ARES-66x3 Series

Robust Box PC with Intel® Ivy Bridge Platform

User's Manual

Version 1.0

P/N: 4012660300100P

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Contents

Copyright Notice

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Under no circumstances will the manufacturer be liable for any direct, indirect, special, incidental, or consequential damages arising from the use or inability to use the product or documentation, even if advised of the possibility of such damages.

Declaration of Conformity

CE

The CE symbol on your product indicates that it is in compliance with the directives of the Union European (EU). A Certificate of Compliance is available by contacting Technical Support.

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from ARBOR. Please contact your local supplier for ordering information.

> Warning
> This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC Class A

This device complies with Part 15 of the 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.

NOTE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment gen

erates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RoHS

ARBOR Technology Corp. certifies that all components in its products are in compliance and conform to the European Union's Restriction of Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2002/95/EC.

The above mentioned directive was published on 2/13/2003. The main purpose of the directive is to prohibit the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE) in electrical and electronic products. Member states of the EU are to enforce by 7/1/2006.

ARBOR Technology Corp. hereby states that the listed products do not contain unintentional additions of lead, mercury, hex chrome, PBB or PBDB that exceed a maximum concentration value of 0.1% by weight or for cadmium exceed 0.01% by weight, per homogenous material. Homogenous material is defined as a substance or mixture of substances with uniform composition (such as solders, resins, plating, etc.). Lead-free solder is used for all terminations (Sn(96-96.5%), Ag(3.0-3.5%) and Cu(0.5%)).

SVHC / REACH

To minimize the environmental impact and take more responsibility to the earth we live, Arbor hereby confirms all products comply with the restriction of SVHC (Substances of Very High Concern) in (EC) 1907/2006 (REACH --Registration, Evaluation, Authorization, and Restriction of Chemicals) regulated by the European Union.

All substances listed in SVHC < 0.1 % by weight (1000 ppm)

Important Safety Instructions

Read these safety instructions carefully

1. Read all cautions and warnings on the equipment.
2. Place this equipment on a reliable surface when installing. Dropping it or letting it fall may cause damage
3. Make sure the correct voltage is connected to the equipment.
4. For pluggable equipment, the socket outlet should be near the equipment and should be easily accessible.

5. Keep this equipment away from humidity.
6. The openings on the enclosure are for air convection and protect the equipment from overheating. DO NOT COVER THE OPENINGS.
7. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
8. Never pour any liquid into opening. This may cause fire or electrical shock.
9. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
10. If one 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 or damaged.
    f. The equipment has obvious signs of breakage.
11. Keep this User's Manual for later reference.

About This User's Manual

This User's Manual is intended for experienced users and integrators with hardware knowledge of personal computers. If you are not sure about any description in this User's Manual, please consult your vendor before further handling.

Warning

The Box PC and its components contain very delicately Integrated Circuits (IC). To protect the Box PC and its components against damage caused by static electricity, you should always follow the precautions below when handling it:

1. Disconnect your Box PC from the power source when you want to work on the inside.
2. Use a grounded wrist strap when handling computer components.
3. Place components on a grounded antistatic pad or on the bag that came with the Box PC, whenever components are separated from the system.

Replacing the Lithium Battery

Incorrect replacement of the lithium battery may lead to a risk of explosion.

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer.

Do not throw lithium batteries into the trash can. It must be disposed of in accordance with local regulations concerning special waste.

Technical Support

If you have any technical difficulties, please consult the user's manual first at: ftp://ftp.arbor.com.tw/pub/manual
Please do not hesitate to call or e-mail our customer service when you still cannot find out the answer.

http://www.arbor.com.tw
E-mail:info@arbor.com.tw

Warranty

This product is warranted to be in good working order for a period of one year from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Vendor will not be liable for any claim made by any other related party.

Vendors disclaim all other warranties, either expressed or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose, with respect to the hardware, the accompanying product's manual(s) and written materials, and any accompanying hardware. This limited warranty gives you specific legal rights.

Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

Chapter 1

General Information

1.1 Introduction

The ARES-66x3 is targeted at many different application fields. By adopting it, you can pinpoint specific markets, such as in-vehicle, car infotainment, bus monitoring system, environment-critical and space-critical applications.

- **All-In-One Platform**
  The CPU, DRAM and even software are integrated to provide a plug-and-play machine.
- **Compact-sized**
  The kernel of ARES-66x3 is FMB-i67M5, which is a compact form factor embedded board. The whole system consumes only a few space.
- **Fanless and Modular Design**
  By using a low power processor, the system does not have to rely on unreliable fans, which may cause dust to circulate inside the equipment. The modular design facilitates maintenance or possible upgrades. Modular Box PC can be easily modified to fit many different applications according to customers' requests.
- **Powerful Communication Capability**
  The ARES-66x3 provides COM, video ports, Ethernet, USB, Digital I/O, Mini-card slot, SIM socket, PCI & PCIe slots. ARES-66x3 supplies Wi-Fi and HSUPA modules. With the great connection capability, users can transmit data and information anywhere.
- **Numerous Display/Video Output**
  Integrated with Intel® HD4000 Graphics core, the ARES-66x3 improves graphics and 3D rendering performance and supports numerous display/video output options includes VGA and DVI-D.
- **Power Supply and Well-Designed Power Protection**
  ARES-66x3's wide range DC power input (9~36V) enables it to conquer unstable power supply and noise.
- **Advanced Storage Solution**
  ARES-66x3 comes with Compact Flash slot, which offers a better, faster and more cost-effective expansibility for various applications.
- **Trustworthy**
  The onboard Watchdog Timer can invoke an NMI or system RESET when your application loses control over the system.

1.2 Packing List

After opening the package, carefully inspect the contents. If any of the items is missing or appears damaged, please contact your local dealer or distributor. The package should contain the following items:

1 x ARES-66x3 Box PC

1 x Accessory Box:
Driver CD

User's Manual/Screws/Cable/4-pin plug for terminal block

1.3 Ordering Information

ARES-6663-EP	Barebone system w/ 6 x LAN, PCI + PCIe x4
ARES-6663-2P	Barebone system w/ 6 x LAN, 2 x PCI

The following items are normally optional, but some vendors may include them as a standard package, or some vendors may not carry all the items.

Optional Accessories

PAC-B120W-FSP (6960301200040P)
120W AC/DC adapter kit

WMK-5000 (6940050000000P)
Wall-mount kit for FPC-5XXX Series

Optional Configuration (Configure to Order Service)

	SSD-25040 (5346402201600P) Intel® 2.5” 40GB SATAII SSD kit
	SSD-25032 (5346322201700P) 2.5” 32GB SATAII SSD
	WIFI-IN1130 (6913000710000P) Intel® Centrino® Advanced-N 6205 WiFi module w/ 20cm internal wiring
	HSPA-SI1400 (6914000210000P) HSUPA 3.75G module kit & internal wiring
	ANT-H11 (6900110210010P) 1 x 2dBi HSUPA antenna
	ANT-D11 (6900110210000P) 1 x WiFi Dual-band 2.4G/5G antenna

1.4 The Installation Paths of CD Driver

Windows XP

Driver & AP	Path
Framework	\Framework 3.5\
CHIPSET	\INF
VGA	\Graphic\Graphic_winxp32_V6.14.10.5415
	\Graphic\Graphic_winxp64_6.14.10.5415
AUDIO	\Hd Audio
Management Engine	\ME\INTEL_ME_winxp_win7_32_64_VIS8.1.0.1143
LAN	\LAN\Install_WinXP_5798_07272012\PCIE_Install_5798_07272012

Windows 7

Driver & AP	Path
CHIPSET	\INF
VGA	\Graphic\Graphic_win7_32_V8.15.10.2795
	\Graphic\Graphic_win7_64_V8.15.10.2795
AUDIO	\Hd Audio
Management Engine	\ME\INTEL_ME_winxp_win7_32_64_VIS8.1.0.1143
USB3.0	\USB 3.0\Intel(R)_USB_3.0_win7_32_64_V1.0.5.235\ Intel(R)_USB_3.0_win7_32_64_Driver_V1.0.5.235
LAN	\LAN\Install_Win7_7061_07272012\Install_ Win7_7061_07272012

1.5 Specifications

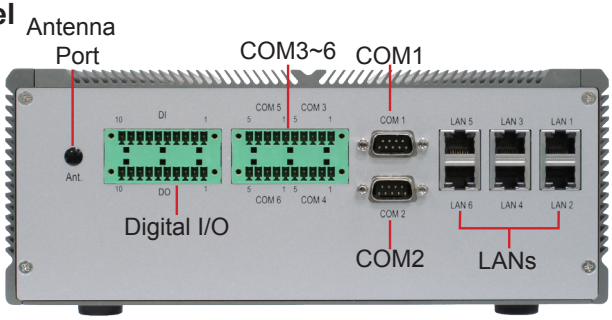
System Kernel	
Processor	Intel® Ivy Bridge rPGA988 (Socket G2)
BIOS	AMI Flash BIOS
Chipset	Intel® QM77
Graphics	Integrated Intel® HD4000
System Memory	1 x 204-pin DDR3 SO-DIMM Socket, supporting 1333/1600MHz SDRAM up to 8GB
Serial ATA	2 x Serial ATA ports with 600MB/s HDD transfer rate
LAN Chipset	6 x Realtek 8111 Gigabit Ethernet controllers
Watchdog Timer	1 ~ 255 levels reset
I/O Ports	
Serial Port	2 x DB-9 male connectors, 1 x 2x10 terminal block connector Support 6 x RS-232 ports (COM1~2 are RS-232, COM3~6 are RS-232/422/485 selectable)
USB Port	4 x USB 2.0 ports
	2 x USB 3.0/2.0 ports
LAN Port	6 x RJ-45 ports for Gigabit Ethernet
Video Port	1 x DB-15 female connector for Analog RGB
	1 x DVI-D female connector for Digital Video output
Digital I/O	1 x 2 x 10-pins terminal block connector for 16-bit digital I/O, 8 in/8 out
Audio	Mic-in/Line-out
Expansion Bus	1 x PCI slot & 1 x PCIe x4 slot or 2 x PCI slots 1 x Mini-card slot coming along with SIM card socket for optional WiFi or HSUPA module 1 x SIM socket 1 x PCI104 slot

Storage	
Type	2 x 2.5" drive bay for HDD/SSD
	1 x SATA port for SATA DOM
	1 x CFast
	onboard 8GB SSD
Qualification	
Certification	By Request: CCC (GB4943, GB9254, GB17625.1), EN 61000-6-4, EN 61000-3-2, EN 61000-3-3, EN 55024, RoHS, CRoHS, WEEE
	CE, FCC Class A
Environment	
Operating Temp.	-10 ~ 60°C (14 ~ 140°F), ambient w/ air flow
Storage Temp.	-40 ~ 80°C (-40 ~ 176°F)
Relative Humidity	5 ~ 95% @ 40°C (non-condensing)
Vibration	2 Grms@IEC-68-2-34, random wave, 5~500 Hz, 1 hr per axis
Shock	Operating 20G (11ms)@IEC-68-2-27, half sine wave
Mechanical	
Construction	Aluminum alloy
Mounting	Support wall-mount
Weight	4 kg (8.81 lb)
Dimensions (W x D x H)	254 x 195 x 100 mm (10" x 7.7" x 3.93")
Power Requirement	
Power Input	DC 9~36V input (w/ 4-pin DC input terminal block combining remote power on/off switch)
Power Consumption	Max. 67W (i5 w/o I/O card)

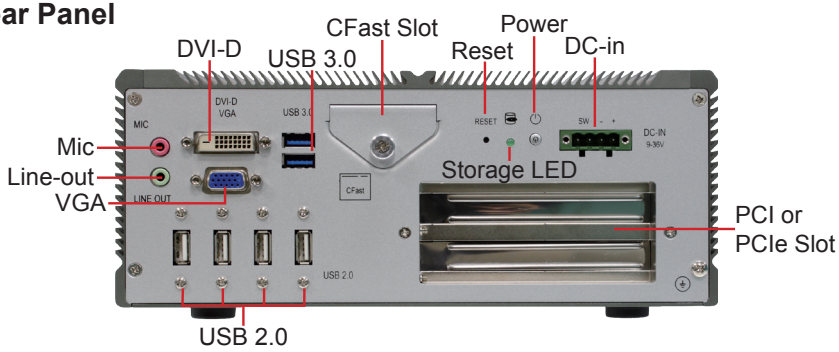
1.6 Locating Controls and Connectors

Please take a moment to identify those controls and connectors shown in the following figures.

Front Panel

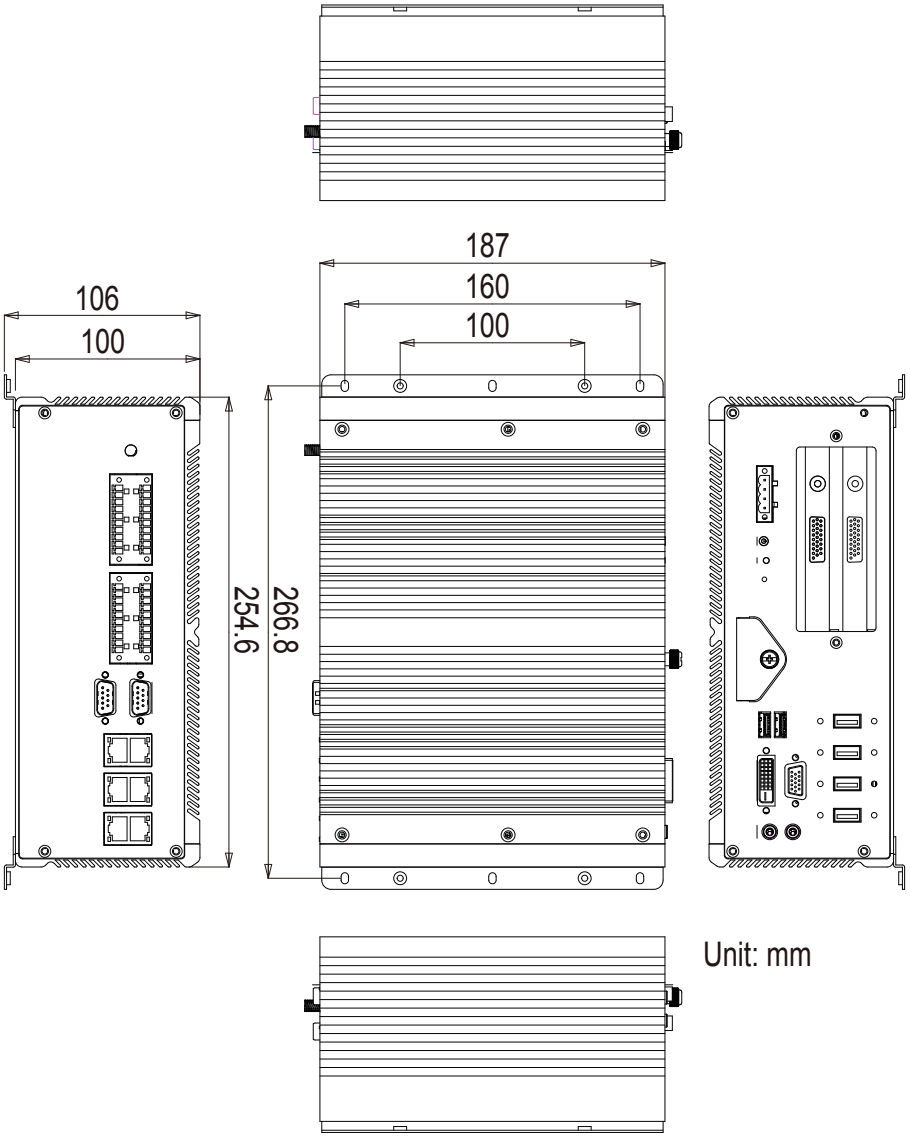


Rear Panel



Side View

1.7 Dimensions



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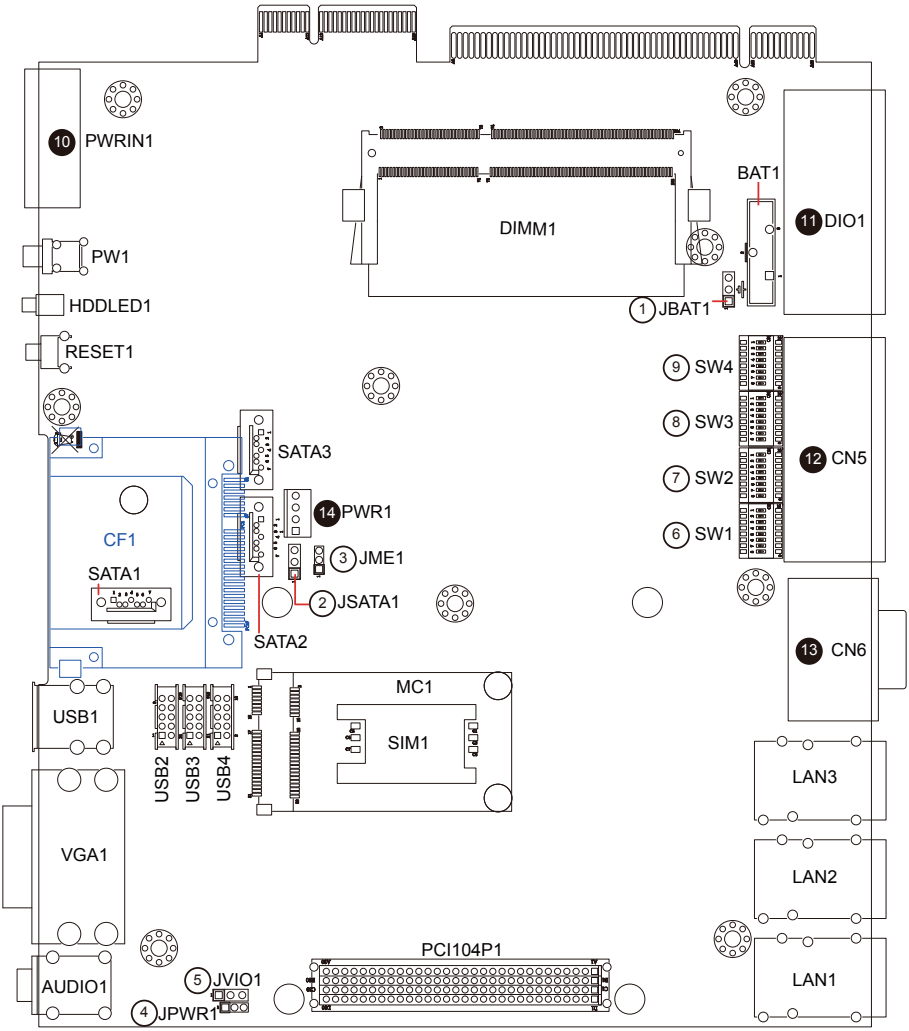
Chapter 2

The Engine of ARES-66x3

2.1 Board Layout

The engine of ARES-66x3 is constructed by the PCBA board, FMB-i67M5.



