HR900-B

COM Express Board
User's Manual

A16590443

Copyright

Trademarks

FCC and DOC Statement on Class B

This equipment has been tested and found to comply with the limits for a Class B 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 residential installation. This equipment generates, 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

Notice:

1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
2. Shielded interface cables must be used in order to comply with the emission limits.

Table of Contents

About this Manual

An electronic file of this manual is included in the CD. To view the user's manual in the CD, insert the CD into a CD-ROM drive. The autorun screen (Main Board Utility CD) will appear. Click "User's Manual" on the main menu.

Warranty

1. Warranty does not cover damages or failures that arised from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.

2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.

3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.

4. We will not be liable for any indirect, special, incidental or consequencial damages to the product that has been modified or altered.

Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.

2. Wear an antistatic wrist strap.

3. Do all preparation work on a static-free surface.

4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.

5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.

Important:
Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

Safety Measures

To avoid damage to the system:
- Use the correct AC input voltage range.

To reduce the risk of electric shock:
- Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

About the Package

The package contains the following items. If any of these items are missing or damaged, please contact your dealer or sales representative for assistance.

☑ One HR900-B board
☑ One drivers/utilities disk
☑ One QR (Quick Reference)

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance with the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

Optional Items

☑ COM630-B carrier board kit
☑ Heat spreader
☑ Heat sink with fan
☑ Heat spreader with heat sink and fan

The system board and accessories in the package may not come similar to the information listed above. This may differ in accordance to the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

Before Using the System Board

Before using the system board, prepare basic system components.

If you are installing the system board in a new system, you will need at least the following internal components.

- Memory module
- Storage devices such as hard disk drive, CD-ROM, etc.

You will also need external system peripherals you intend to use which will normally include at least a keyboard, a mouse and a video display monitor.

Chapter 1 - Introduction

Specifications

Processor

- Socket G2 988B for:
  - 3rd Generation Intel® Core™ processors (22nm process technology)
    - : Intel® Core™ i7-3610QE (6M Cache, up to 3.3 GHz); 45W
    - : Intel® Core™ i5-3610ME (3M Cache, up to 3.3 GHz); 35W
    - : Intel® Core™ i3-3120ME (3M Cache, 2.4 GHz); 35W
  - 2nd Generation Intel® Core™ processors (32nm process technology)
    - : Intel® Core™ i7-2710QE (6M Cache, up to 3.0 GHz); 45W
    - : Intel® Core™ i5-2510E (3M Cache, up to 3.1 GHz); 35W
    - : Intel® Core™ i3-2330E (3M Cache, 2.2 GHz); 35W
    - : Intel® Celeron® B810 (2M Cache, 1.6 GHz); 35W
- Intel® Advanced Vector Extensions (Intel® AVX) Instructions
- Intel® Turbo Boost Technology

Chipset

- Intel® QM67 Express Chipset

System Memory

- Two 204-pin DDR3 SODIMM sockets

3rd Generation Processors	2nd Generation Processors
DDR3 1066/1333/1600MHz	DDR3 1066/1333MHz (i5/i3/Celeron)
	DDR3 1600MHz (i7)

- Supports dual channel memory interface
- Supports up to 16GB system memory
- DRAM device technologies: 1Gb, 2Gb and 4Gb DDR3 DRAM technologies are supported for x8 and x16 devices, unbuffered, non-ECC

Graphics

- Intel® HD Graphics 4000 (3rd generation processors)
- Intel® HD Graphics 3000 (2nd generation processors)
- Intel® HD Graphics (Intel® Celeron® processors)
- Supports VGA, LVDS and DDI interfaces
- VGA: resolution up to 2048x1536 @ 75Hz
- LVDS: Single Channel - 18/24-bit; Dual Channel - 36/48-bit, resolution up to 1920x1200 @ 60Hz
- Digital Display Interfaces: HDMI, DP and SDVO (for Port B)
- HDMI, DP: resolution up to 1920x1200 @ 60Hz
- Supports 6 or 16 Graphics Execution Units (EUs) (3rd generation processors)
- Supports 6 or 12 Graphics Execution Units (EUs) (2nd generation processors)
- Intel® Clear Video Technology
- DirectX Video Acceleration (DXVA) support for accelerating video processing
- Supports DirectX 11/10.1/10/9 and OpenGL 3.0 (3rd generation processors)
- Supports DirectX 10.1/10/9 and OpenGL 3.0 (2nd generation processors)

Audio

- Supports High Definition Audio interface

LAN	• Intel 82579LM Gigabit Ethernet PHY • Integrated 10/100/1000 transceiver • Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
SATA	• Supports 4 Serial ATA interfaces • 2 SATA 2.0 with data transfer rate up to 3Gb/s • 2 SATA 3.0 with data transfer rate up to 6Gb/s • Integrated Advanced Host Controller Interface (AHCI) controller
IDE	• Supports up to two IDE devices • DMA mode: Ultra ATA up to 100MB/s • PIO mode: up to 16MB/s
Expansion Interfaces	• Supports 8 USB ports (USB 1.1/2.0 host controllers) • Supports 4 PCI slots (PCI 2.3 interface) • Supports PCIe x16/SDVO/HDMI/Display Port switchable interface - Uses QM67's DDI (Digital Display Interface) Port B for SDVO/HDMI and DDI Port C for Display Port/HDMI - VBIOS default setting at Port C only; VBIOS settings modified upon request • Supports 1 PCIE x16 interface - Supports Gen 3.0 (3rd generation processors) - Supports Gen 2.0 (2nd generation processors) • Supports 5 PCIE x1 interfaces • Supports LPC interface • Supports SMBus interface • Supports IDE interface • Supports 8-bit Digital I/O
Damage Free Intelligence	• Monitors CPU temperature and overheat alarm • Monitors CPU fan speed and failure alarm • Monitors Vcore/V_{GFX}/1.5V voltages and failure alarm • Watchdog timer function
BIOS	• 64Mbit UEFI SPI BIOS
Power Consumption	• 54.70 W with i7-2710QE at 2.10GHz and 2x 4GB DDR3 SODIMM
OS Support	• Windows XP Professional x86 & SP3 (32-bit) • Windows XP Professional x64 & SP2 (64-bit) • Windows 7 Ultimate x86 & SP1 (32-bit) • Windows 7 Ultimate x64 & SP1 (64-bit) • Windows 8 Enterprise x86 (32-bit) • Windows 8 Enterprise x64 (64-bit)
Temperature	• 0ºC to 60ºC
Humidity	• 10% to 90%
Power	• Input: 12V, 5VSB (optional), VCC_RTC
Certification	• CE, FCC Class B, UL, RoHS
PCB	• Dimensions - Basic COM Express form factor - 95mm (3.74”) x 125mm (4.9”) • Compliance - PICMG COM Express R1.0 basic form factor, Type 2

Features

Watchdog Timer

The Watchdog Timer function allows your application to regularly “clear” the system at the set time interval. If the system hangs or fails to function, it will reset at the set time interval so that your system will continue to operate.

DDR3

DDR3 delivers increased system bandwidth and improved performance. The advantages of DDR3 are its higher bandwidth and its increase in performance at a lower power than DDR2.

Graphics

The integrated Intel® HD graphics engine delivers an excellent blend of graphics performance and features to meet business needs. It provides excellent video and 3D graphics with outstanding graphics responsiveness. These enhancements deliver the performance and compatibility needed for today’s and tomorrow’s business applications. Supports LVDS, VGA and DDI interfaces for display outputs.

Serial ATA

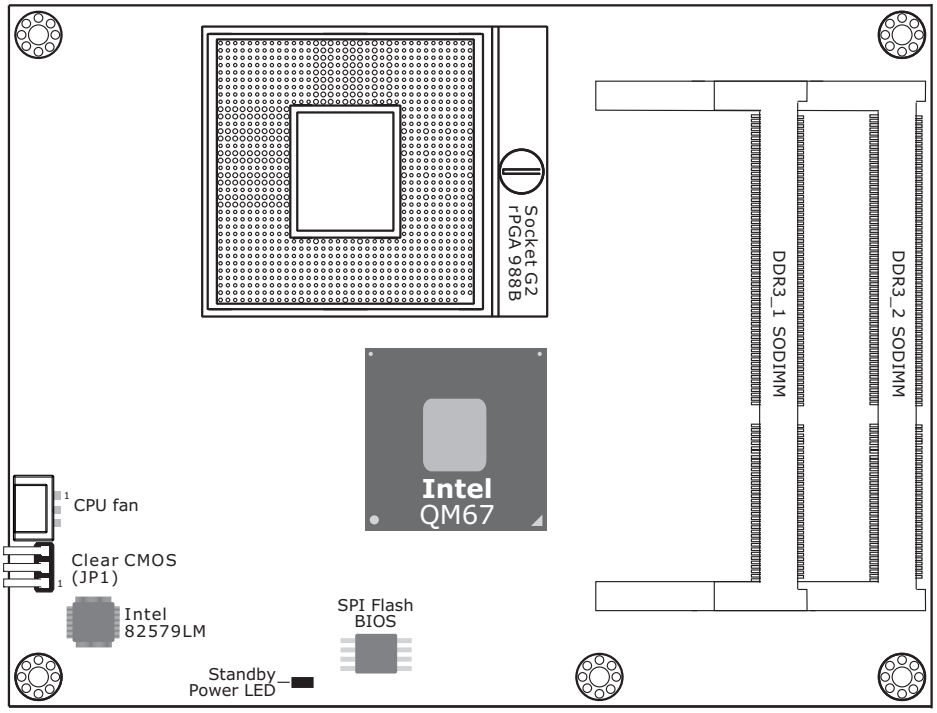
Serial ATA is a storage interface that is compliant with SATA 1.0a specification. With speed of up to 3Gb/s (SATA 2.0) and 6Gb/s (SATA 3.0), it improves hard drive performance faster than the standard parallel ATA whose data transfer rate is 100MB/s. The bandwidth of the SATA 3.0 will be limited by carrier board design.

Gigabit LAN

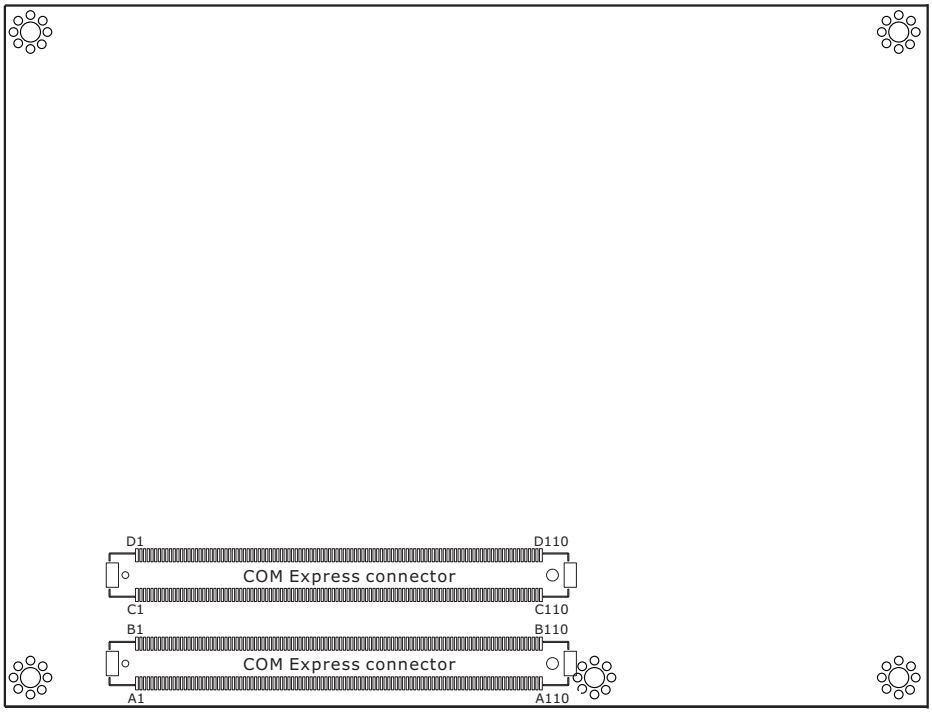
The Intel 82579LM Gigabit LAN controller supports up to 1Gbps data transmission.

Chapter 2 - Hardware Installation

Board Layout

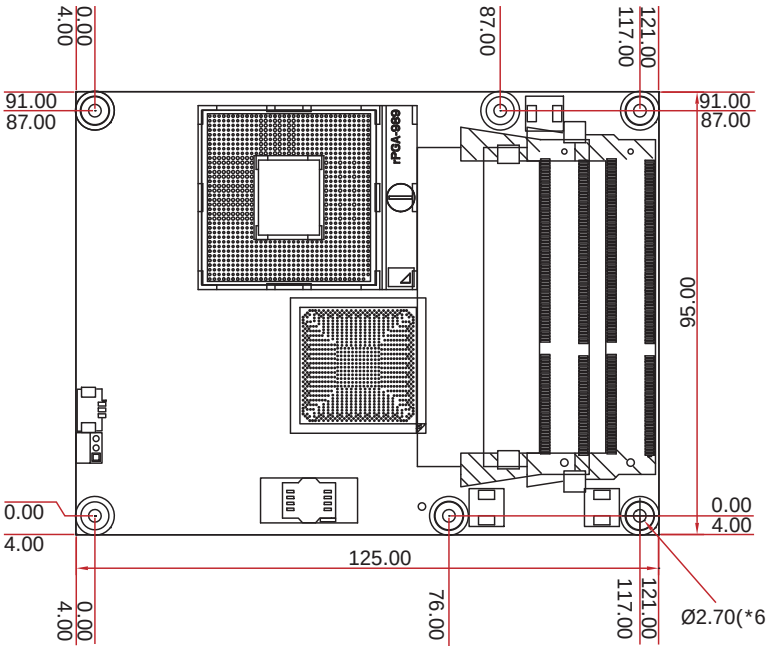


Top View

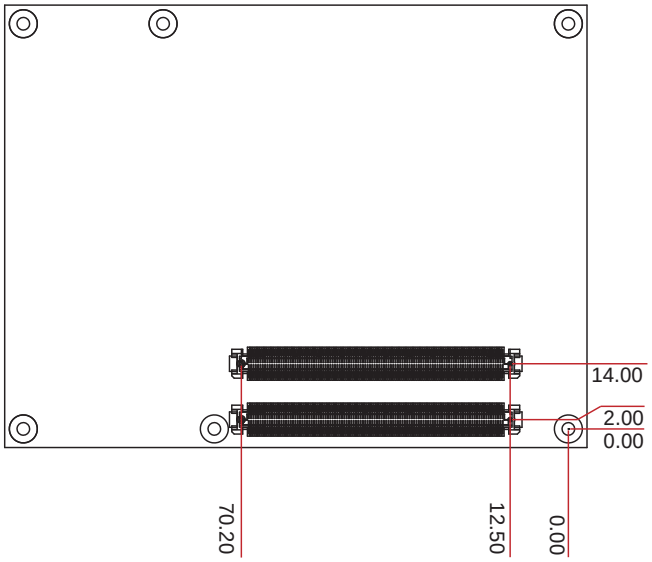


Buttom View

Mechanical Diagram



Top View



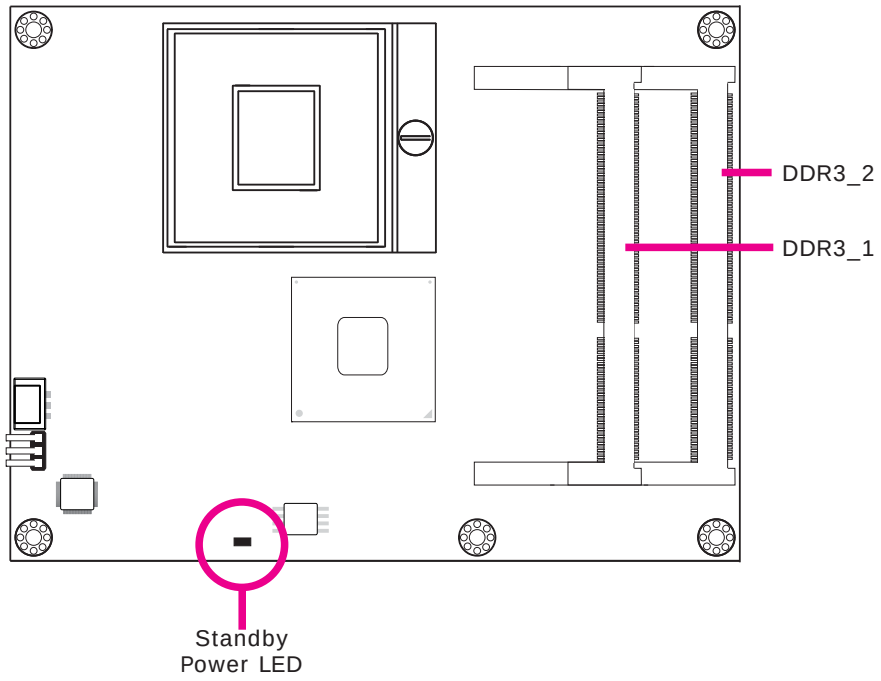
Bottom View

Important:
Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

System Memory

The system board is equipped with two 204-pin SODIMM sockets that support DDR3 memory modules.

