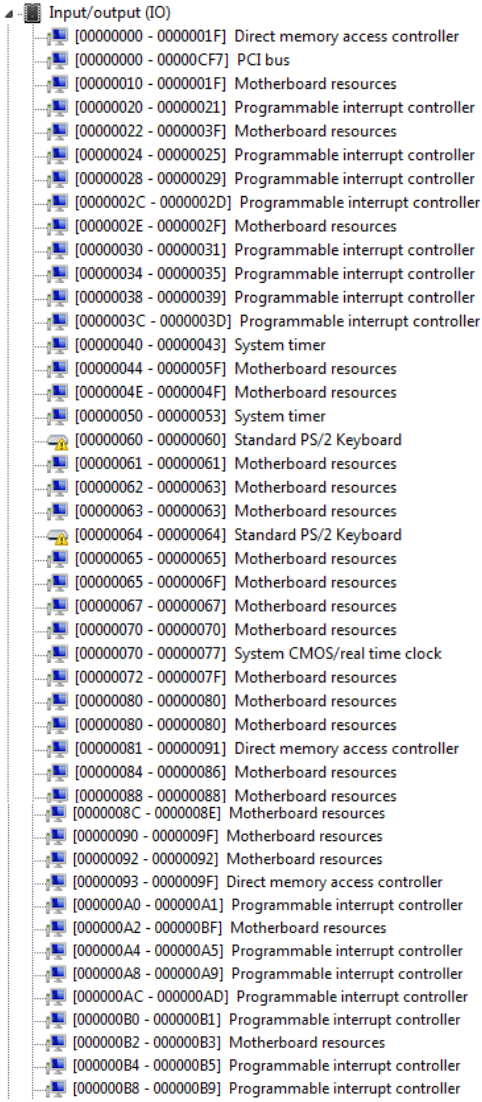
```
*****************************************************************************
VOID   SIOEnterMBPnPMode(){
       IOWriteByte(SIOIndex, 0x87);
       IOWriteByte(SIOIndex, 0x87);
}

VOID   SIOExitMBPnPMode(){
       IOWriteByte(SIOIndex, 0xAA);
}

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

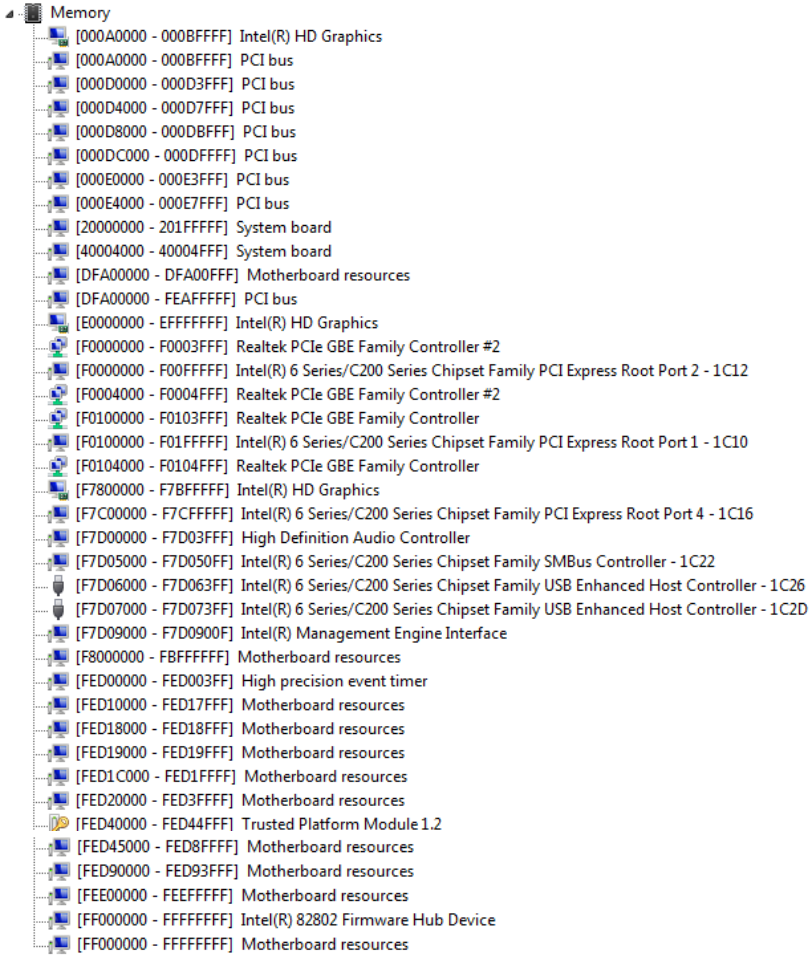
I/O Information

B.1 I/O Address Map

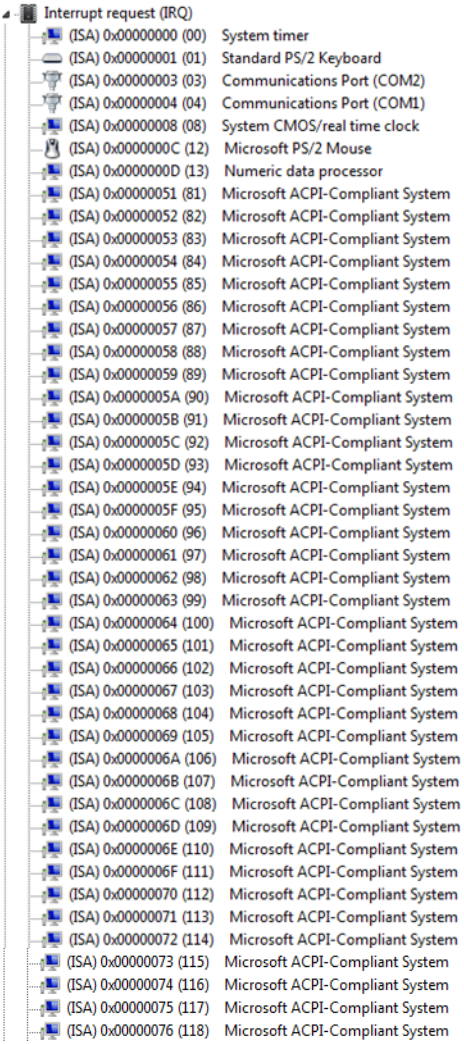


- [000000BC - 000000BD] Programmable interrupt controller
- [000000C0 - 000000DF] Direct memory access controller
- [000000E0 - 000000EF] Motherboard resources
- [000000F0 - 000000FF] Numeric data processor
- [00000290 - 0000029F] Motherboard resources
- [000002D0 - 000002D7] Communications Port (COM5)
- [000002D8 - 000002DF] Communications Port (COM6)
- [000002E8 - 000002EF] Communications Port (COM4)
- [000002F8 - 000002FF] Communications Port (COM2)
- [000003B0 - 000003BB] Intel(R) HD Graphics
- [000003C0 - 000003DF] Intel(R) HD Graphics
- [000003E8 - 000003EF] Communications Port (COM3)
- [000003F8 - 000003FF] Communications Port (COM1)
- [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 - 00000A0F] Motherboard resources
- [00000A10 - 00000A1F] Motherboard resources
- [00000D00 - 0000FFFF] PCI bus