2.2 Jumpers and Connectors

2.2.1 Jumpers & Connectors List

Jumpers

Label	Function
JBAT1	Clear CMOS
JSATA1	SATA1 Connector PIN7 5V / GND Selection
JME1	ME Function Selection
JPWR1	AT/ATX Selection
JVIO1	PCI104 IO Voltage
SW2	COM3 RS-232-3W/RS-422/RS-485 Select DIP Switch
SW1	COM4 RS-232-3W/RS-422/RS-485 Select DIP Switch
SW4	COM5 RS-232-3W/RS-422/RS-485 Select DIP Switch
SW3	COM6 RS-232-3W/RS-422/RS-485 Select DIP Switch

Connectors

Label	Function
PWRIN1	DC Adapter Power Input
DIO1	8 bit Digital Input + 8 bit Digital Output Connector
CN5	COM3-COM6 Serial Ports (4 x RS-232/422/485 Connectors)
CN6	COM1-COM2 Serial Ports (2 x RS-232 Connectors)
PW1	Power Button
RESET1	Reset Button
HDDLED1	H.D.D LED
AUDIO1	Line-in/Mic-in
VGA1	CRT + DVI-D Display
PCI104P1	PCI104 Connector
BAT1	Battery Socket
SATA1	SATA 7 Pin Connector
SATA2	SATA 7 Pin Connector
SATA3	SATA 7 Pin Connector
CF1	CFast Connector

USB1	USB 0/1 Connector
USB2	USB 4/5 Connector
USB3	USB 6/7 Connector
USB4	USB 8/9 Connector
LAN1	2 x Ethernet 10/100/1000 Mbps Connector
LAN2	2 x Ethernet 10/100/1000 Mbps Connector
LAN3	2 x Ethernet 10/100/1000 Mbps Connector
DIMM1	DDR3 SODIMM Socket
MC1	PCI Express Mini Card
SIM1	3G SIM card
PWR1	HDD/SSD Power Connector

2.2.2 Jumper Setting

Label	Function	Jumper Settings	
JBAT1 (1)	Clear CMOS	1-2: Keep CMOS (default)	
		2-3: Clear CMOS	
JSATA1 (2)	SATA1 Connector PIN7 5V / GND Selection	1-2: +5V	
		2-3: GND (default)	
JME1 (3)	ME Function Selection	1-2: Enabled (default)	
		2-3: Disabled	
JPWR1 (4)	AT/ATX Selection	1-2: ATX Mode (default)	
		2-3: AT Mode	
JVIO1 (5)	PCI104 IO Voltage	1-2: +5V (default)	
		2-3: +3.3V	

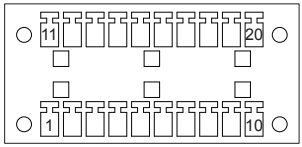
SW2/1/4/3: COM3/4/5/6 RS-232-3W/RS-422/RS-485 Select DIP Switches (7/6/9/8)

Mode / Pin	RS-232-3W	RS-422	RS-485
1	ON	OFF	OFF
2	OFF	ON	OFF
3	OFF	ON	ON
4	OFF	OFF	OFF
5	ON	OFF	OFF
6	ON	OFF	OFF
7	OFF	ON	OFF
8	OFF	ON	OFF
			

2.2.3 Pin Assignments for Connectors

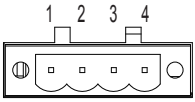
DIO1: 8 bit Digital Input + 8 bit Digital Output Connector (11)
Connector type: 2 x 10 pin terminal block connector.

	INPUT		OUTPUT
Pin	Description	Pin	Description
1	DI0	11	DO0
2	DI1	12	DO1
3	DI2	13	DO2
4	DI3	14	DO3
5	GND	15	GND
6	DI4	16	DO4
7	DI5	17	DO5
8	DI6	18	DO6
9	DI7	19	DO7
10	GND	20	GND

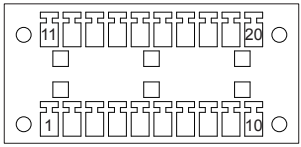


PWRIN1: DC Adapter Power Input (10)
Connector type: 4-pin terminal block.

Pin	Description
1	VCC 9~36V
2	GND
3	PBT -
4	PBT +



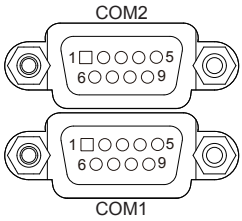
CN5: COM3-COM6 Serial Ports (4 x RS-232/422/485 Connectors) (12)
Connector type: 2 x 10 pin terminal block connector.



Pin	RS-232-3W	RS-422	RS-485	Pin	RS-232-3W	RS-422	RS-485
1	RX3	RXD3+		11	RX4	RXD4+	
2	TX3	RXD3-		12	TX4	RXD4-	
3		TXD3+	DATA3+	13		TXD4+	DATA4+
4		TXD3-	DATA3-	14		TXD4-	DATA4-
5	GND	GND	GND	15	GND	GND	GND
6	RX5	RXD5+		16	RX6	RXD6+	
7	TX5	RXD5-		17	TX6	RXD6-	
8		TXD5+	DATA5+	18		TXD6+	DATA6+
9		TXD5-	DATA5-	19		TXD6-	DATA6-
10	GND	GND	GND	20	GND	GND	GND

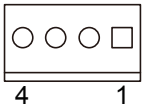
CN6: COM1-COM2 Serial Ports (2 x RS-232 Connectors) (13)
Connector type: Double stacked D-Sub 9-pin male.

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



PWR1: HDD/SSD Power Connector (14)
On-board HDD/SSD power connector.

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



Chapter 3

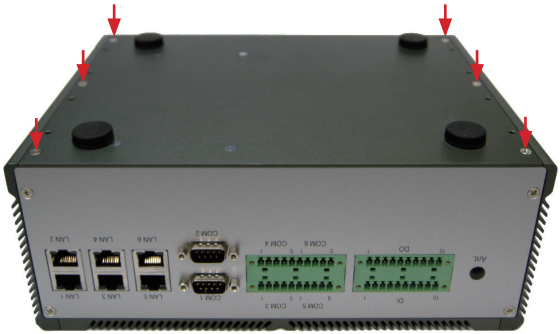
Installation and Maintenance

3.1 HDD/SSD, Memory Module, PCI/PCIe, PCI104, WiFi/ HSUPA and SIM Cards Installation

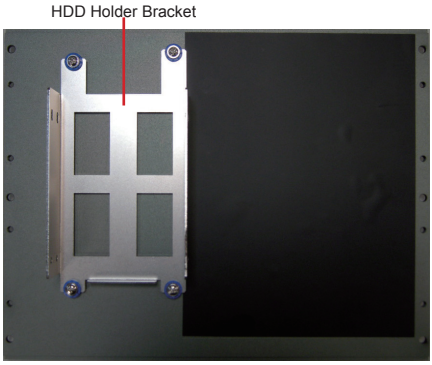
ARES-66x3 is designed to be modular for easier maintenance. The following sections describe simple hardware installations.

3.1.1 Removing Bottom Cover

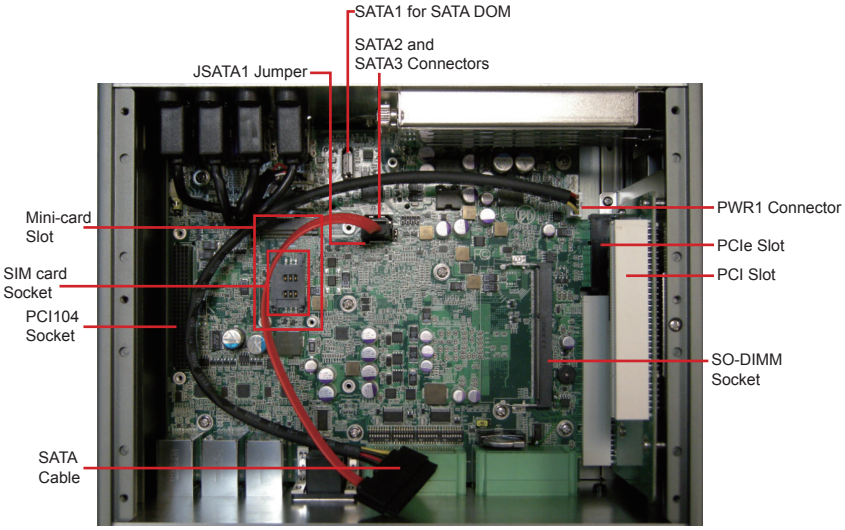
1. Power off the Box PC and place it upside down. Locate six screws securing the bottom cover.



2. Use a screwdriver to remove these six screws. First unscrew the four screws in each corner, and then the two screws in the middle of the two sides. Keep the screws for later use. Lightly pull one side of bottom cover upwards, flip it and gently put it down as below.



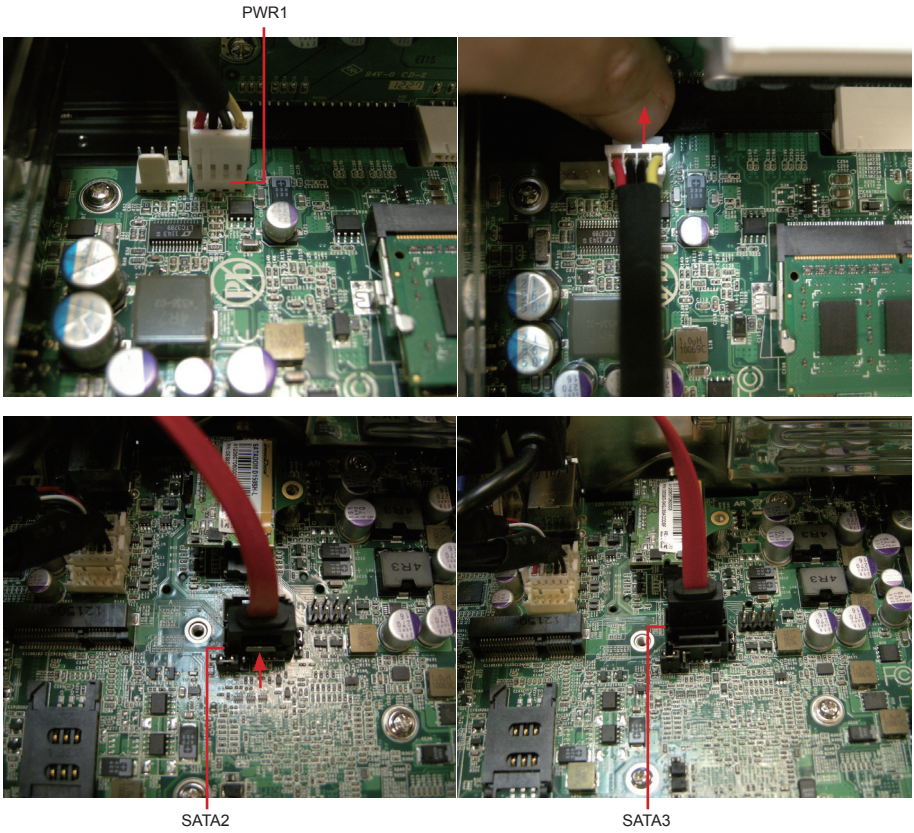
3. Take a quick look at its inside.



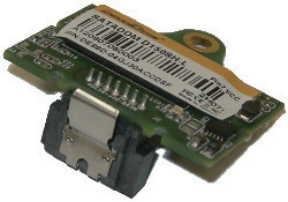
3.1.2 Installing SSD/HDD

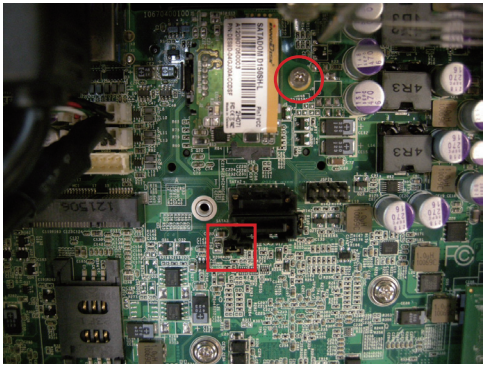
1. The SSD/HDD holder bracket is attached to bottom cover, also used as a cooling plate. Fit SSD into holder bracket properly and screw its four corners as red arrows direct. The bracket can hold 2 SSD/HDD. Insert one end of SATA cable into SSD jack.

2. Plug power line into PWR1 connector on main board. If you want to unplug it, press the white plastic clip outwards before unpluging it. Plug SATA cable into SATA2 or SATA3 on main board. If you want to unplug it, yous should press the metallic clip inwards and unplug it.

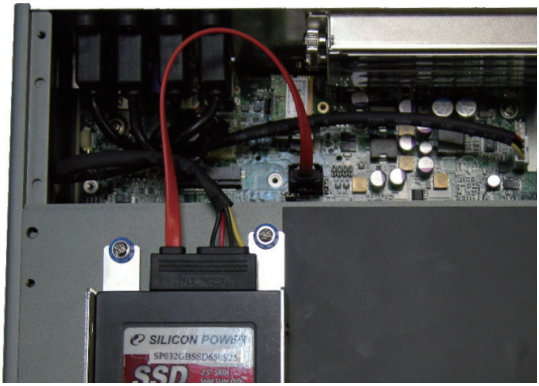


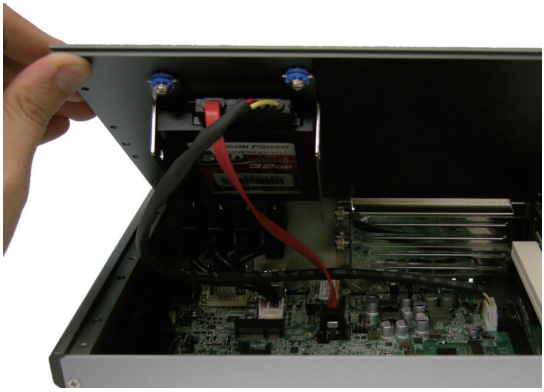
3. ARES-66x3's main board FMB-i67M5 also supports SATA DOM, a type of mini solid-state drive. To install that, you must set JSATA1 as pin1-2 firstly, and then insert SATA DOM into SATA1 and screw it as shown in picture. NEVER INSTALL SATA CABLE INTO SATA1 IN THIS STATE, OR YOUR HDD/ SSD WILL BURN OUT. Restore JSATA1 to pin2-3 to discooncet power supply from SATA1 as SATA DOM is not used.



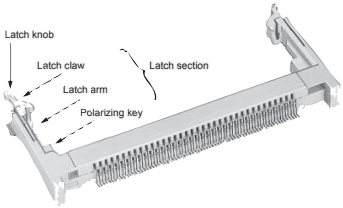


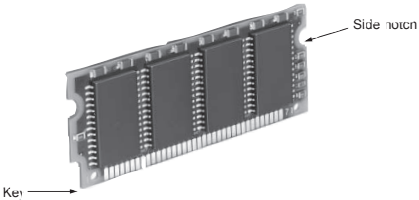
4. Reinstall bottom cover back to its original place. Be careful not to press SATA cable in the process and not to pull it away next time you remove bottom cover.





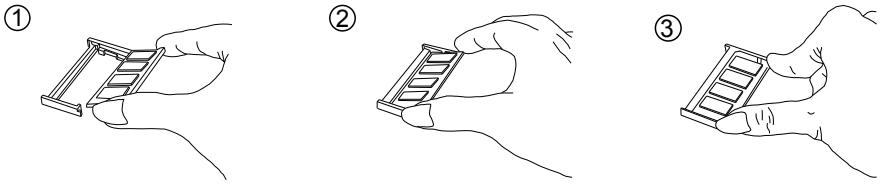
3.1.3 Installing Memory





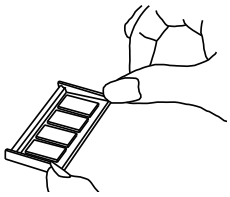
To install the Memory module, locate the Memory SO-DIMM slot on the board and perform as below:

1. Adjust the socket polarizing key and the board key to the same direction.
2. Insert the board obliquely. Moreover, lay the board in parallel to the opening at angle of 20^{o} to 30^{o}, and softly insert the board so as to hit the socket bottom. Stopping insertion halfway will result in improper insertion.
3. Applying the board side notch in parallel to the socket bottom so that the board position cannot be displaced, press the board side notch up, and fix it to the latch portion at both socket edges. Press the board side notch, and release the notch with a snap “click” tone, if the printed board exceeds the latch claw head.



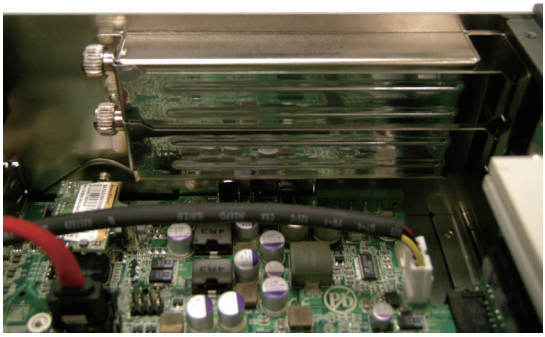
Procedures for board extraction

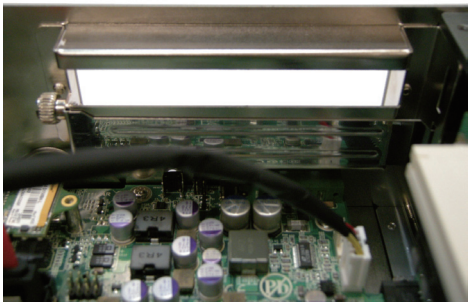
Apply the thumb nail to the latch knob at both socket edges. Forcibly widen the latch knobs to right and left ways, and release the latch. Then draw the board out along an angle where the board is raised.



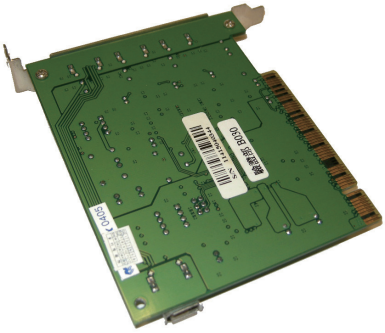
3.1.4 Installing PCI/PCIe Card

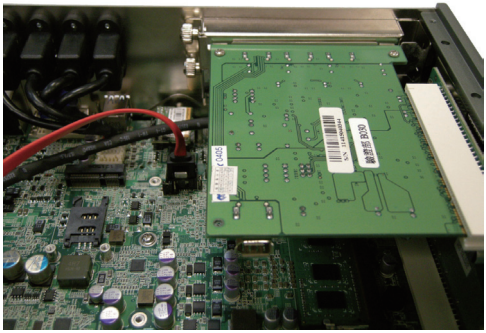
1. Unscrew preferred PCI/PCIe slot bracket without the need to use any tool. Take the thumb screw and bracket off and keep them for later use.





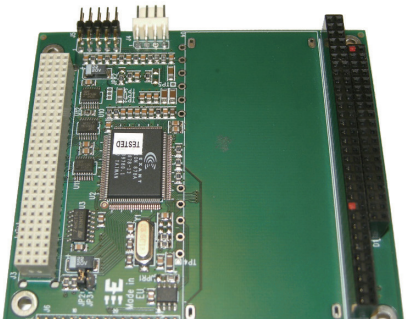
2. Plug your desired PCI or PCIe card into appropriate place and secure it.

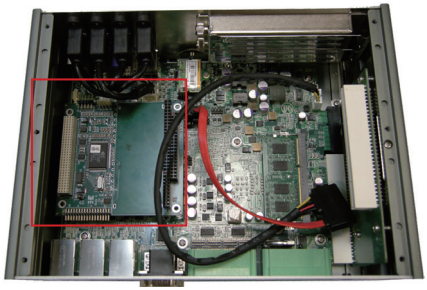




3.1.5 Installing PCI104 Card

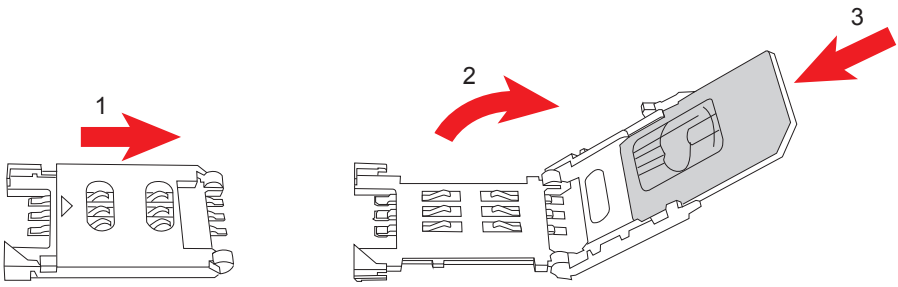
Plug your desired PCI104 card into its socket. Be sure to align its pins with socket carefully.





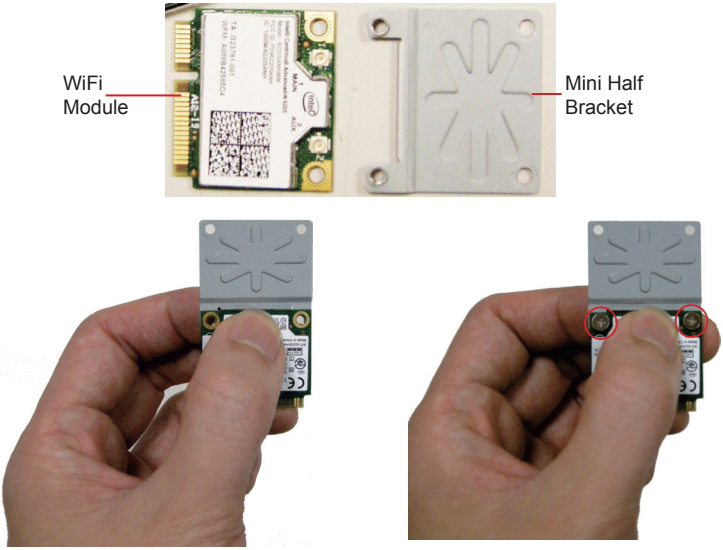
3.1.6 Installing SIM Card

1. Slightly press SIM socket lid and move it rightards. Lift socket lid.
2. Slip SIM card along grooves on lid's inside as below, close it and move leftwards.

