AEC-6638

Fanless Embedded Box PC

User's Manual 3rd Ed

Last Updated: December 23, 2015

Copyright Notice

Acknowledgement

Packing List

Before setting up your product, please make sure the following items have been shipped:

Item	Quantity
● AEC-6638	1
● Thermal pad for RAM (1998F15003 x 1, 1998666630 x2, 1998666652 x1)	4
● Screw package	1
● Wallmount bracket	2
● Product DVD with User's Manual (in pdf) and drivers	1

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

About this Document

This User's Manual contains all the essential information, such as detailed descriptions and explanations on the product's hardware and software features (if any), its specifications, dimensions, jumper/connector settings/definitions, and driver installation instructions (if any), to facilitate users in setting up their product.

Users may refer to the AAEON.com for the latest version of this document.

Safety Precautions

Please read the following safety instructions carefully. It is advised that you keep this manual for future references

1. All cautions and warnings on the device should be noted.
2. Make sure the power source matches the power rating of the device.
3. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
4. Always completely disconnect the power before working on the system's hardware.
5. No connections should be made when the system is powered as a sudden rush of power may damage sensitive electronic components.
6. If the device is not to be used for a long time, disconnect it from the power supply to avoid damage by transient over-voltage.
7. Always disconnect this device from any AC supply before cleaning.
8. While cleaning, use a damp cloth instead of liquid or spray detergents.
9. Make sure the device is installed near a power outlet and is easily accessible.
10. Keep this device away from humidity.
11. Place the device on a solid surface during installation to prevent falls
12. Do not cover the openings on the device to ensure optimal heat dissipation.
13. Watch out for high temperatures when the system is running.
14. Do not touch the heat sink or heat spreader when the system is running
15. Never pour any liquid into the openings. This could cause fire or electric shock.
16. As most electronic components are sensitive to static electrical charge, be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and contain all electronic components in any static-shielded containers.

17. If any of the following situations arises, please the contact our service personnel:
    i. Damaged power cord or plug
    ii. Liquid intrusion to the device
    iii. Exposure to moisture
    iv. Device is not working as expected or in a manner as described in this manual
    v. The device is dropped or damaged
    vi. Any obvious signs of damage displayed on the device
18. DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WITH TEMPERATURES BEYOND THE DEVICE'S PERMITTED STORAGE TEMPERATURES (SEE CHAPTER 1) TO PREVENT DAMAGE.

FCC Statement

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.

Attention:

Il y a un risque d'explosion si la batterie est remplacée de façon incorrecte.
Ne la remplacer qu'avec le même modèle ou équivalent recommandé par le constructeur. Recycler les batteries usées en accord avec les instructions du fabricant et les directives gouvernementales de recyclage.

China RoHS Requirements (CN)

产品中有毒有害物质或元素名称及含量

AAEON Embedded Box PC/ 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	○	○	○	○	○	○

○：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。

China RoHS Requirement (EN)

Poisonous or Hazardous Substances or Elements in Products

AAEON Embedded Box PC/ Industrial System

Component	Poisonous or Hazardous Substances or Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
PCB & Other Components	O	O	O	O	O	O
Wires & Connectors for External Connections	O	O	O	O	O	O
Chassis	O	O	O	O	O	O
CPU & RAM	O	O	O	O	O	O
Hard Disk	O	O	O	O	O	O
PSU	O	O	O	O	O	O

O：The quantity of poisonous or hazardous substances or elements found in each of the component's parts is below the SJ/T 11363-2006-stipulated requirement.

X: The quantity of poisonous or hazardous substances or elements found in at least one of the component's parts is beyond the SJ/T 11363-2006-stipulated requirement.

Note: The Environment Friendly Use Period as labeled on this product is applicable under normal usage only

Table of Contents

Chapter 1

Product Specifications

1.1 Specifications

System	
CPU	Intel® Core™ i3-4100E 2.4GHz/i5-4400E 2.4GHz processor
CPU board	GENE-QM87
System Memory	DDR3L 1333/1600 SODIMM x 1 up to 8 GB
Display Interface	DB-15 x 1 for VGA DVI-D x 1 HDMI x 1
Storage Device	CFast™ x 1 or mSATA (Optional) 2.5" SATA 6.0Gb/s Hard Disk Drive Bay x 1 Supports RAID 0 & 1 (via optional 2nd HDD kit)[with QM87]
Network	Intel® I217/I218 Gigabit PHY & Intel® I210/211 Gigabit, RJ-45 x 2
Front I/O	Power ON/OFF switch x 1 Power LED x 1 HDD LED x 1 Line-out x 1 USB 2.0 x 2 Antenna hole x 2 for optional wireless module 3-pin terminal block x 1
Rear I/O	DB-9 x 1 for RS-232/ RS-422/ RS-485 (Ring/ +5V/ +12V), RS-485 with auto flow DB-9 x 2 for RS-232 x 2 USB 3.0 x 2 DB-15 x 1 for VGA

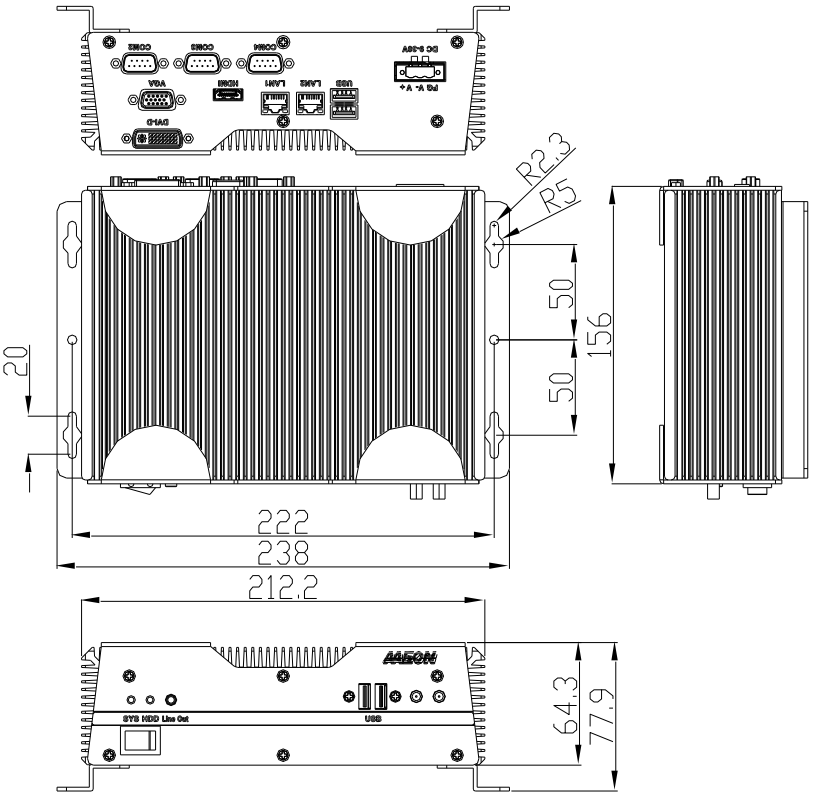
		DVI-D x 1
		HDMI x 1
		RJ-45 x 2 for 10/100/1000 base-T
Expansion		MiniCard x 1 for optional wireless module
Power Requirement		9~30V DC with 3-pin terminal block
Mounting		Wallmount
Operating Temperature		14°F ~ 122°F (-10°C ~ 50°C) with industrial grade devices (according to IEC68-2-14, IEC68-2-1, IEC68-2-2)
Storage Temperature		-20 ~ 70°C (-4 ~ 158°F)
Vibration		5 Grms/5~500Hz/ operation (CFast™); 1 Grms /5~500Hz/ operation (HDD)
Shock		50G peak acceleration (11 msec, duration)-CFast™ 20G peak acceleration (11 msec, duration)-HDD
Certification	EMC	CE/FCC Class A

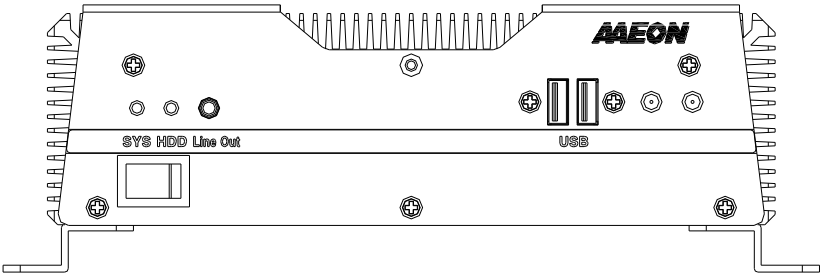
Chapter 2

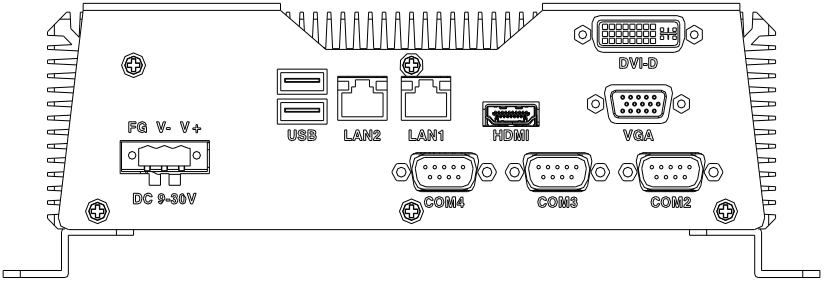
Hardware Information

2.1 Dimensions

A1M/A2M /A3M Version




SYS HDD Line Out
USB

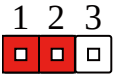

FG V- V+
DC 9-30V
USB
LAN2
LAN1
HDMI
DVI-D
VGA
COM4
COM3
COM2

2.2 List of Jumpers

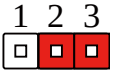
Please refer to the table below for all of the system's jumpers that you can configure for your application

Label	Function
JP1	Mini-Card with mSATA / PCIe Selection
JP2	Touchscreen 4/5/8-wire Mode Selection
JP3	LVDS Port 1 Backlight Inverter Voltage Selection
JP4	LVDS Port 1 Backlight Lightness Control Mode Selection
JP5	LVDS Port 1 Operating Voltage Selection
JP6	LVDS Port 2 Operating Voltage Selection
JP7	LVDS Port 2 Backlight Inverter Voltage Selection
JP8	LVDS Port 2 Backlight Lightness Control Mode Selection
JP9	AT/ATX Power Supply Mode Selection
JP10	Clear CMOS Jumper
JP11	COM2 Pin8 Function Selection

2.2.1 MiniCard with mSATA/ PCIe Selection (JP1)



mSATA



PCIe (Default)

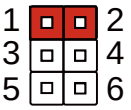
2.2.2 AT/ATX Power Supply Mode Selection (JP9)

Pin	Function
1-2	ATX Mode (Default)
2-3	AT Mode

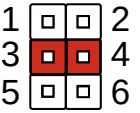
2.2.3 Clear CMOS Jumper (JP10)

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

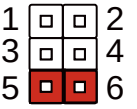
2.2.4 COM2 Pin8 Function Selection (JP11)



+12V



Ring (Default)



+5V

2.3 List of Connectors

Please refer to the table below for all of the system's connectors that you can configure for your application

Label	Function
CN1	+5VSB Output w/SMBus
CN2	LVDS Port 2 Inverter / Backlight Connector
CN3	+5V Output for SATA HDD
CN4	External +5VSB Input
CN5	CPU FAN
CN6	SATA Port 2
CN7	SATA Port 1
CN8	Main Power Input (+12V ONLY)
CN9	Digital IO Port
CN10	LVDS Port 1 Inverter / Backlight Connector
CN11	SPI Programming Header (Debug ONLY)
CN12	USB 2.0 Port 3
CN13	USB 2.0 Port 4
CN14	LVDS Port 1
CN15	LVDS Port 2
CN16	USB 2.0 Port 5
CN17	USB 2.0 Port 6
CN18	USB 2.0 Port 8
CN19	USB 2.0 Port 7
CN20	Touch Screen Connector
CN21	COM Port 4
CN22	COM Port 3
CN23	LPC Expansion Connector

CN24	COM Port 2 (RS232/285/422)
CN25	PS/2 Keyboard/Mouse Combo Port
CN26	Stereo Audio RIGHT Channel
CN27	Stereo Audio LEFT Channel
CN28	Front Panel
CN29	10M/100M/1G Ethernet Port 1
CN30	10M/100M/1G Ethernet Port 2
CN31	USB 2.0/3.0 Port 1 & 2
CN32	High Definition Audio
CN33	COM Port 1
CN34	HDMI
CN35	VGA / DVI Ports (depend on hardware configuration)
CN36	UIM Socket
PCIE1	Mini-Card
CFD1	C-FAST
DIMM1	DDR3L SODIMM

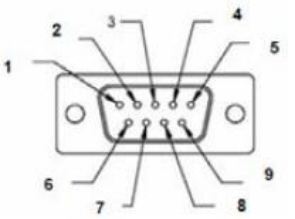
2.3.1 COM Port 3 Connector (CN21)

Pin	Signal	Pin	Signal
1	DCDC	2	RXC
3	TXC	4	DTRC
5	Ground	6	DSRC
7	RTSC	8	CTSC
9	RIC		

2.3.2 COM Port 4 Connector (CN22)

Pin	Signal	Pin	Signal
1	DCDD	2	RXD
3	TXD	4	DTRD
5	Ground	6	DSRD
7	RTSD	8	CTSD
9	RID		

2.3.3 COM Port 2 Connector (CN24)



RS-232			
Pin	Signal	Pin	Signal
1	DCDB	2	RXB
3	TXB	4	DTRB

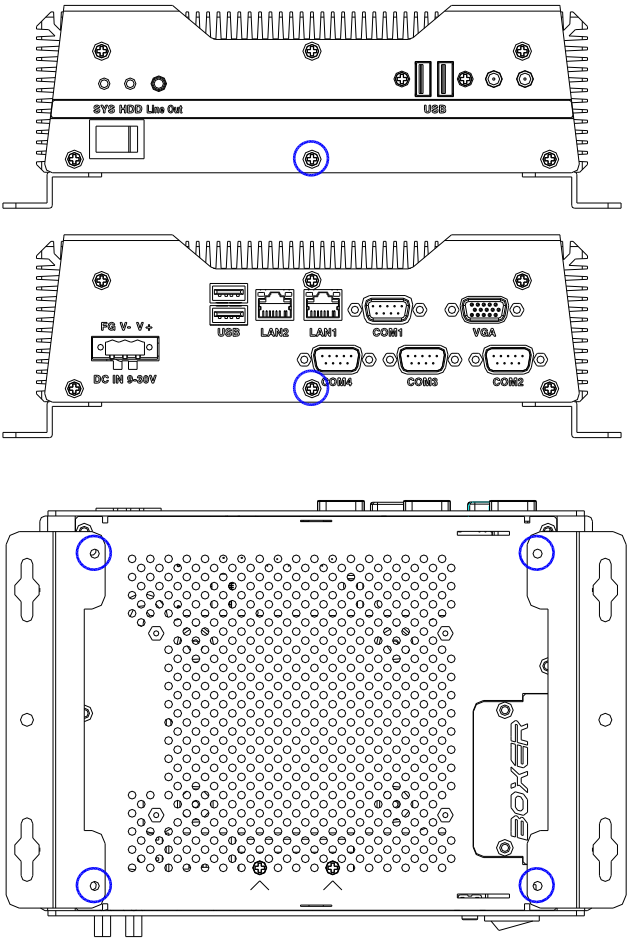
RS-232			
Pin	Signal	Pin	Signal
5	Ground	6	DSRB
7	RTSB	8	CTSB
9	RIB/ +5V/ (+12V)		