Important:
When the Standby Power LED lit red, it indicates that there is power on the board. Power-off the PC then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the board and components.



Installing the DIM Module

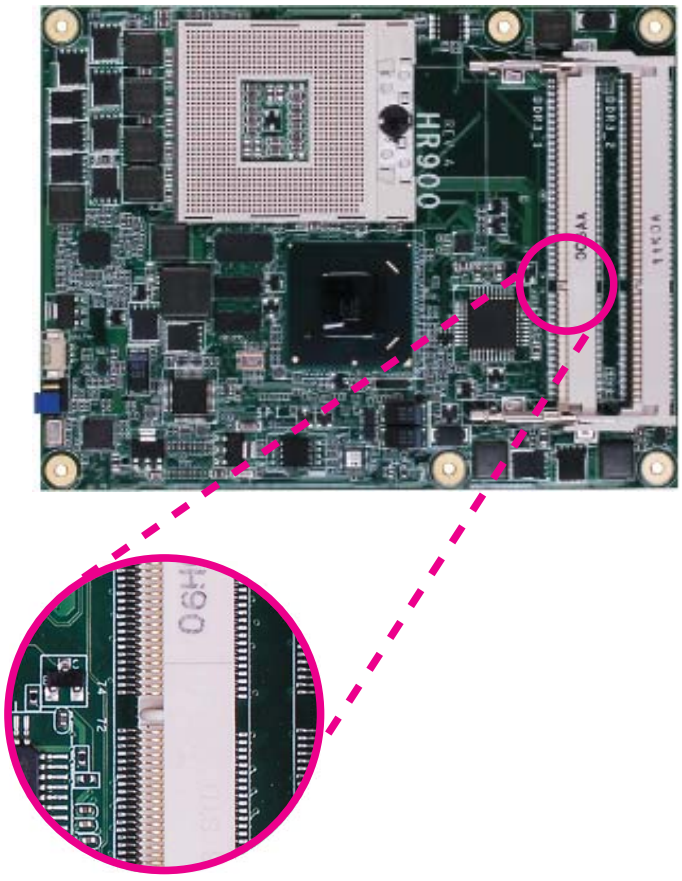
Note:
The system board used in the following illustrations may not resemble the actual one. These illustrations are for reference only.

1. Make sure the PC and all other peripheral devices connected to it has been powered down.

2. Disconnect all power cords and cables.

3. Locate the SODIMM socket on the system board.

4. Note the key on the socket. The key ensures the module can be plugged into the socket in only one direction.



5. Grasping the module by its edges, align the module into the socket at an approximately 30 degrees angle. Apply firm even pressure to each end of the module until it slips down into the socket. The contact fingers on the edge of the module will almost completely disappear inside the socket.

6. Push down the module until the clips at each end of the socket lock into position. You will hear a distinctive “click”, indicating the module is correctly locked into position.

CPU

Overview

The system board is equipped with a surface mount rPGA 988B CPU socket.

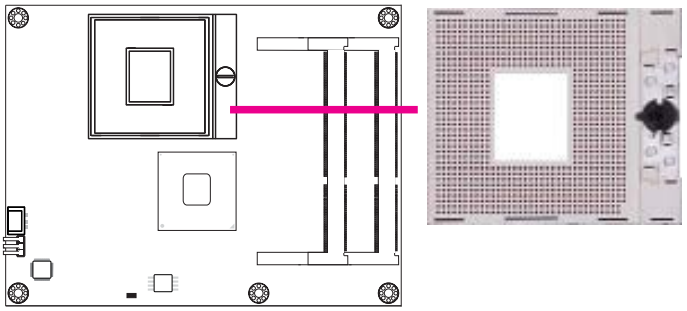
Note:
The system board used in the following illustrations may not resemble the actual one. These illustrations are for reference only.

Installing the CPU

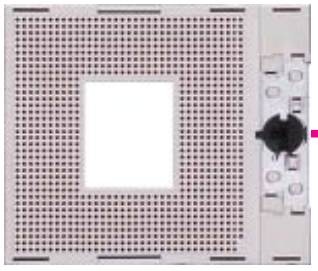
1. Make sure the PC and all other peripheral devices connected to it has been powered down.

2. Disconnect all power cords and cables.

3. Locate the rPGA 988B socket on the board.

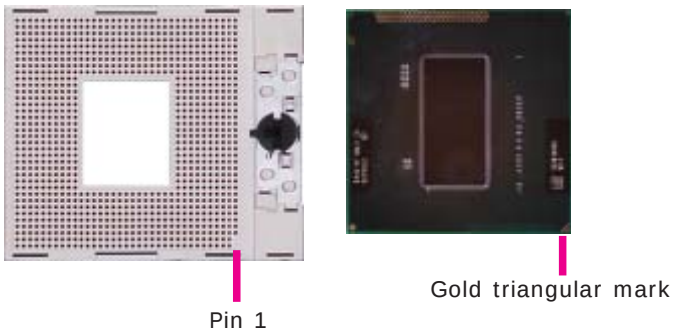


4. Make sure the screw is in its unlock position. If it's not, use a screwdriver to turn the screw to its unlock position.



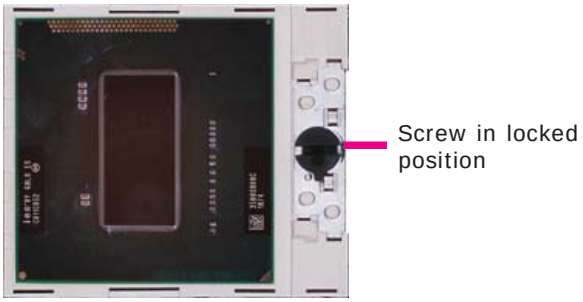
5. Position the CPU above the socket. The gold triangular mark on the CPU must align with pin 1 of the CPU socket.

Important:
Handle the CPU by its edges and avoid touching the pins.



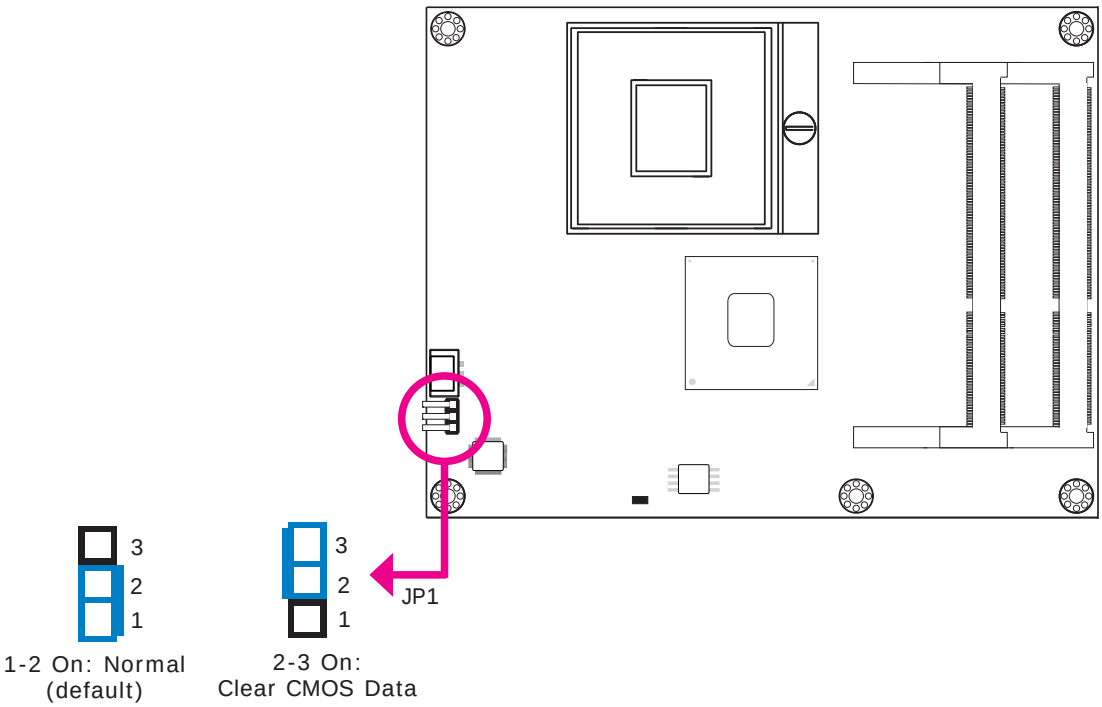
6. Insert the CPU into the socket until it is seated in place. The CPU will fit in only one orientation and can easily be inserted without exerting any force. Use a screwdriver to turn the screw to its lock position.

Important:
Do not force the CPU into the socket. Forcing the CPU into the socket may bend the pins and damage the CPU.



Jumper Settings

Clear CMOS Data



If you encounter the following,

a) CMOS data becomes corrupted.
b) You forgot the supervisor or user password.

you can reconfigure the system with the default values stored in the ROM BIOS.

To load the default values stored in the ROM BIOS, please follow the steps below.

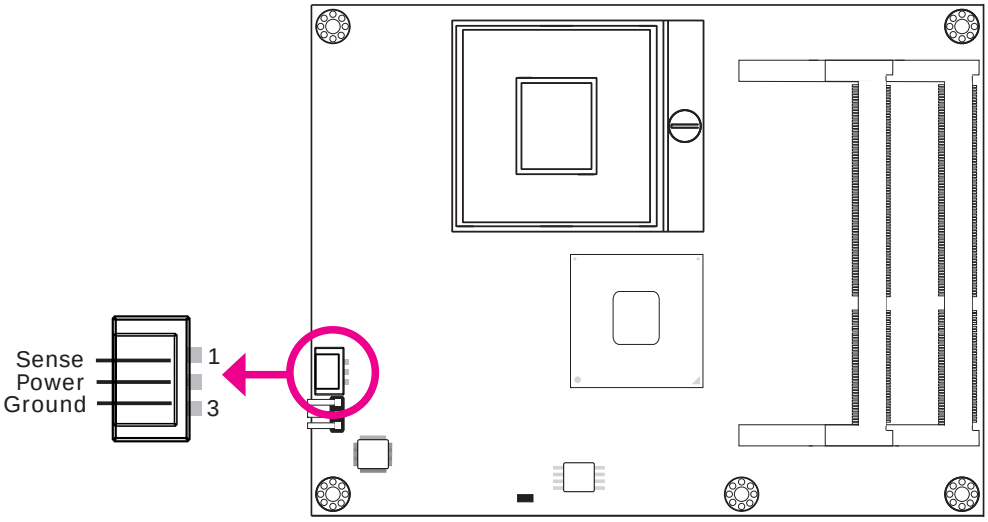
1. Power-off the system and unplug the power cord.

2. Set pins 2 and 3 to On. Wait for a few seconds and set the jumper back to its default setting, pins 1 and 2 On.

3. Now plug the power cord and power-on the system.

Connectors

CPU Fan Connector



Connect the CPU fan's cable connector to the CPU fan connector on the board. The cooling fan will provide adequate airflow throughout the chassis to prevent overheating the CPU and board components.

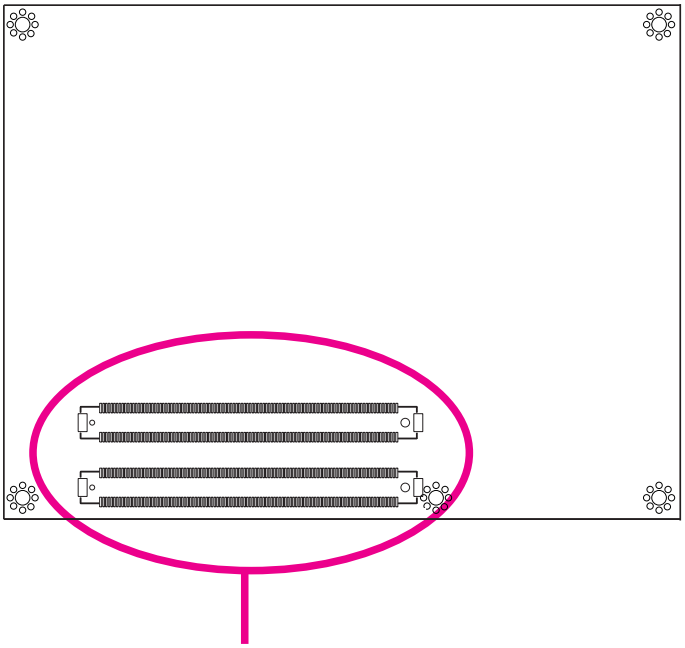
BIOS Setting

"Module Board H/W Monitor" submenu in the Advanced menu of the BIOS will display the current speed of the cooling fan. Refer to chapter 3 of the manual for more information.

COM Express Connectors

The COM Express connectors are used to interface the HR900-B COM Express board to a carrier board. Connect the COM Express connectors (lcoated on the solder side of the board) to the COM Express connectors on the carrier board.

Refer to the “Installing HR900-B onto a Carrier Board” section for more information.



COM Express Connectors

Refer to the following pages for the pin functions of these connectors.