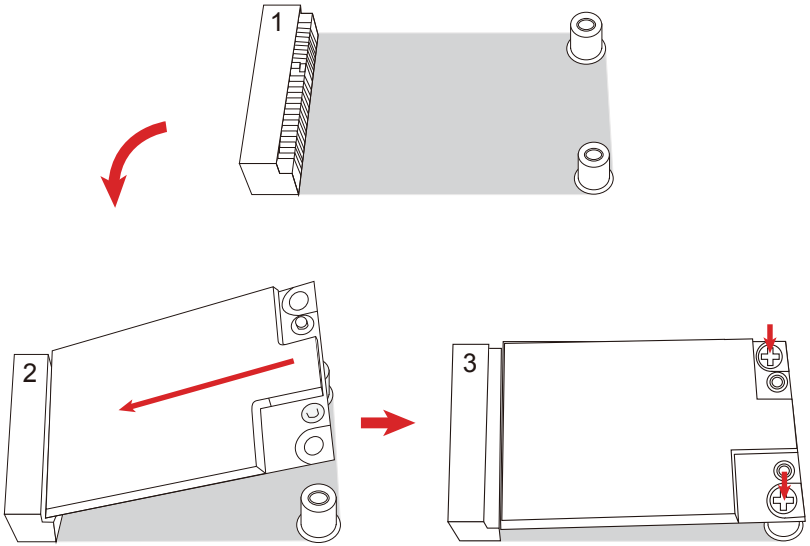


3.1.7 Installing WiFi/HSUPA (optional)

1. Before all, do the 1st step for WiFi module and only WiFi module. Due to the module's length limitation, you have to extend its length using mini half bracket, or it would be too short to install on socket on main borad. Combine WiFi module and mini half bracket in light of screw hole position, turn to the back and secure them.



2. Locate Mini-card socket. Insert WiFi or HSUPA module into its slot at a slanted angle. Remember to align the notch with the break on slot. And then, secure two screws to fasten the module.



3.2 How to Access CFast Card

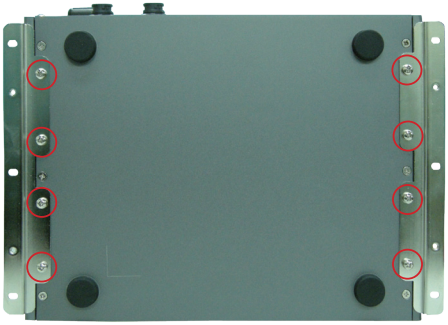
1. If OS is installed on CFast card, make sure you have turned off the power before inserting or ejecting the CFast card. Locate the CFast card door on the front panel. Unscrew the door without any tool. Pull down, remove and keep the door for later usage.

2. Insert your CFast card into the slot according to the illustration by the card holder. Push it inward until you hear a click. Close the card door and screw it on clockwise.

3. To remove the CFast/SIM card, follow step 1 and 2 above. And then push card inward to pop-out it from the slot.

3.3 Wall Mounting (optional)

1. Place ARES-66x3 upside down on a flat surface and locate the 8 screw holes on the bottom cover.
2. Place the wall-mount brackets horizontally along bottom cover so that the screw holes on brackets completely correspond to the ones on bottom cover.
3. Secure the brackets to ARES-66x3.



3.4 Grounding the Box PC

Follow the instructions below to ground the box PC onto land. Be sure of following any grounding requirements in your place.

> ⚠ **Warning** Whenever installing the unit, the ground connection must always be made first of all and disconnected lastly.

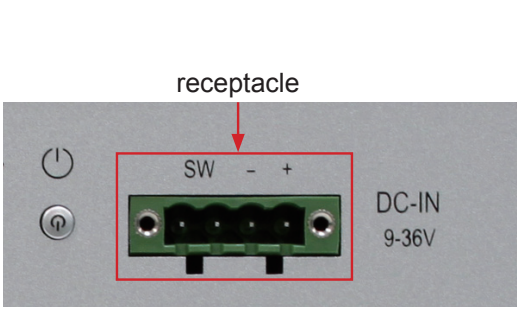
1. As the figure illustrates above, remove the ground screw located on the bottom-right of the rear panel.
2. Attach the ground wire to the rear panel with the screw.

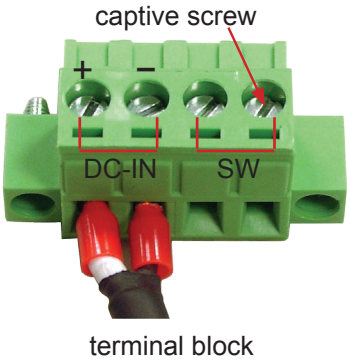
3.5 Wiring the DC-Input Power Source

> **Warning** Only trained and qualified personnel are allowed to install or replace this equipment.

Follow the instructions below for connecting the computer to a DC-input power source.

1. Before wiring, make sure the power source is disconnected.
2. Find the terminal block in the accessory box.
3. Use the wire-stripping tool to strip a short insulation segment from the output wires of the DC power source.
4. Identify the positive and negative feed positions for the terminal block connection. See the symbols printed on the rear panel indicating the polarities and DC-input power range in voltage.
5. Insert the exposed wires into the terminal block plugs. Only wires with insulation should extend from the terminal block plugs. Note that the polarities between the wires and the terminal block plugs must be positive to positive and negative to negative.
6. Use a slotted screwdriver to tighten the captive screws. Plug the terminal block firmly, which wired, into the receptacle on the rear panel.





Chapter 4

Driver & AP

4.1 Preliminary work

After everything mentioned before is settled down, and now, you need to install the necessary drivers and the application so that the box PC's functions can operate normally. The following instructions take Windows 7 32bit as the exemplary OS. Different OS may vary slightly, but generally speaking, they are almost the same. Be assured that appropriate installation procedure is as below:

Framework (only for Win XP)→CHIPSET→ Management Engine→VGA→AUDIO→LAN→USB3.0 (only for Win 7)

Please **Follow This Procedure** to install all necessary units in most cases, or you may encounter errors.

Also, the correct driver paths for Windows 7 & Windows XP are listed below. You should follow the suggested paths to proceed with installation.

Windows XP

Driver & AP	Path
Framework	\Framework 3.5
CHIPSET	\INF
VGA	\Graphic\Graphic_winxp32_V6.14.10.5415
	\Graphic\Graphic_winxp64_6.14.10.5415
AUDIO	\Hd Audio
Management Engine	\ME\INTEL_ME_winxp_win7_32_64_VIS8.1.0.1143
LAN	\LAN\Install_WinXP_5798_07272012\PCIE_Install_5798_07272012

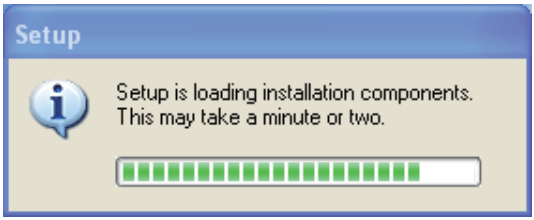
Windows 7

Driver & AP	Path
CHIPSET	\INF
VGA	\Graphic\Graphic_win7_32_V8.15.10.2795
	\Graphic\Graphic_win7_64_V8.15.10.2795
AUDIO	\Hd Audio
Management Engine	\ME\INTEL_ME_winxp_win7_32_64_VIS8.1.0.1143
USB3.0	\USB 3.0\Intel(R)_USB_3.0_win7_32_64_V1.0.5.235\ Intel(R)_USB_3.0_win7_32_64_Driver_V1.0.5.235
LAN	\LAN\Install_Win7_7061_07272012\Install_ Win7_7061_07272012

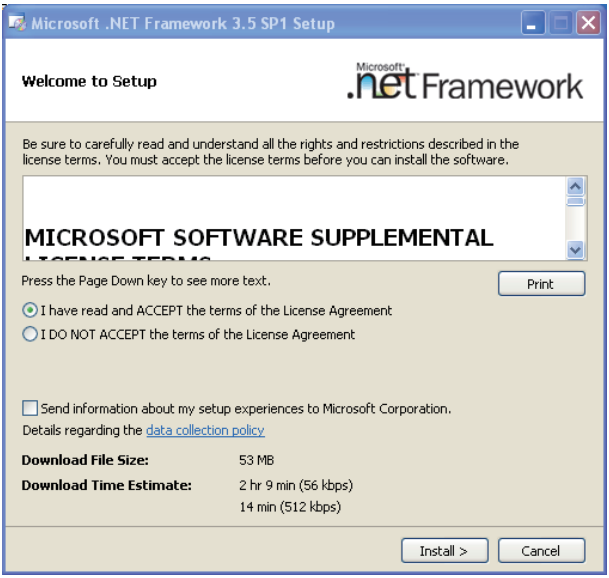
4.2 Application

4.2.1 Microsoft .NET 3.5 (only for Win XP)

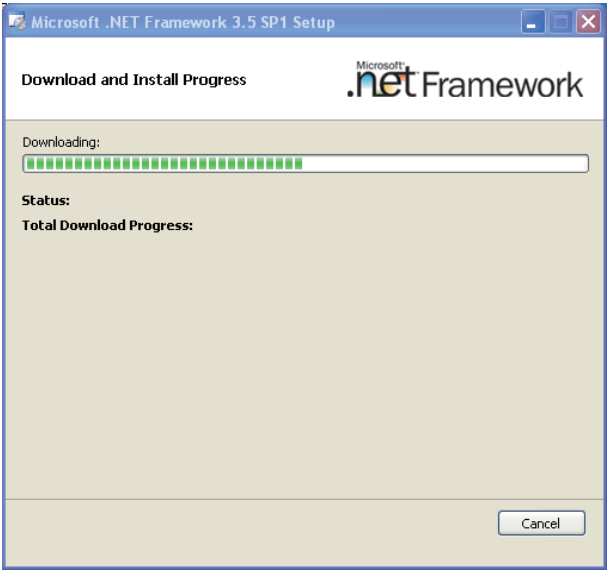
1. For Windows XP, you should install the additional application before all. Execute “dotnetfx35.exe” in the suggested path (\Framework 3.5). Wait for the process.



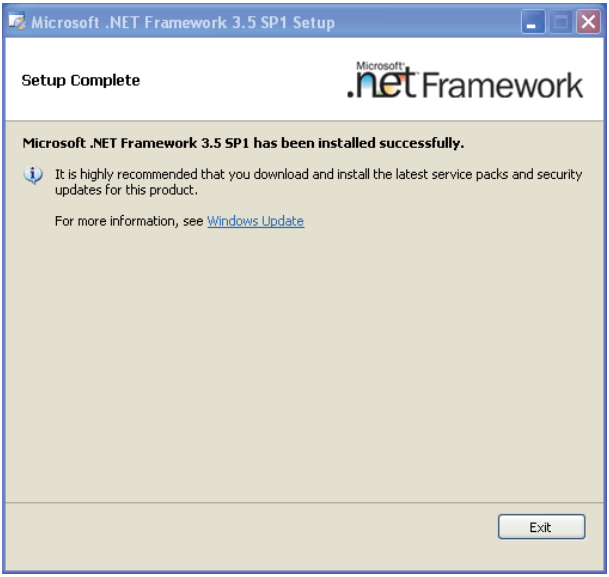
2. Read license terms, choose “I have read and ACCEPT the terms of the License Agreement” and then click “Install >”.



3. Wait for installation progress.



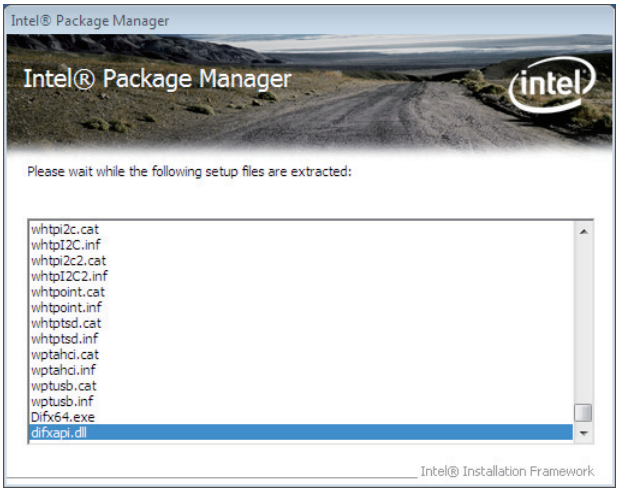
4. Click ***Exit*** to close the window.



4.3 Drivers

4.3.1 CHIPSET

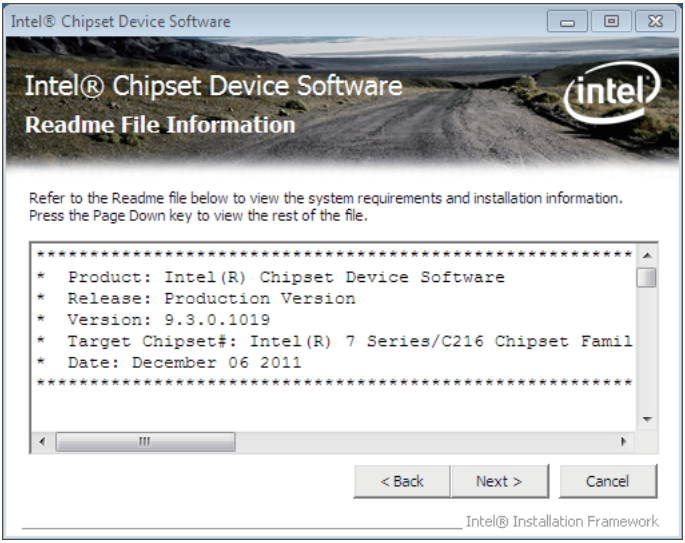
1. Execute “infinst_winxp_win7_32_64_v9.3.0.1019.exe” in the suggested path (\INF). Always click Yes whenever Windows 7 inquires you “Do you want to allow the following programs to make changes to this computer?” Wait for extracting.



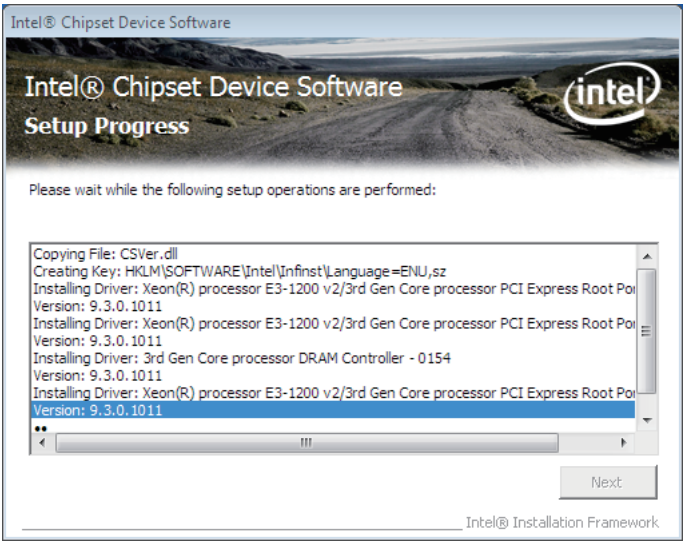
2. Click “Next >”.

3. Click “Yes >”.

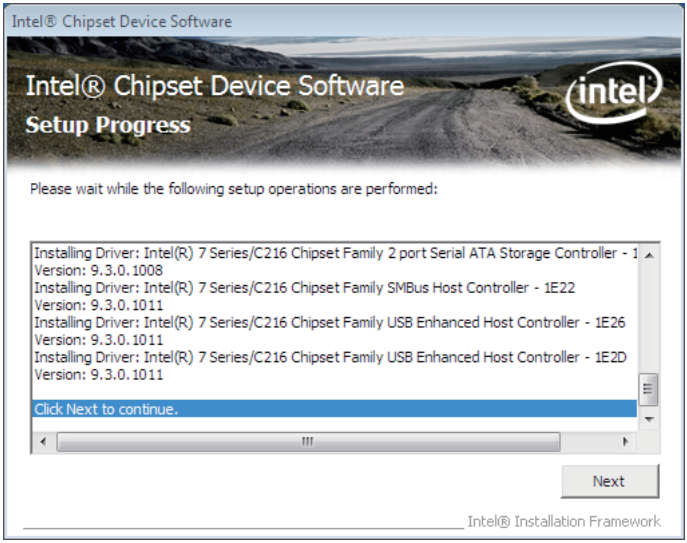
4. Click “Next >”.



5. Wait for setup progress.



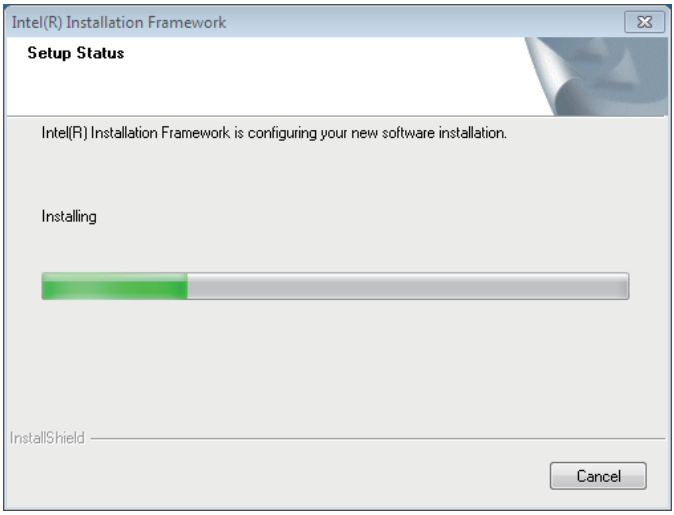
6. Click “Next”.



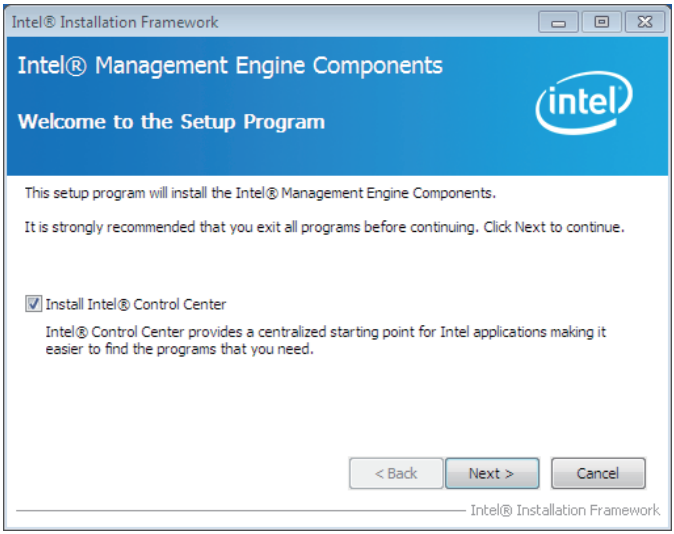
7. Choose “Yes” and click “Finish >” to reboot computer.

4.3.2 Management Engine

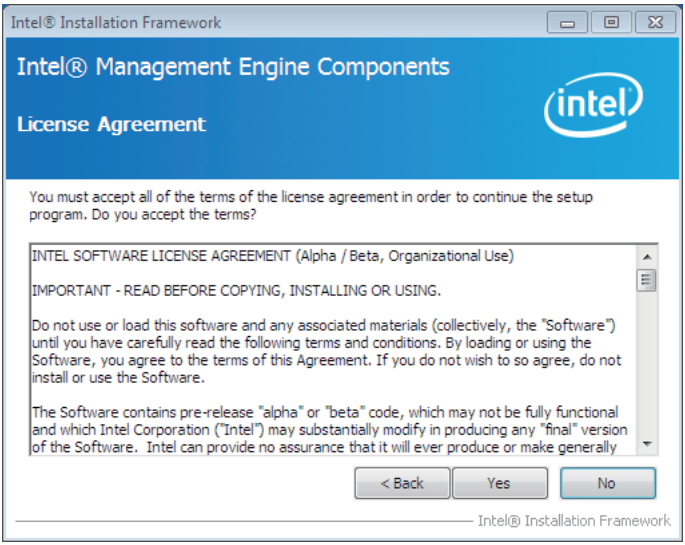
1. Execute “setup.exe” in the suggested path (\ME\INTEL_ME_winxp_win7_32_64_VIS8.1.0.1143). Wait for the process.