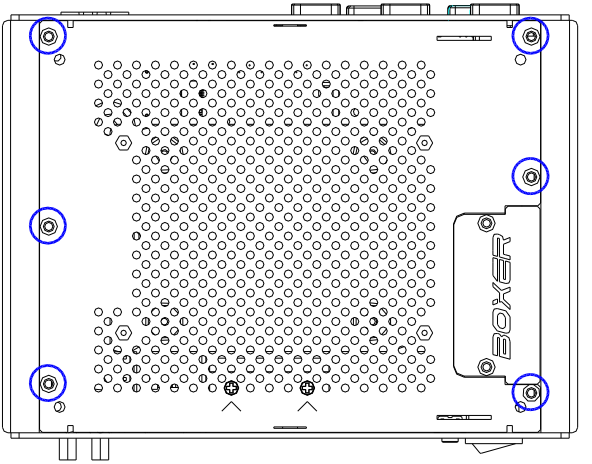
RS-422			
Pin	Signal	Pin	Signal
1	TXD-	2	RXD+
3	TXD+	4	RXD-
5	Ground	6	N/C
7	N/C	8	N/C
9	N/C/ +5V/ (+12V)		

RS-485			
Pin	Signal	Pin	Signal
1	TXD-	2	N/C
3	TXD+	4	N/C
5	Ground	6	N/C
7	N/C	8	N/C
9	N/C/ +5V/ (+12V)		

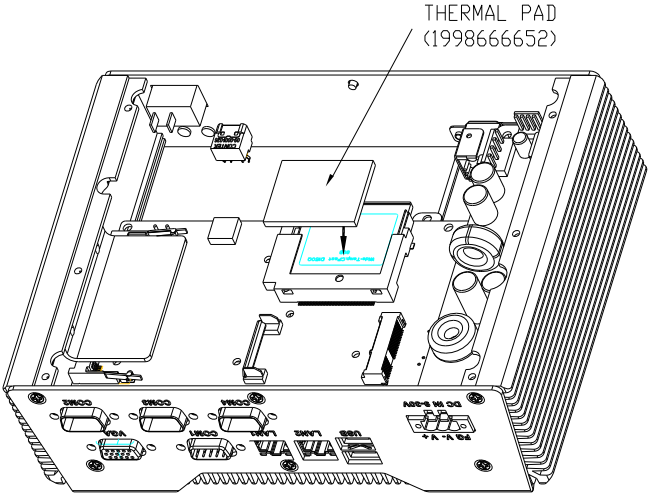
2.4 CFast™ Card Installation

Step1: To install the CFast™ card, first remove the highlighted screws



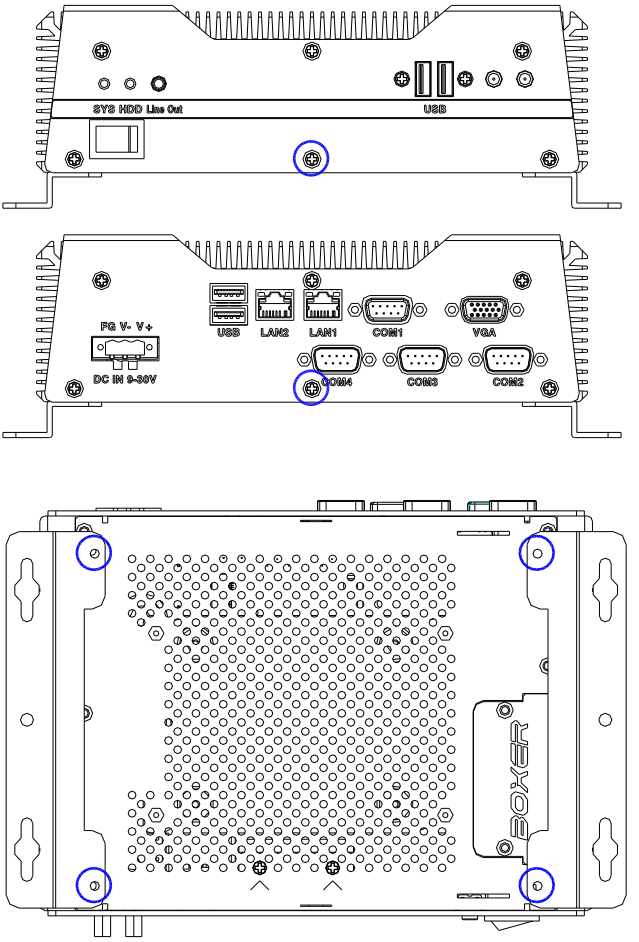


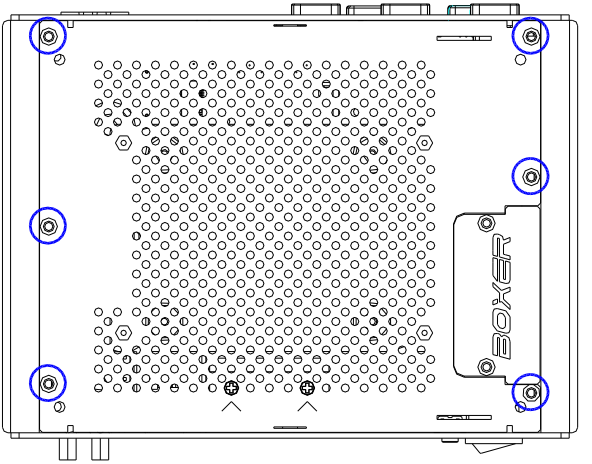
Step 2: Slot the CFast™ Card in to the CFast™ slot, adhere the thermal pad onto the card and close the cover



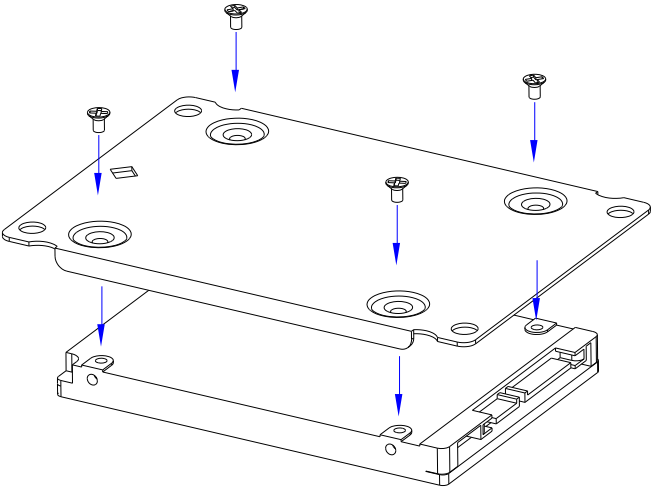
2.5 Hard Disk Drive (HDD) Installation

Step1: To install the CFast™ card, first remove the highlighted screws

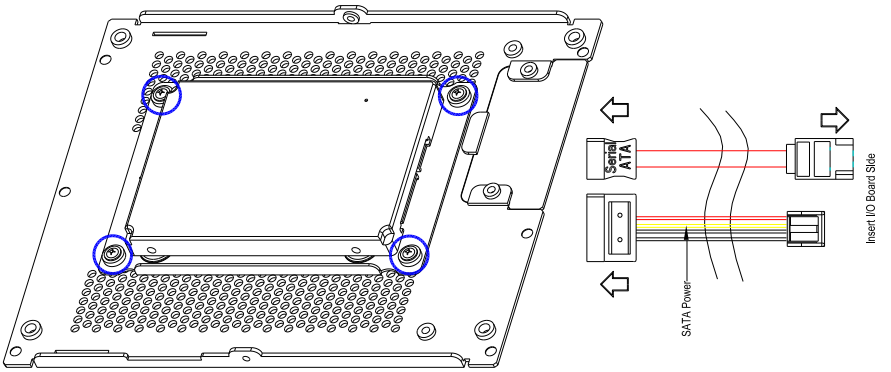




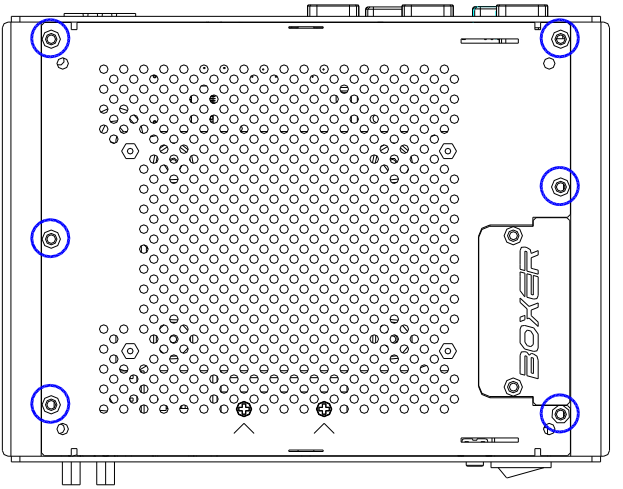
Step 2: Get the HDD and HDD Bracket ready. Attach the HDD to the HDD bracket and tighten the screws



Step 3: Connect the SATA cable to the HDD

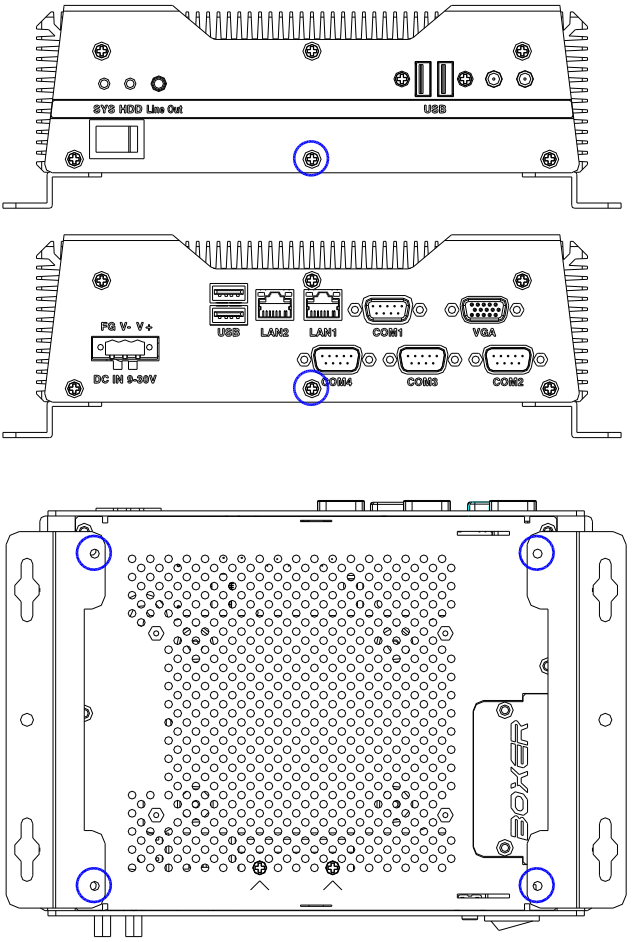


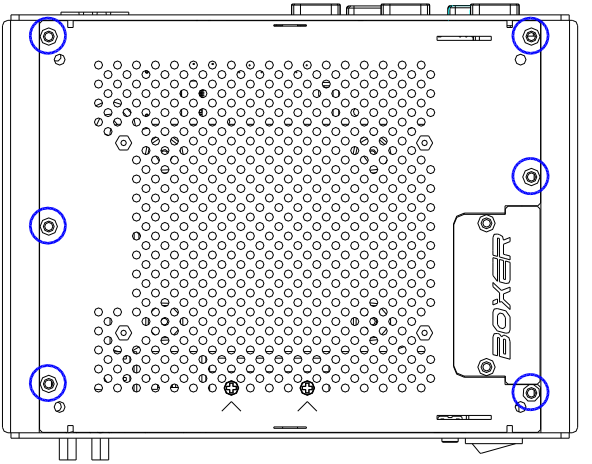
Step 4: Close the bottom cover. Tight the screws to secure.



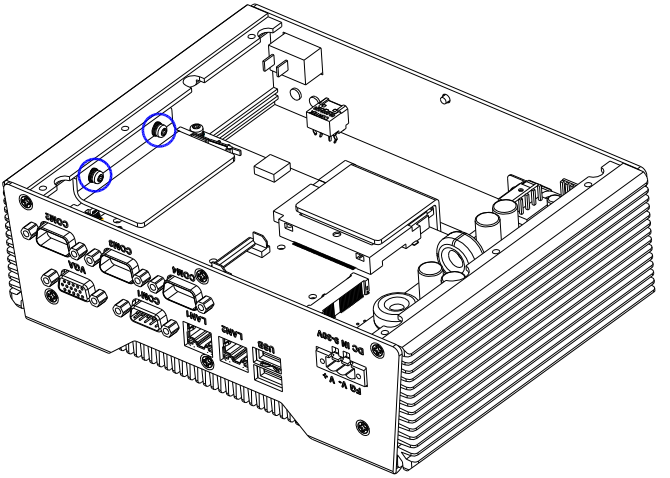
2.6 Memory Card Installation

Step1: To install the CFast™ card, first remove the highlighted screws

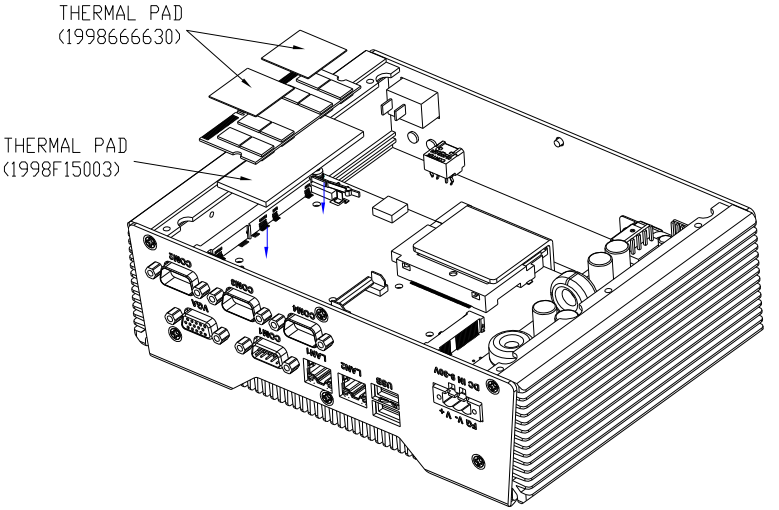




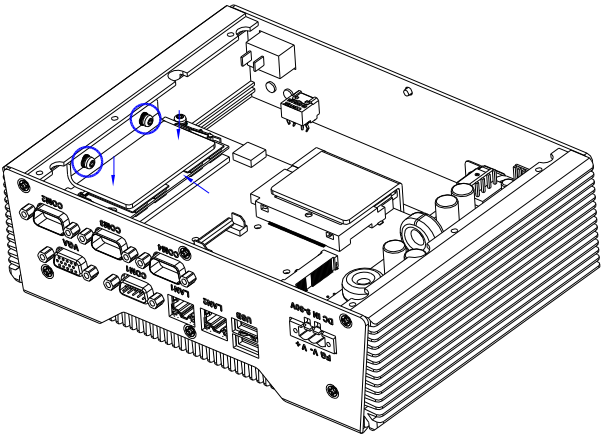
Step 2: Remove the screws on the bracket of Memory Card



Step 3: Adhere the Thermal pads onto the top and bottom of the Memory Card, and then insert the RAM diagonally to the memory slot, push down to secure.