Row A			
1	GNDA1	56	PCIE_TX8-
2	GBE0_MDI3-	57	GBD
3	GBE0_MDI3+	58	PCIE_TX4+
4	GNE0_LINK100#	59	PCIE_TX4-
5	GBE0_LINK1000#	60	GNDA7
6	GBE0_MDI2-	61	PCIE_TX3+
7	GBE0_MDI2+	62	PCIE_TX3-
8	NC	63	GPI1(PCH GPIO3)
9	GBE0_MDI1-	64	PCIE_TX2+
10	GBE0_MDI1+	65	PCIE_TX2-
11	GNDA2	66	GNDA8
12	GBE0_MDI0-	67	GPI2(PCH GPIO4)
13	GBE0_MDI0+	68	PCIE_TX1+
14	GBE0_CTREF	69	PCIE_TX1-
15	SUS_S3#	70	GNDA9
16	SATA0_TX+	71	LVDS_A0+
17	SATA0_TX-	72	LVDS_A0-
18	SUS_S4#	73	LVDS_A1+
19	SATA0_RX+	74	LVDS_A1-
20	SATA0_RX-	75	LVDS_A2+
21	GNDA3	76	LVDS_A2-
22	SATA4_TX+	77	LVDS_VDD_EN
23	SATA4_TX-	78	LVDS_A3+
24	SUS_S5#	79	LVDS_A3-
25	SATA4_RX+	80	GNDA10
26	SATA4_RX-	81	LVDS_A_CK+
27	BATLOW#	82	LVDS_A_CK-
28	ATA_ACT#	83	LVDS_I2C_CK
29	AC_SYNC	84	LVDS_I2C_DAT
30	AC_RST#	85	GPI3(PCH GPIO5)
31	GNDA4	86	KBD_RST#
32	AC_BITCLK	87	KBD_A20GATE
33	AC_SDOUT	88	PCIE0_CK_REF+
34	NC	89	PCIE1_CK_REF-
35	THRMTRIP#	90	GNDA11
36	USB10-	91	RSVDA1
37	USB10+	92	NC
38	USB8_10_OC#	93	GPO0(PCH GPIO52)
39	USB8-	94	NC
40	USB8+	95	NC
41	GNDA5	96	GNDA12
42	USB2-	97	VCC_12VA1
43	USB2+	98	VCC_12VA2
44	USB0_3_OC#	99	VCC_12VA3
45	USB0-	100	GNDA13
46	USB0+	101	VCC_12VA4
47	VCC_RTC	102	VCC_12VA5
48	PCH GPIO68	103	VCC_12VA6
49	PCH GPIO70	104	VCC_12VA7
50	LPC_SERIRQ	105	VCC_12VA8
51	GNDA6	106	VCC_12VA9
52	NC	107	VCC_12VA10
53	NC	108	VCC_12VA11
54	GPI0(PCH GPIO2)	109	VCC_12VA12
55	PCIE_TX8+	110	GNDA14

Row B			
1	GNDB1	56	PCIE_RX8-
2	GBE0_ACT#	57	GPO2(PCH GPIO54)
3	LPC_FRAME#	58	PCIE_RX4+
4	LPC_AD0	59	PCIE_RX4-
5	LPC_AD1	60	GNDB7
6	LPC_AD2	61	PCIE_RX3+
7	LPC_AD3	62	PCIE_RX3-
8	LPC_DRQ0#	63	GPO3(PCH GPIO55)
9	LPC_DRQ1#	64	PCIE_RX2+
10	LPC_CLK	65	PCIE_RX2-
11	GNDB2	66	WAKE0#
12	PWRBTN#	67	WAKE1#
13	SMB_CK	68	PCIE_RX1+
14	SMB_DAT	69	PCIE_RX1-
15	SMB_ALERT#	70	GNDB8
16	SATA1_TX+	71	LVDS_B0+
17	SATA1_TX-	72	LVDS_B0-
18	SUS_STAT#	73	LVDS_B1+
19	SATA1_RX+	74	LVDS_B1-
20	SATA1_RX-	75	LVDS_B2+
21	GNDB3	76	LVDS_B2-
22	SATA5_TX+	77	LVDS_B3+
23	SATA5_TX-	78	LVDS_B3-
24	PWR_OK	79	LVDS_BKLT_EN
25	SATA5_RX+	80	GNDB9
26	SATA5_RX-	81	LVDS_B_CK+
27	WDT	82	LVDS_B_CK-
28	AC_SDIN2	83	LVDS_BKLT_CTRL
29	AC_SDIN1	84	VCC_5V_SBYB1
30	AC_SDIN0	85	VCC_5V_SBYB2
31	GNDB4	86	VCC_5V_SBYB3
32	SPKR	87	VCC_5V_SBYB4
33	I2C_CK	88	NC
34	I2C_DAT	89	VGA_RED
35	THRM#	90	GNDB10
36	USB11-	91	VGA_GREEN
37	USB11+	92	VGA_BLUE
38	USB8_11_OC#	93	VGA_HSYNC
39	USB9-	94	VGA_VSYNC
40	USB9+	95	VGA_I2C_CK
41	GNDB5	96	VGA_I2C_DAT
42	USB3-	97	NC
43	USB3+	98	NC
44	USB0_3_OC#	99	NC
45	USB1-	100	GNDB11
46	USB1+	101	VCC_12VB1
47	PCH_GPIO69	102	VCC_12VB2
48	PCH_GPIO71	103	VCC_12VB3
49	SYS_RESET#	104	VCC_12VB4
50	CB_RESET#	105	VCC_12VB5
51	GNDB6	106	VCC_12VB6
52	NC	107	VCC_12VB7
53	NC	108	VCC_12VB8
54	GPO1(PCH GPIO53)	109	VCC_12VB9
55	PCIE_RX8+	110	GNDB12

Row C			
1	GNDC1	56	PEG_RX1-/SDVO_INT-
2	IDE_D7	57	NC
3	IDE_D6	58	PEG_RX2+/SDVO_STALL+
4	IDE_D3	59	PEG_RX2-/SDVO_STALL-
5	IDE_D15	60	GNDC7
6	IDE_D8	61	PEG_RX3+/DDPB_HPD
7	IDE_D9	62	PEG_RX3-
8	IDE_D2	63	NC
9	IDE_D13	64	NC
10	IDE_D1	65	PEG_RX4+
11	GNDC2	66	PEG_RX4-
12	IDE_D14	67	NC
13	IDE_IORDY	68	PEG_RX5+
14	IDE_IOR#	69	PEG_RX5-
15	PCI_PME#	70	GNDC8
16	PCI_GNT2#	71	PEG_RX6+/DDPC_AUX+
17	PCI_REQ2#	72	PEG_RX6-/DDPC_AUX-
18	PCI_GNT1#	73	SDVOB_CTRLDATA
19	PCI_REQ1#	74	PEG_RX7+/DDPC_HPD
20	PCI_GNT0#	75	PEG_RX7-
21	GNDC3	76	GNDC9
22	PCI_REQ0#	77	NC
23	PCI_RESET#	78	PEG_RX8+
24	PCI_AD0	79	PEG_RX8-
25	PCI_AD2	80	GNDC10
26	PCI_AD4	81	PEG_RX9+
27	PCI_AD6	82	PEG_RX9-
28	PCI_AD8	83	NC/DDPC_CTRLDATA
29	PCI_AD10	84	GNDC11
30	PCI_AD12	85	PEG_RX10+
31	GNDC4	86	PEG_RX10-
32	PCI_AD14	87	GNDC12
33	PCI_C/BE1#	88	PEG_RX11+
34	PCI_PERR#	89	PEG_RX11-
35	PCI_LOCK#	90	GNDC13
36	PCI_DEVSEL#	91	PEG_RX12+
37	PCI_IRDY#	92	PEG_RX12-
38	PCI_C/BE2#	93	GNDC14
39	PCI_AD17	94	PEG_RX13+
40	PCI_AD19	95	PEG_RX13-
41	GNDC5	96	GNDC15
42	PCI_AD21	97	NC
43	PCI_AD23	98	PEG_RX14+
44	PCI_C/BE3#	99	PEG_RX14-
45	PCI_AD25	100	GNDC16
46	PCI_AD27	101	PEG_RX15+
47	PCI_AD29	102	PEG_RX15-
48	PCI_AD31	103	GNDC17
49	PCI_IRQA#	104	VCC_12VC1
50	PCI_IRQB#	105	VCC_12VC2
51	GNDC6	106	VCC_12VC3
52	PEG_RX0+/SDVO_TVCLK+	107	VCC_12VC4
53	PEG_RX0-/SDVO_TVCLK-	108	VCC_12VC5
54	NC	109	VCC_12VC6
55	PEG_RX1+/SDVO_INT+	110	GNDC18

Row D			
1	GNDD1	56	PEG_TX1-/DDPB_1-
2	IDE_D5	57	NC
3	IDE_D10	58	PEG_TX2+/DDPB_2+
4	IDE_D11	59	PEG_TX2-/DDPB_2-
5	IDE_D12	60	GNDD7
6	IDE_D4	61	PEG_TX3+/DDPB_3+
7	IDE_D0	62	PEG_TX3-/DDPB_3-
8	IDE_REQ#	63	NC
9	IDE_IOW#	64	NC
10	IDE_ACK#	65	PEG_TX4+/DDPC_0+
11	GNDD2	66	PEG_TX4-/DDPC_0-
12	IDE_IRQ	67	GNDD8
13	IDE_A0	68	PEG_TX5+/DDPC_1+
14	IDE_A1	69	PEG_TX5-/DDPC_1-
15	IDE_A2	70	GNDD9
16	IDE_CS1#	71	PEG_TX6+/DDPC_2+
17	IDE_CS3#	72	PEG_TX6-/DDPC_2-
18	IDE_RESET#	73	SDVO_CLK
19	PCI_GNT3#	74	PEG_TX7+/DDPC_3+
20	PCI_REQ3#	75	PEG_TX7-/DDPC_3-
21	GNDD3	76	GNDD10
22	PCI_AD1	77	IDE_CBLID#
23	PCI_AD3	78	PEG_TX8+
24	PCI_AD5	79	PEG_TX8-
25	PCI_AD7	80	GNDD11
26	PCI_C/BE0#	81	PEG_TX9+
27	PCI_AD9	82	PEG_TX9-
28	PCI_AD11	83	NC/DDPC_CTRLCLK
29	PCI_AD13	84	GNDD12
30	PCI_AD15	85	PEG_TX10+
31	GNDD4	86	PEG_TX10-
32	PCI_PAR	87	GNDD13
33	PCI_SERR#	88	PEG_TX11+
34	PCI_STOP#	89	PEG_TX11-
35	PCI_TRDY#	90	GNDD14
36	PCI_FRAME#	91	PEG_TX12+
37	PCI_AD16	92	PEG_TX12-
38	PCI_AD18	93	GNDD15
39	PCI_AD20	94	PEG_TX13+
40	PCI_AD22	95	PEG_TX13-
41	GNDD5	96	GNDD16
42	PCI_AD24	97	NC
43	PCI_AD26	98	PEG_TX14+
44	PCI_AD28	99	PEG_TX14-
45	PCI_AD30	100	GNDD17
46	PCI_IRQC#	101	PEG_TX15+
47	PCI_IRQD#	102	PEG_TX15-
48	PCI_CLKRUN#	103	GNDD18
49	NC	104	VCC_12VD1
50	PCI_CLK	105	VCC_12VD2
51	GNDD6	106	VCC_12VD3
52	PEG_TX0+/DDPB_0+	107	VCC_12VD4
53	PEG_TX0-/DDPB_0-	108	VCC_12VD5
54	NC	109	VCC_12VD6
55	PEG_TX1+/DDPB_1+	110	GNDD19

PIN Mapping

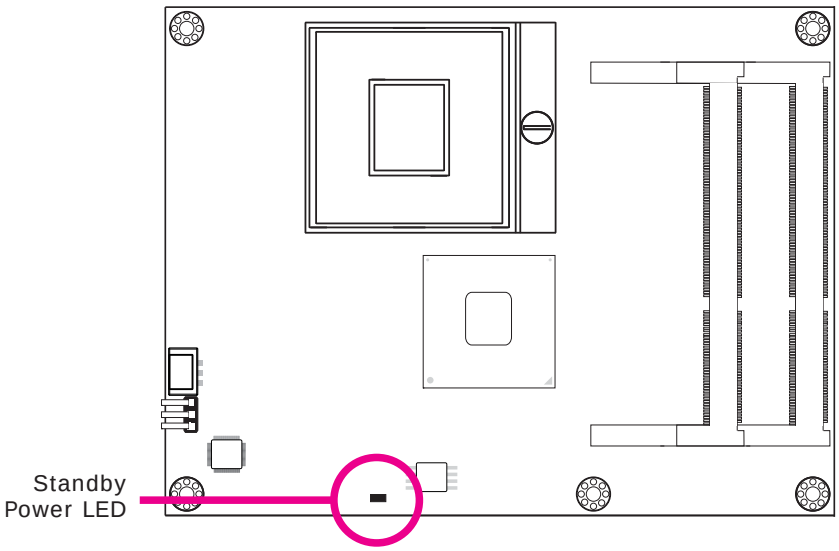
DDI Port B

COM Express BTB Connector Pin No.	QM67 Digital Display Interface Signal (Port B)	
	SDVO	HDMI/DVI
D52	DDPB_[0]P: red	DDPB_[0]P: TMDSB_DATA2
D53	DDPB_[0]N: red complement	DDPB_[0]N: TMDSB_DATA2B
D55	DDPB_[1]P: green	DDPB_[1]P: TMDSB_DATA1
D56	DDPB_[1]N:green complement	DDPB_[1]N: TMDSB_DATA1B
D58	DDPB_[2]P: blue	DDPB_[2]P: TMDSB_DATA0
D59	DDPB_[2]N: blue complement	DDPB_[2]N: TMDSB_DATA0B
D61	DDPB_[3]P: clock	DDPB_[3]P: TMDSB_CLK
D62	DDPB_[3]N: clock complement	DDPB_[3]N: TMDSB_CLKB
C52	SDVO_TVCLKINP	
C53	SDVO_TVCLKINN	
C55	SDVO_INTP	
C56	SDVO_INTN	
C58	SDVO_STALLP	
C59	SDVO_STALLN	
C61		DDPB_HPD
C73	SDVO_CTRLDATA	HDMI Control Data.
D73	SDVO_CTRLCLK	HDMI Control Clock

DDI Port C

COM Express BTB Connector Pin No.	QM67 Digital Display Interface Signal (Port C)	
	Display Port	HDMI/DVI
D65	DDPC_[0]P: Display Port Lane 0	DDPC_[0]P: TMDSC_DATA2
D66	DDPC_[0]N: Lane 0 complement	DDPC_[0]N: TMDSC_DATA2B
D68	DDPC_[1]P: Display Port Lane 1	DDPC_[1]P: TMDSC_DATA1
D69	DDPC_[1]N: Lane 1 complement	DDPC_[1]N: TMDSC_DATA1B
D71	DDPC_[2]P: Display Port Lane 2	DDPC_[2]P: TMDSC_DATA0
D72	DDPC_[2]N: Lane 2 complement	DDPC_[2]N: TMDSC_DATA0B
D74	DDPC_[3]P: Display Port Lane 3	DDPC_[3]P: TMDSC_CLK
D75	DDPC_[3]N: Lane 3 complement	DDPC_[3]N: TMDSC_CLKB
C71	DDPC_AUX_P	
C72	DDPC_AUX_N	
C74	DDPC_HPD	DDPC_HPD
C83	SDVO_CTRLDATA	HDMI Control Data.
D83	SDVO_CTRLCLK	HDMI Control Clock

Standby Power LED

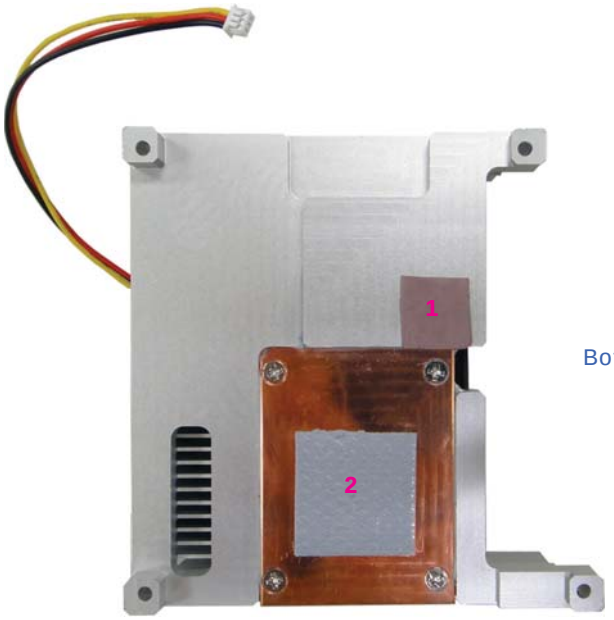


This LED will light when the system is in the standby mode.