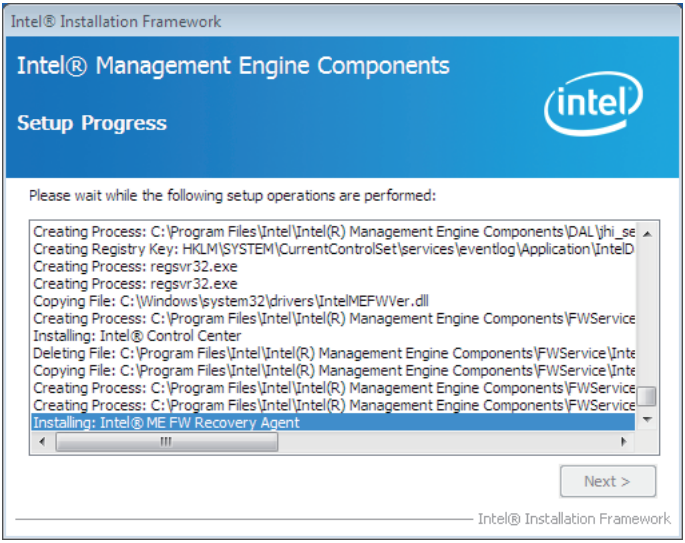
2. Check the box and click “Next >”.



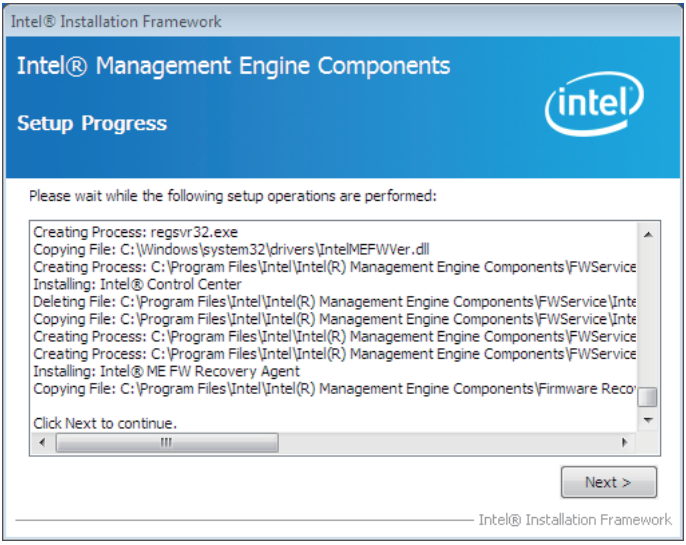
3. Click “Yes >”.



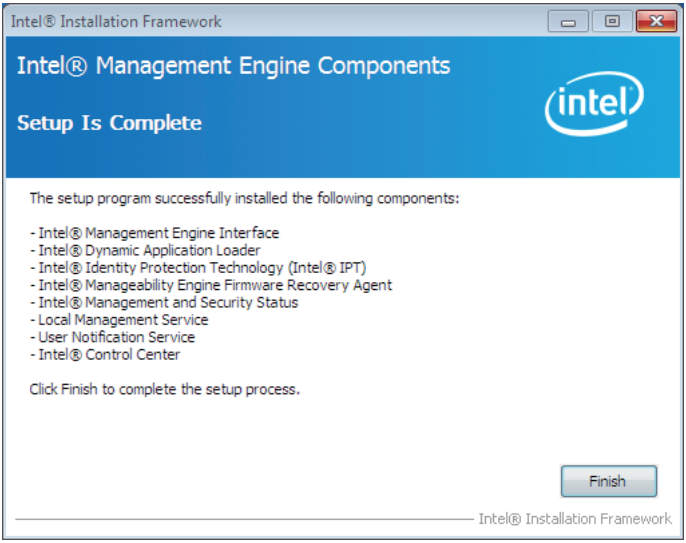
4. Wait for setup progress.



5. Click “Next >”.



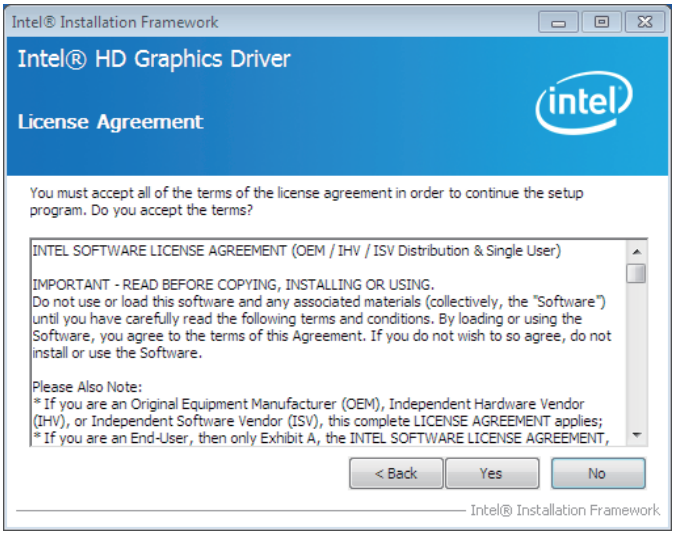
6. Click “Finish”.



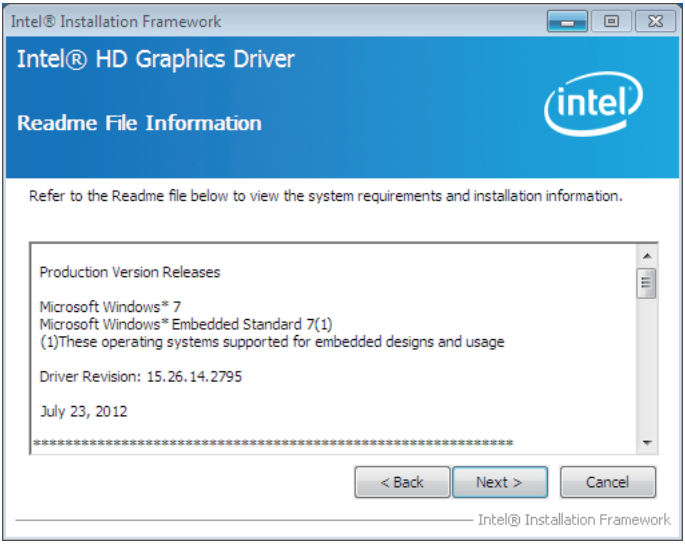
4.3.3 VGA

1. Execute “setup.exe” in the suggested path (\Graphic\Graphic_win7_32_V8.15.10.2795).

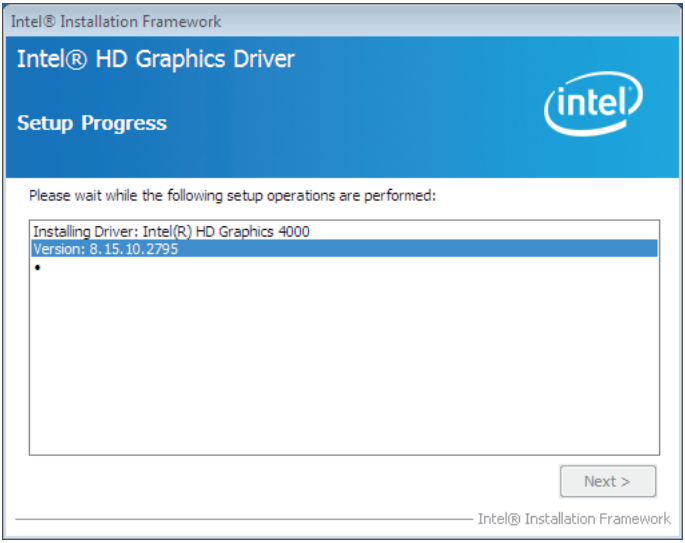
2. Click “Yes”.



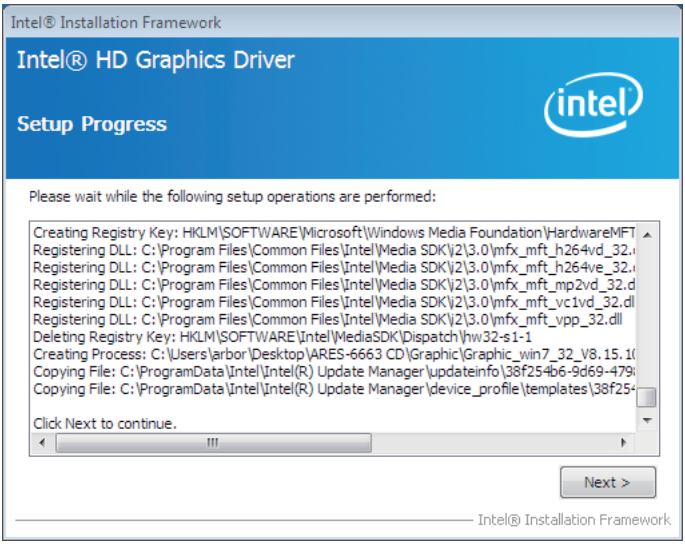
3. Click “Next >”.



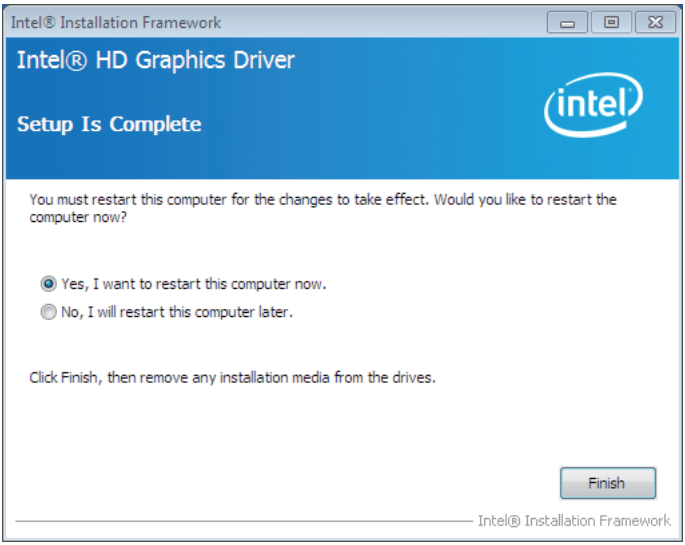
4. Wait for setup progress.



5. Click “Next >”.

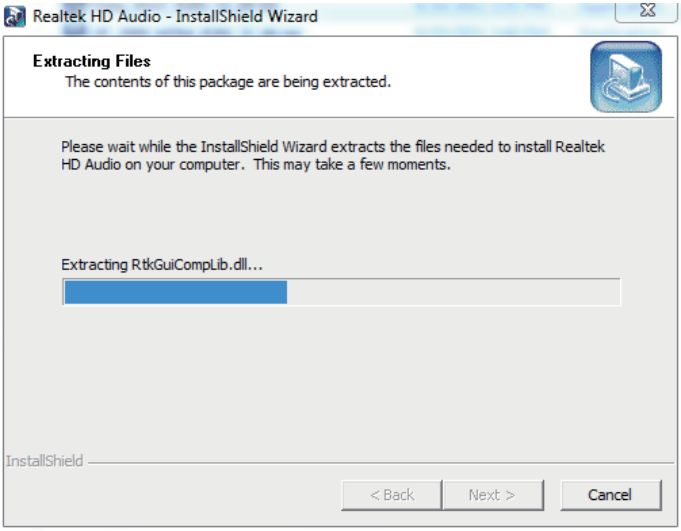


6. Choose “Yes >” and click “Finish” to restart computer.

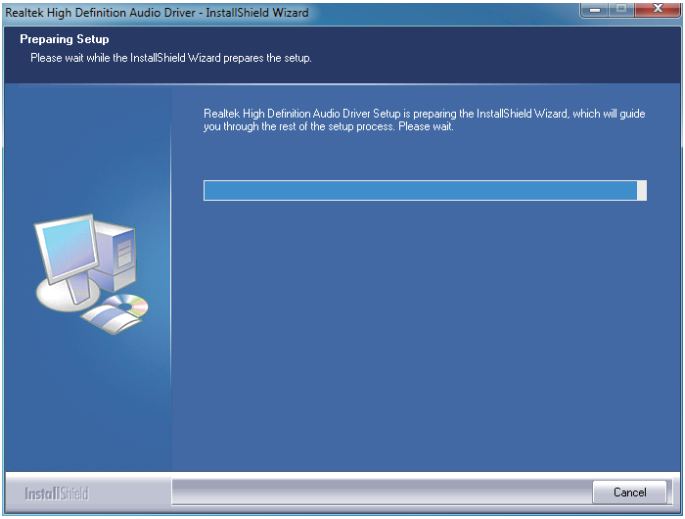


4.3.4 Audio

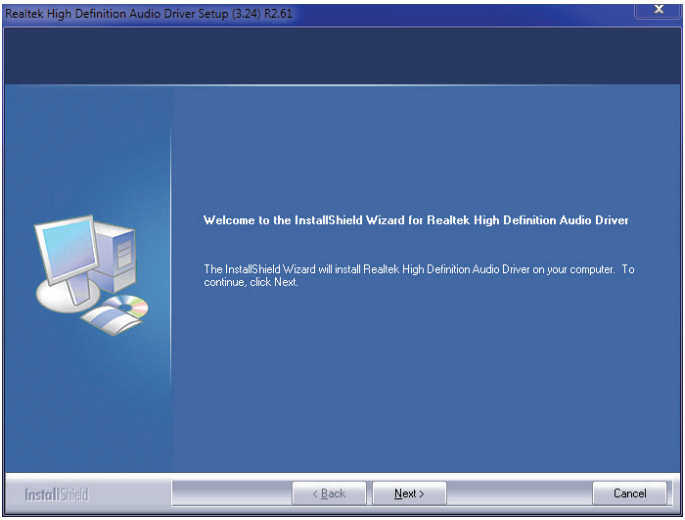
1. Execute “Vista_Win7_R261-32_64.exe” in the suggested path (\Hd Audio). Wait for extracting.



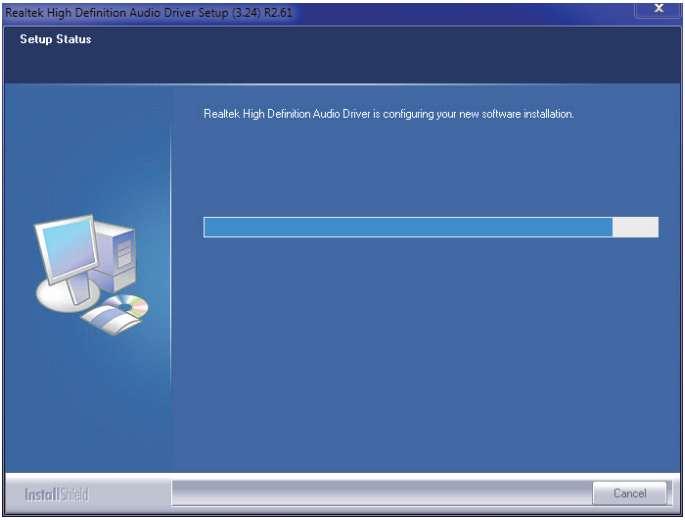
2. Keep waiting.



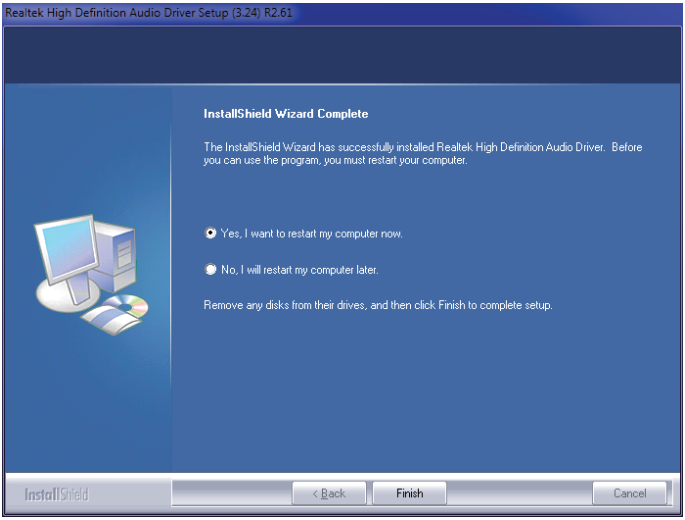
3. Click “Next >”.



4. Wait for the process.

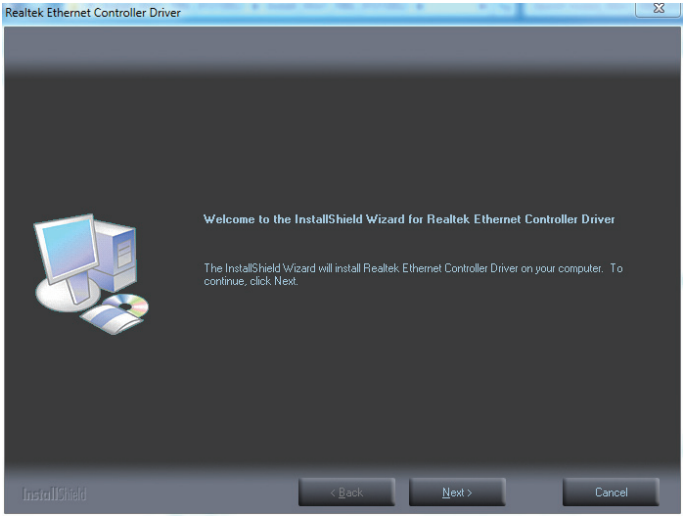


5. Choose “Yes >” and click “Finish” to restart computer.

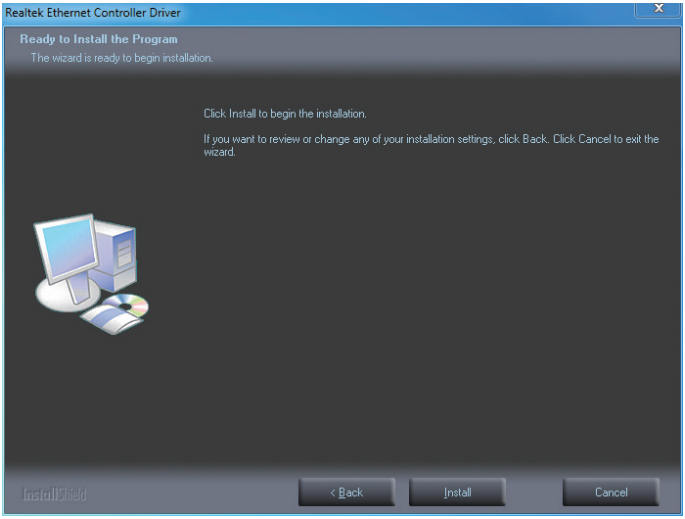


4.3.5 LAN

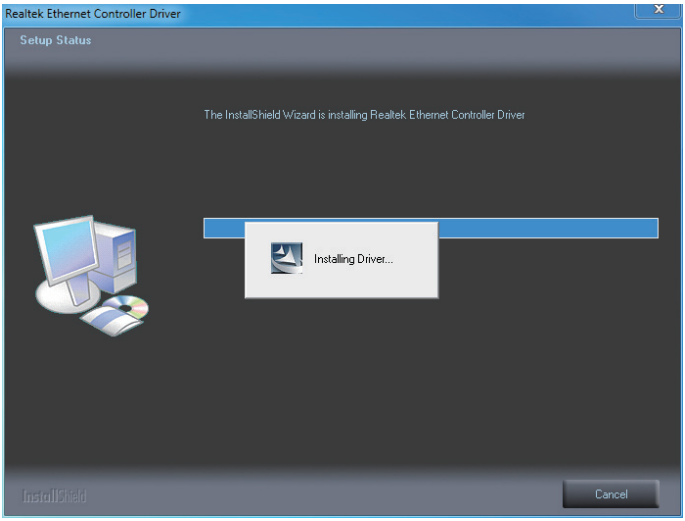
1. Execute “setup.exe” in the suggested path (\LAN\Install_ Win7_7061_07272012\Install_Win7_7061_07272012). Click “Next >”.