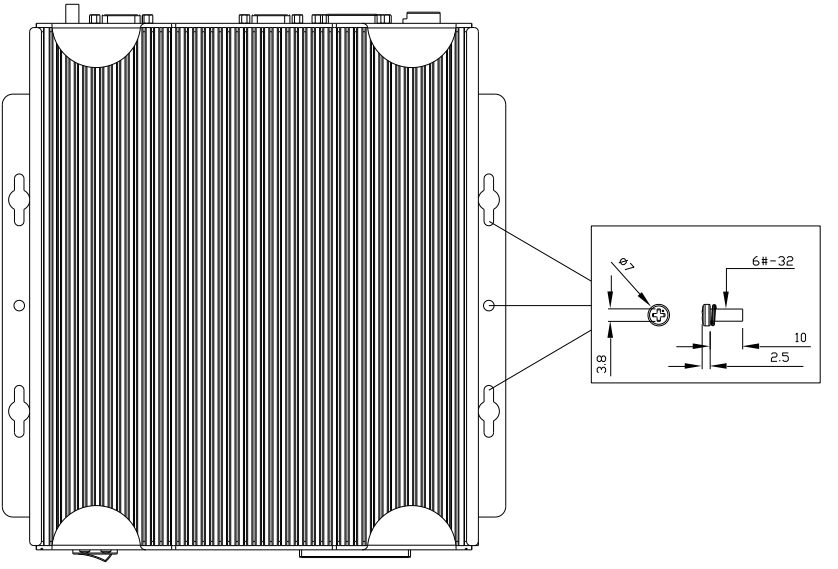


Step 4: Tighten the screws of the bracket of Memory Card to finish the installation



2.7 Wallmount Kit Installation

To attach the wallmount kit on to the AEC-6638, tightens four screws as shown in the diagram below.



Chapter 3

AMI BIOS Setup

3.1 System Test and Initialization

The system uses certain routines to perform testing and initialization. If an error, fatal or non-fatal, is encountered, a few short beeps or an error message will be outputted. The board can usually continue the boot up sequence with non-fatal errors.

The system configuration verification routines check the current system configuration against the values stored in the CMOS memory. If they do not match, an error message will be outputted, in which case you will need to run the BIOS setup program to set the configuration information in memory.

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

- You are starting your system for the first time
- You have changed your system's hardware
- The CMOS memory has lost power and the configuration information is erased

The system's CMOS memory uses a backup battery for data retention, which is to be replaced once emptied.

3.2 AMI BIOS Setup

The AMI BIOS ROM has a pre-installed Setup program that allows users to modify basic system configurations, which is stored in the battery-backed CMOS RAM and BIOS NVRAM so that the information is retained when the power is turned off.

To enter BIOS Setup, press <Del> or <F2> immediately while your computer is powering up.

The function for each interface can be found below.

Main – Date and time can be set here. Press <Tab> to switch between date elements

Advanced – Enable/ Disable boot option for legacy network devices

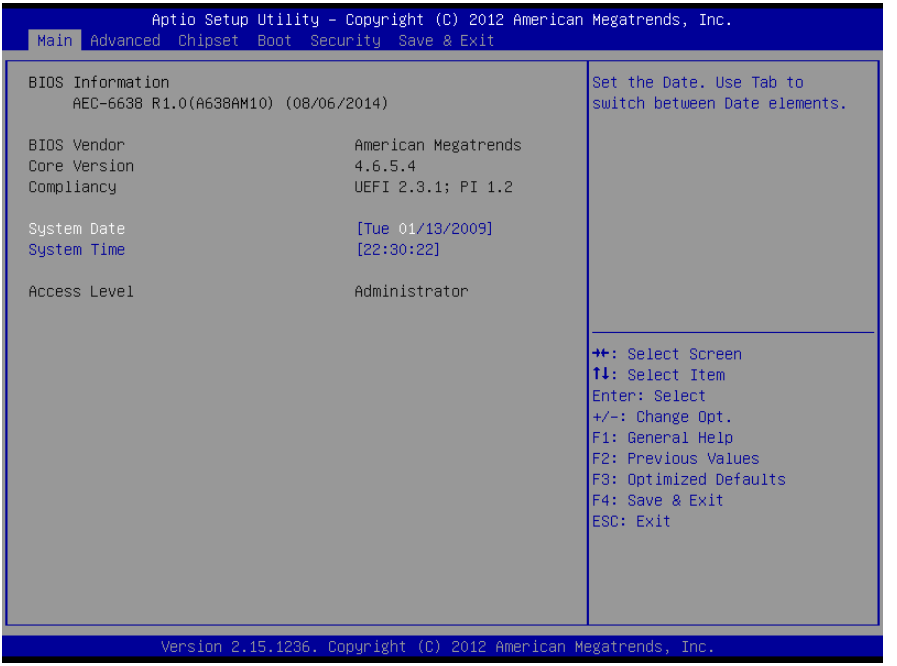
Chipset – For hosting bridge parameters

Boot – Enable/ Disable quiet Boot Option

Security – The setup administrator password can be set here

Save & Exit –Save your changes and exit the program

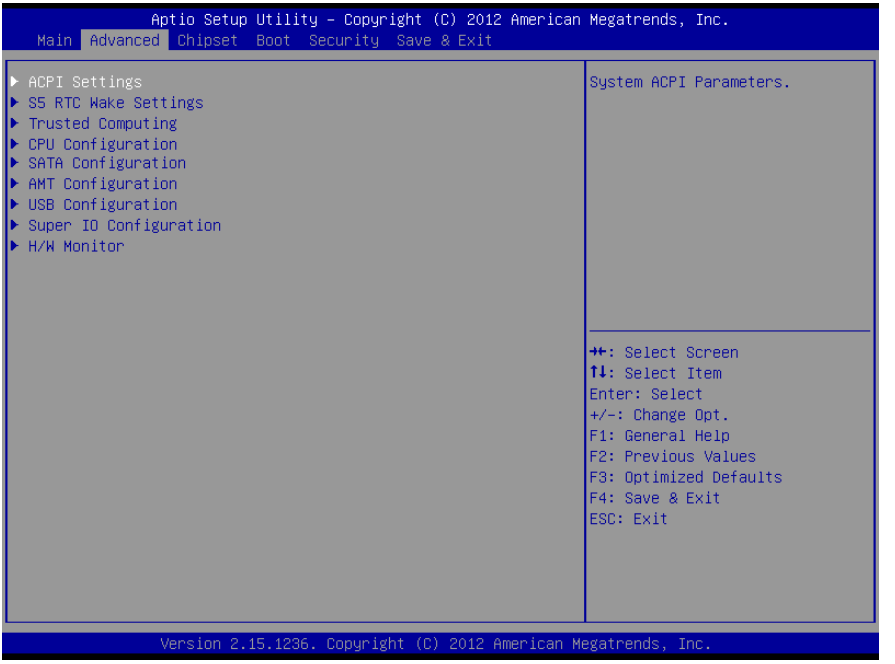
3.3 Setup Submenu: Main



Options summary: (**default setting**)

System Date	Day MM:DD:YYYY	
Change the month, year and century. The 'Day' is changed automatically.		
System Time	HH : MM : SS	
Change the clock of the system.		

3.4 Setup Submenu: Advanced

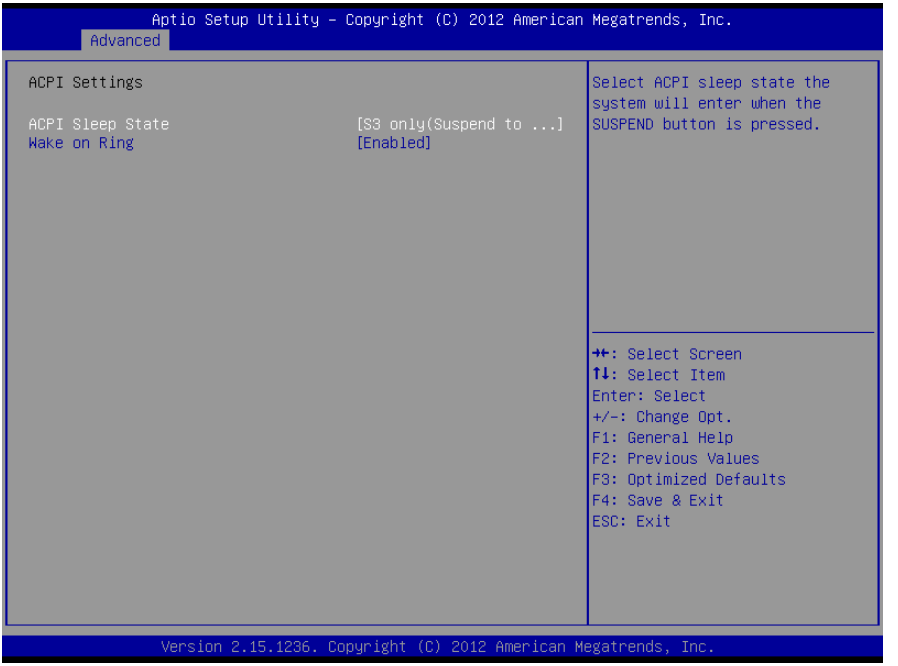


Options summary: (**default setting**)

ACPI Settings		
System ACPI Parameters		
S5 RTC Wake Settings		
Enable system to wake from S5 using RTC alarm.		
Trusted Computing		
Trusted Computing Settings		
CPU Configuration		
CPU Configuration Parameters		
SATA Configuration		
SATA Device Options Settings		

AMT Configuration		
AMT Configuration Parameters		
USB Configuration		
USB Configuration Parameters		
Super IO Configuration		
Super IO Configuration Parameters		
H/W Monitor		
Monitor hardware status		

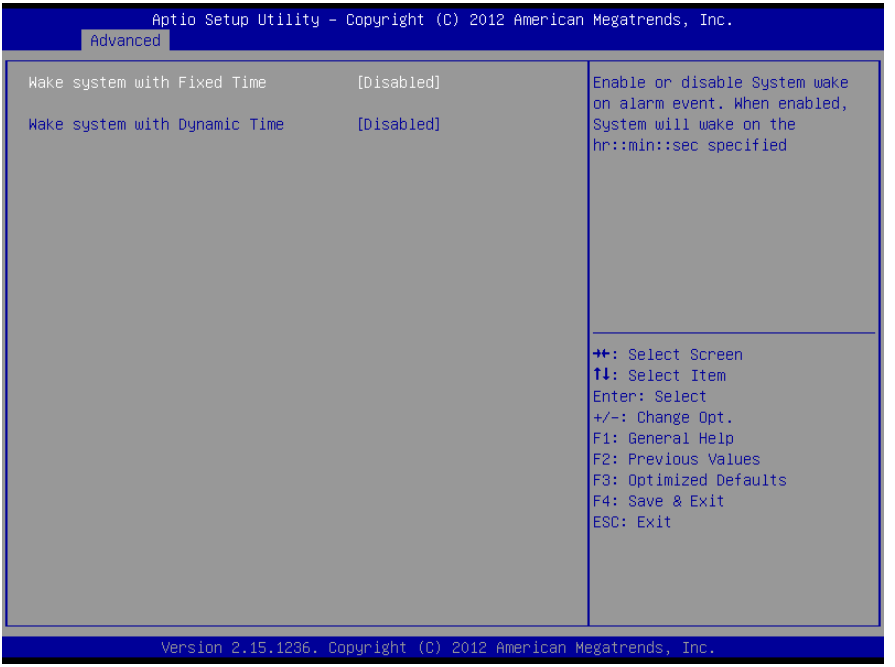
3.4.1 Advanced: ACPI Settings



Options summary: (**default setting**)

ACPI Sleep State	Suspend Disabled	
	S3 only(Suspend to RAM)	
Select the ACPI state used for System Suspend		
Wake on Ring	Disabled	
	Enabled	
Enable/Disable Wake on Ring function		

3.4.2 Advanced: RTC Wake Settings

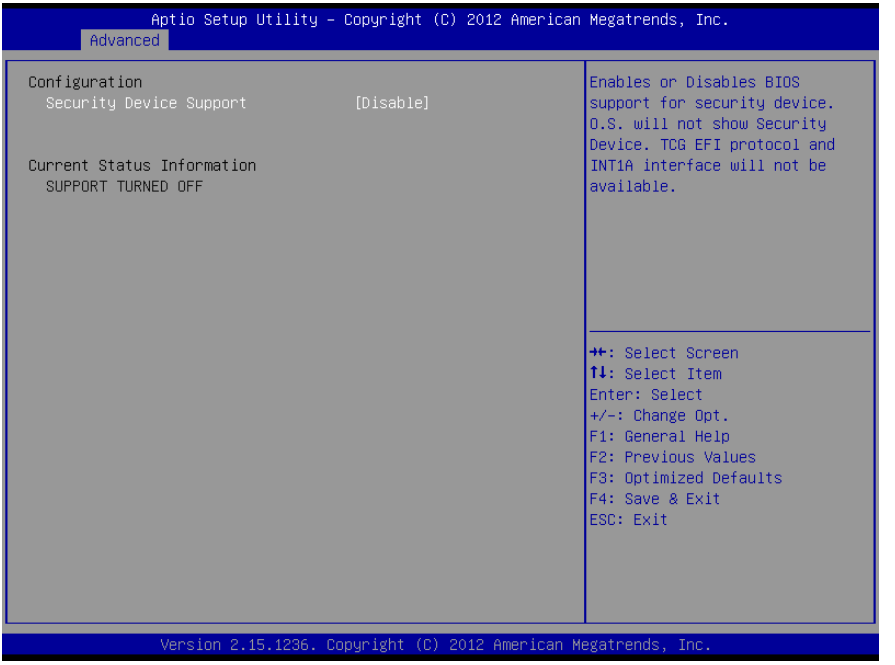


Options summary: (**default setting**)