Cooling Option

Heat Sink with Cooling Fan

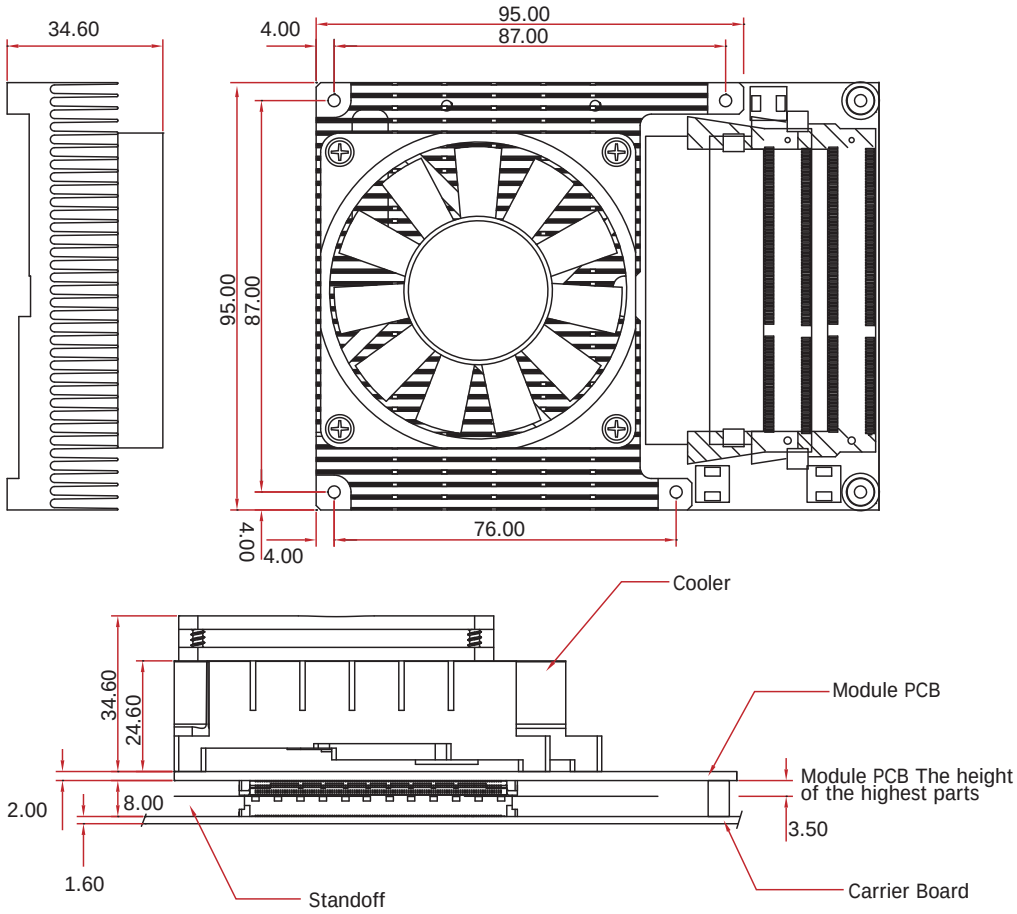
Top View of the Heat Sink



Bottom View of the Heat Sink

- "1" and "2" denote the locations of the thermal pads designed to contact the corresponding components that are on HR900-B.
- Remove the plastic covering from the thermal pads prior to mounting the heat sink onto HR900-B.

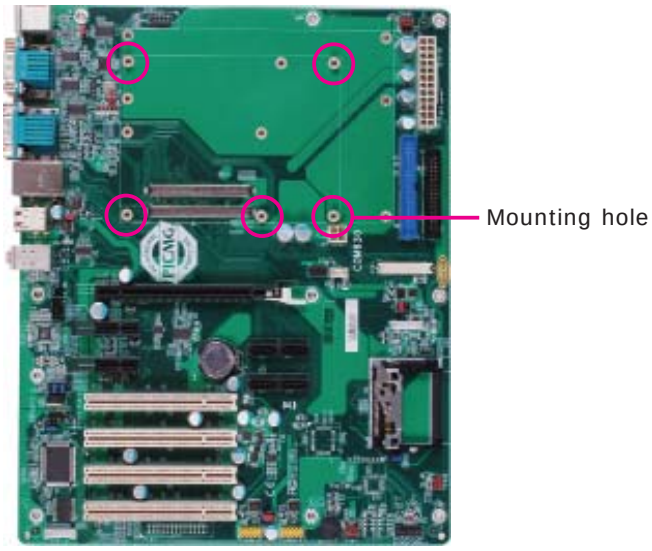
Dimensions


34.60
4.00
95.00
87.00
95.00
87.00
4.00
4.00
76.00
Cooler
34.60
24.60
Module PCB
Module PCB The height
of the highest parts
2.00
8.00
3.50
1.60
Standoff
Carrier Board

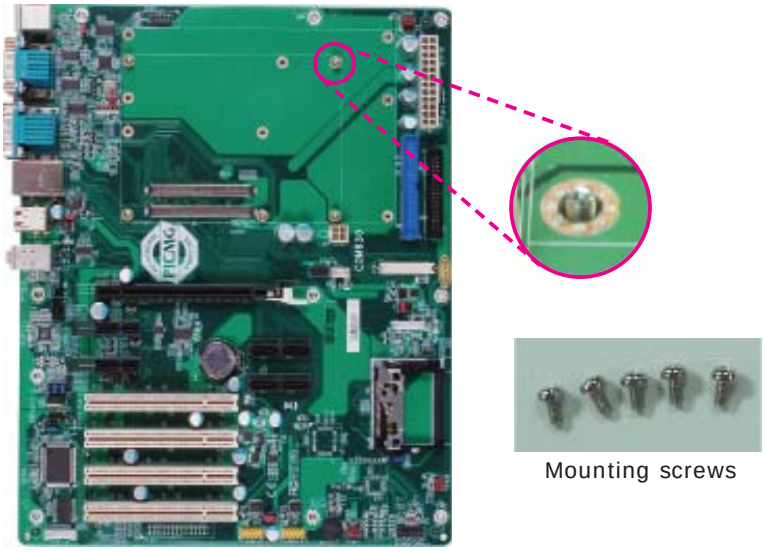
Installing HR900-B onto a Carrier Board

Important:
The carrier board used in this section is for reference purpose only and may not resemble your carrier board. These illustrations are mainly to guide you on how to install HR900-B onto the carrier board of your choice.

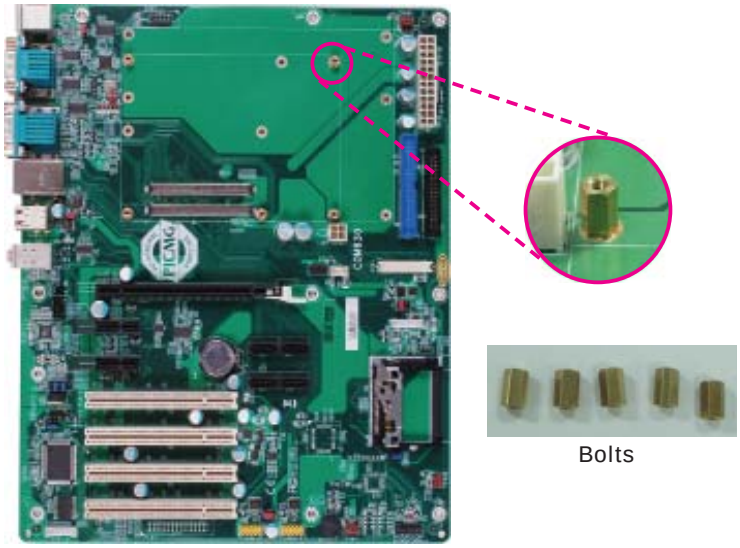
1. The photo below shows the locations of the mounting holes.



2. Insert the provided mounting screws into the mounting holes - from the bottom through the top of the carrier board.

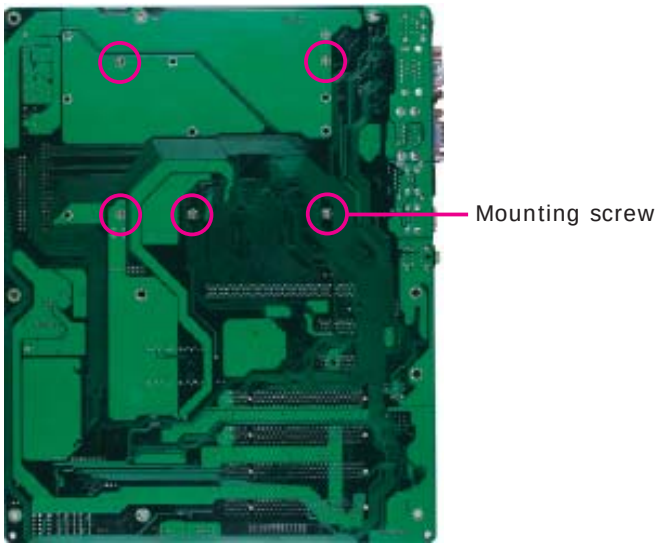


3. While supporting the mounting screw at the bottom, from the top side of the board, fasten a bolt into the screw.

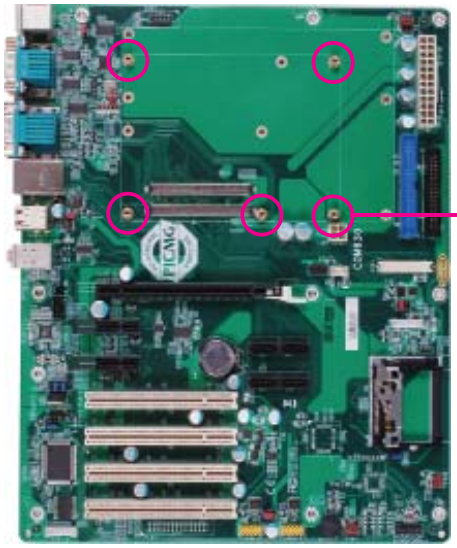


Bolts

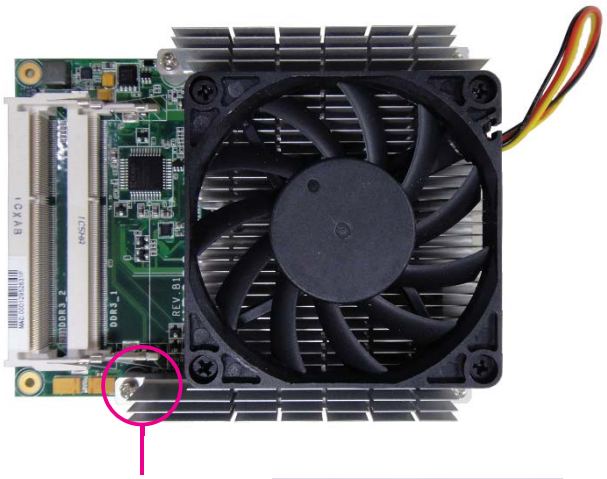
4. The photo below shows the solder side of the board with the screws already fixed in place.



5. The photo below shows the component side of the board with the bolts already fixed in place.

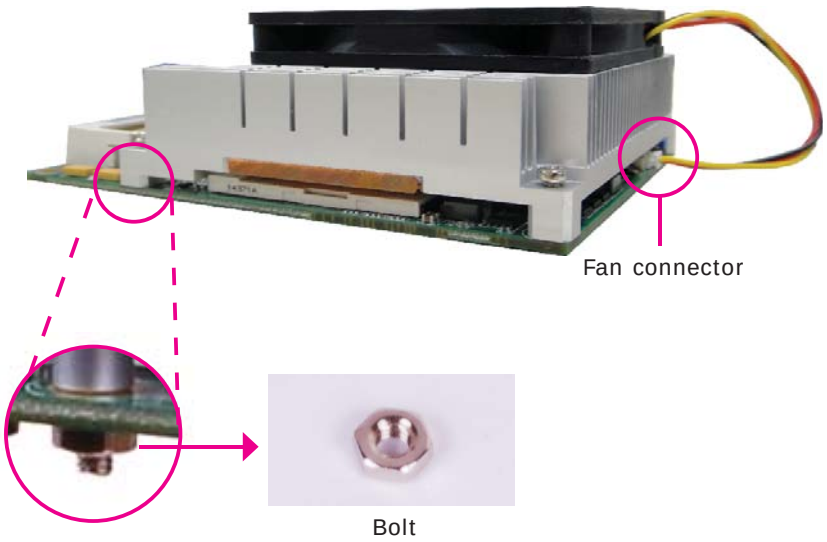


6. Position the heat sink on top of HR900-B with the heat sink's mounting holes aligned with HR900-B's mounting holes. Insert one of the provided long screws into the mounting hole shown in the photo below.

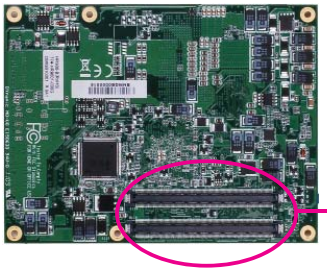


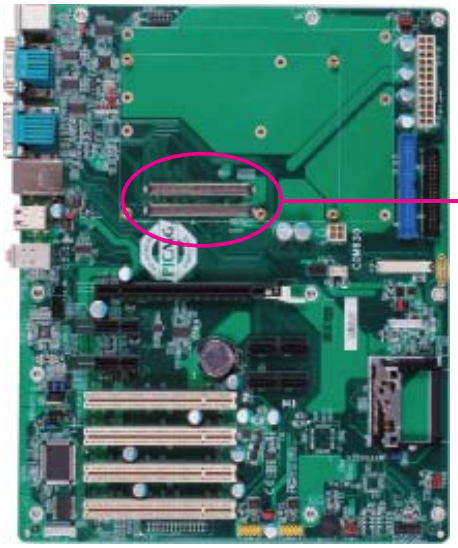
Long screw

7. From the bottom of the board, fasten the provided bolt into the screw and then connect the cooling fan's cable to the fan connector on HR900-B.

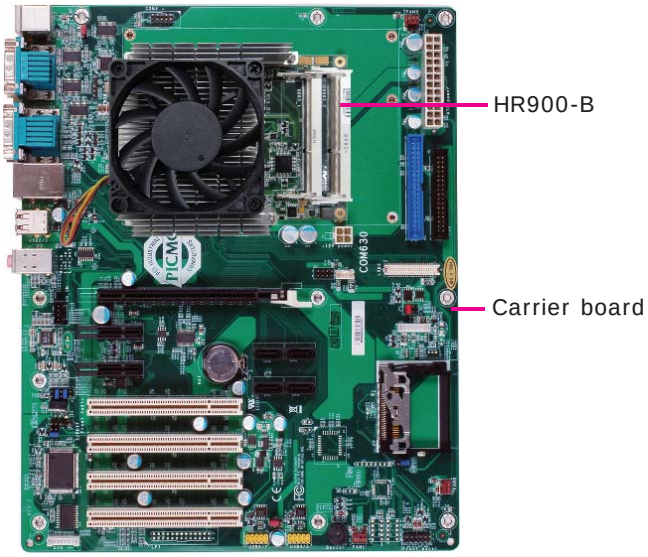


8. Grasping HR900-B by its edges, position it on top of the carrier board with its mounting holes aligned with the bolts on the carrier board. This will also align the COM Express connectors of the two boards to each other.

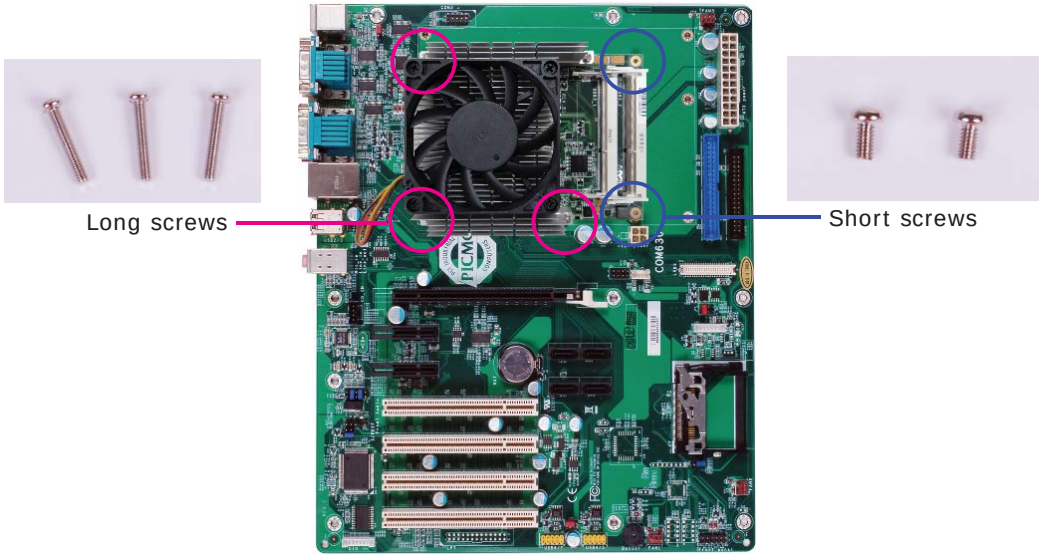




9. Press HR900-B down firmly until it is completely seated on the COM Express connectors of the carrier board.



10. Use the provided mounting screws to secure HR900-B with heat sink to the carrier board. The photo below shows the locations of the long/short mounting screws.