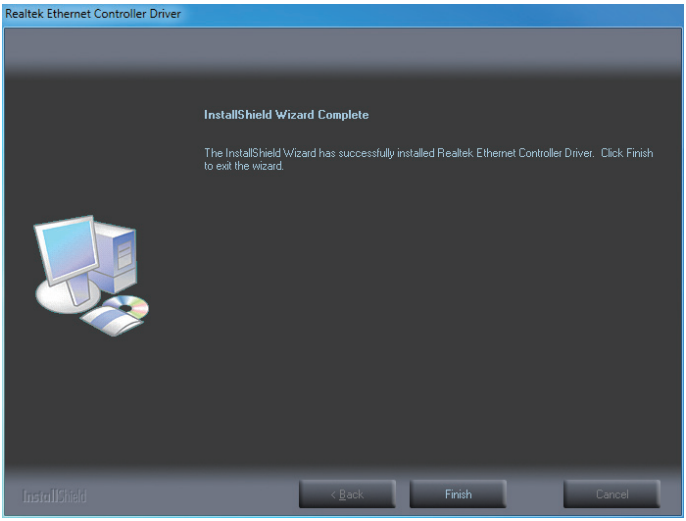
2. Click “Install >”.



3. Wait for the process.

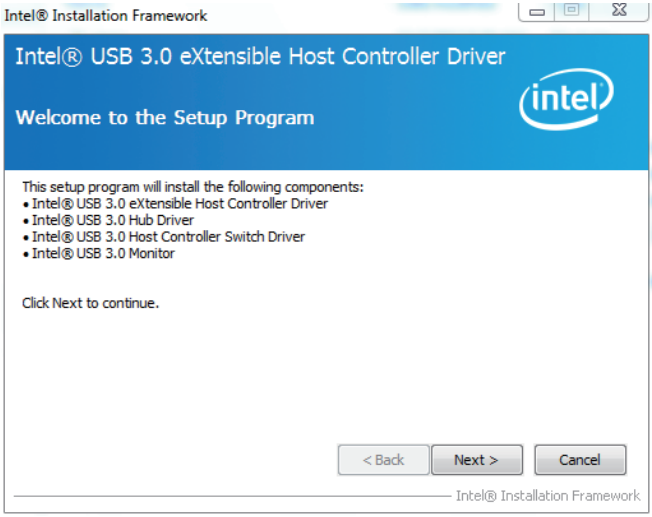


4. Click “Finish >”.

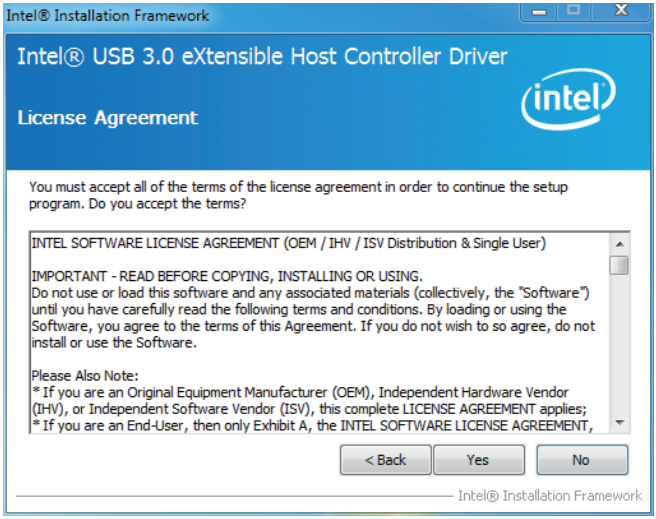


4.3.6 USB3.0

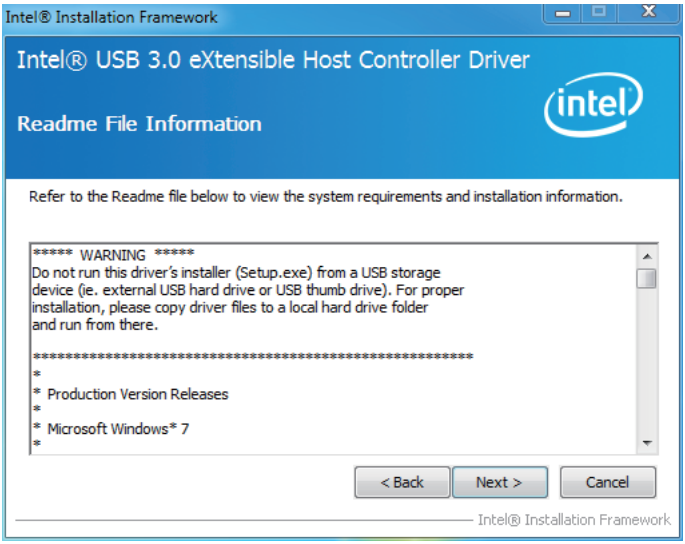
1. Before installing this driver, be aware that Windows XP doesn't support USB3.0, so the system won't allow you to install USB3.0. Execute "Setup.exe" in the suggested path (\USB 3.0\Intel(R)_USB_3.0_win7_32_64_V1.0.5.235\Intel(R)_USB_3.0_win7_32_64_Driver_V1.0.5.235). Click "Next >".



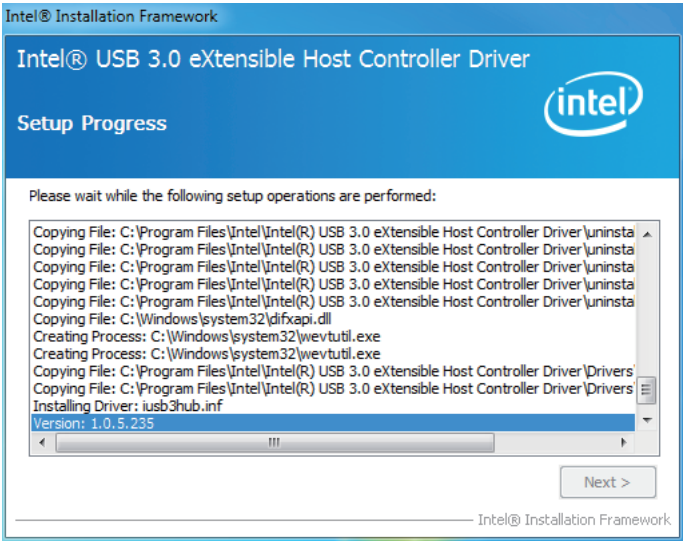
2. Click "Yes".



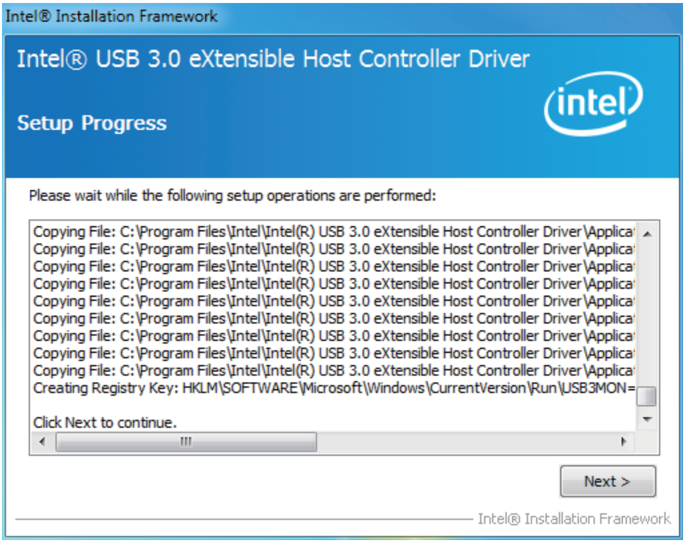
3. Click “Next >”.



4. Wait for setup progress.



5. Click “Next >”.



6. Choose “Yes >” and click “Finish” to restart computer.

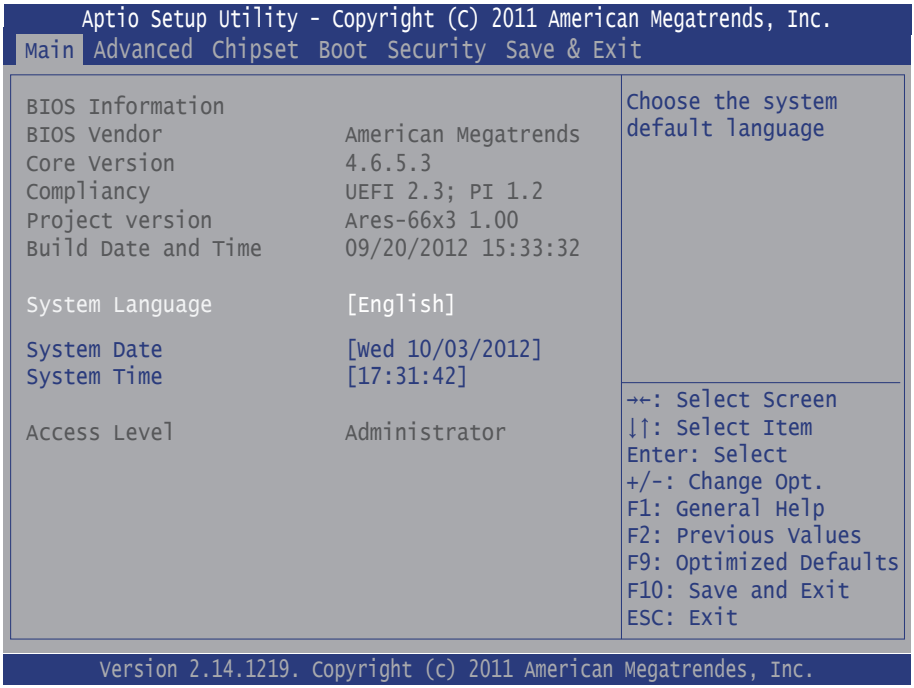
Chapter 5

BIOS

5.1 Main

The AMI BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS RAM of the system stores the Setup utility and configurations. When you turn on the computer, the AMI BIOS is immediately activated. To enter the BIOS SETUP UTILITY, press **"Delete"** once the power is turned on. When the computer is shut down, the battery on the motherboard supplies the power for BIOS RAM.

The **Main Setup** screen lists the following information:



Setting	Description
BIOS Information	
BIOS Vendor	displays vendor name
Core Version	displays current core version information
Compliancy	displays compliant format
Project Version	displays current BIOS version information
Build Date and Time	the date that the BIOS version was made/updated

System Language	Choose the system default language
System Date	Set the system date. Note that the 'Day' automatically changes when you set the date. ► The date format is: **Day:** Sun to Sat **Month:** 1 to 12 **Date:** 1 to 31 **Year:** 1998 to 2099
System Time	Set the system time. ► The time format is: **Hour:** 00 to 23 **Minute:** 00 to 59 **Second:** 00 to 59

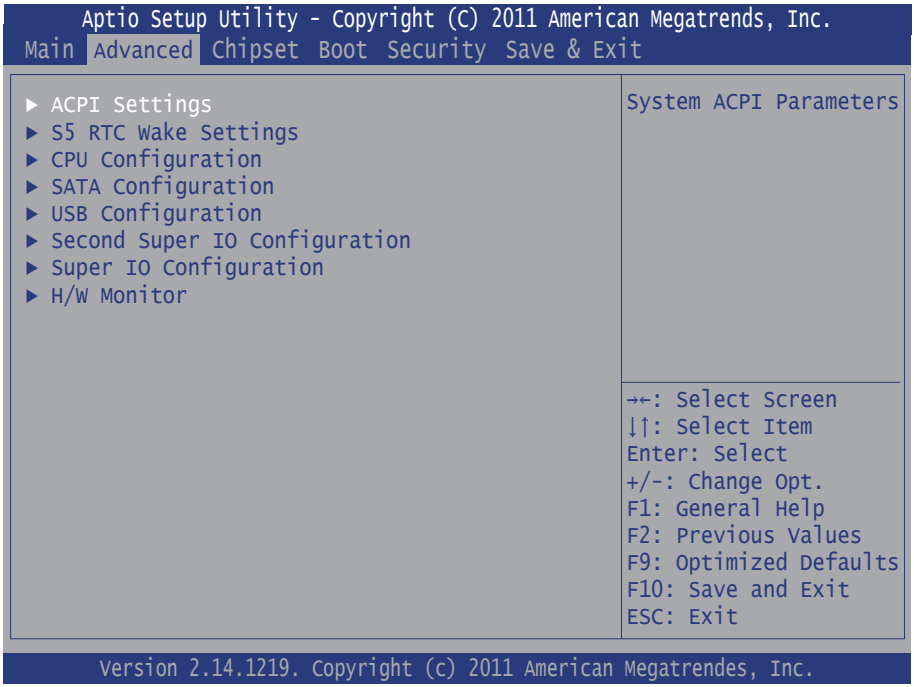
Key Commands

BIOS Setup Utility is mainly a key-based navigation interface. Please refer to the following key command instructions for navigation process.

Keystroke	Function
◄ ►	Move to highlight a particular configuration screen from the top menu bar / Move to highlight items on the screen
▼ ▲	Move to highlight previous/next item
Enter	Select and access a setup item/field
Esc	On the Main Menu – Quit the setup and not save changes into CMOS (a message screen will display and ask you to select "OK" or "Cancel" for exiting and discarding changes. Use "←" and "→" to select and press "Enter" to confirm) On the Sub Menu – Exit current page and return to main menu
Page Up / +	Increase the numeric value on a selected setup item / make change
Page Down -	Decrease the numeric value on a selected setup item / make change
F1	Activate "General Help" screen
F10	Save the changes that have been made in the setup and exit. (a message screen will display and ask you to select "OK" or "Cancel" for exiting and saving changes. Use "←" and "→" to select and press "Enter" to confirm)

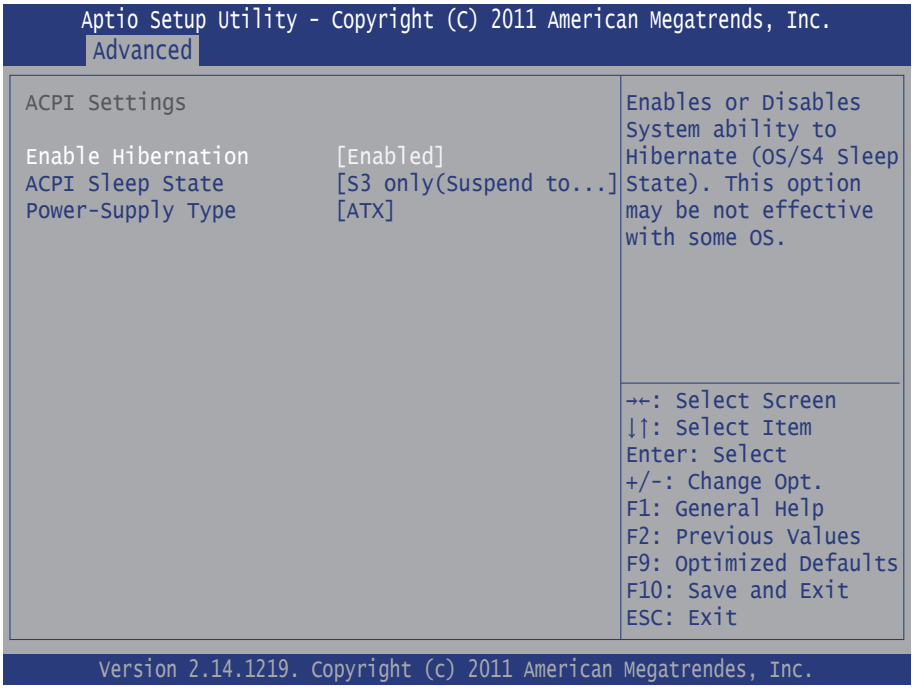
5.2 Advanced

The “Advanced” setting page provides you the options to configure the details of your hardware, such as ACPI, CPU, SATA, USB and (Second) Super IO.



Setting	Description
ACPI Settings	See Section 5.2.1
S5 RTC Wake Settings	See Section 5.2.2
CPU Configuration	See Section 5.2.3
SATA Configuration	See Section 5.2.4
USB Configuration	See Section 5.2.5
Second Super IO Configuration	See Section 5.2.6
Super IO Configuration	See Section 5.2.7
H/W Monitor	See Section 5.2.8

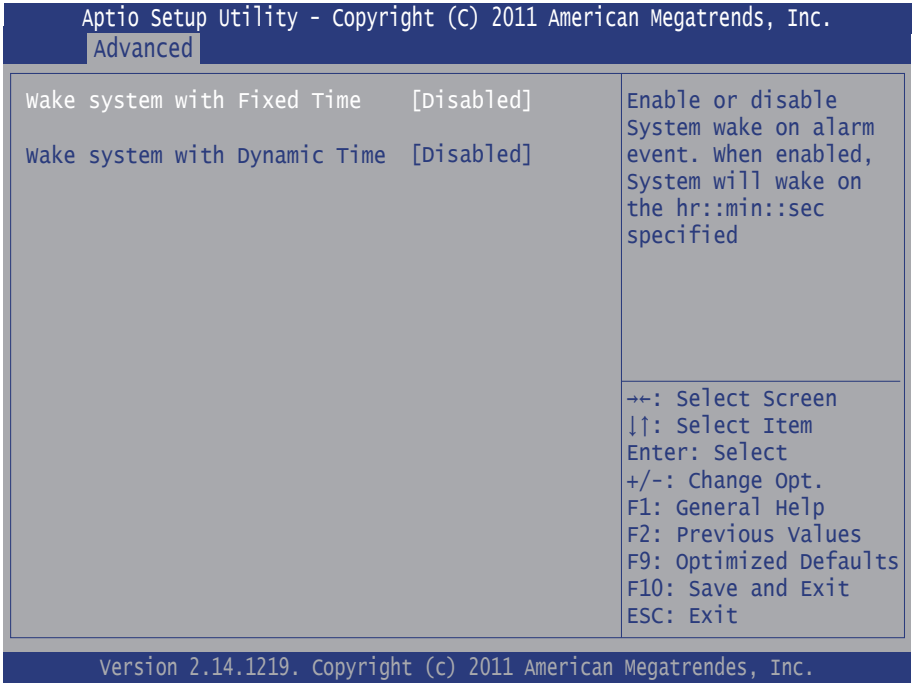
5.2.1 ACPI Settings



Setting	Description
Enable Hibernation	**Enable** (default) or **Disable** system ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Select ACPI sleep state the system will enter when the SUSPEND button is pressed. ► Options: **Suspend Disabled**, **S1 only(CPU Stop Clock)**, **S3 only(Suspend to RAM)** (default).
Power-Supply Type	Select Power-Supply Type. ► Options: **AT**, **ATX** (default).

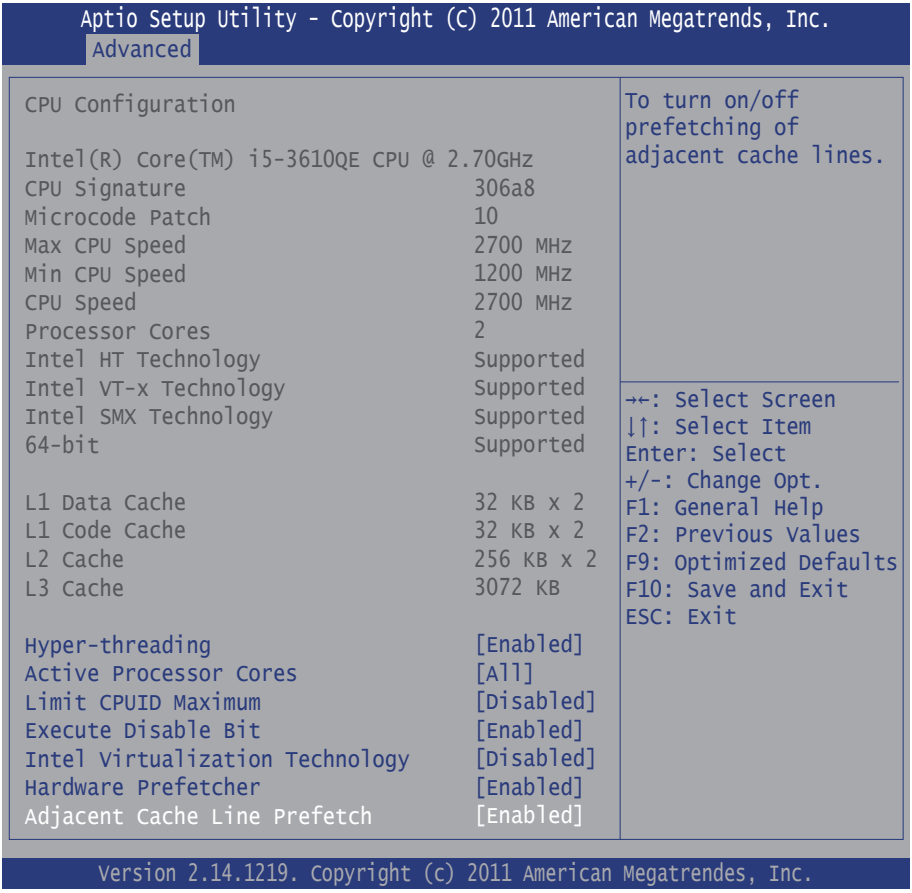
5.2.2 S5 RTC Wake Settings

Enable system to wake from S5 using RTC alarm.