Wake system with Fixed Time	**Disabled**	
	Enabled	
Enable or disable System wake on alarm event. Wake up time is setting by following settings.		
Wake up day	0-31	
Select 0 for daily system wake up		
Wake up hour	0-23	
Wake up minute	0-59	

Wake up second	0-59	
Wake system with Dynamic Time	**Disabled** Enabled	
Enable or disable System wake on alarm event. Wake up time is current time + Increase minutes.		
Wake up minute increase	1-5	

3.4.3 Advanced: Trusted Computing

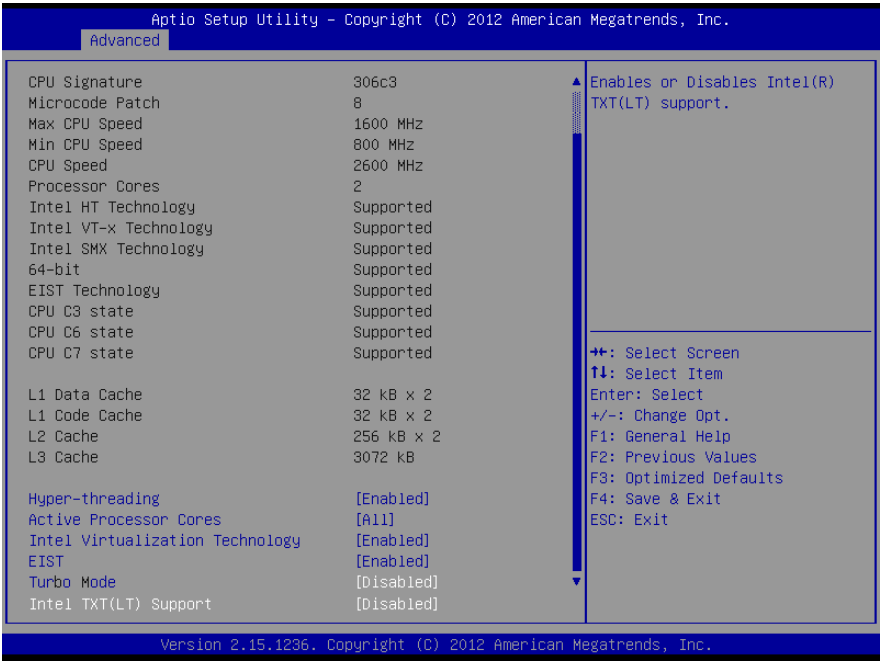


Options summary: (**default setting**)

Security Device Support	**Disabled**	
	Enabled	
En/Disable TPM support.		
TPM State	**Disabled**	
	Enabled	
En/Disable TPM functionality.		
Pending TPM Operation	**None**	
	Enable Take Ownership	
	Disable Take Ownership	
	TPM Clear	

Select one-time TPM operation. Item value returns to 'None' after next POST.

3.4.4 Advanced: CPU Configuration

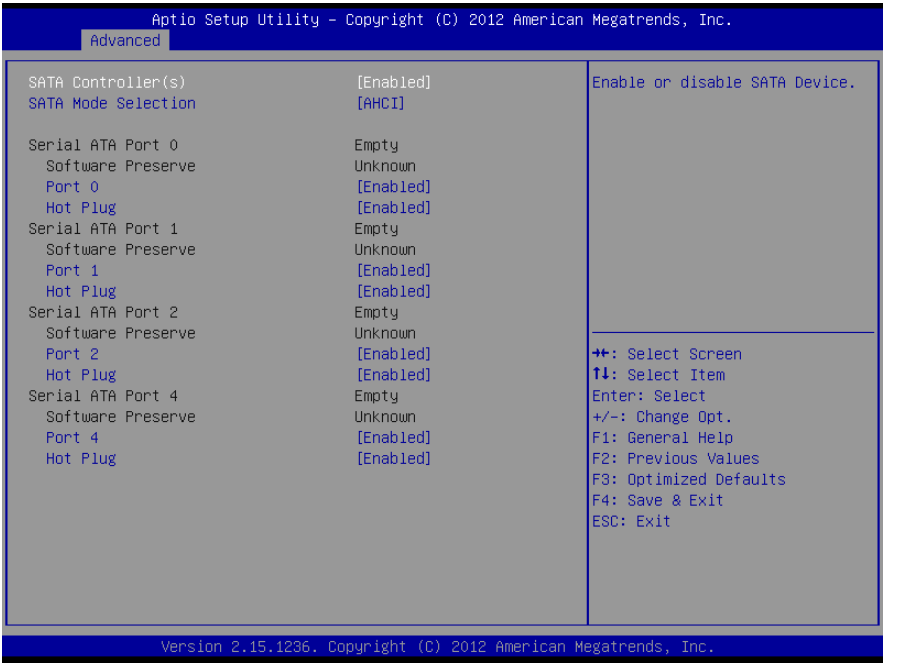


Options summary: (**default setting**)

Hyper-Threading	Disabled	
	Enabled	
En/Disable CPU Hyper-Threading function		
Active Processor Cores	**ALL**	
	1 to Max CPU cores	
Number of CPU cores to be active.		
Intel Virtualization Technology	Disabled	
	Enabled	

En/Disable Intel VT-x function		
EIST	Disabled	
	Enabled	
En/Disable Intel SpeedStep		
Turbo Mode	**Disabled**	
	Enabled	
En/Disable Turbo mode		
Intel TXT(LT) Support	**Disabled**	
	Enabled	
En/Disable Intel TXT(LT)		

3.4.5 Advanced: SATA Configuration

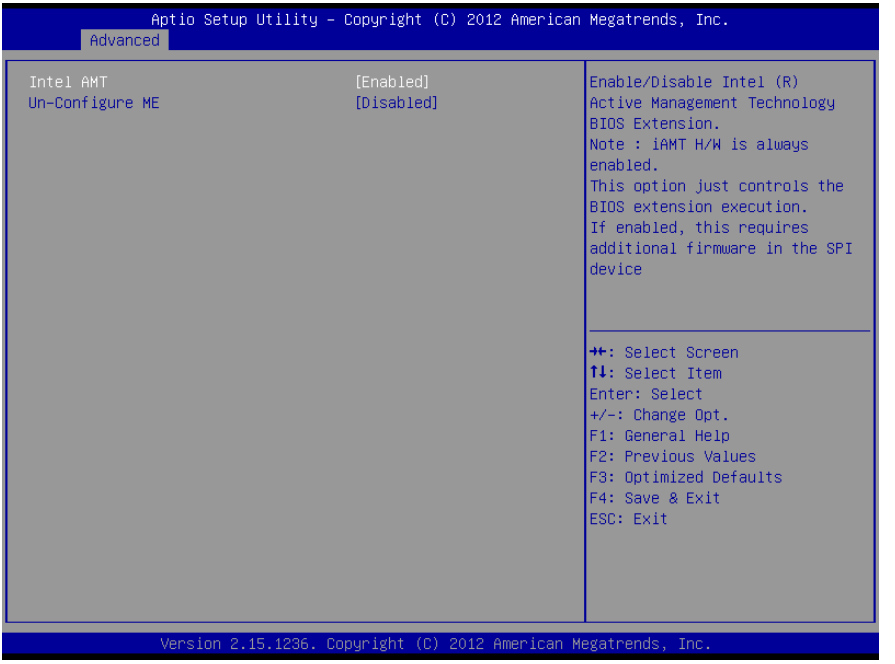


Options summary: (**default setting**)

SATA Controller(s)	Disabled	
	Enabled	
En/Disable SATA controller		
SATA Mode Selection	IDE	
	AHCI	
	RAID	
Configure SATA controller operating as IDE/AHCI/RAID mode.		
Port X	Disabled	
	Enabled	
En/Disable the selected port.		

Hot Plug	**Disabled**	
	Enabled	
En/Disable Hot Plug feature for specified port.		

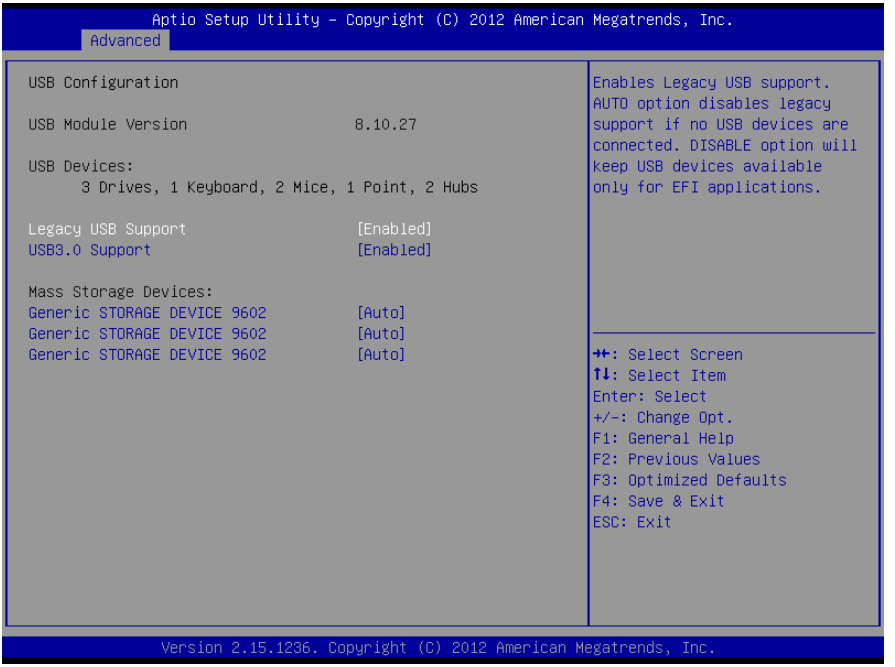
3.4.6 Advanced: AMT Configuration



Options summary: (**default setting**)

Intel AMT	**Enabled**	
	Disabled	
En/Disable Intel® Active Management Technology BIOS Extension. Note: iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device		
Un-Configure ME	Enabled	
	Disabled	
OEMFlag Bit 15: Un-Configure ME without password		

3.4.7 Advanced: USB Configuration

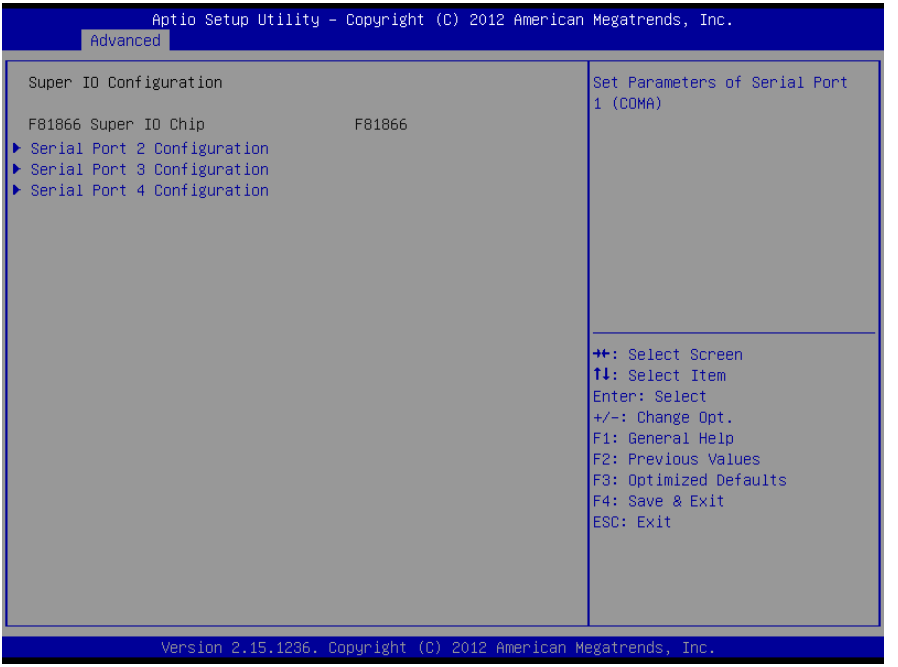


Options summary: (**default setting**)

Legacy USB Support	**Enabled**	
	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. DISABLE option will keep USB devices available only for EFI application		
USB3.0 Support	**Enabled**	
	Disabled	
Enables BIOS Support for USB3.0 (XHCI). When disabled, PCH USB3.0 controller will also be disabled.		

Device Name (Emulation Type)	Auto	
	Floppy	
	Forced FDD	
	Hard Disk	
	CD-ROM	
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)		

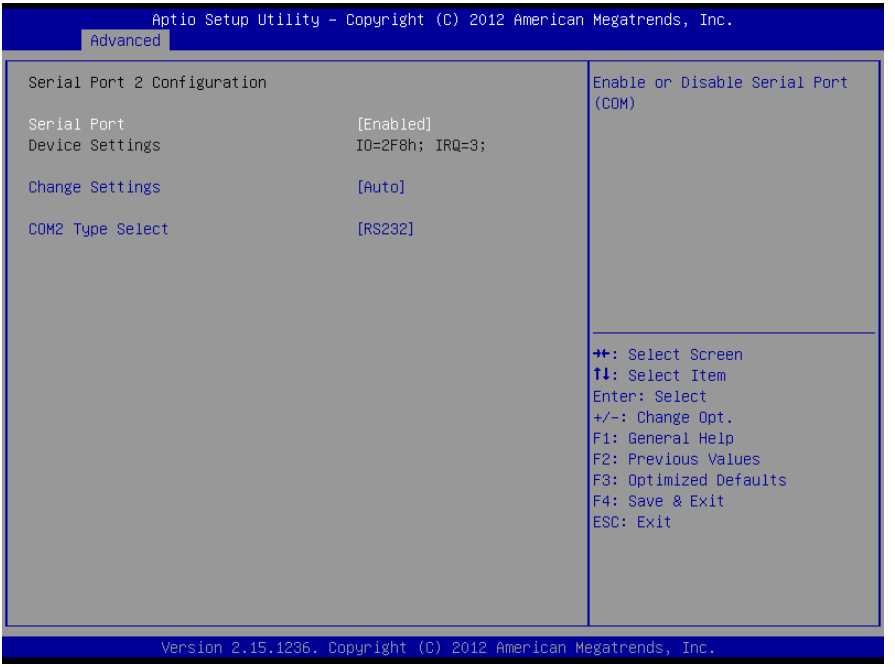
3.4.8 Advanced: Super IO Configuration



Options summary: (**default setting**)