- [00001000 - 0000100F] Motherboard resources
- [0000164E - 0000164F] Motherboard resources
- [0000C000 - 0000C00F] Standard Dual Channel PCI IDE Controller
- [0000C000 - 0000CFFF] Intel(R) 6 Series/C200 Series Chipset Family PCI Express Root Port 4 - 1C16
- [0000C010 - 0000C013] Standard Dual Channel PCI IDE Controller
- [0000C020 - 0000C027] Standard Dual Channel PCI IDE Controller
- [0000C030 - 0000C033] Standard Dual Channel PCI IDE Controller
- [0000C040 - 0000C047] Standard Dual Channel PCI IDE Controller
- [0000D000 - 0000D0FF] Realtek PCIe GBE Family Controller #2
- [0000D000 - 0000DFFF] Intel(R) 6 Series/C200 Series Chipset Family PCI Express Root Port 2 - 1C12
- [0000E000 - 0000E0FF] Realtek PCIe GBE Family Controller
- [0000E000 - 0000EFFF] Intel(R) 6 Series/C200 Series Chipset Family PCI Express Root Port 1 - 1C10
- [0000F000 - 0000F03F] Intel(R) HD Graphics
- [0000F040 - 0000F05F] Intel(R) 6 Series/C200 Series Chipset Family SMBus Controller - 1C22
- [0000F060 - 0000F06F] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C08
- [0000F070 - 0000F07F] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C08
- [0000F080 - 0000F083] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C08
- [0000F090 - 0000F097] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C08