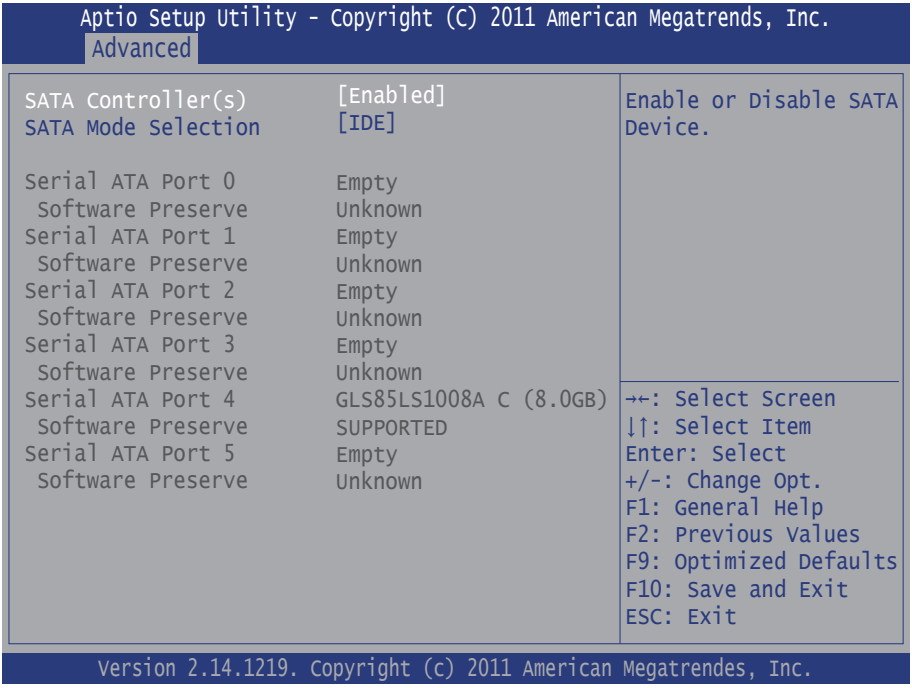
Setting	Description
Wake system with Fixed Time	**Enable** or **Disable** (default) System wake on alarm event. When enabled, System will wake on the hr::min::sec specified.
Wake system with Dynamic Time	**Enable** or **Disable** (default) System wake on alarm event. When enabled, System will wake on the current time + Increase minute(s).

5.2.3 CPU Configuration



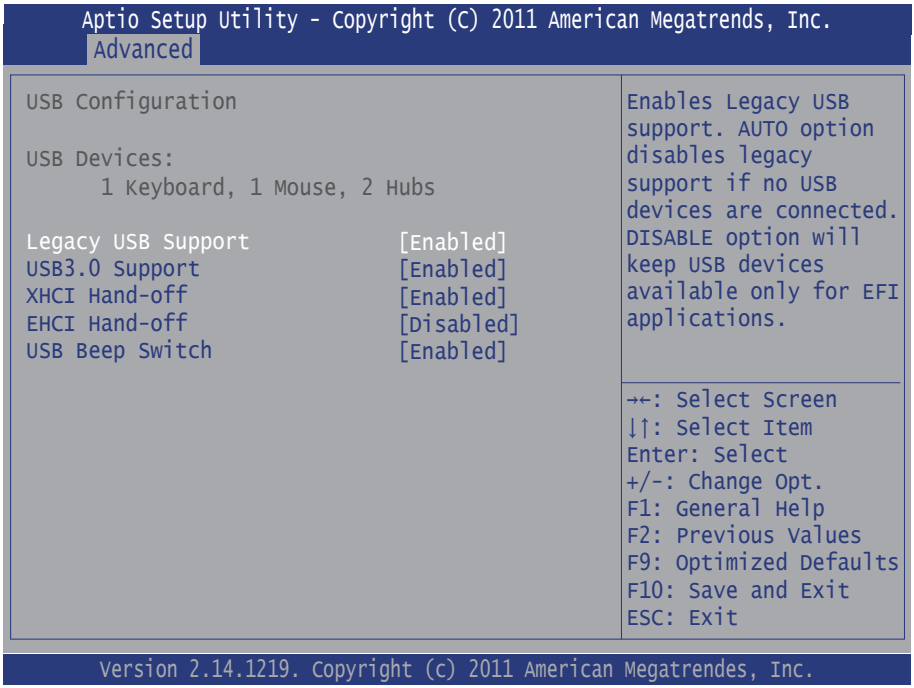
Setting	Description
Hyper-threading	**Enabled** (default) for Windows XP and Linux (OS optimized for Hyper-threading Technology) and **Disabled** for other OS (OS not optimized for Hyper-threading Technology). When Disabled, only one thread per enabled core is enabled.
Active Processor Cores	Number of cores to enable in each processor package. ► Options: **All** (default), **1**, **2**, **3**
Limit CPUID Maximum	Disabled for Windows XP ► Options: **Enabled** and **Disabled** (default).
Execute Disable Bit	XP can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3.) ► Options: **Enabled** (default) and **Disabled**.
Intel Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology. ► Options: **Enabled** and **Disabled** (default).
Hardware Prefetcher	To turn on/off the Mid Level Cache (L2) streamer prefetcher. ► Options: **Enabled** (default) and **Disabled**.
Adjacent Cache Line Prefetch	To turn on/off prefetching of adjacent cache lines. ► Options: **Enabled** (default) and **Disabled**.

5.2.4 SATA Configuration



Setting	Description
SATA Controller(s)	**Enable** (default) or **Disable** SATA Device.
SATA Mode Selection	Determine how SATA controller(s) operate. ► Options: **IDE**, **AHCI** (default) and **RAID**.

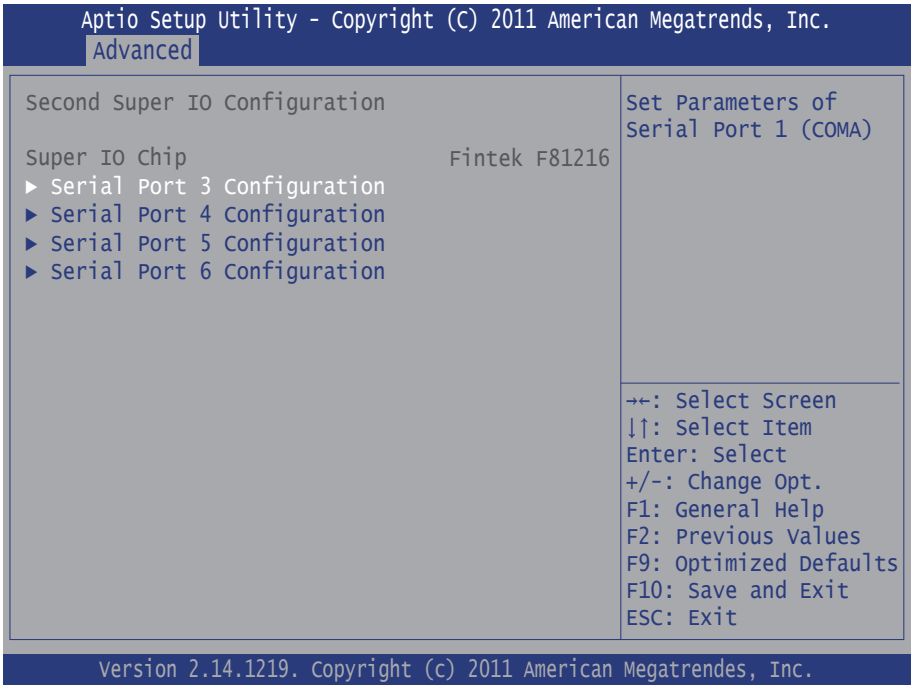
5.2.5 USB Configuration



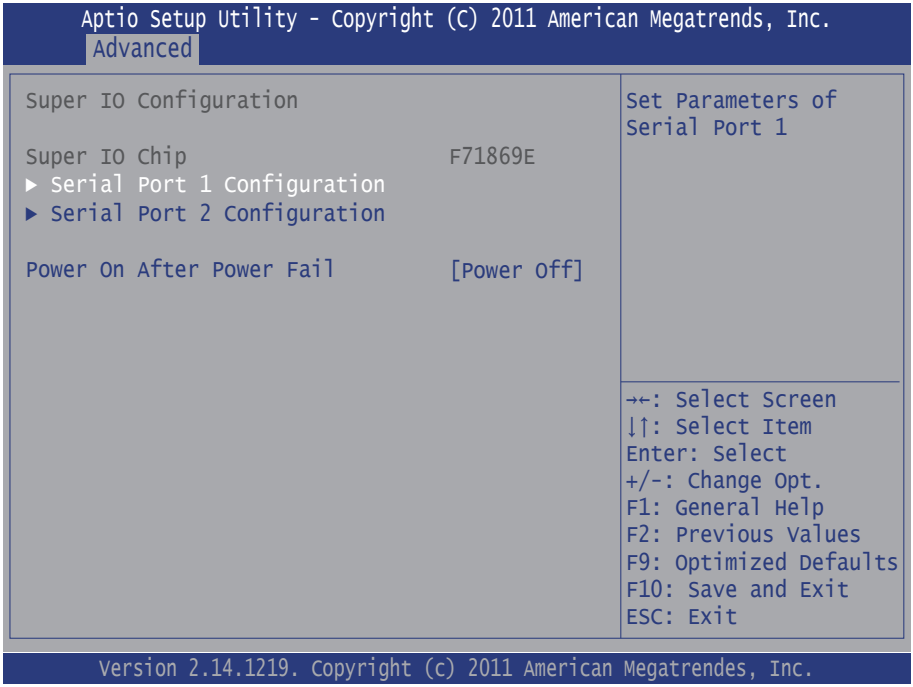
Setting	Description
Legacy USB Support	**Enables** (default) Legacy USB support. **AUTO** option disables legacy support if no USB devices are connected. **DISABLE** option will keep USB devices available only for EFI applications.
USB3.0 Support	**Enable** (default) or **Disable** USB3.0 (XHCI) Controller support.
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver. ► Options: **Enabled** (default) and **Disabled**.

EHCI Hand-off	This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver. ► Options: **Enabled** and **Disabled** (default).
USB Beep Switch	**Enable** (default) or **Disable** USB Beep sound.

5.2.6 Second Super IO Configuration

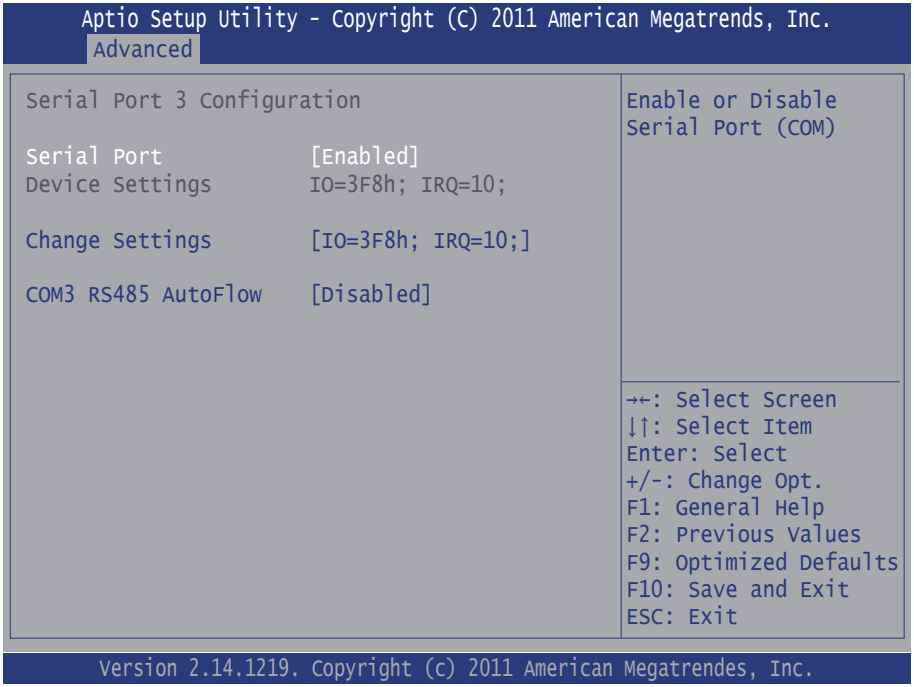


5.2.7 Super IO Configuration



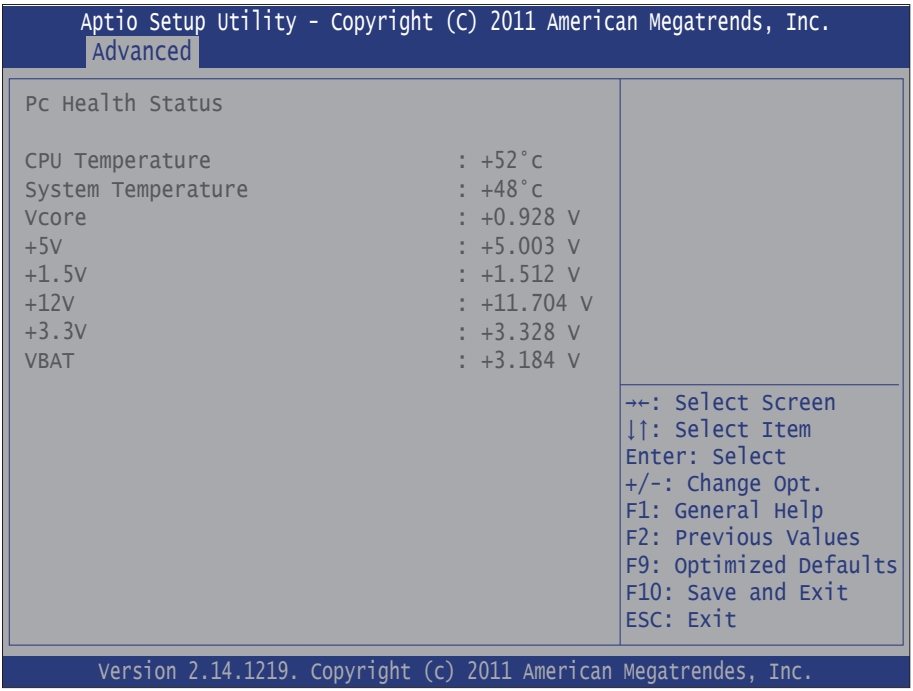
Setting	Description
Power On After Power Fail	Specify what state to go to when power is re-applied after a power failure. ► Options: **Power Off** (default) and **Power On**

Serial Port 1~6 Configuration

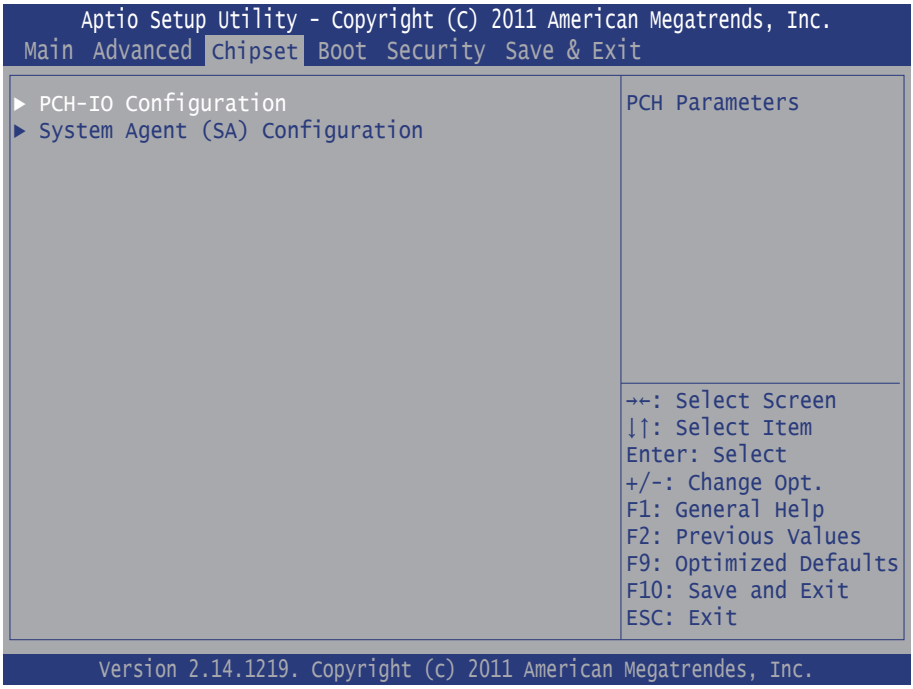


Setting	Description
Serial Port	**Enable** (default) or **Disable** Serial Port (COM)
Change Settings	Select an optimal setting for Super IO device.
COM3 RS485 AutoFlow	**Enable** or **Disable** (default) RS485 AutoFlow Settings. (only for Port 3~5)

5.2.8 H/W Monitor

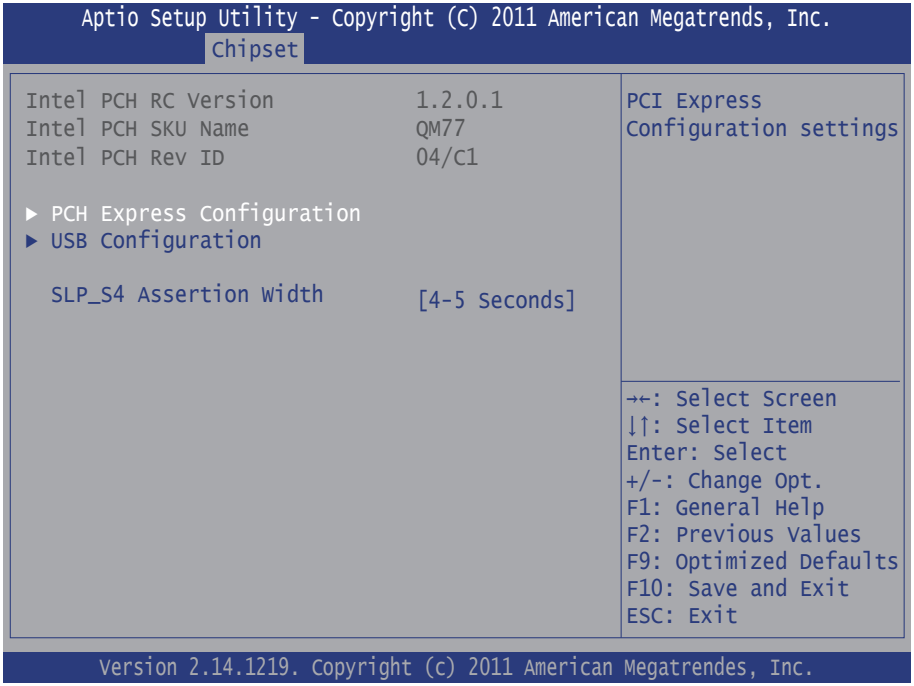


5.3 Chipset



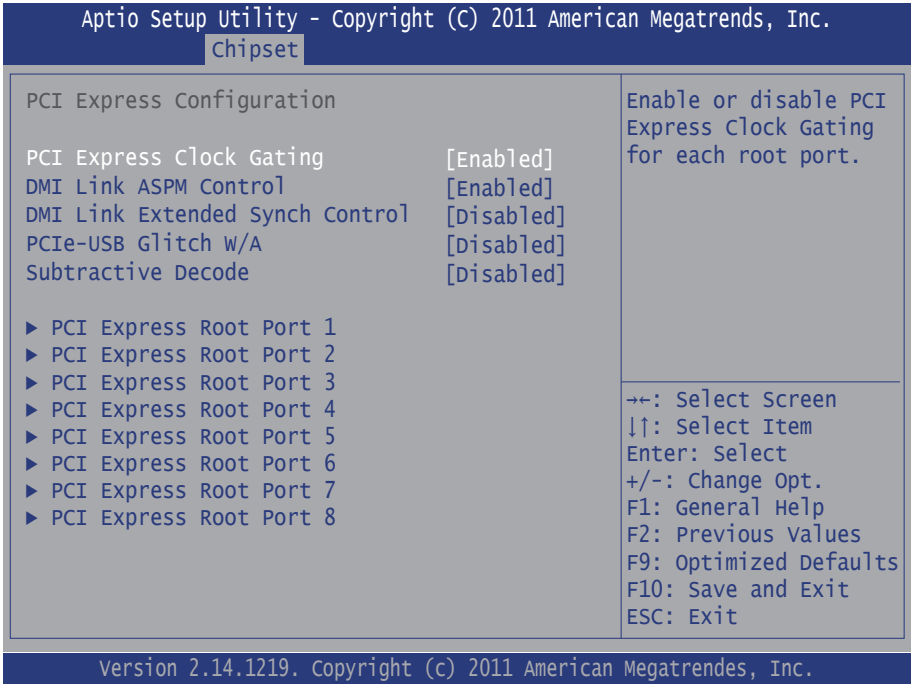
Setting	Description
PCH-IO Configuration	See Section 5.3.1
System Agent (SA) Configuration	See Section 5.3.2