Serial Port 2/3/4 Configuration		
Set Parameters of Serial Port 2/3/4		

3.4.8.1 Super IO Configuration: Serial Port X Configuration

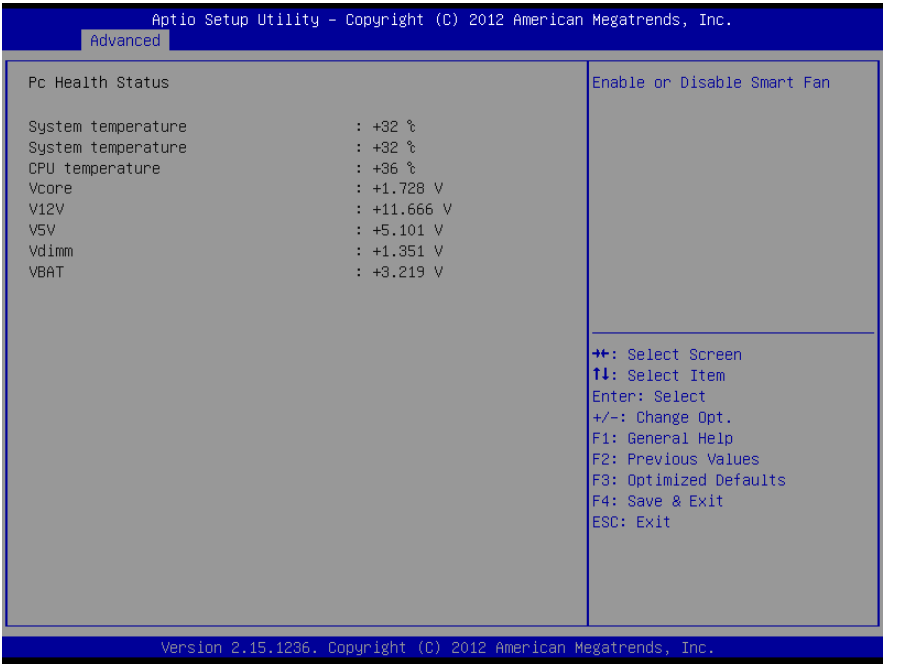


Options summary: (**default setting**)

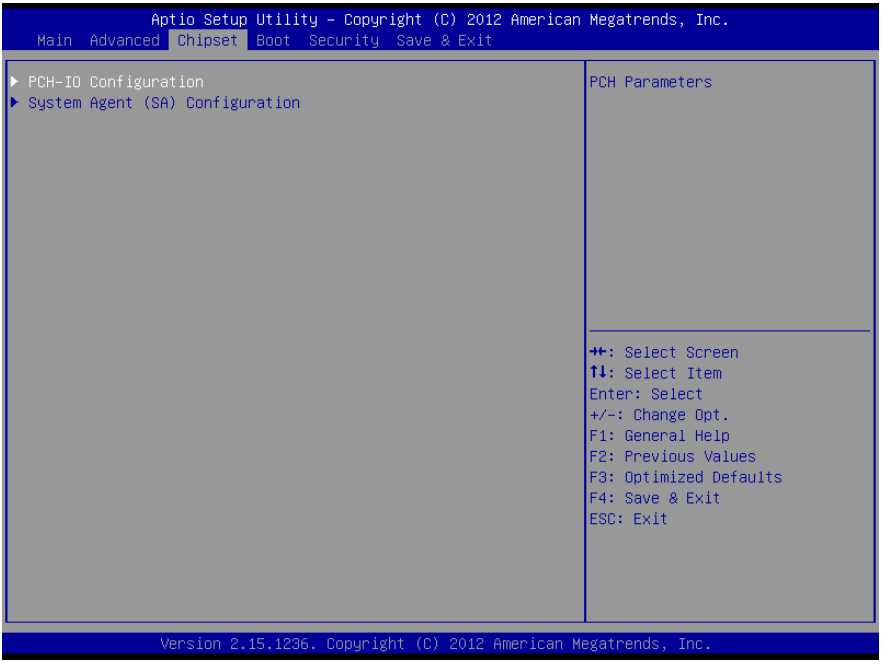
Serial Port	Disabled	
	Enabled	
En/Disable specified serial port.		
Change Settings	**Auto**	
	IO=2F8h; IRQ=3;	
	IO=3F8h; IRQ=3,4,5,7,10,11,12;	
	IO=2F8h; IRQ=3,4,5,7,10,11,12;	
	IO=3E8h; IRQ=3,4,5,7,10,11,12;	
	IO=2E8h; IRQ=3,4,5,7,10,11,12;	
Select a resource setting for Super IO device.		

Device Type	**RS232**	
	RS422	
	RS485	
Configure COM2/6 operated as RS232, RS422 or RS485.		

3.4.9 Advanced: H/W Monitor



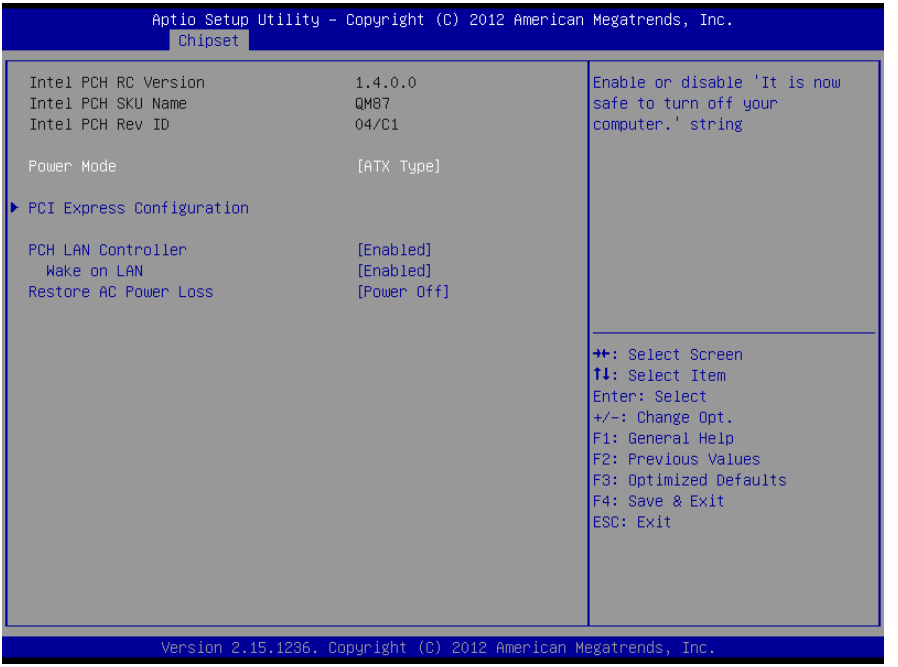
3.5 Setup submenu: Chipset



Options summary: (**default setting**)

PCH-IO Configuration		
South Bridge Parameters		
System Agent (SA) Configuration		
SA Parameters		

3.5.1 Chipset: PCH0IO Configuration



Options summary: (**default setting**)

Power Mode	**ATX Type**	
	AT Type	
Enable or disable 'It is now safe to turn off your computer.' string		
PCI Express Configuration		
PCI Express Configuration settings		
PCH LAN Controller	**Enabled**	
	Disabled	
En/Disabled onboard NIC		
Wake on LAN	**Enabled**	

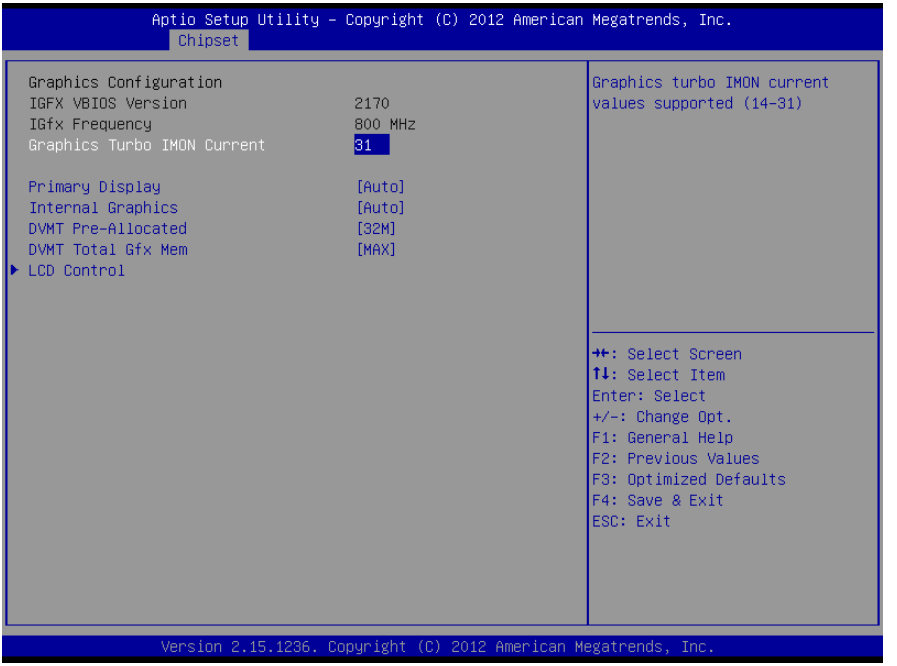
	Disabled	
En/Disabled integrated LAN to wake the system. (The Wake on LAN cannot be disabled if ME is on at Sx state.		
Restore AC Power Loss	Power Off	
	Power On	
	Last State	
Select AC power state when power is re-applied after a power failure		

3.5.2 Chipset: System Agent (SA) Configuration

Options summary: (**default setting**)

VT-d	**Disabled**	
	Enabled	
Check to enable VT-d function on MCH		
CPU SA Audio Device	**Enabled**	
(B0:D3:F0)	Disabled	
En/Disable CPU SA Audio Device		
Graphics Configuration		
Config Graphics Settings		

3.5.2.1 System Agent (SA) Configuration: Graphic Configuration

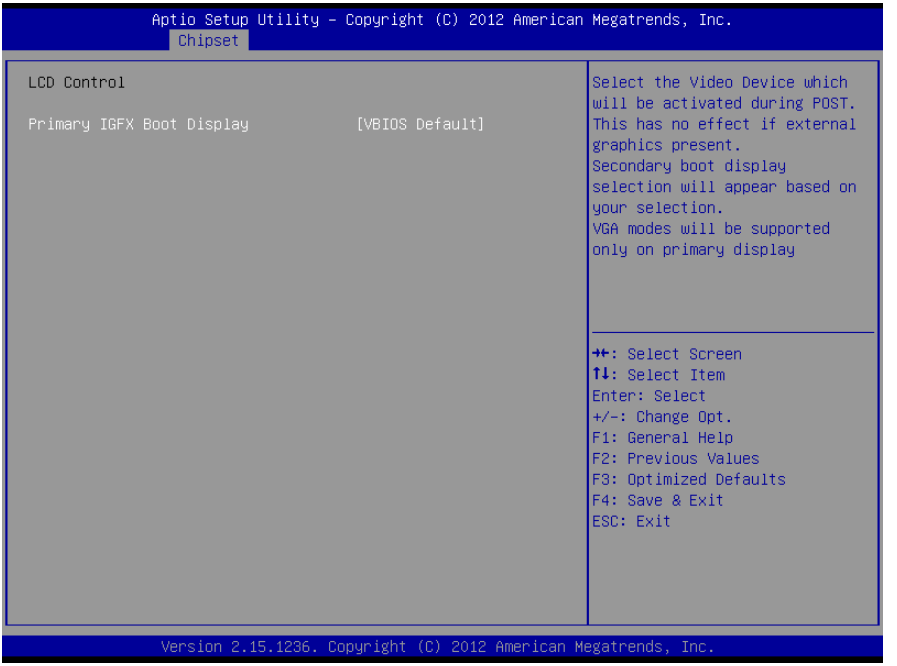


Options summary: (**default setting**)

Primary Display	**Auto**	
	IGFX	
	PEG	
	PCIE	
	SG	
Select graphic adapters to boot		
Internal Graphics	**Auto**	
	Disabled	
	Enabled	
En/Disabled internal graphics device		

DVMT Pre-Allocated	**32MB**	
	64MB~1024MB	
Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.		
DVMT Total Gfx Mem	128MB	
	256MB	
	Max	
Select DVMT 5.0 Total Graphic Memory size used by the Internal Graphics Device.		

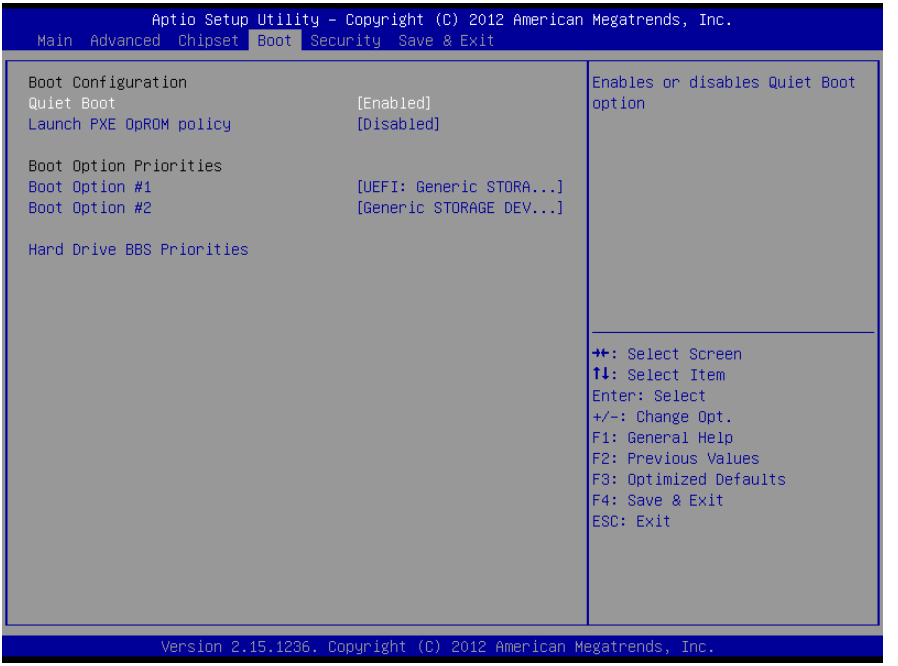
3.5.2.2 System Agent (SA) Configuration: LCD Control



Options summary: (**default setting**)

Primary IGFX Boot Display	**VBIOS Defat**	
	CRT	
	HDMI	
Select Primary IGFX boot display device		

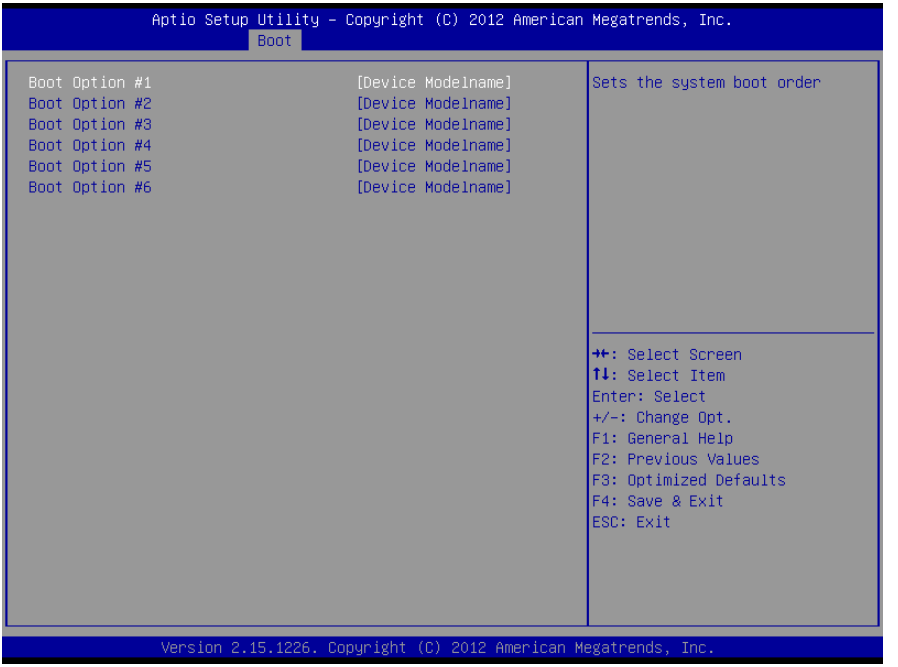
3.6 Setup submenu: Boot



Options summary: (**default setting**)

Quiet Boot	Disabled	
	Enabled	
En/Disable showing boot logo.		
Launch PXE OpROM policy	**Disabled**	
	Enabled	
En/Disable PXE boot for LAN		
Boot Option #X/ XXXX Drive BBS Priorities		
The order of boot priorities.		