- [0000F0A0 - 0000F0A3] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C08
- [0000F0B0 - 0000F0B7] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C08
- [0000F0C0 - 0000F0CF] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C00
- [0000F0D0 - 0000F0DF] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C00
- [0000F0E0 - 0000F0E3] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C00
- [0000F0F0 - 0000F0F7] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C00
- [0000F100 - 0000F103] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C00
- [0000F110 - 0000F117] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C00
- [0000FFFF - 0000FFFF] Motherboard resources
- [0000FFFF - 0000FFFF] Motherboard resources

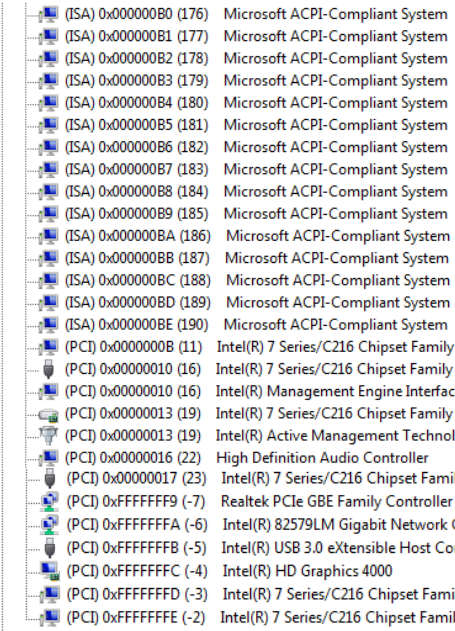
B.2 1st MB Memory Address Map



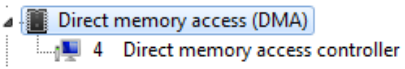
B.3 IRQ Mapping Chart



(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



B.4 DMA Channel Assignments



Appendix

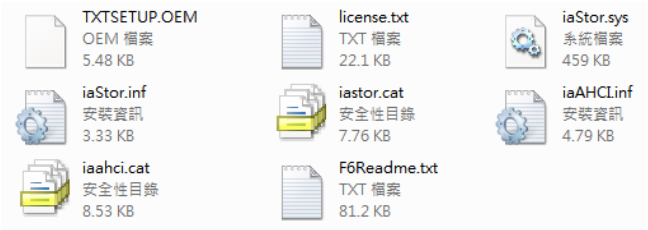
C

AHCI Settings

C.1 Setting AHCI

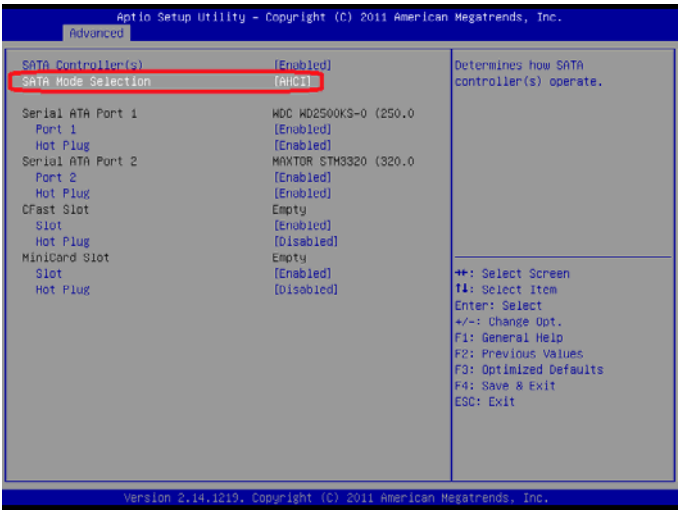
OS installation to SETUP AHCI Mode

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

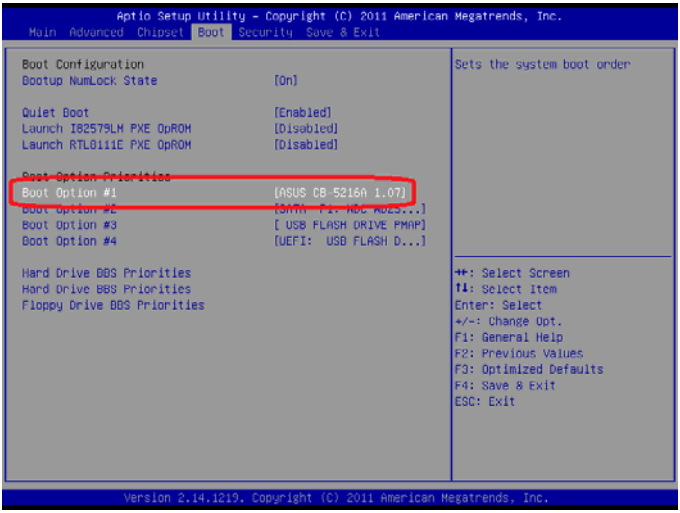


Step 2: Connect the USB Floppy drive to the board and insert the diskette from previous step.