5.3.1 PCH-IO Configuration

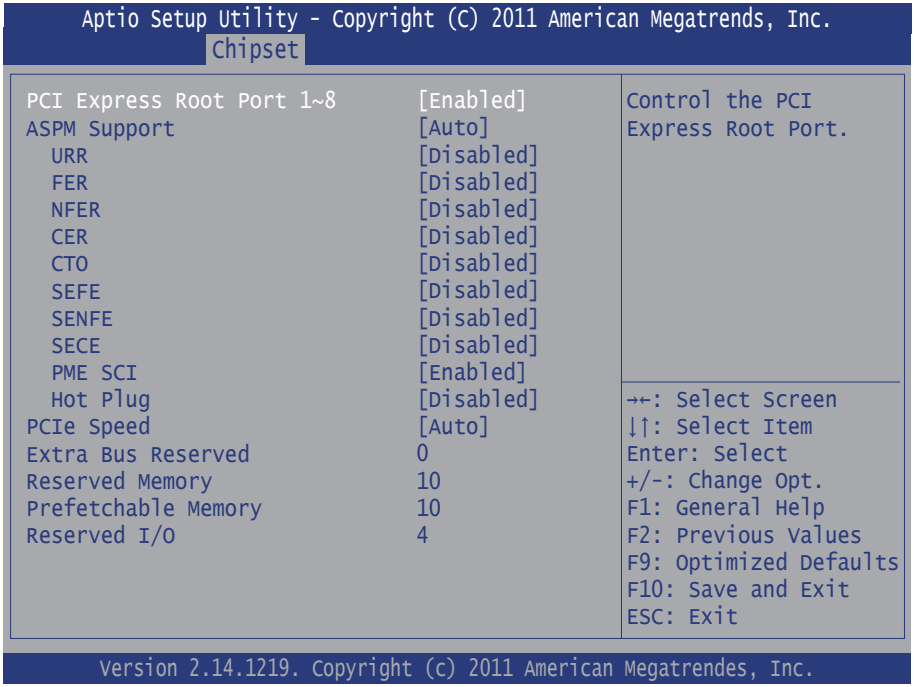


Setting	Description
PCH Express Configuration	See PCH Express Configuration tab
USB Configuration	See USB Configuration tab
SLP_S4 Assertion Width	Select a minimum assertion width of the SLP_S4# signal. ► Options: **Disabled, 1-2/2-3/3-4/4-5 Seconds** (default)

PCI Express Configuration



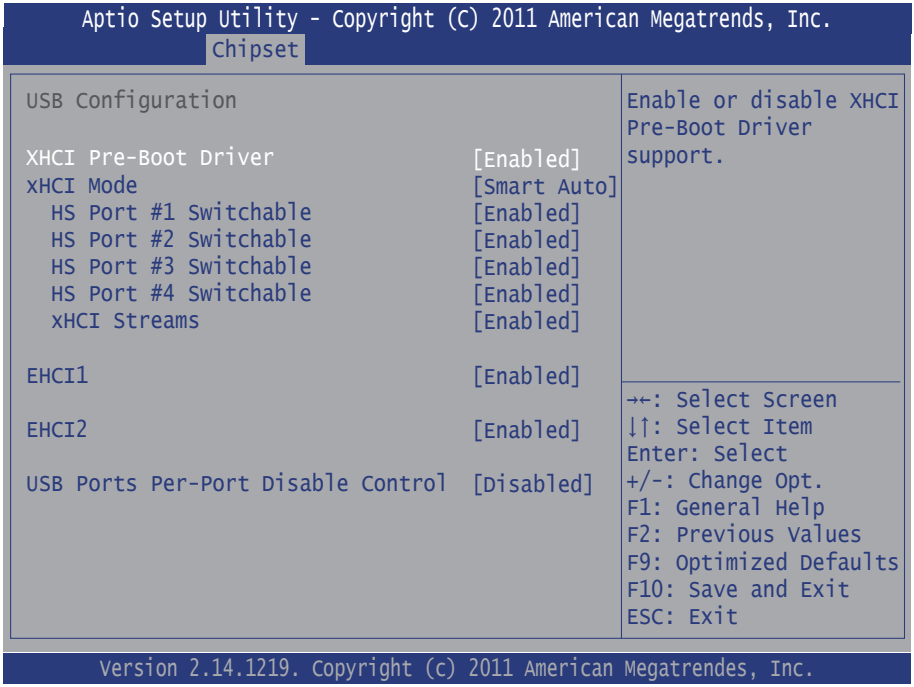
Setting	Description
PCI Express Clock Gating	**Enable** (default) or **Disable** PCI Express Clock Gating for each root port.
DMI Link ASPM Control	The control of Active State Power Management on both NB side and SB side of the DMI Link. ► Options: **Enabled** (default) and **Disabled**.
DMI Link Extended Synch Control	The control of Extended Synch on SB side of the DMI Link. ► Options: **Enabled** and **Disabled** (default).
PCIe-USB Glitch W/A	PCIe-USB Glitch W/A for bad USB devices connected behind PCIE/PEG Port. ► Options: **Enabled** and **Disabled** (default).
Subtractive Decode	**Enable** or **Disable** (default) PCI Express Subtractive Decode.



Setting	Description
PCI Express Root Port 1~8	Control the PCI Express Root Port. ► Options: **Enabled** (default) and **Disabled**.
ASPM Support	Set the ASPM Level: Force L0s - Force all links to L0s State; AUTO - BIOS auto configure; DISABLE - Disable ASPM ► Options: **Disabled**, **L0s**, **L1**, **L0sL1**, **Auto** (default)
URR	**Enable** or **Disable** (default) PCI Express Unsupported Request Reporting.
FER	**Enable** or **Disable** (default) PCI Express Device Fatal Error Reporting.
NFER	**Enable** or **Disable** (default) PCI Express Device Non-Fatal Error Reporting.

CER	**Enable** or **Disable** (default) PCI Express Device Correctable Error Reporting.
CTO	**Enable** or **Disable** (default) PCI Express Completion Timer TO.
SEFE	**Enable** or **Disable** (default) Root PCI Express System Error on Fatal Error.
SENFE	**Enable** or **Disable** (default) Root PCI Express System Error on Non-Fatal Error.
SECE	**Enable** or **Disable** (default) Root PCI Express System Error on Correctable Error.
PME SCI	**Enable** (default) or **Disable** PCI Express PME SCI.
Hot Plug	**Enable** or **Disable** (default) PCI Express Hot Plug.
PCIe Speed	Select PCI Express port speed. ► Options: **Auto** (default), **Gen1**, **Gen2**
Extra Bus Reserved	Extra Bus Reserved (default 0) for bridges behind this Root Bridge. ► Options: **0~7**
Reserved Memory	Reserved Memory (default 10) Range for this Root Bridge. ► Options: **1~20**
Prefetchable Memory	Prefetchable Memory (default 10) Range for this Root Bridge. ► Options: **1~20**
Reserved I/O	Reserved I/O (default 4) Range for this Root Bridge. ► Options: **4k/8k/12k/16k/20k**

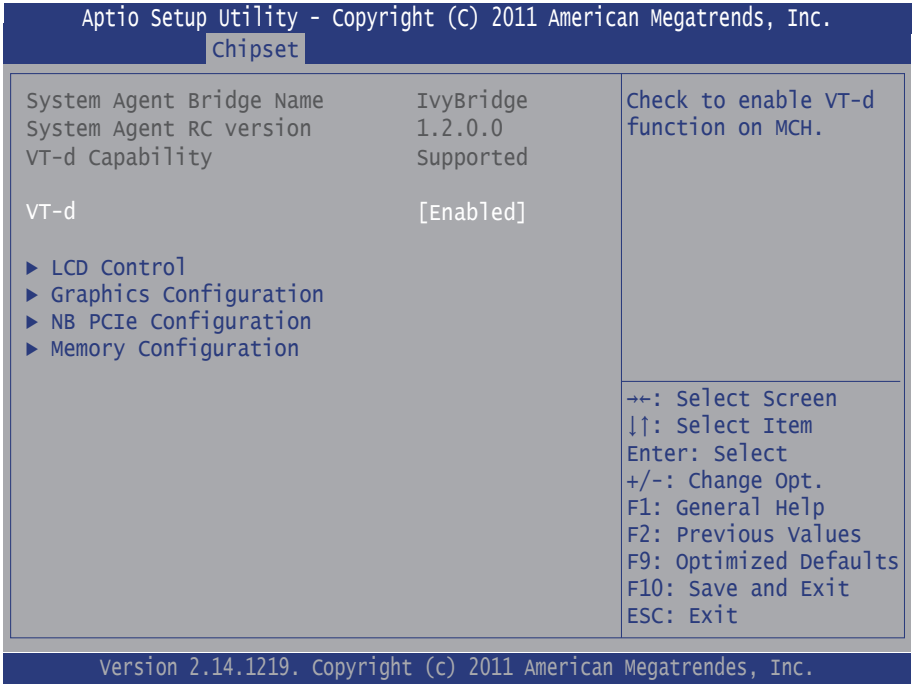
USB Configuration



Setting	Description
XHCI Pre-Boot Driver	**Enable** (default) or **Disable** XHCI Pre-Boot Driver support.
xHCI Mode	Mode of operation of xHCI controller. ► Options: **Smart Auto** (default), **Auto**, **Enabled**, **Disabled**
HS Port #1~4 Switchable	Always for HS port switching between xHCI and EHCI. If disabled, port is routed to EHCI. If HS port is routed to xHCI, the corresponding SS port is enabled. ► Options: **Enabled** (default) and **Disabled**.
xHCI Streams	**Enable** (default) or **Disable** xHCI Maximum Primary Stream Array Size.

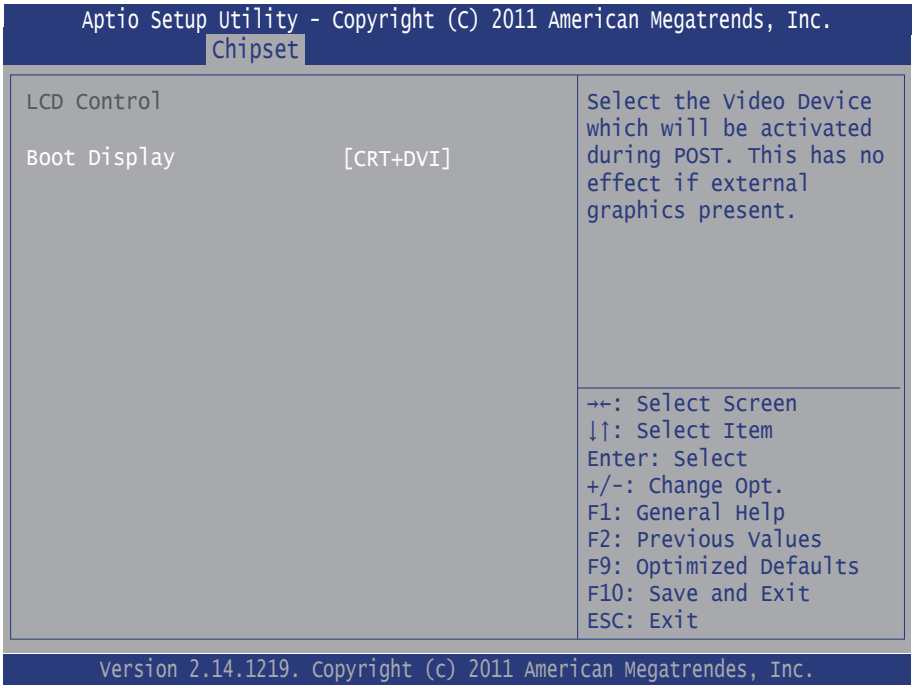
EHCI1~2	Control the USB EHCI (USB 2.0) functions. One EHCI controller must always be enabled. ► Options: **Enabled** (default) and **Disabled**.
USB Ports Per-Port Disable Control	Control each of the USB ports (0~13) disabling. ► Options: **Enabled** and **Disabled** (default).

5.3.2 System Agent (SA) Configuration



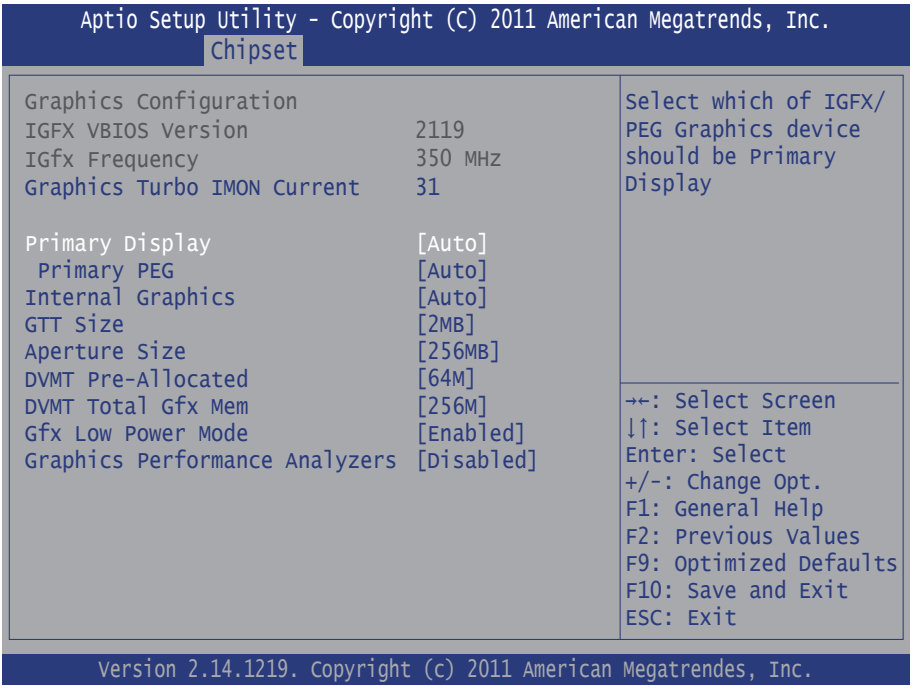
Setting	Description
VT-d	Check to enable VT-d function on MCH. ► Options: **Enabled** (default) and **Disabled**.
LCD Control	See LCD Control tab
Graphics Configuration	See Graphics Configuration tab
NB PCIe Configuration	See NB PCIe Configuration tab
Memory Configuration	See Memory Configuration tab

LCD Control



Setting	Description
Boot Display	Select the Video Device which will be activated during POST. This has no effect if external graphics present. ► Options: **CRT+DVI** (default), **CRT**, **DVI**

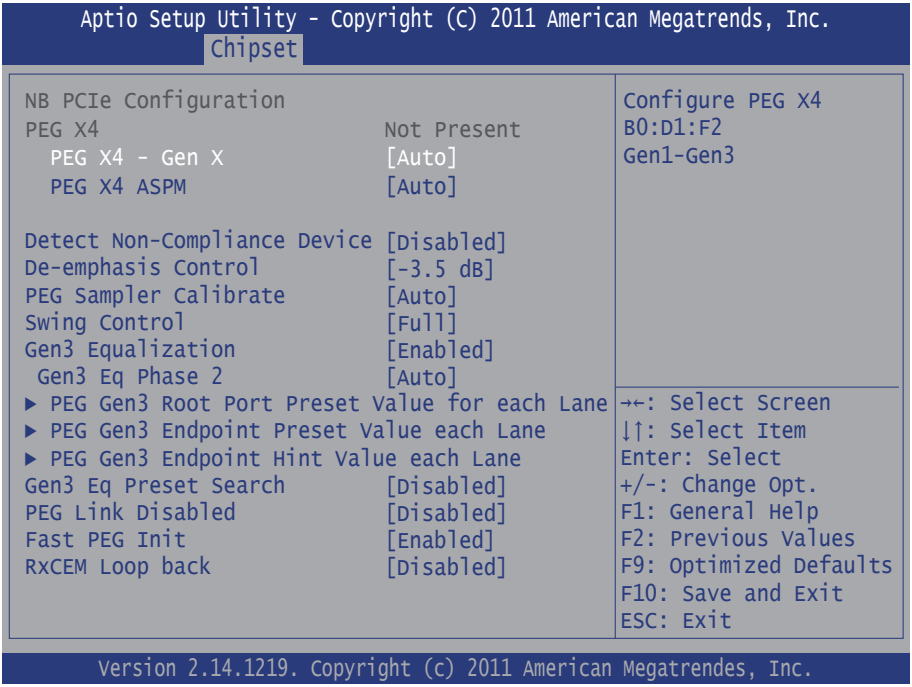
Graphics Configuration



Setting	Description
Graphics Turbo IMON Current	Graphics turbo IMON current values supported (14-31)
Primary Display	Select which of IGFX/PEG Graphics device should be Primary Display ► Options: **Auto** (default), **IGFX**, **PEG**
Primary PEG	Select PEG0/PEG1/PEG2/PEG3 Graphics device should be Primary PEG. ► Options: **Auto** (default), **PEG11**, **PEG12**, **PEG60**
Internal Graphics	Keep IGD enabled based on the setup options. ► Options: **Auto** (default), **Disabled**, **Enabled**
GTT Size	Select the GTT Size ► Options: **1MB**, **2MB** (default)

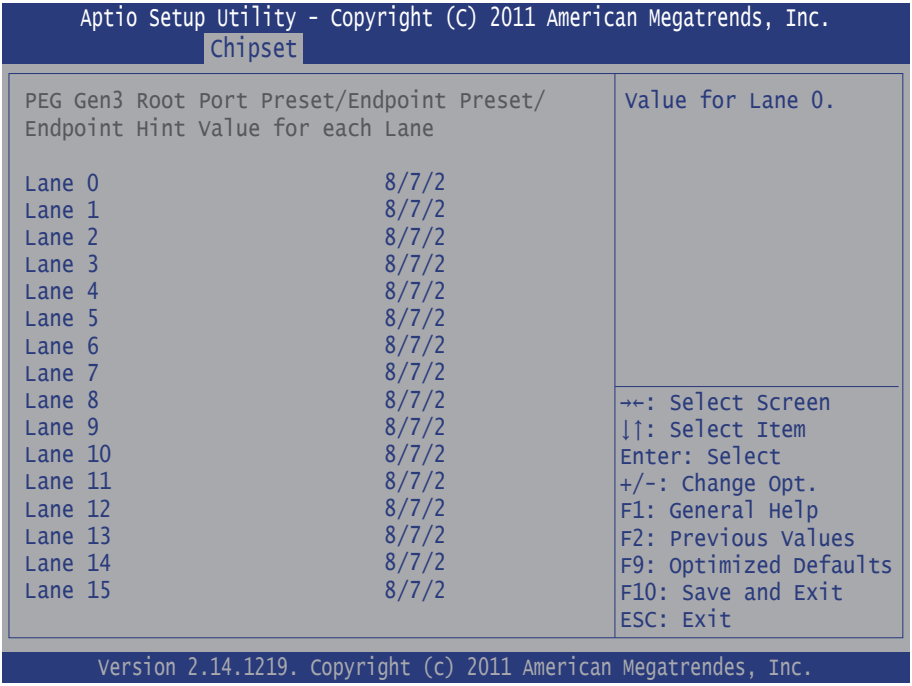
Aperture Size	Select the Aperture Size ► Options: **128MB**, **256MB** (default), **512MB**
DVMT Pre-Allocated	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device. ► Options: **32/64** (default) **/96/128/160/192/224/256/288/320/352/384/416/448/480/512/1024M**
DVMT Total Gfx Mem	Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device ► Options: **128M**, **256M** (default), **MAX**
Gfx Low Power Mode	This option is applicable for SFF only. ► Options: **Enabled** (default) and **Disabled**.
Graphics Performance Analyzers	**Enable** or **Disable** (default) Intel Graphics Performance Analyzers Counters.