Chapter 3 - BIOS Setup

Overview

The BIOS is a program that takes care of the basic level of communication between the CPU and peripherals. It contains codes for various advanced features found in this system board. The BIOS allows you to configure the system and save the configuration in a battery-backed CMOS so that the data retains even when the power is off. In general, the information stored in the CMOS RAM of the EEPROM will stay unchanged unless a configuration change has been made such as a hard drive replaced or a device added.

It is possible that the CMOS battery will fail causing CMOS data loss. If this happens, you need to install a new CMOS battery and reconfigure the BIOS settings.

Note:
The BIOS is constantly updated to improve the performance of the system board; therefore the BIOS screens in this chapter may not appear the same as the actual one. These screens are for reference purpose only.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering the BIOS Setup Utility

The BIOS Setup Utility can only be operated from the keyboard and all commands are keyboard commands. The commands are available at the right side of each setup screen.

The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message “Press DEL to run setup” will appear on the screen. If the message disappears before you respond, restart the system or press the “Reset” button. You may also restart the system by pressing the <Ctrl> <Alt> and <Del> keys simultaneously.

Legends

Keys	Function
Right and Left arrows	Moves the highlight left or right to select a menu.
Up and Down arrows	Moves the highlight up or down between submenus or fields.
<Esc>	Exits to the BIOS Setup Utility.
+ (plus key)	Scrolls forward through the values or options of the highlighted field.
- (minus key)	Scrolls backward through the values or options of the highlighted field.
Tab	Selects a field.
<F1>	Displays General Help.
<F4>	Saves and exits the Setup program.
<Enter>	Press <Enter> to enter the highlighted submenu.

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

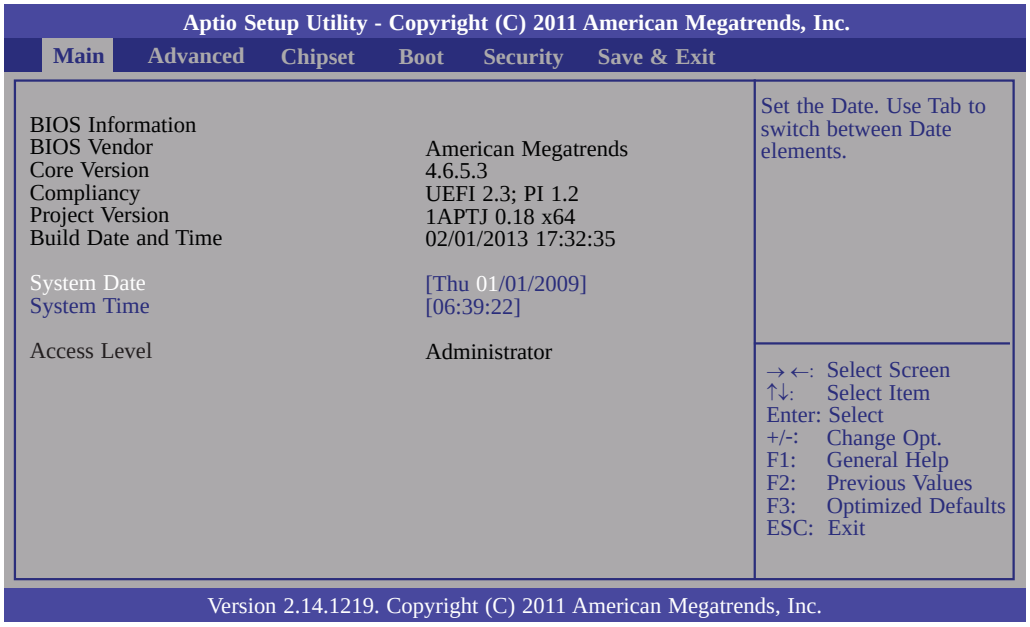
Submenu

When "▸" appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press <Enter>.

AMI BIOS Setup Utility

Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.



System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Sunday to Saturday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1980 to 2099.

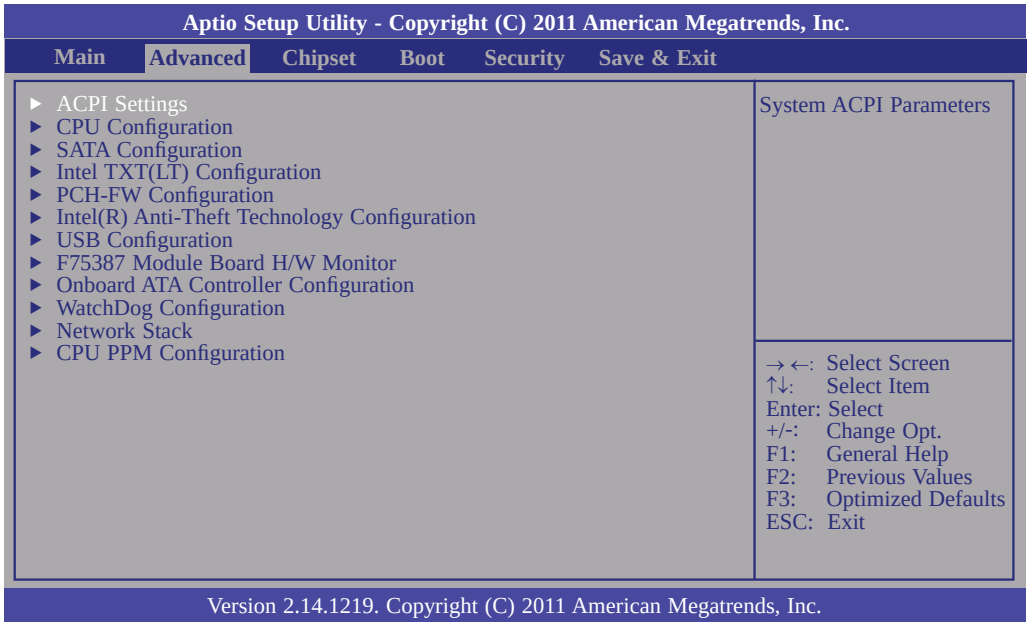
System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

Important:
Setting incorrect field values may cause the system to malfunction.



Launch PXE OpROM

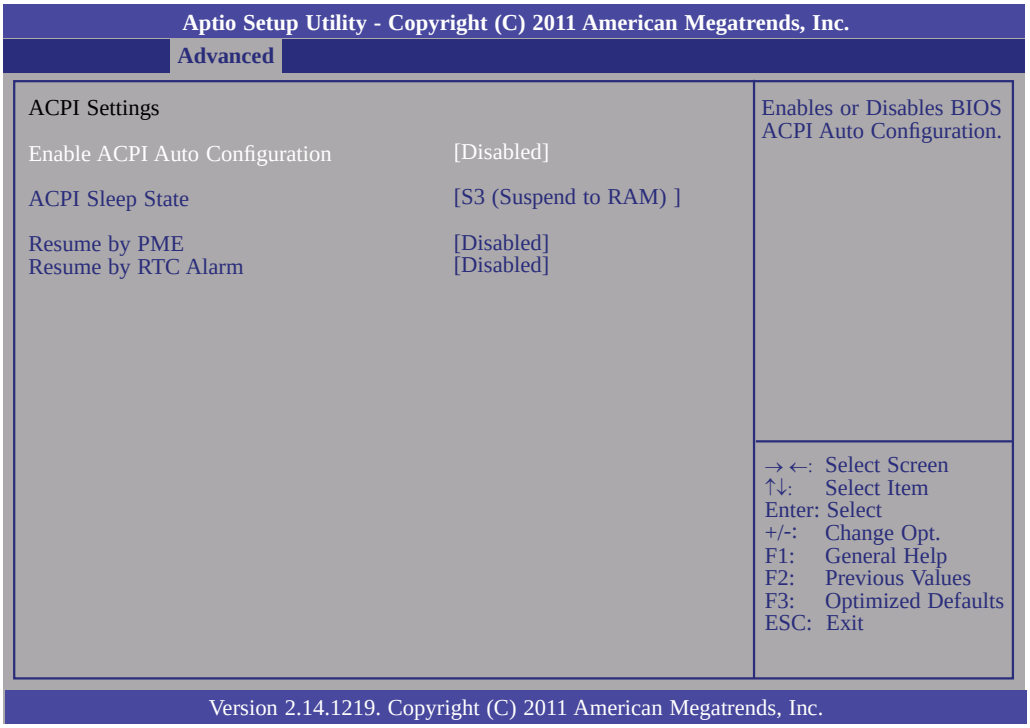
Enables or disables the boot option for legacy network devices.

Launch Storage OpROM

Enables or disables the boot option for legacy mass storage devices with option ROM.

ACPI Settings

This section is used to configure the ACPI settings.



ACPI Sleep State

Selects the highest ACPI sleep state the system will enter when the Suspend button is pressed.

S1(POS) Enables the Power On Suspend function.

S3(STR) Enables the Suspend to RAM function.

Resume by PME

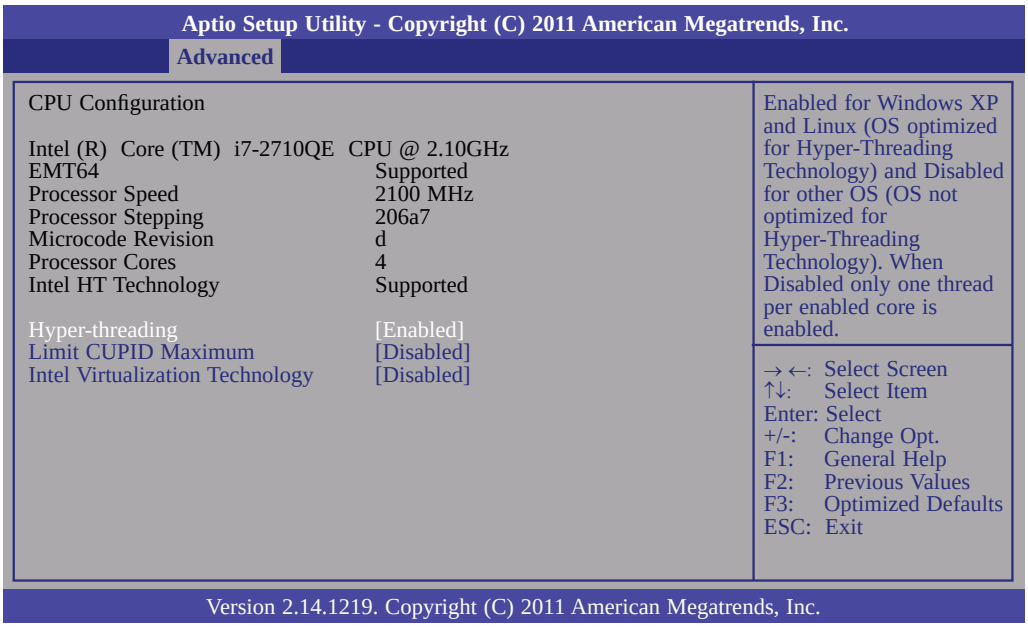
Enable this field to use the PME signal to wake up the system (via PCI, PCIE, onboard LAN and PS2 KB/MB).

Resume by RTC Alarm

When Enabled, the system uses the RTC to generate a wakeup event.

CPU Configuration

This section is used to configure the CPU. It will also display the detected CPU information.



Hyper-threading

Enable this field for Windows XP and Linux which are optimized for Hyper-Threading technology. Select disabled for other OSes not optimized for Hyper-Threading technology. When disabled, only one thread per enabled core is enabled.

Limit CUPID Maximum

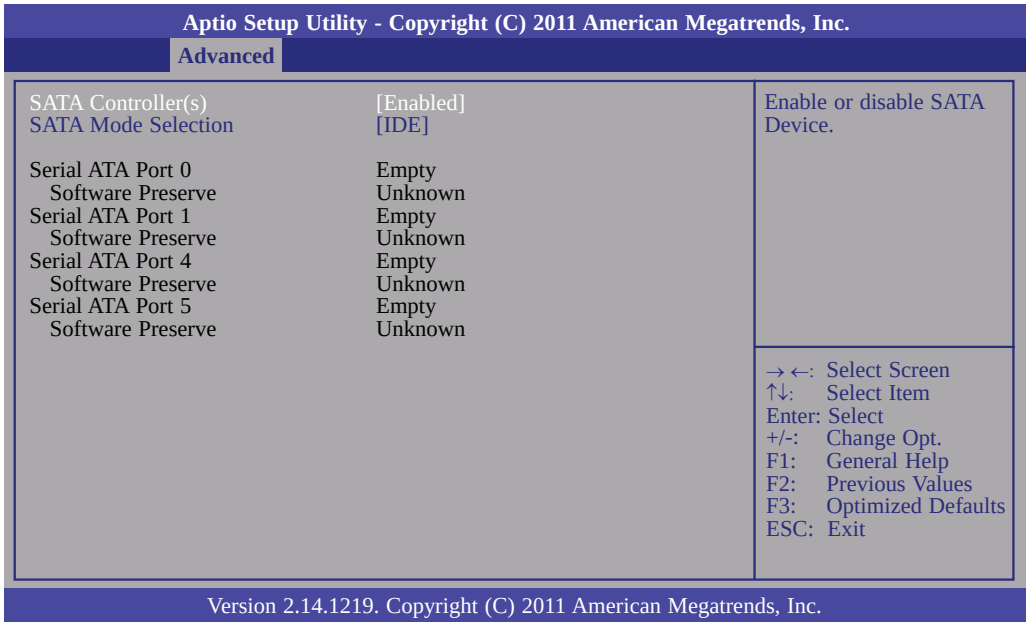
The CPUID instruction of some newer CPUs will return a value greater than 3. The default is Disabled because this problem does not exist in the Windows series operating systems. If you are using an operating system other than Windows, this problem may occur. To avoid this problem, enable this field to limit the return value to 3 or less than 3.

Intel Virtualization Technology

When this field is set to Enabled, the VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

SATA Configuration

This section is used to configure SATA functions.



SATA Controller(s)

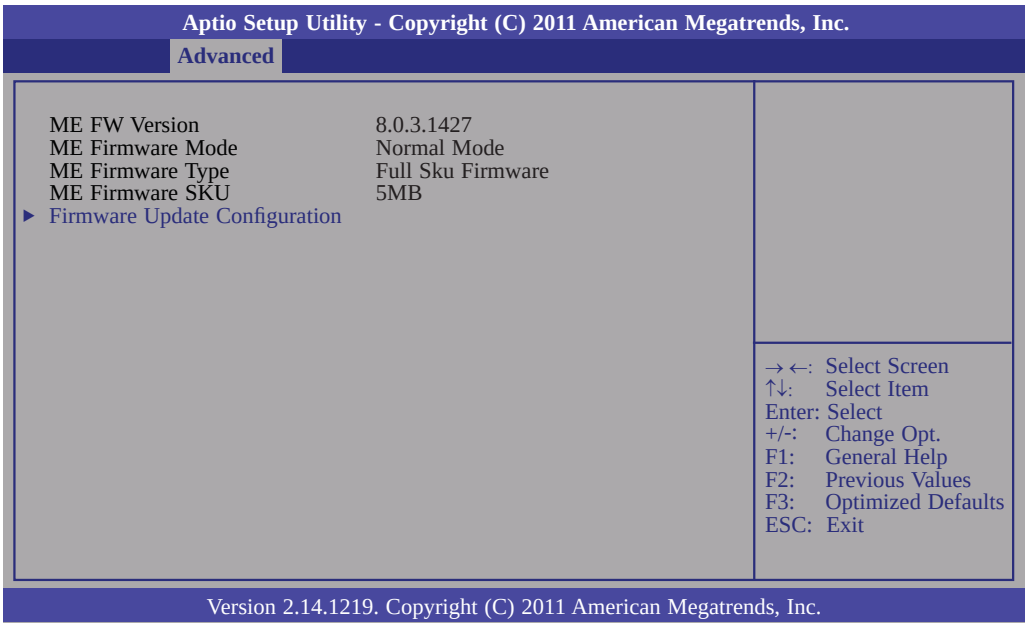
This field is used to enable or disable the Serial ATA channels.