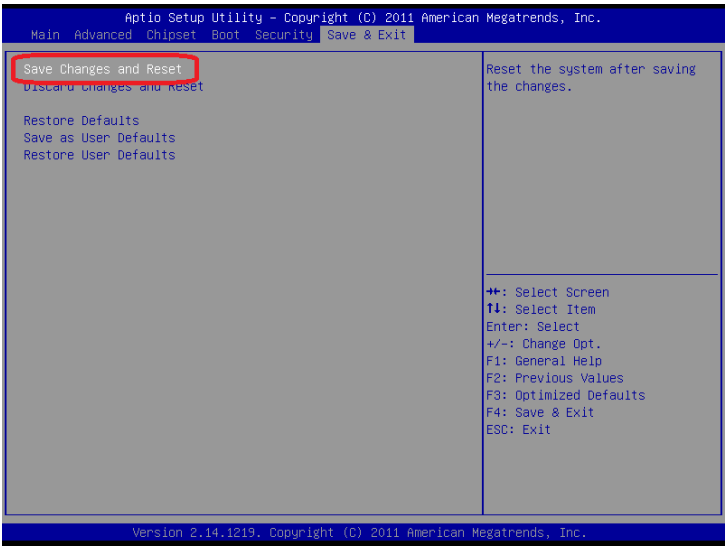
Step 3: Configure SATA Controller to AHCI mode in **BIOS SETUP Menu: Advanced -> SATA Configuration -> SATA Mode -> AHCI Mode**



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



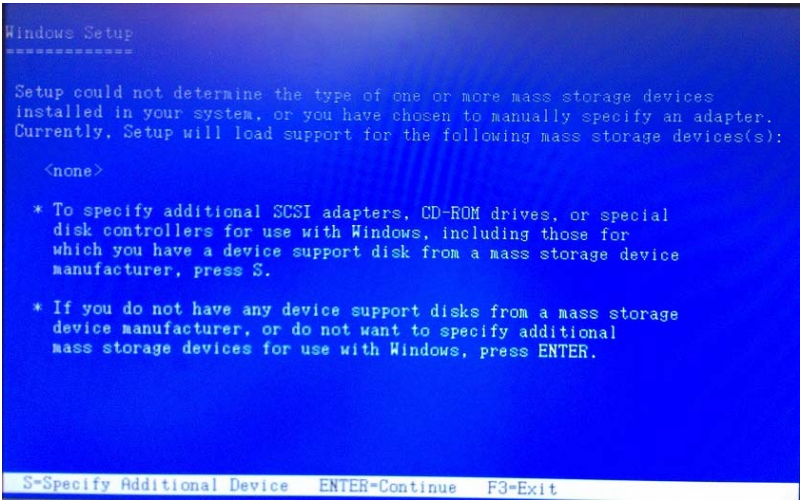
Step 5: Save changes and exit BIOS SETUP



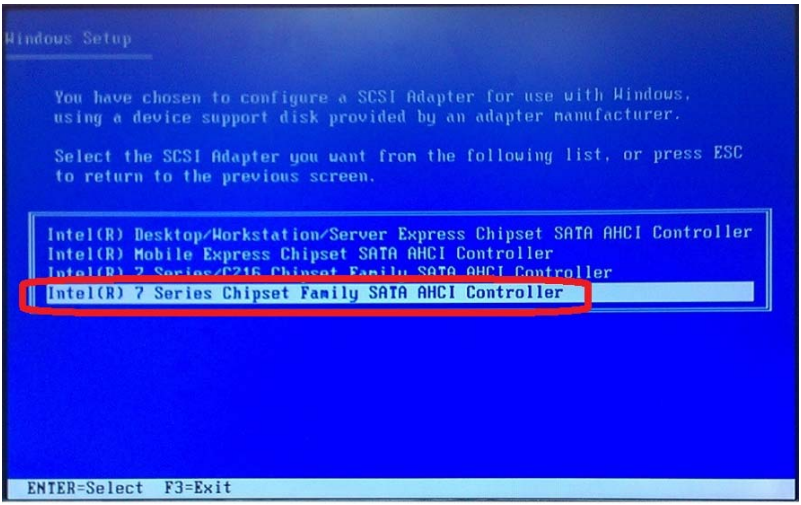
Step 6 – Boot to DVD/CD-ROM device to install OS

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

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



Step 9 – Choose **"Intel(R) 7 Series Chipset Family SATA AHCI Controller"**



Step 10 – It will show the model you selected and then press **"ENTER"**.

Windows Setup will continue to install OS.