NB PCIe Configuration



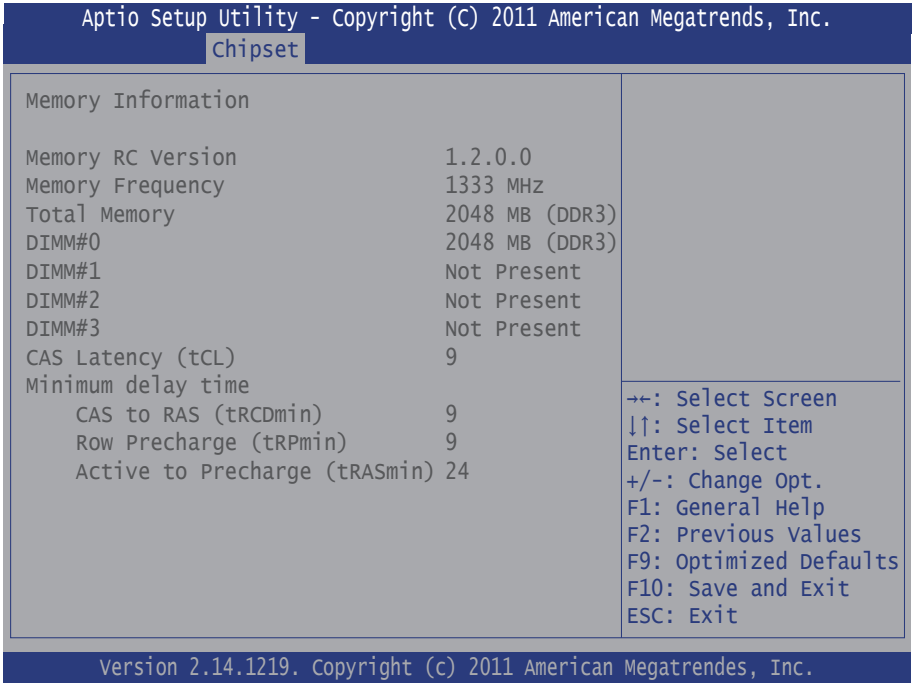
Setting	Description
PEG X4 - Gen X	Configure PEG X4 B0:D1:F2 ► Options: **Auto** (default), **Gen1**, **Gen2**, **Gen3**
PEG X4 ASPM	Control ASPM support for the PEG: Device 1 Function 2. This has no effect if PEG is not the currently active device. ► Options: **Disabled**, **Auto** (default), **ASPM L0s**, **ASPM L1**, **ASPM L0sL1**
Detect Non-Compliance Device	Detect Non-Compliance PCI Express Device in PEG ► Options: **Enabled** and **Disabled** (default).
De-emphasis Control	Configure the De-emphasis control on PEG ► Options: **-6 dB**, **-3.5 dB** (default)
PEG Sampler Calibrate	**Enable** or **Disable** PEG Sampler Calibrate. **Auto** (default) means disabled for SNB MB/DT. Enbaled for IVB A0 B0.
Swing Control	Perform PEG Swing Control, on IVB C0 and later. ► Options: **Reduced**, **Half** and **Full** (default).
Gen3 Equalization	Perform PEG Gen3 Equalization steps ► Options: **Enabled** (default) and **Disabled**.
Gen3 Eq Phase 2	Perform PEG Gen3 Equalization Phase 2 ► Options: **Auto** (default), **Enabled** and **Disabled**.
PEG Gen3...	See PEG Gen3... tab
Gen3 Eq Preset Search	Perform PEG Gen3 Preset Search algorithm, on IVB C0 and Later. ► Options: **Enabled** and **Disabled** (default)
PEG Link Disabled	**Enable** or **Disable** (default) PCIe link disable mechanism for additional power saving.
Fast PEG Init	**Enable** (default) or **Disable** Fast PEG Init. Some optimization if no PEG devices present in cold boot.
RxCEM Loop back	**Enable** or **Disable** (default) RxCEM Loop back.

PEG Gen3...

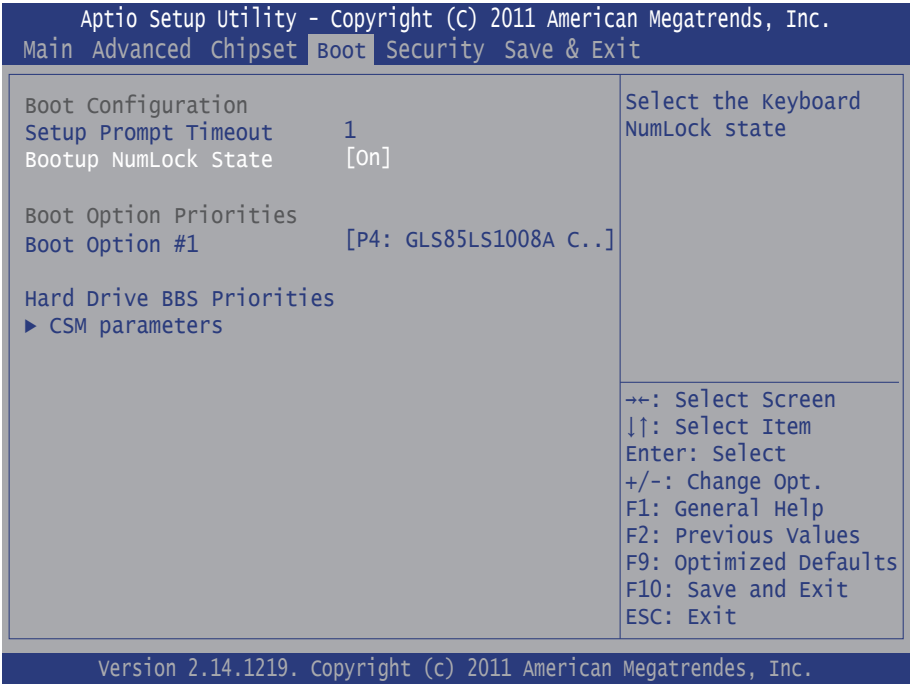


Setting	Description
Lane 0~15	Value for Lane 0~15. Default setting is 8 for ; 7 for Endpoint Preset Value; 2 for Endpoint Hint Value. ► Options: **1~11**

Memory Configuration

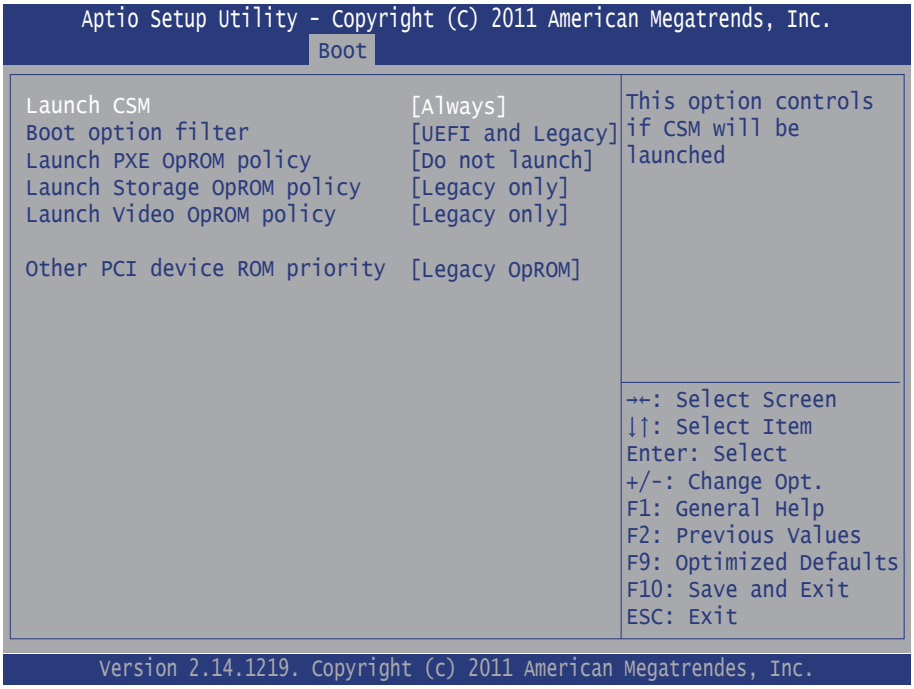


5.4 Boot



Setting	Description
Setup Prompt Time-out	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	Select the keyboard NumLock state ► Options: **On** (default), **Off**
Boot Option Priorities	Sets the system boot order.
Hard Drive BBS Priorities	Set the order of the legacy devices in this group
CSM parameters	See Section 5.4.1

5.4.1 CSM parameters

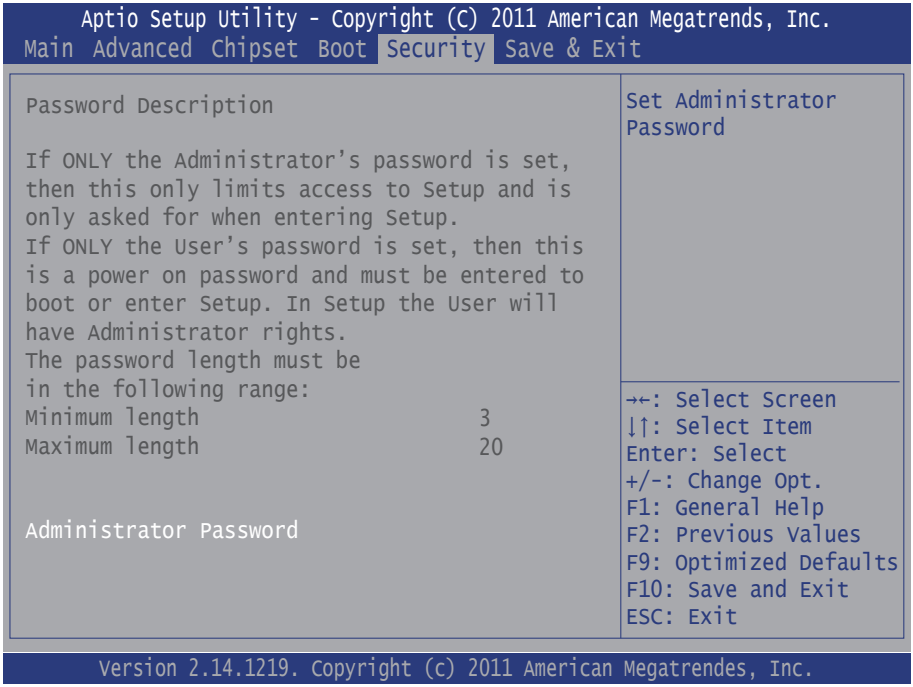


Setting	Description
Launch CSM	This option controls if CSM will be launched. ► Options: **Always** (default), **Never**.
Boot option filter	This option controls what devices system can boot to ► Options: **UEFI and Legacy** (default), **Legacy only**, **UEFI only**
Launch PXE OpROM policy	Controls the execution of UEFI and Legacy PXE OpROM. ► Options: **Do not launch** (default), **UEFI only**, **Legacy only**.
Launch Storage OpROM policy	Controls the execution of UEFI and Legacy Storage OpROM. ► Options: **Do not launch**, **UEFI only**, **Legacy only** (default).

Launch Video OpROM policy	Controls the execution of UEFI and Legacy Video OpROM. ► Options: **Do not launch**, **UEFI only**, **Legacy only** (default).
Other PCI device ROM priority	For PCI devices other than Network, Mass storage or Video defines which OpROM to launch ► Options: **UEFI OpROM**, **Legacy OpROM** (default)

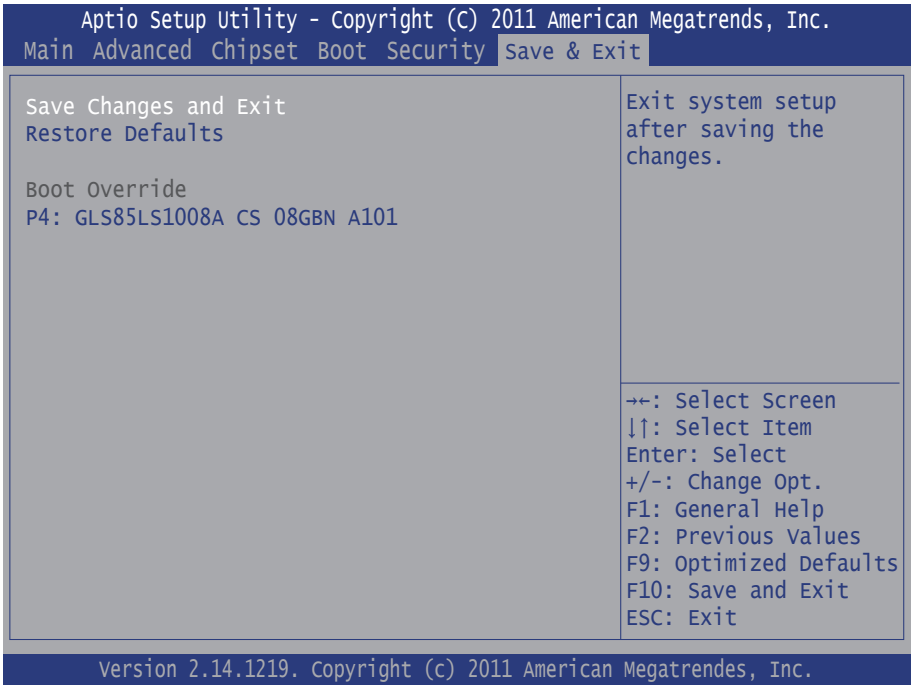
5.5 Security

The **Security** menu sets up the administrator password. Once an administrator password is set up, this BIOS SETUP utility is limited to access and will ask for the password each time any access is attempted.



Setting	Description
Administrator Password	To set up an administrator password: 1. Select **Administrator Password**. The screen then pops up an **Create New Password** dialog. 2. Enter your desired password that is no fewer than 3 characters and no more than 20 characters. 3. Hit [Enter] key to submit.

5.6 Save & Exit Options



Setting	Description
Save Changes and Exit	Exit system setup after saving the changes. ► Enter the item and then a dialog box pops up: **Save configuration and exit?**
Restore Defaults	Restore/Load Default values for all the setup options. ► Enter the item and then a dialog box pops up: **Load Optimized Defaults?**
Boot Override	**Boot Override** presents a list of boot devices on screen. Select the device to boot up the system regardless of the currently configured boot priority.

Appendix

Appendix A: Digital I/O Setting

Digital I/O can read from or write to a line or an entire digital port, which is a collection of lines. This mechanism can be used to meet user's various applications such as industrial automation, customized circuit, and laboratory testing. The source code below written in C is the applicable sample for programming.

```
#include “math.h”
#include “stdio.h”
#include “dos.h”

unsigned char SMB_Byte_READ (int, int, int);
void SMB_Byte_WRITE(int, int, int, int);

void main(void)
{
        int SMB_PORT_AD  = 0x0F040;
        int SMB_DEVICE_ADD = 0x6e; /*75111R’s Add=6eh */
        unsigned char num;

        printf(“ I67M5DIO DIO Utility Program Ver:0.1 \n”);
        printf(“ Warning: This tools is test only. \n\n”);

/*      Index 20, GPIO2x Output pin control      */
        SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_
ADD,0x20,0x00);

        delay(10);

        num = SMB_Byte_READ(SMB_PORT_AD,SMB_DEVICE_
ADD,0x22);
        printf(“GPIO2x Digital I/O Input First Time ... %02X \n”, num);

        delay(2000);

        num = SMB_Byte_READ(SMB_PORT_AD,SMB_DEVICE_
ADD,0x22);
        printf(“GPIO2x Digital I/O Input Second Time ... %02X \n”, num);

        delay(2000);
```

```
/*          Index 10, GPIO1x Output Data value      */
            SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_
ADD,0x10,0xFF);
            SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_
ADD,0x40,0x01);

            delay(2000);

            SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_
ADD,0x11,0x00);
            SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_
ADD,0x41,0x00);
            printf("GPIO1x Digital I/O ouput low ...\n");

            delay(2000);

            SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_
ADD,0x11,0xFF);
            SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_
ADD,0x41,0xFF);
            printf("GPIO1x Digital I/O ouput high ...\n");

            delay(1000);
}
//---------------------------------------------------------------------------
unsigned char SMB_Byte_READ (int SMPORT, int DeviceID, int REG_IN-
DEX)
{
  unsigned char SMB_R;
  outportb(SMPORT+02, 0x00);              /* clear */
  outportb(SMPORT+00, 0xff);              /* clear */
  delay(10);
  outportb(SMPORT+04, DeviceID+1);    /* clear */
  outportb(SMPORT+03, REG_INDEX);  /* clear */
  outportb(SMPORT+02, 0x48);              /* read_byte */
  delay(10);
  SMB_R= inportb(SMPORT+05);
  return SMB_R;
```

```
}
void SMB_Byte_WRITE(int SMPORT, int DeviceID, int REG_INDEX, int
REG_DATA)
{
  outportb(SMPORT+02, 0x00);              /* clear */
  outportb(SMPORT+00, 0xff);              /* clear */
  delay(10);
  outportb(SMPORT+04, DeviceID);          /* clear */
  outportb(SMPORT+03, REG_INDEX);  /* clear */
  outportb(SMPORT+05, REG_DATA);    /* read_byte */
  outportb(SMPORT+02, 0x48);              /* read_byte */
  delay(10);
}
//---------------------------------------------------------------------------
```

Appendix B: Watchdog Timer (WDT) Setting

WDT is widely applied to industry computers to monitor activities of CPU. The programmed application triggers WDT with adequate timer setting depending on its requirement. Before WDT counts down to zero, the functional system will reset the counter. In case the WDT counter is not reset by an abnormal system, it will counts down to zero and then reset the system automatically.

This computer supports the watchdog timer up to 255 levels for users for software programming. Below please take the source code written in C for a WDT application example.

```
#include “math.h”
#include “stdio.h”
#include “dos.h”

void main(void)
{
  printf(“ I67M5 WDT Utility Program Ver:0.1 \n”);
  printf(“ Warning: This tools is test only. \n\n”);
  printf(“ System will reset after 5 seconds!!!\n”);

  outportb(0x2e, 0x87);          /* initial IO port */
  outportb(0x2e, 0x87);          /* twice, */
  outportb(0x2e, 0x07);          /* point to logical device */
  outportb(0x2e+1, 0x07);                /* select logical device 7 */
  outportb(0x2e, 0xf5);          /* select offset f5h */
  outportb(0x2e+1, 0x40);                /* set bit5 = 1 to clear bit5 */
  outportb(0x2e, 0xf0);          /* select offset f0h */
  outportb(0x2e+1, 0x81);                /* set bit7 =1 to enable WDTRST#
*/
  outportb(0x2e, 0xf6);          /* select offset f6h */
  outportb(0x2e+1, 0x05);                /* update offset f6h to 0ah :10sec
*/
  outportb(0x2e, 0xF5);          /* select offset f5h */
  outportb(0x2e+1, 0x20);                /* set bit5 = 1 enable watch dog
time */
  outportb(0x2e, 0xAA);          /* stop program F71869E, Exit */
}
```