SATA Mode Selection

IDE Mode
This option configures the Serial ATA drives as Parallel ATA storage devices.

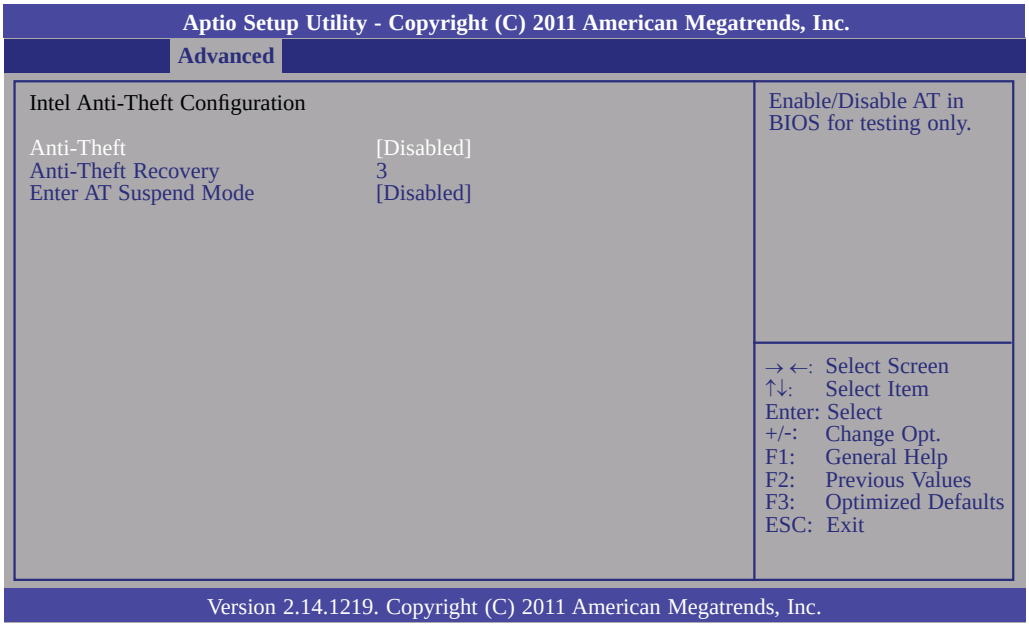
AHCI Mode
This option allows the Serial ATA devices to use AHCI (Advanced Host Controller Interface).

PCH-FW Configuration



Anti-Theft Configuration

This section is used to disable the PC at the hardware level in the event of loss or theft.



Anti-Theft

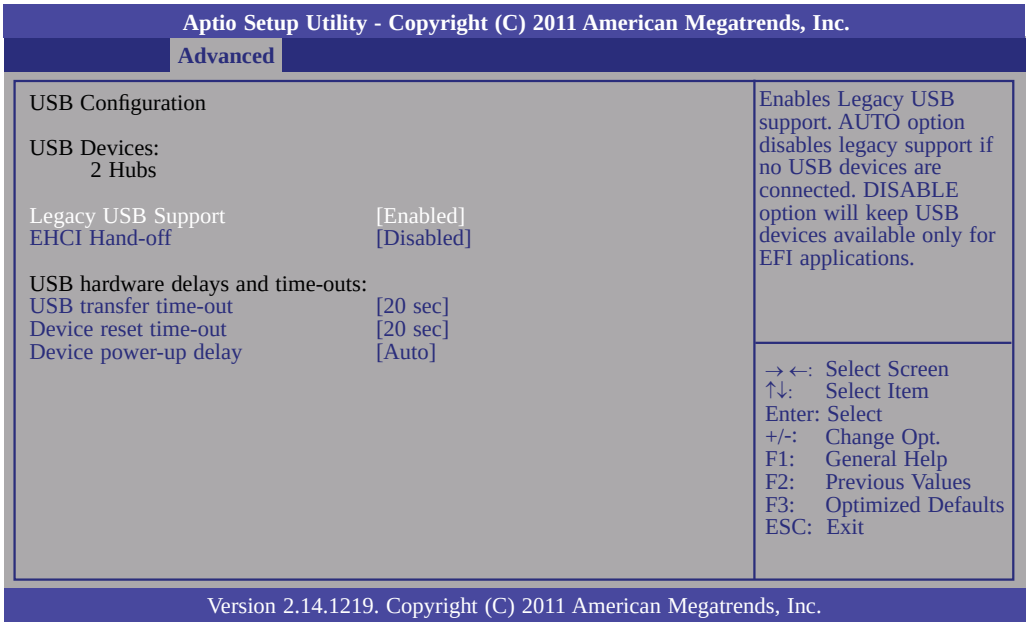
The options are Enabled and Disabled.

Enter AT Suspend Mode

The options are Enabled and Disabled.

USB Configuration

This section is used to configure USB.



Legacy USB Support

Enabled
Enables legacy USB.

Auto
Disables support for legacy when no USB devices are connected.

Disabled
Keeps USB devices available only for EFI applications.

EHCI Hand-off

This is a workaround for OSes that does not support EHCI hand-off. The EHCI ownership change should be claimed by the EHCI driver.

USB transfer time-out

The time-out value for Bulk and Interrupt transfers.

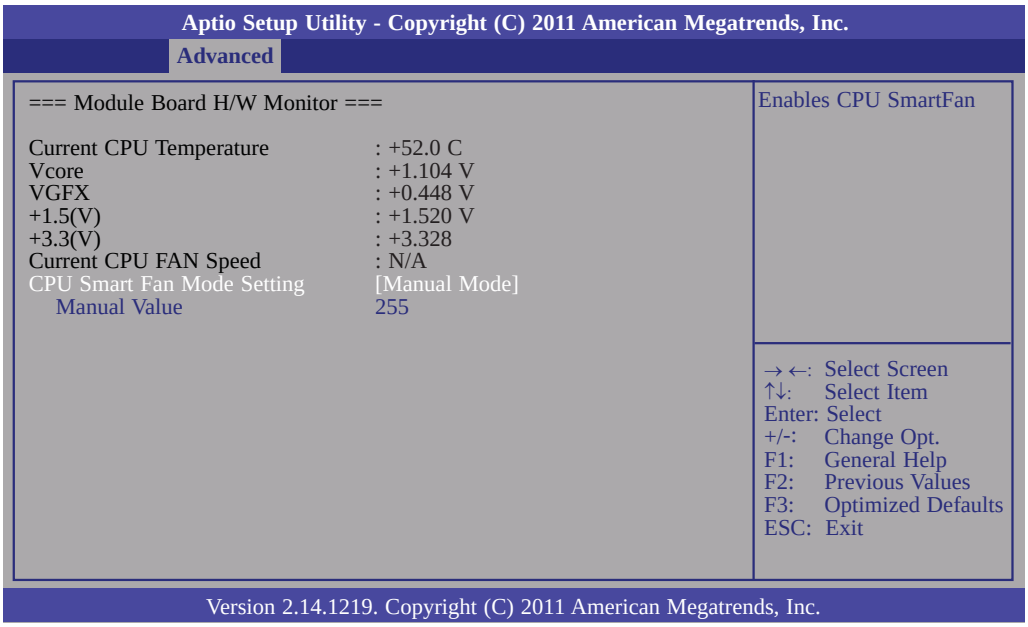
Device reset time-out

Selects the USB mass storage device start unit command timeout.

Device power-up delay

Maximum time the device will take before it properly reports itself to the Host Controller. “Auto” uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

F75387 Module Board H/W Monitor



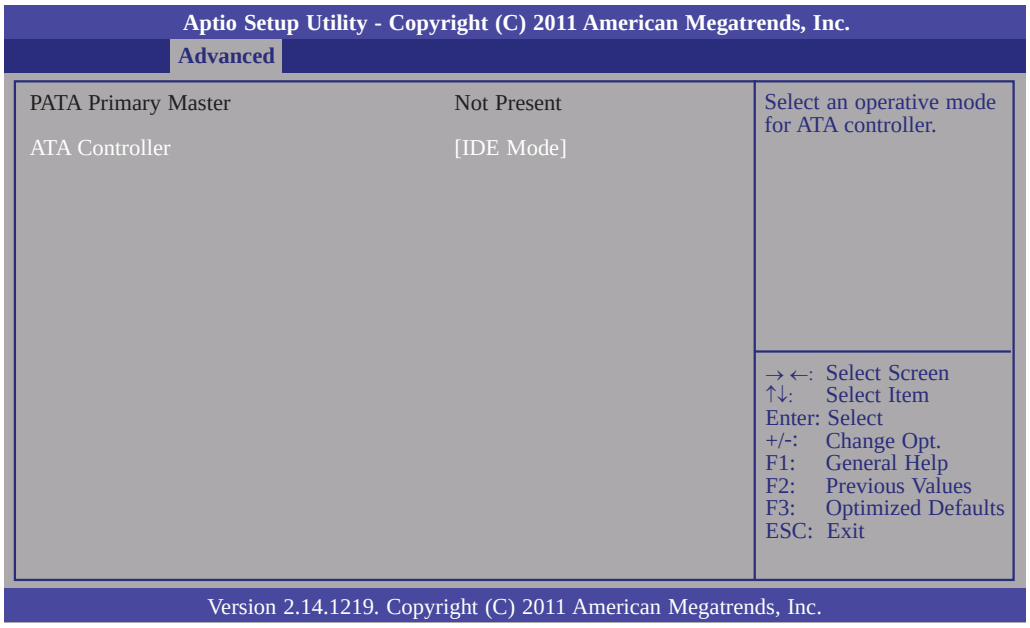
CPU Smart Fan Mode Setting

The options are Manual Mode and PWM mode.

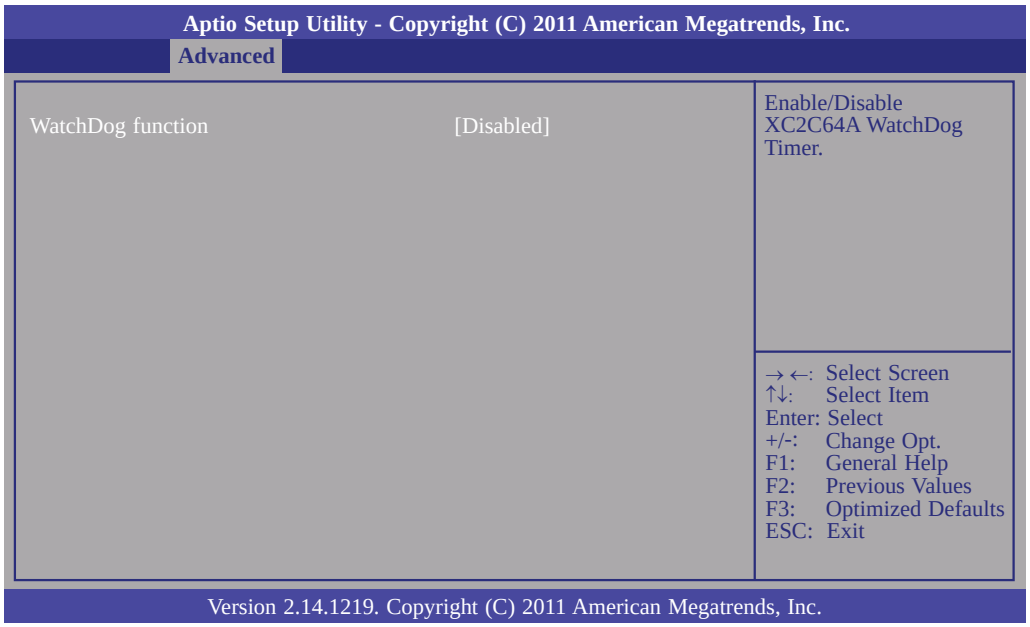
Manual Value

Allows you to manually enter the CPU fan's speed.

Onboard ATA Controller Configuration



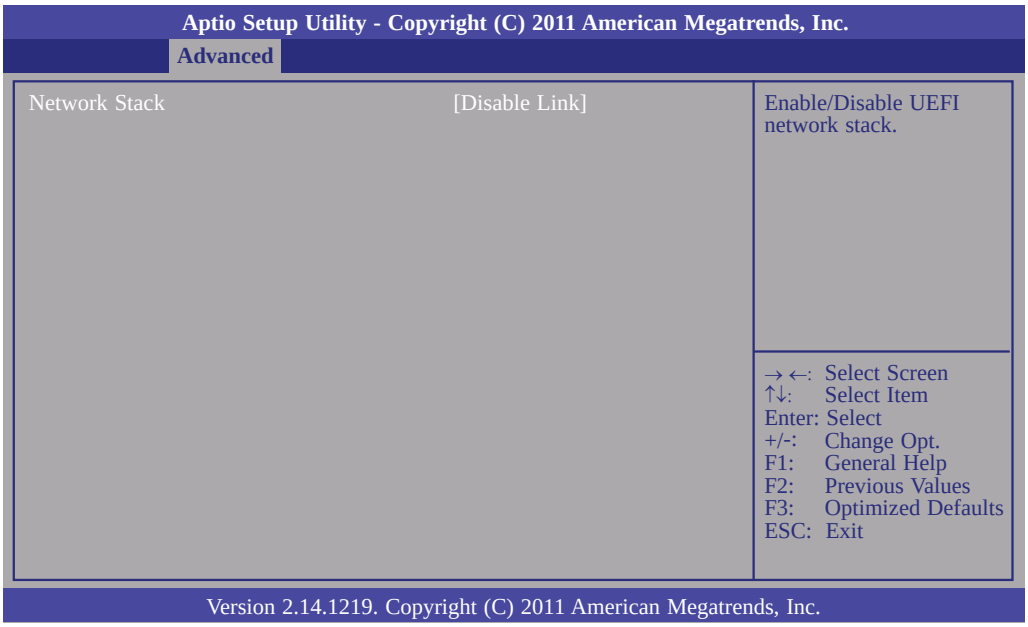
WatchDog Configuration



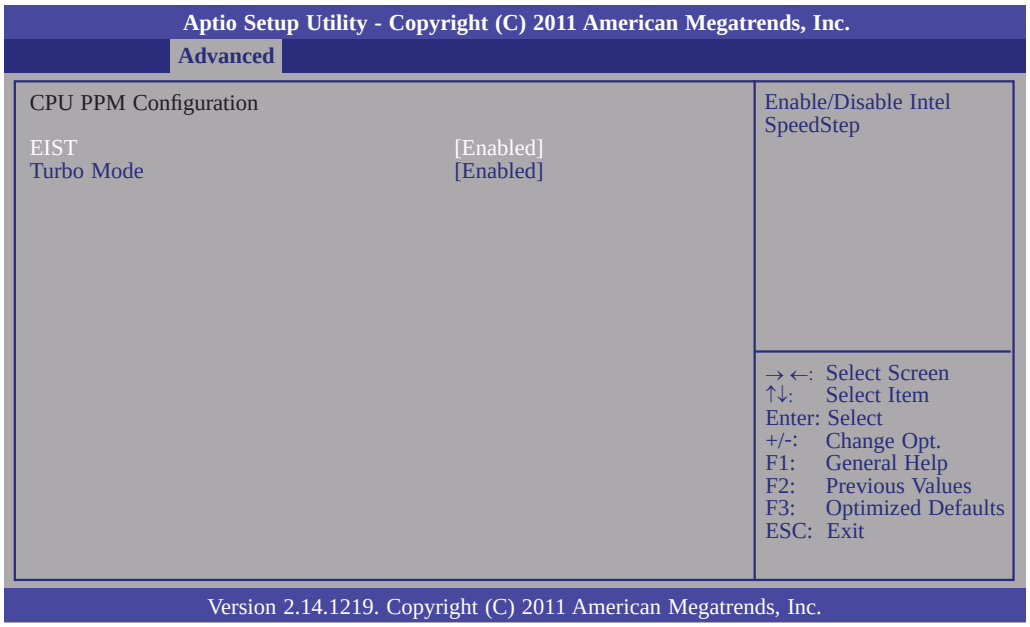
WatchDog function

This field is used to enable or disable the Watchdog timer function.