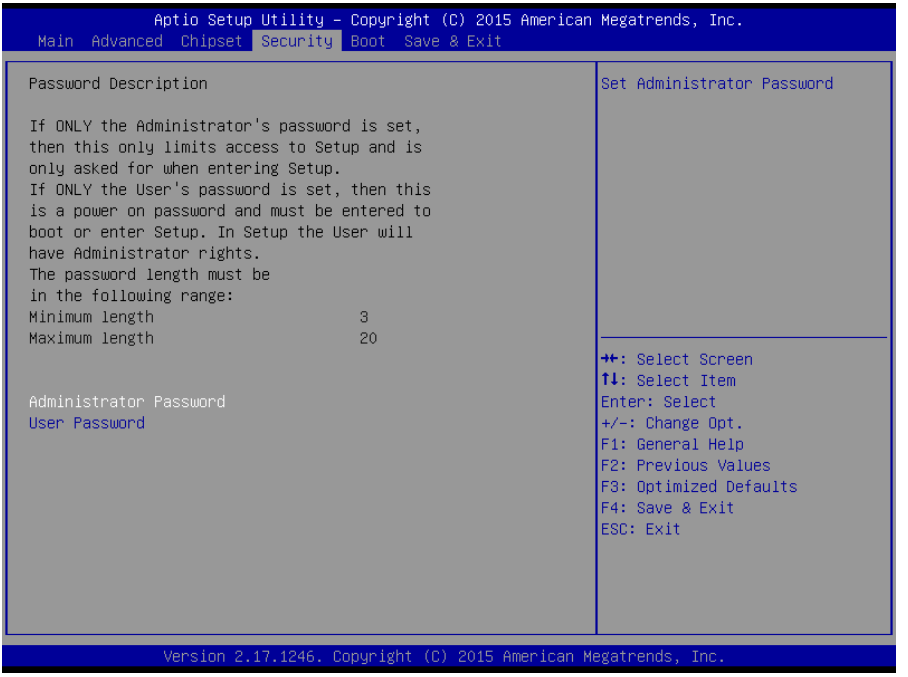
3.6.1 Boot: BBS Priorities



Options summary: (**default setting**)

Boot Option #x	Disabled	
	Device name	
Sets the system boot order		

3.7 Setup submenu: Security



Options summary: (*default setting*)

Administrator Password/ User Password	*Not set*	

Change User/Administrator Password

You can set a User Password once an Administrator Password is set. The password will be required during boot up, or when the user enters the Setup utility. Please Note that a User Password does not provide access to many of the features in the Setup utility.

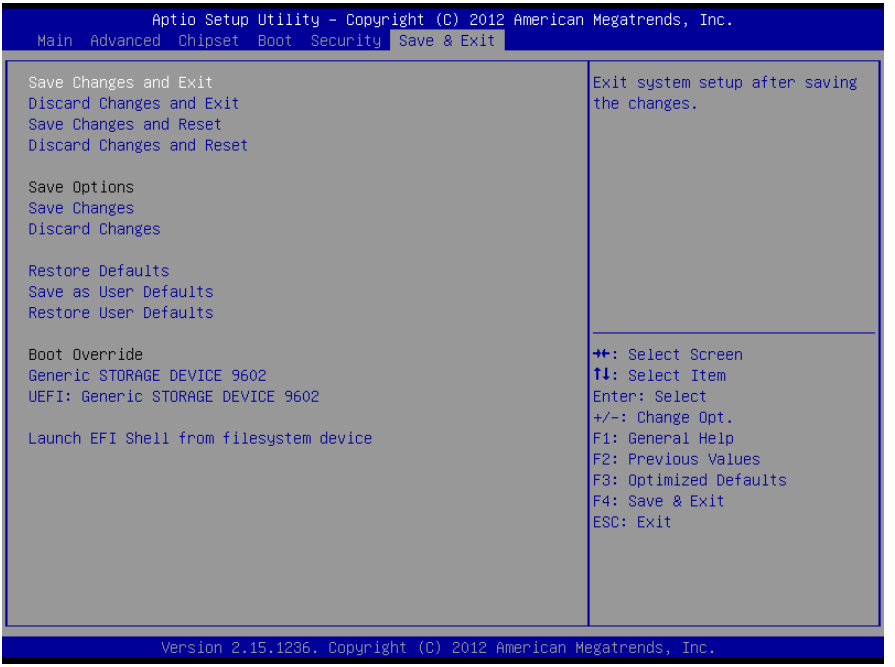
Select the password you wish to set, press Enter to open a dialog box to enter your password (you can enter no more than six letters or numbers). Press Enter to confirm your entry, after which you will be prompted to retype your password for a final

confirmation. Press Enter again after you have retyped it correctly.

Removing the Password

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

3.8 Setup submenu: Save & Exit



Options summary: (**default setting**)

Save Changes and Exit		
Exit system setup after saving the changes		
Discard Changes and Exit		
Exit system setup without saving any changes		
Save Changes and Reset		
Reset the system after saving the changes		
Discard Changes and Reset		
Save Changes		
Save Changes done so far to any of the setup options.		
Discard Changes		

Discard Changes done so far to any of the setup options		
Reset system setup without saving any changes		
Restore Defaults		
Restore/Load Default values for all the setup options.		
Save as User Defaults		
Save the changes done so far as User Defaults		
Restore User Defaults		
Restore the User Defaults to all the setup options		

Chapter 4

Drivers Installation

4.1 Product CD/DVD

The AEC-6638 comes with a product DVD that contains all the drivers and utilities you need to setup your product. Insert the DVD and follow the steps in the autorun program to install the drivers.

In case the program does not start, follow the sequence below to install the drivers.

Step 1 – Install Chipset Driver

1. Open the **STEP1 - Chipset** folder and select your OS
2. Open the **.exe** file.
3. Follow the instructions
4. Drivers will be installed automatically

Step 2 – Install Graphic Driver

1. Open the **STEP2 - Graphics** folder and select your OS
2. Open the **Setup.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 3 – Install LAN Driver

1. Open the **STEP3 - LAN** folder and select your OS
2. Open the **.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 4 – Install Audio Driver

1. Open the **STEP4 - Audio** folder and select your OS
2. Open the **.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 5 – Install ME SW Driver

1. Open the **STEP5 – ME SW** folder and select your OS
2. Open the **.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 6 – Install TPM Driver (Windows 7 and 8 only)

1. Open the **STEP6 - TPM** folder followed by **Setup.exe**
2. Follow the instructions
3. Drivers will be installed automatically

Step 7 – Install USB 3.0 Driver (Windows 7 only)

1. Open the **STEP7 – USB3.0** folder and select your OS
2. Open the **Setup.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

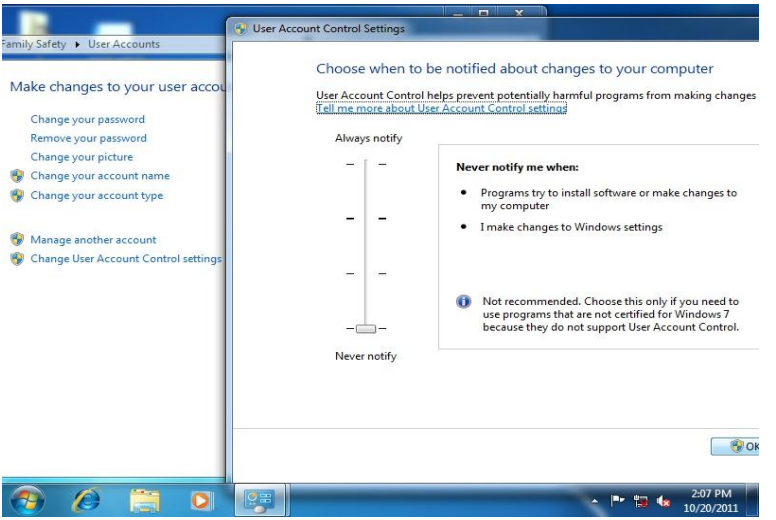
Step 8 – Install IRST Driver (Windows 8 only, Optional)

1. Open the **STEP8 - TPM** folder and select your OS
2. Open the **SetupRST.exe** in the folder
3. Follow the instructions
4. Drivers will be installed automatically

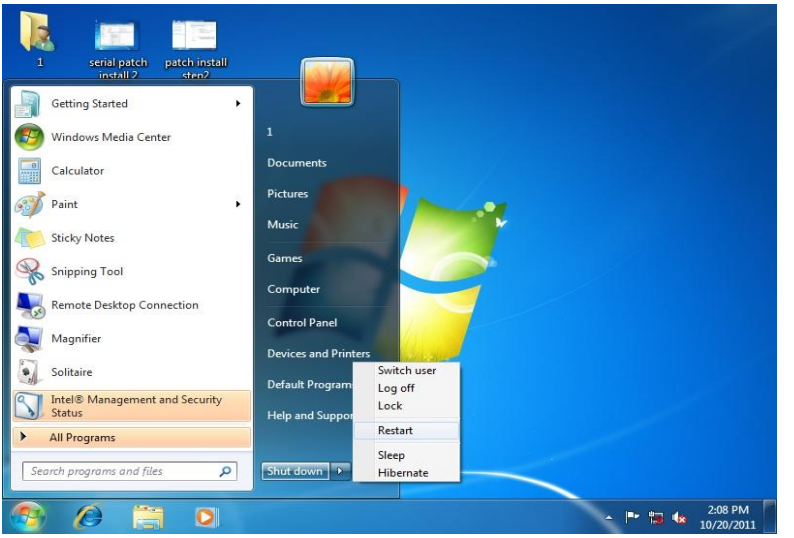
Step 9 – Install Serial Port Driver (Optional)

For Windows 7:

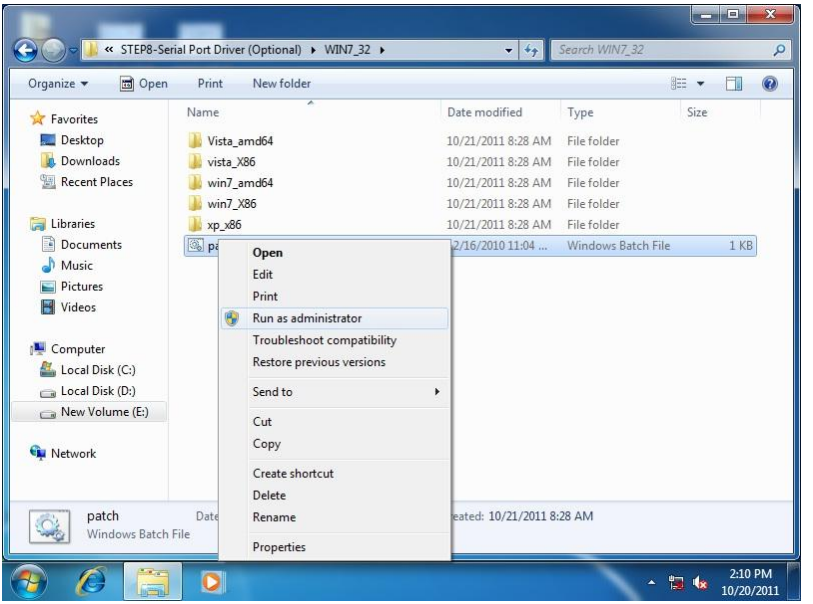
1. Change User Account Control settings to **Never notify**



2. Reboot and log in as administrator

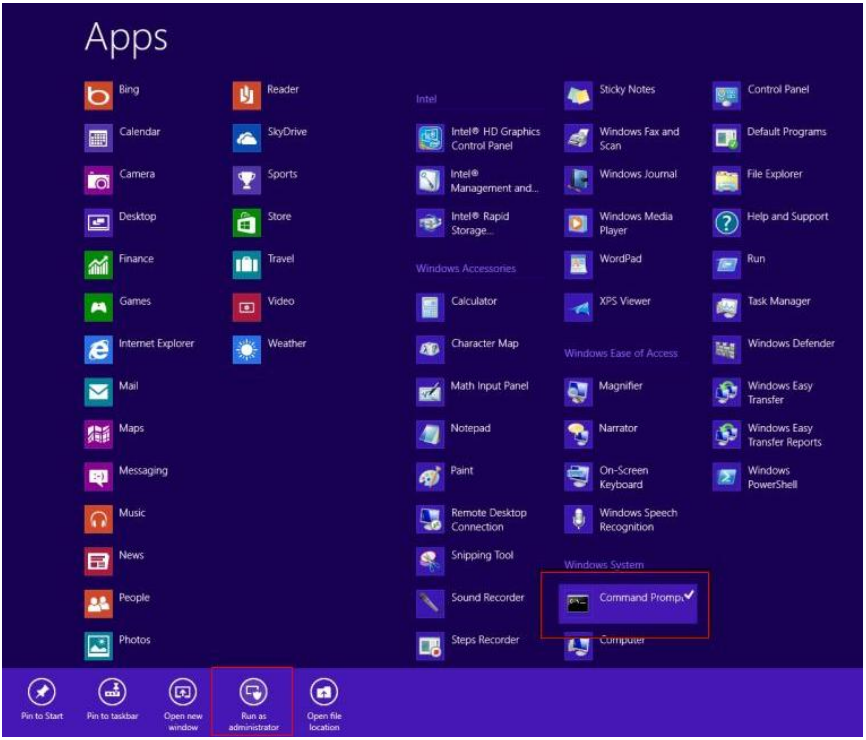


3. Run patch.bat as administrator



For Windows 8:

1. Open the Apps Screen, right click on the **Command Prompt** tile and select **Run as Administrator**

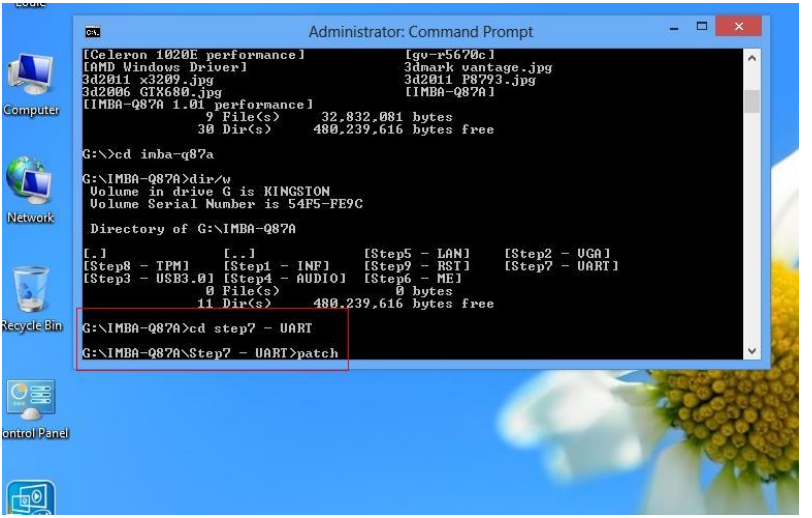


2. To install the driver (patch.bat), you will first have to locate the file in command prompt. To do that, first go to the directory which contains the file by entering **<drive letter>:** eg. if the driver is in D drive, enter **D:**

3. You are now at the directory containing the installation file. Next, go to the folder in which the file resides by entering **cd <folder>** eg: if the file is in a folder named abc, enter cd <abc>.