Network Stack



CPU PPM Configuration



EIST

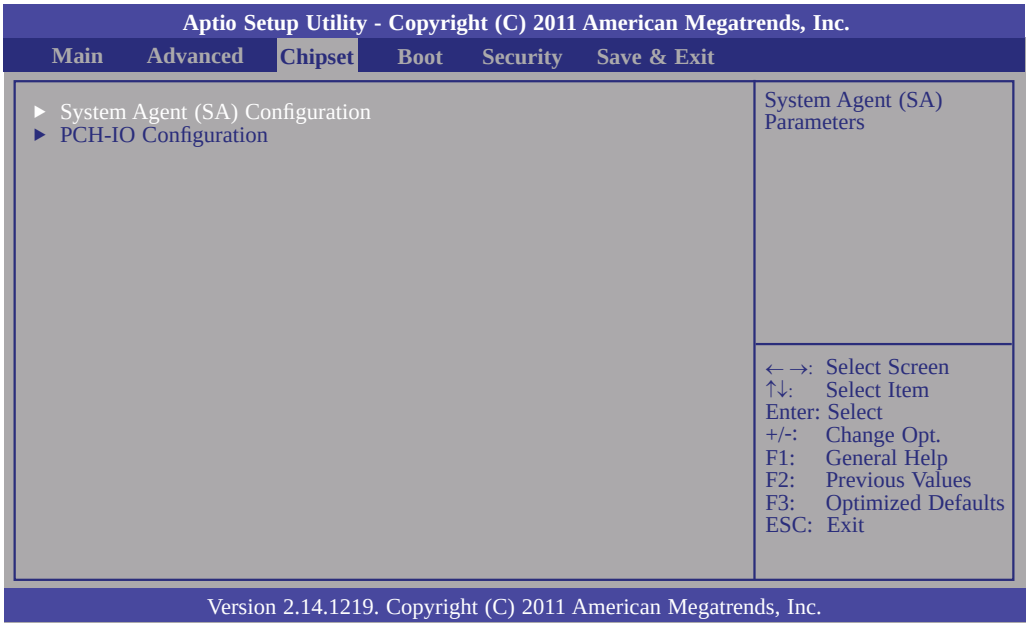
This field is used to enable or disable the Intel Enhanced SpeedStep Technology.

Turbo Mode

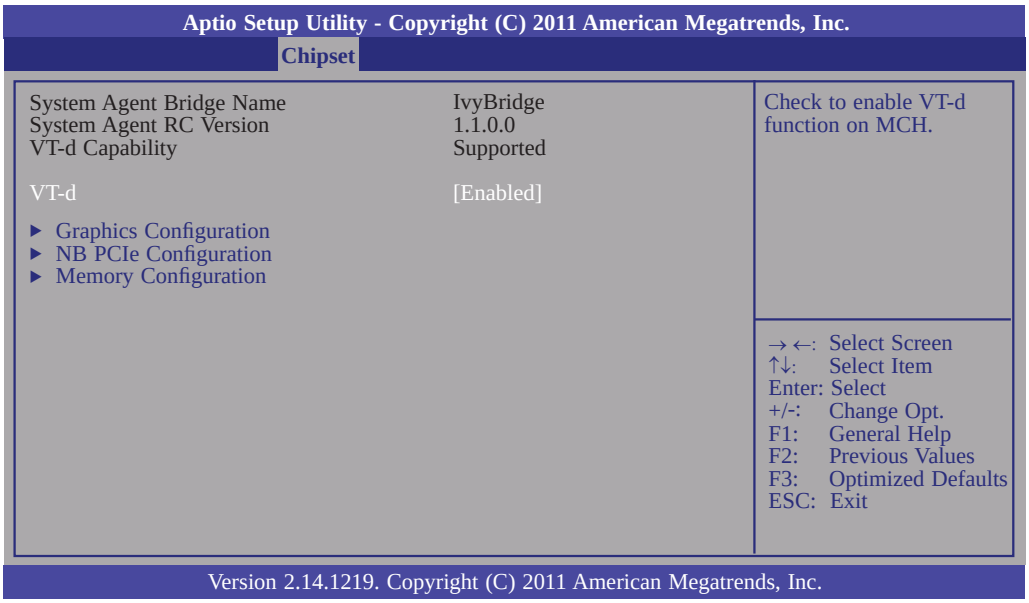
The options are Enabled and Disabled.

Chipset

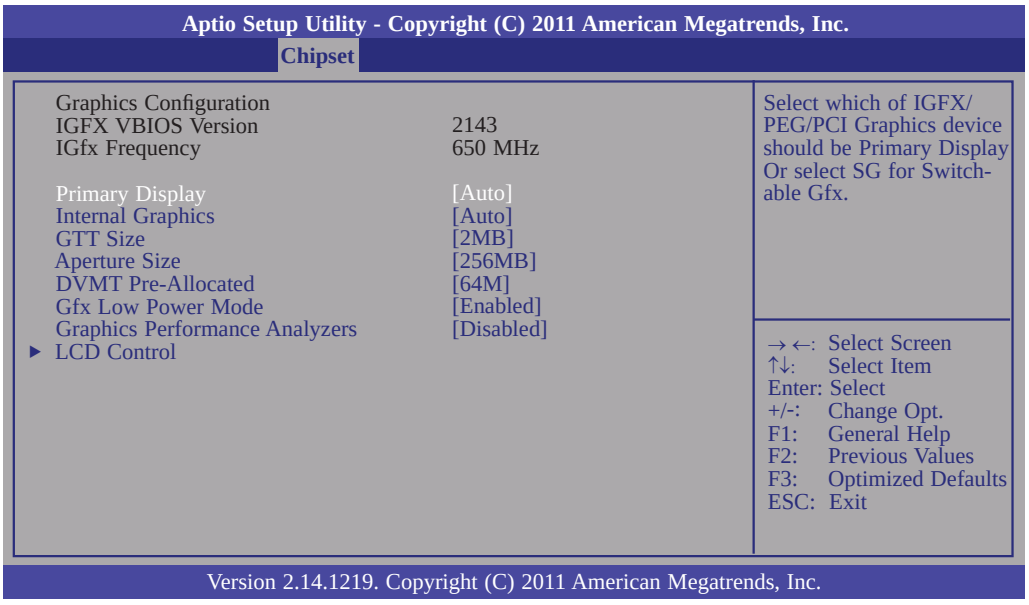
Configures relevant chipset functions.



System Agent (SA) Configuration



Graphics Configuration



Primary Display

Auto	When the system boots, it will auto detects the display device.
IGFX	When the system boots, it will first initialize the onboard VGA.
PEG	When the system boots, it will first initialize the PCI Express x16 graphics card.

Internal Graphics

Keeps IGD enabled based on the setup options.

GTT Size

Selects the GTT Size. The options are 1MB and 2 MB.

Aperture Size

This field is relevant to the memory-mapped graphics data of the PCIe x16. Leave this in its default setting.

DVMT Pre-Allocated

Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.

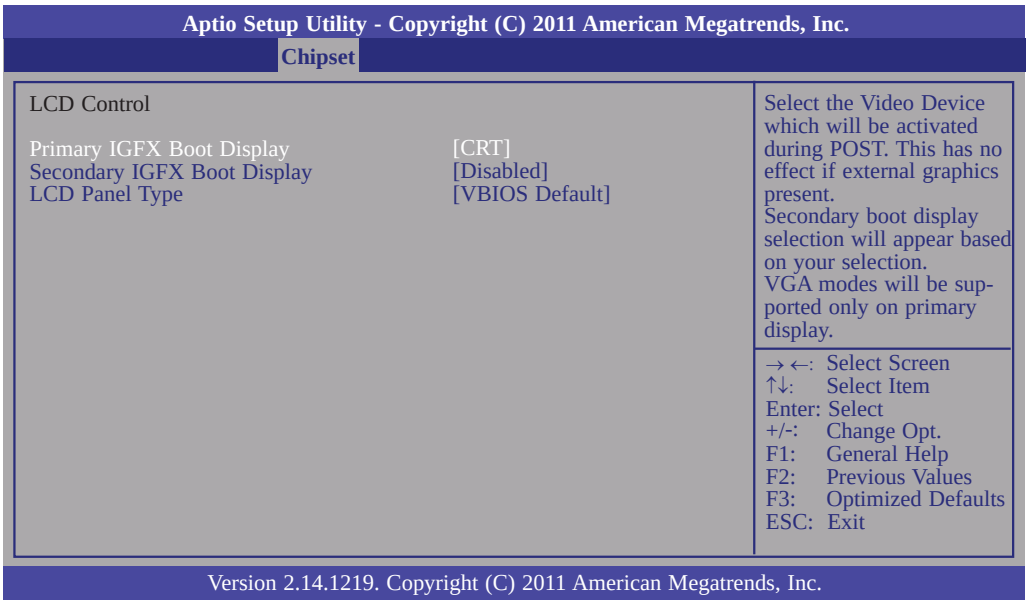
Gfx Low Power Mode

This option is applicable for SFF only. Enable or Disable the Gfx Low Power Mode.

Graphics Performance Analyzers

Enable or disable Intel Graphics Performance Analyzers Counters.

LCD Control



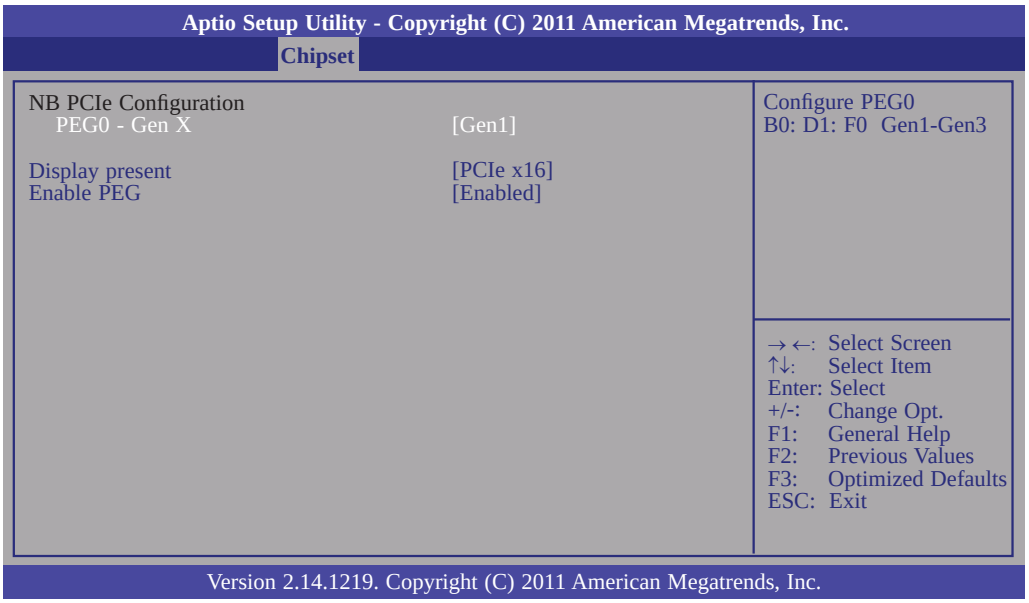
Primary IGFX Boot Display and Secondary IGFX Boot Display

The options are Disabled, CRT, EFP, LFP, EFP3 and EFP2.

LCD Panel Type

This field is used to select the type of LCD panel used by the internal graphics device.

NB PCIe Configuration



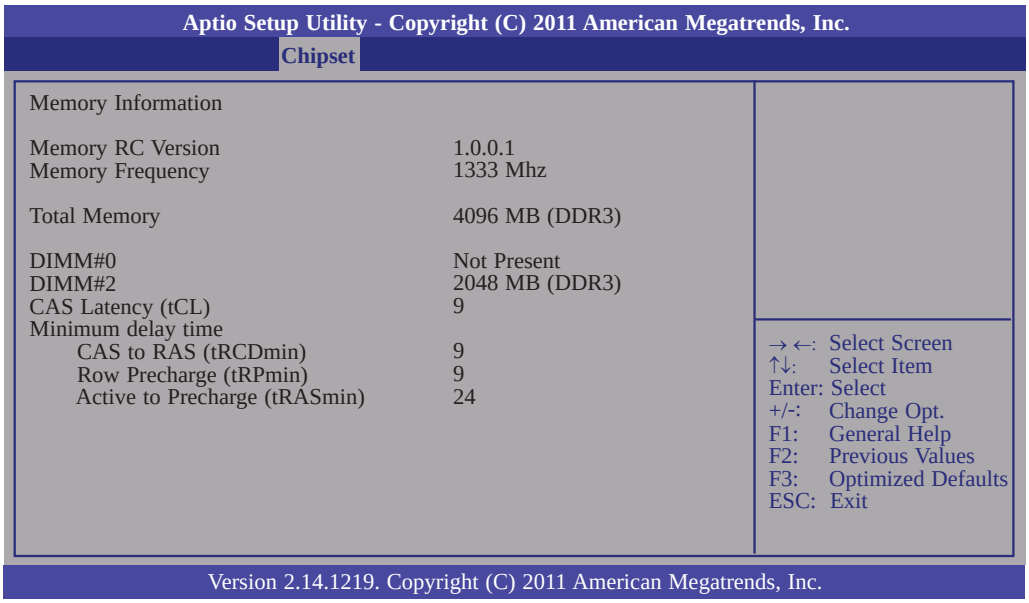
Display Present

Selects the display mode. The options are PCIe x16 and SDVO/HDMI/DP.

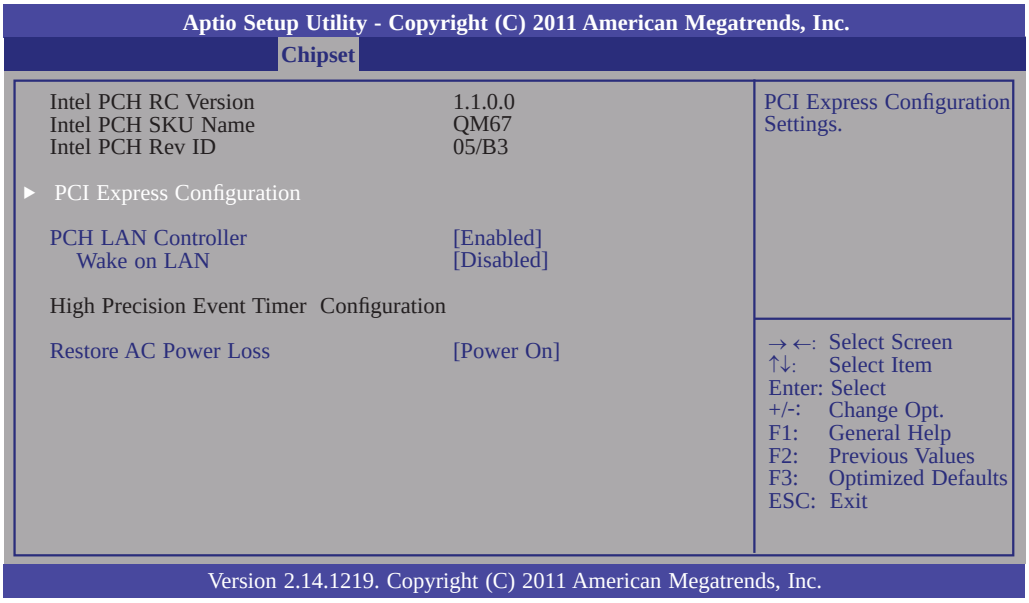
Enable PEG

To enable or disable the PEG.

Memory Configuration



PCH-IO Configuration



PCH LAN Controller

Enables or disables the PCH LAN Controller.