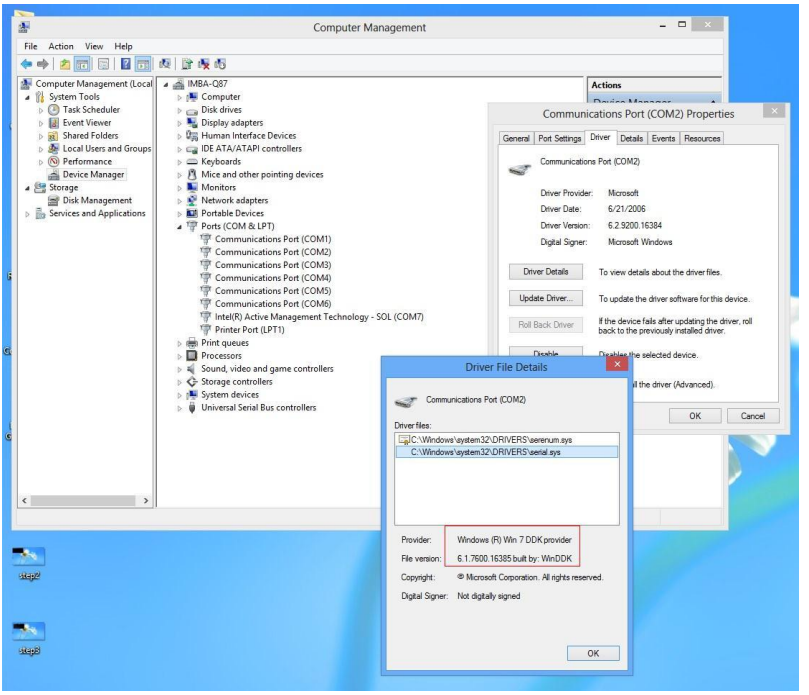
4. You are now at the folder where the file is located. Enter the **patch.bat** to open and install the drivers. If your file is in a subfolder, enter the cd

<folder> command again to access the subfolder (screenshot below is for reference only).



5. Reboot after installation completes.

6. To confirm the installation, go to Device Manager, expand the Ports (COM & LPT) tree and double click on any of the COM ports to open its properties. Go to the Driver tab, select Driver Details and click on serial.sys, you should see its provider as Windows (R) Win 7 DDK Provider.



For Windows 10:

1. Open the **STEP9 – Serial Port Driver (Optional)** folder followed by **Setup.exe**
2. Follow the instructions
3. Drivers will be installed automatically

Appendix A

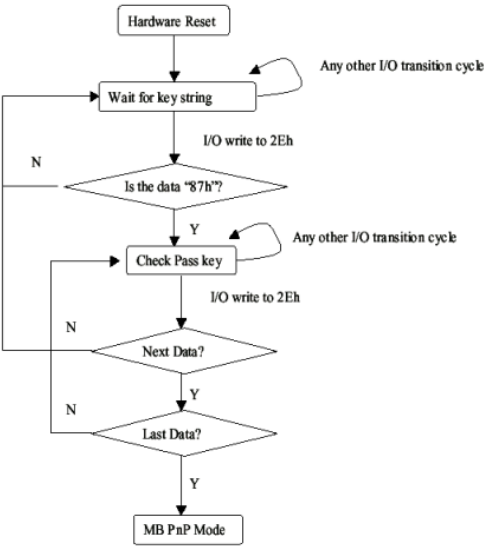
Watchdog Timer Programming

A.1 Watchdog Timer Programming

AEC-6638 utilizes FINTEK 81866 chipset as its watchdog timer controller. Below are the procedures to complete its configuration and the AAEON initial watchdog timer program is also attached based on which you can develop customized program to fit your application.

Configuring Sequence Description

After the hardware reset or power-on reset, the FINTEK 81866 enters the normal mode with all logical devices disabled except KBC. The initial state (enable bit) of this logical device (KBC) is determined by the state of pin 121 (DTR1#) at the falling edge of the system reset during power-on reset.



There are three steps to complete the configuration setup: (1) Enter the MB PnP Mode; (2) Modify the data of configuration registers; (3) Exit the MB PnP Mode. Undesired result may occur if the MB PnP Mode is not exited normally.

(1) Enter the MB PnP Mode

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

```
-o 4e 87
-o 4e 87                ( enable configuration )
```

(2) Modify the Data of the Registers

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

(3) Exit the MB PnP Mode

Write exit key 0xAA to the index port.

```
-o 4e aa                ( disable configuration )
```

Watch Dog Timer 1, 2, 3 Control Register (Index=F5h,F6h,FAh Default=00h)

7.8.4 Watchdog Control Configuration Register 1 — Index F5h

Bit	Name	R/W	Reset	Default	Description
7	Reserved	R	-	0	Reserved
6	WDTMOUT_STS	R/W	5VSB	0	If watchdog timeout event occurred, this bit will be set to 1. Write a 1 to this bit will clear it to 0.
5	WD_EN	R/W	5VSB	0	If this bit is set to 1, the counting of watchdog time is enabled.
4	WD_PULSE	R/W	5VSB	0	Select output mode (0: level, 1: pulse) of RSTOUT# by setting this bit.
3	WD_UNIT	R/W	5VSB	0	Select time unit (0: 1sec, 1: 60 sec) of watchdog timer by setting this bit.
2	WD_HACTIVE	R/W	5VSB	0	Select output polarity of RSTOUT# (1: high active, 0: low active) by setting this bit.
1-0	WD_PSWIDTH	R/W	5VSB	0	Select output pulse width of RSTOUT# 0: 1 ms 1: 25 ms 2: 125 ms 3: 5 sec

7.8.5 Watchdog Timer Configuration Register 2 — Index F6h

Bit	Name	R/W	Reset	Default	Description
7-0	WD_TIME	R/W	5VSB	0	Time of watchdog timer (0~255)

7.8.6 Watchdog PME Enable Configuration Register 2 — Index FAh

Bit	Name	R/W	Reset	Default	Description
7	WDT_PME	R	5VSB	0	0: No WDT PME occurred. 1: WDT PME occurred. The WDT PME is occurred one unit before WDT timeout.
6	WDT_PME_EN	R/W	5VSB	0	0: Disable Watchdog PME. 1: enable Watchdog PME.
5	Reserved	R	-	0	Reserved
4	WDT_CLK_SEL	R/W	5VSB	1	WDT Clock Source Select 0: Internal 1KHz clock. 1: 1KHZ clock driven by CLKIN.
3-1	Reserved	R	-	0	Reserved
0	WDOUT_EN	R/W	5VSB	0	0: disable Watchdog time out output via WDTRST#. 1: enable Watchdog time out output via WDTRST#.

A.2 F81866 Watchdog Timer Initial Program

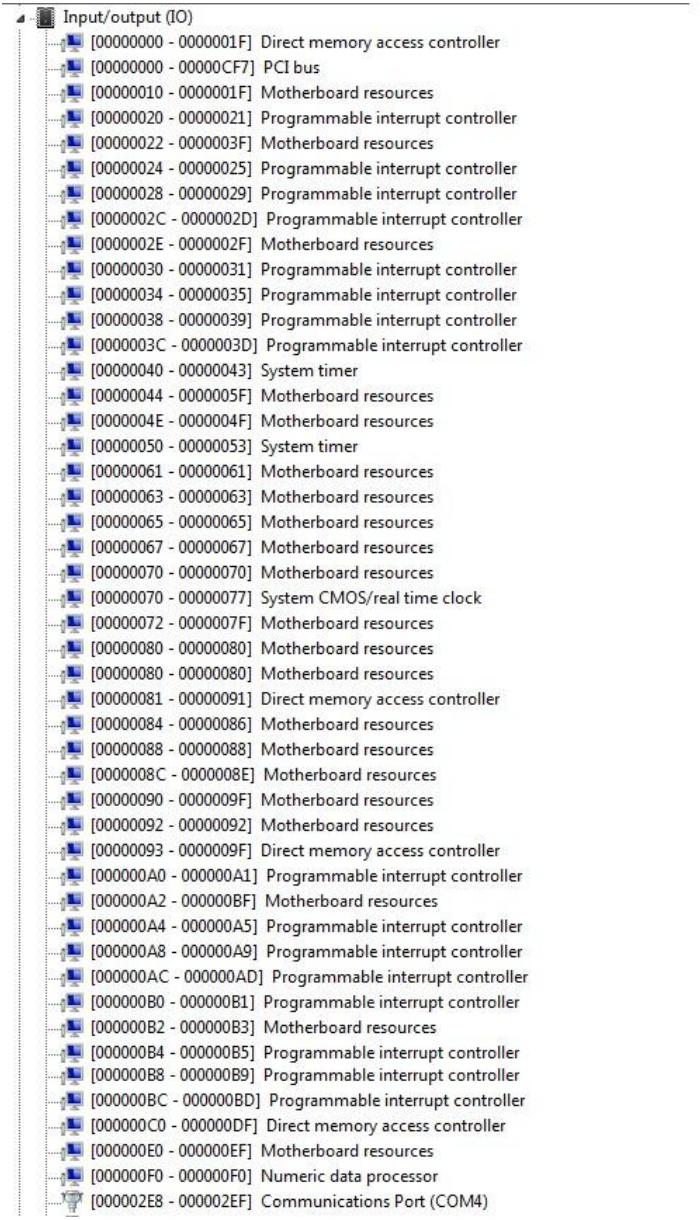
```
Main(){
aaeonSuperIOOpen();
aaeonWdtSetCountMode(BOOL bMinute); // Set wdt count mode
aaeonWdtSetTimeoutCount(BYTE tTimeout); // Set wdt timer
aaeonWdtSetEnable(BOOL bEnable); // Enable wdt
aaeonSuperIOClose();
}

Void aaeonSuperIOOpen(){       // Config F81866 Entry key
        aaeonioWritePortByte(F81866_INDEX, 0x87);
        aaeonioWritePortByte(F81866_INDEX, 0x87);
}

Void aaeonWdtSetCountMode(BOOL bMinute){
   BYTE WDT_CONTROL = f81866ReadByte(F81866_WDT_CONTROL_REG);
   if(bMinute)
         f81866WriteByte(F81866_WDT_CONTROL_REG, WDT_CONTROL | 0x08);
   else
         f81866WriteByte(F81866_WDT_CONTROL_REG, WDT_CONTROL & 0xF7);
}



Void aaeonWdtSetTimeoutCount(BYTE tTimeout){
   f81866SetLdn(0x07);
   f81866WriteByte(F81866_WDT_TIME_REG, tTimeout);
```

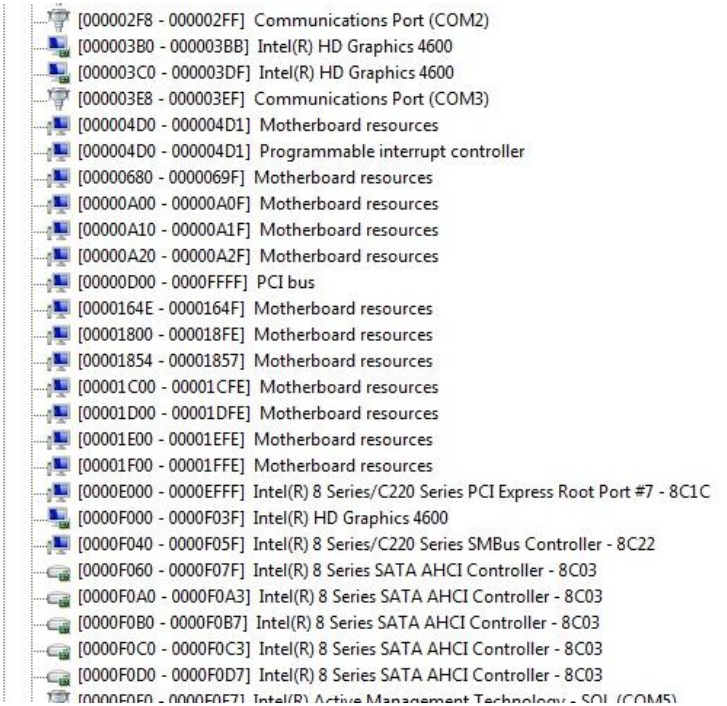
```
}

Void aaeonWdtSetEnable(BOOL bEnable){
   f81866SetLdn(0x07);
   if(bEnable){
        f81866WriteByte(0x30, 0x01);
         WDT_BASE_ADDR =
         (f81866ReadByte(F81866_WDT_BASEADDR_REG_MSB) << 8)
         | f81866ReadByte(F81866_WDT_BASEADDR_REG_LSB);
         WDT_STATUS = f81866ReadByte(F81866_WDT_CONTROL_REG);
         f81866WriteByte(F81866_WDT_CONTROL_REG, WDT_STATUS | 0x20);
         WDT_STATUS = f81866ReadByte(F81866_WDT_PME_REG);
         f81866WriteByte(F81866_WDT_PME_REG, WDT_STATUS | 0x01);
   }else{
        f81866WriteByte(0x30, 0x00);
        WDT_BASE_ADDR = 0;
        WDT_STATUS = f81866ReadByte(F81866_WDT_CONTROL_REG);
        f81866WriteByte(F81866_WDT_CONTROL_REG, WDT_STATUS & 0xDF);
        WDT_STATUS = f81866ReadByte(F81866_WDT_PME_REG);
        f81866WriteByte(F81866_WDT_PME_REG, WDT_STATUS & 0xFE);
   }
}
Void aaeonSuperIOClose(){
        aaeonioWritePortByte(F81866_INDEX, 0xaa);
}
```

Appendix B

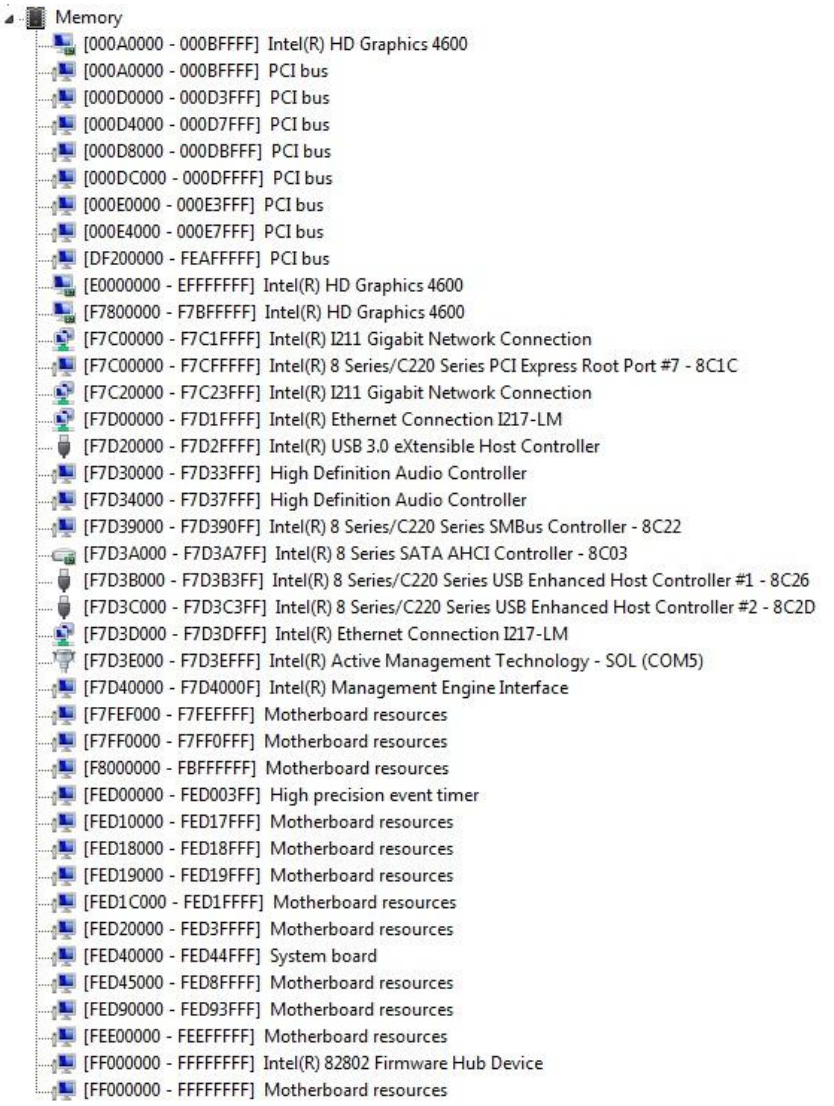
I/O Information

B.1 I/O Address Map

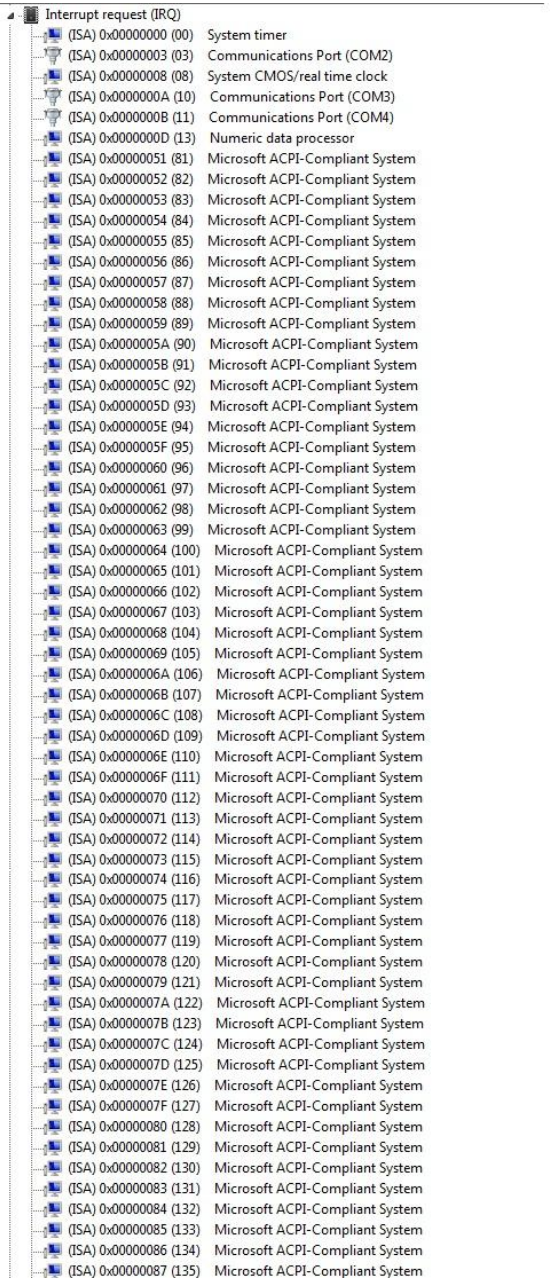



[000002F8 - 000002FF] Communications Port (COM2)
[000003B0 - 000003BB] Intel(R) HD Graphics 4600
[000003C0 - 000003DF] Intel(R) HD Graphics 4600
[000003E8 - 000003EF] Communications Port (COM3)
[000004D0 - 000004D1] Motherboard resources
[000004D0 - 000004D1] Programmable interrupt controller
[00000680 - 0000069F] Motherboard resources
[00000A00 - 00000A0F] Motherboard resources
[00000A10 - 00000A1F] Motherboard resources
[00000A20 - 00000A2F] Motherboard resources
[00000D00 - 0000FFFF] PCI bus
[0000164E - 0000164F] Motherboard resources
[00001800 - 000018FE] Motherboard resources
[00001854 - 00001857] Motherboard resources
[00001C00 - 00001CFE] Motherboard resources
[00001D00 - 00001DFE] Motherboard resources
[00001E00 - 00001EFE] Motherboard resources
[00001F00 - 00001FFE] Motherboard resources
[0000E000 - 0000EFFF] Intel(R) 8 Series/C220 Series PCI Express Root Port #7 - 8C1C
[0000F000 - 0000F03F] Intel(R) HD Graphics 4600
[0000F040 - 0000F05F] Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
[0000F060 - 0000F07F] Intel(R) 8 Series SATA AHCI Controller - 8C03
[0000F0A0 - 0000F0A3] Intel(R) 8 Series SATA AHCI Controller - 8C03
[0000F0B0 - 0000F0B7] Intel(R) 8 Series SATA AHCI Controller - 8C03
[0000F0C0 - 0000F0C3] Intel(R) 8 Series SATA AHCI Controller - 8C03
[0000F0D0 - 0000F0D7] Intel(R) 8 Series SATA AHCI Controller - 8C03

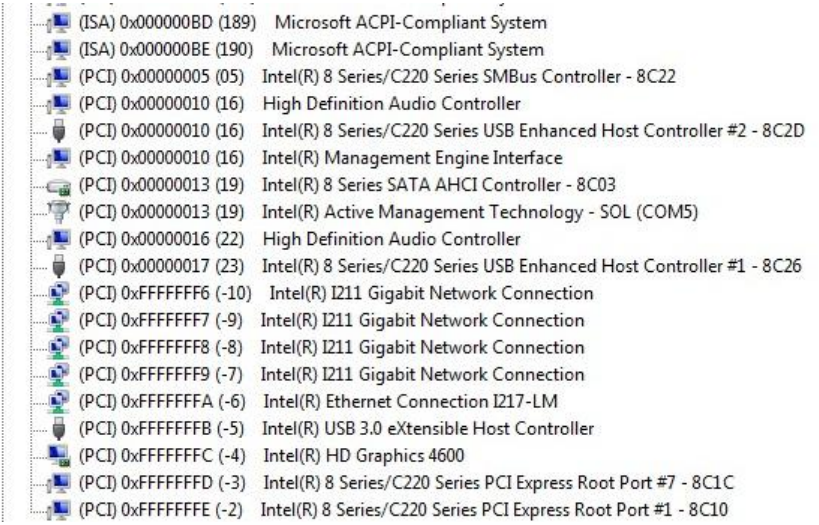
B.2 Memory Address Map



B.3 IRQ Mapping Chart



(ISA) 0x00000088 (136) Microsoft ACPI-Compliant System
(ISA) 0x00000089 (137) Microsoft ACPI-Compliant System
(ISA) 0x0000008A (138) Microsoft ACPI-Compliant System
(ISA) 0x0000008B (139) Microsoft ACPI-Compliant System
(ISA) 0x0000008C (140) Microsoft ACPI-Compliant System
(ISA) 0x0000008D (141) Microsoft ACPI-Compliant System
(ISA) 0x0000008E (142) Microsoft ACPI-Compliant System
(ISA) 0x0000008F (143) Microsoft ACPI-Compliant System
(ISA) 0x00000090 (144) Microsoft ACPI-Compliant System
(ISA) 0x00000091 (145) Microsoft ACPI-Compliant System
(ISA) 0x00000092 (146) Microsoft ACPI-Compliant System
(ISA) 0x00000093 (147) Microsoft ACPI-Compliant System
(ISA) 0x00000094 (148) Microsoft ACPI-Compliant System
(ISA) 0x00000095 (149) Microsoft ACPI-Compliant System
(ISA) 0x00000096 (150) Microsoft ACPI-Compliant System
(ISA) 0x00000097 (151) Microsoft ACPI-Compliant System
(ISA) 0x00000098 (152) Microsoft ACPI-Compliant System
(ISA) 0x00000099 (153) Microsoft ACPI-Compliant System
(ISA) 0x0000009A (154) Microsoft ACPI-Compliant System
(ISA) 0x0000009B (155) Microsoft ACPI-Compliant System
(ISA) 0x0000009C (156) Microsoft ACPI-Compliant System
(ISA) 0x0000009D (157) Microsoft ACPI-Compliant System
(ISA) 0x0000009E (158) Microsoft ACPI-Compliant System
(ISA) 0x0000009F (159) Microsoft ACPI-Compliant System
(ISA) 0x000000A0 (160) Microsoft ACPI-Compliant System
(ISA) 0x000000A1 (161) Microsoft ACPI-Compliant System
(ISA) 0x000000A2 (162) Microsoft ACPI-Compliant System
(ISA) 0x000000A3 (163) Microsoft ACPI-Compliant System
(ISA) 0x000000A4 (164) Microsoft ACPI-Compliant System
(ISA) 0x000000A5 (165) Microsoft ACPI-Compliant System
(ISA) 0x000000A6 (166) Microsoft ACPI-Compliant System
(ISA) 0x000000A7 (167) Microsoft ACPI-Compliant System
(ISA) 0x000000A8 (168) Microsoft ACPI-Compliant System
(ISA) 0x000000A9 (169) Microsoft ACPI-Compliant System
(ISA) 0x000000AA (170) Microsoft ACPI-Compliant System
(ISA) 0x000000AB (171) Microsoft ACPI-Compliant System
(ISA) 0x000000AC (172) Microsoft ACPI-Compliant System
(ISA) 0x000000AD (173) Microsoft ACPI-Compliant System
(ISA) 0x000000AE (174) Microsoft ACPI-Compliant System
(ISA) 0x000000AF (175) Microsoft ACPI-Compliant System
(ISA) 0x000000B0 (176) Microsoft ACPI-Compliant System
(ISA) 0x000000B1 (177) Microsoft ACPI-Compliant System
(ISA) 0x000000B2 (178) Microsoft ACPI-Compliant System
(ISA) 0x000000B3 (179) Microsoft ACPI-Compliant System
(ISA) 0x000000B4 (180) Microsoft ACPI-Compliant System
(ISA) 0x000000B5 (181) Microsoft ACPI-Compliant System
(ISA) 0x000000B6 (182) Microsoft ACPI-Compliant System
(ISA) 0x000000B7 (183) Microsoft ACPI-Compliant System
(ISA) 0x000000B8 (184) Microsoft ACPI-Compliant System
(ISA) 0x000000B9 (185) Microsoft ACPI-Compliant System
(ISA) 0x000000BA (186) Microsoft ACPI-Compliant System
(ISA) 0x000000BB (187) Microsoft ACPI-Compliant System
(ISA) 0x000000BC (188) Microsoft ACPI-Compliant System


(ISA) 0x000000BD (189) Microsoft ACPI-Compliant System
(ISA) 0x000000BE (190) Microsoft ACPI-Compliant System
(PCI) 0x00000005 (05) Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
(PCI) 0x00000010 (16) High Definition Audio Controller
(PCI) 0x00000010 (16) Intel(R) 8 Series/C220 Series USB Enhanced Host Controller #2 - 8C2D
(PCI) 0x00000010 (16) Intel(R) Management Engine Interface
(PCI) 0x00000013 (19) Intel(R) 8 Series SATA AHCI Controller - 8C03
(PCI) 0x00000013 (19) Intel(R) Active Management Technology - SOL (COM5)
(PCI) 0x00000016 (22) High Definition Audio Controller
(PCI) 0x00000017 (23) Intel(R) 8 Series/C220 Series USB Enhanced Host Controller #1 - 8C26
(PCI) 0xFFFFFFF6 (-10) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF7 (-9) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF8 (-8) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF9 (-7) Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFFA (-6) Intel(R) Ethernet Connection I217-LM
(PCI) 0xFFFFFFFB (-5) Intel(R) USB 3.0 eXtensible Host Controller
(PCI) 0xFFFFFFFC (-4) Intel(R) HD Graphics 4600
(PCI) 0xFFFFFFFD (-3) Intel(R) 8 Series/C220 Series PCI Express Root Port #7 - 8C1C
(PCI) 0xFFFFFFFE (-2) Intel(R) 8 Series/C220 Series PCI Express Root Port #1 - 8C10

B.4 DMA Channel Assignments