Wake on LAN Enable

Set this field to Enabled to wake up the system via the onboard LAN or via a LAN card that supports the remote wake up function.

Restore AC Power Loss

Off

When power returns after an AC power failure, the system's power is off. You must press the Power button to power-on the system.

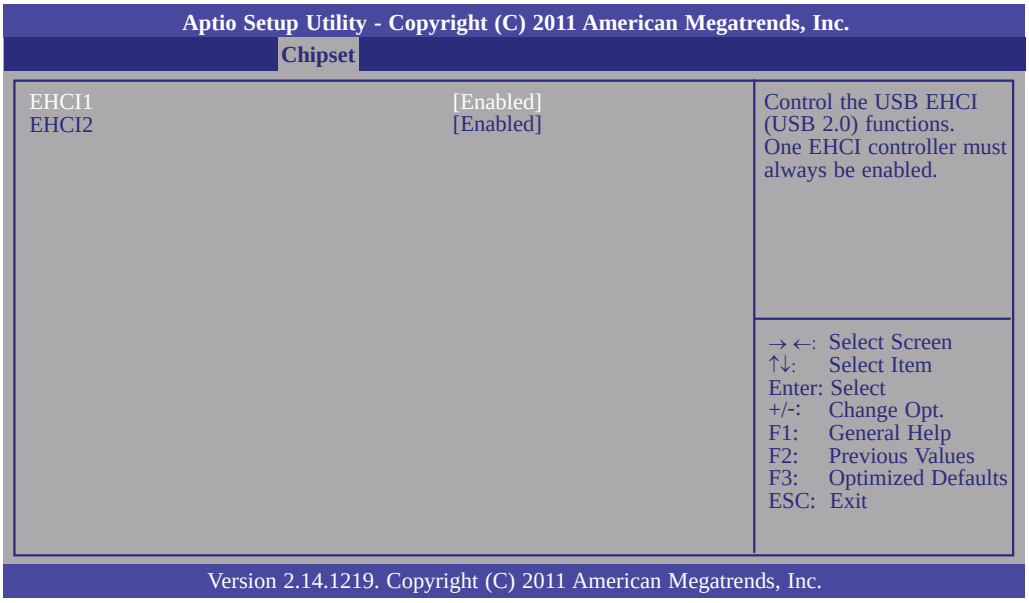
On

When power returns after an AC power failure, the system will automatically power-on.

Former-Sts

When power returns after an AC power failure, the system will return to the state where you left off before power failure occurs. If the system's power is off when AC power failure occurs, it will remain off when power returns. If the system's power is on when AC power failure occurs, the system will power-on when power returns.

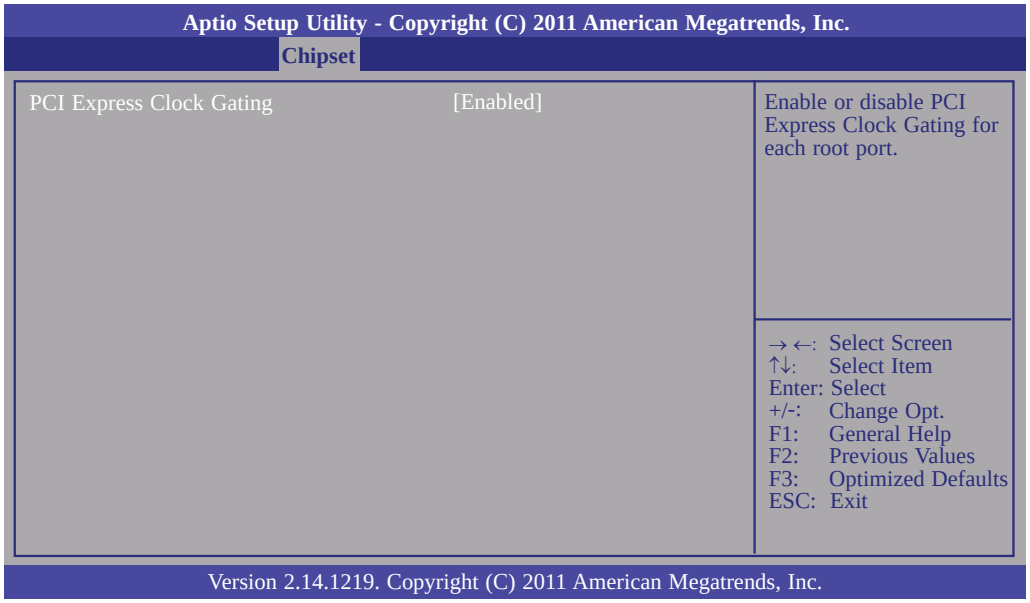
USB Configuration



EHCI1 and EHCI2

These fields are used to enable or disable USB 2.0.

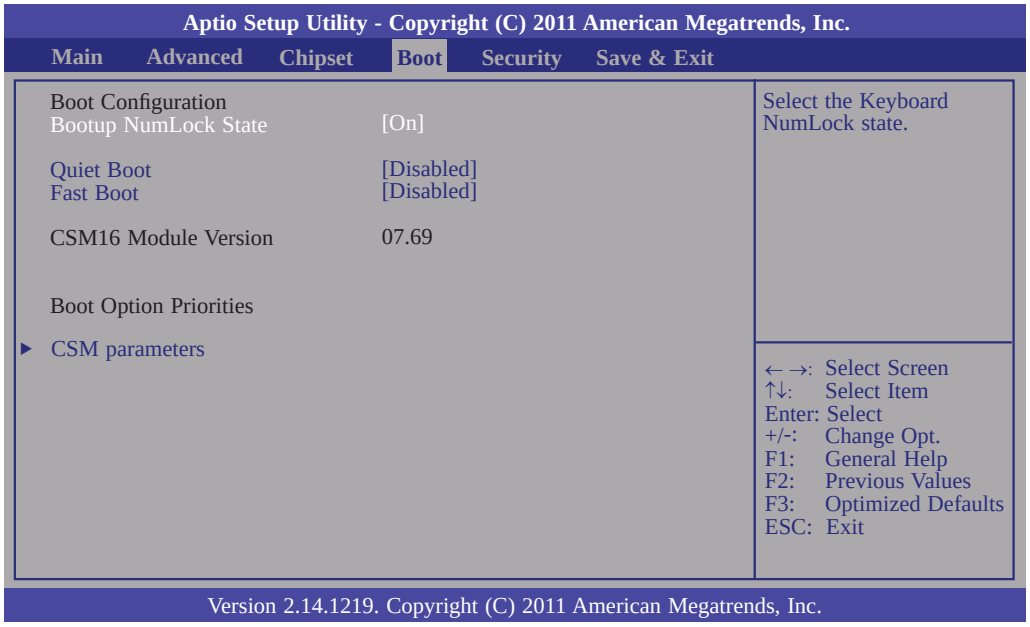
PCI Express Configuration



PCI Express Clock Gating

Enables or disables PCI Express Clock Gating for each root port.

Boot



Bootup NumLock State

This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

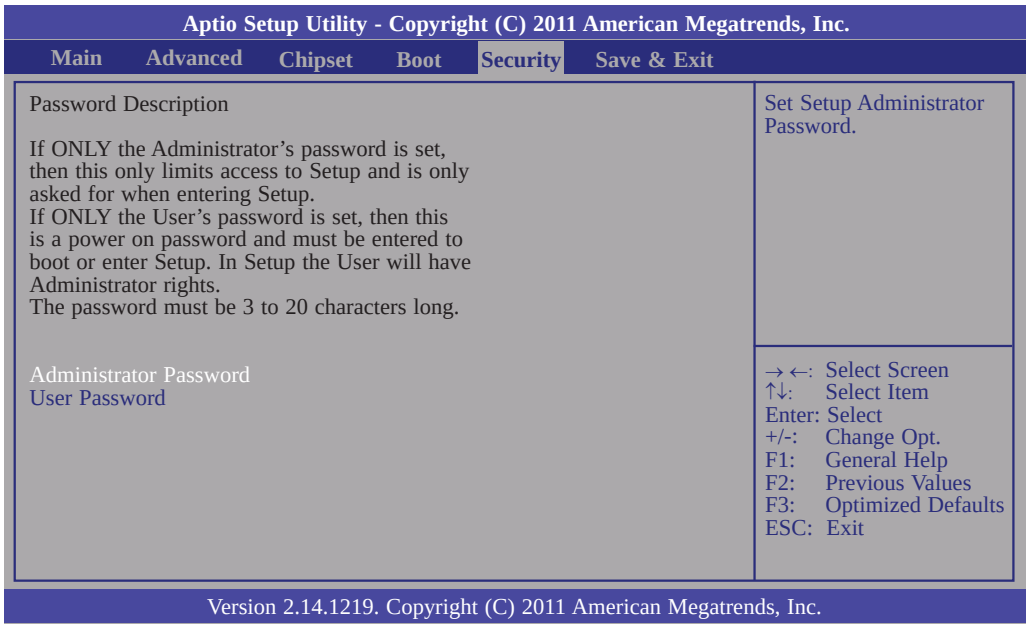
Quiet Boot

Enables or disables the quiet boot function.

Fast Boot

Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

Security



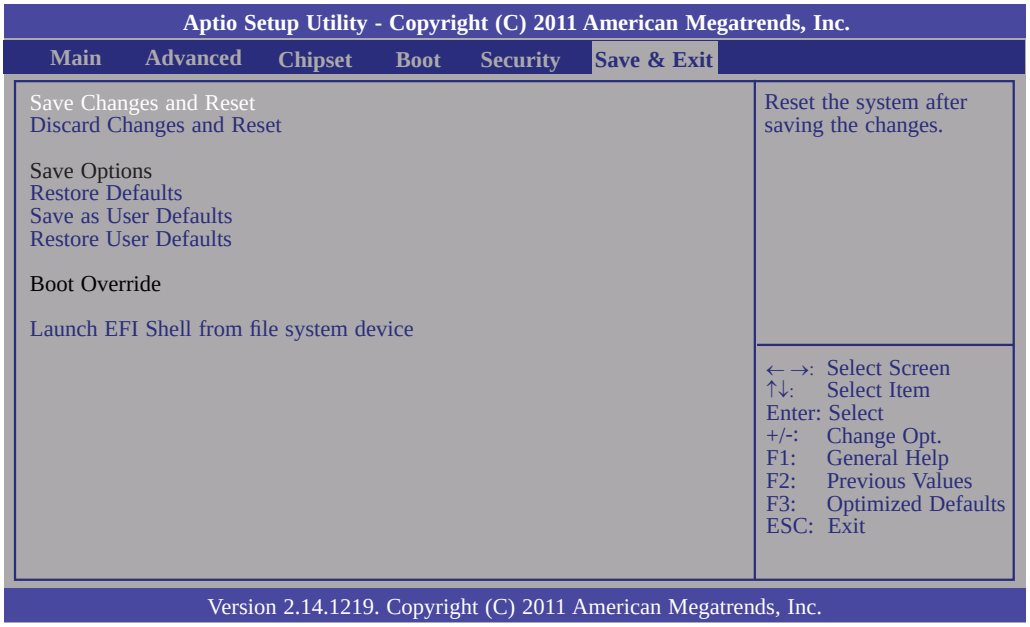
Administrator Password

Sets the administrator password.

User Password

Sets the user password.

Save & Exit



Save Changes and Reset

To save the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system after saving all changes made.

Discard Changes and Reset

To discard the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system setup without saving any changes.

Restore Defaults

To restore and load the optimized default values, select this field and then press <Enter>. A dialog box will appear. Select Yes to restore the default values of all the setup options.

Save as User Defaults

To save changes done so far as user default, select this field and then press <Enter>. A dialog box will appear. Select Yes to save values as user default.

Restore User Defaults

To restore user default to all the setup options, select this field and then press <Enter>. A dialog box will appear. Select Yes to restore user default.

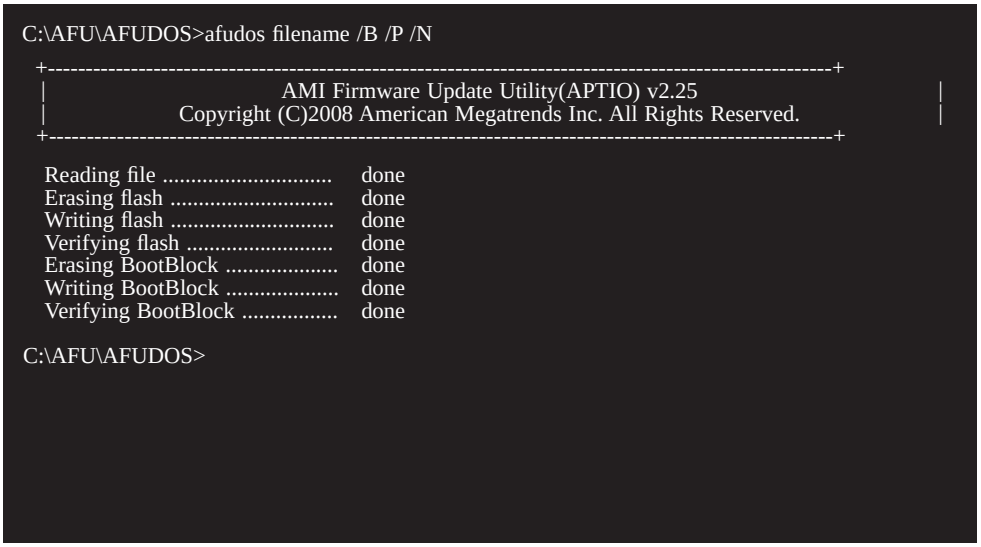
Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility, AFUDOS. EXE. Please contact technical support or your sales representative for the files.

To execute the utility, type:

A:> AFUDOS BIOS_File_Name /b /p /n

then press <Enter>.



After finishing BIOS update, please turn off the AC power. Wait about 10 seconds and then turn on the AC power again.

Notice: BIOS SPI ROM

1. The Intel® Management Engine has already been integrated into this system board. Due to the safety concerns, the BIOS (SPI ROM) chip cannot be removed from this system board and used on another system board of the same model.

2. The BIOS (SPI ROM) on this system board must be the original equipment from the factory and cannot be used to replace one which has been utilized on other system boards.

3. If you do not follow the methods above, the Intel® Management Engine will not be updated and will cease to be effective.

Note:

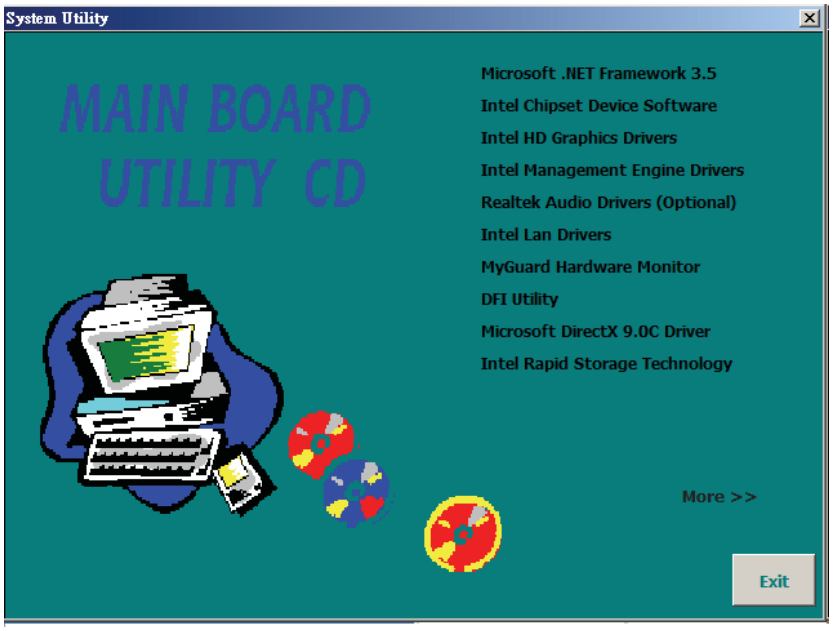
a. You can take advantage of flash tools to update the default configuration of the BIOS (SPI ROM) to the latest version anytime.

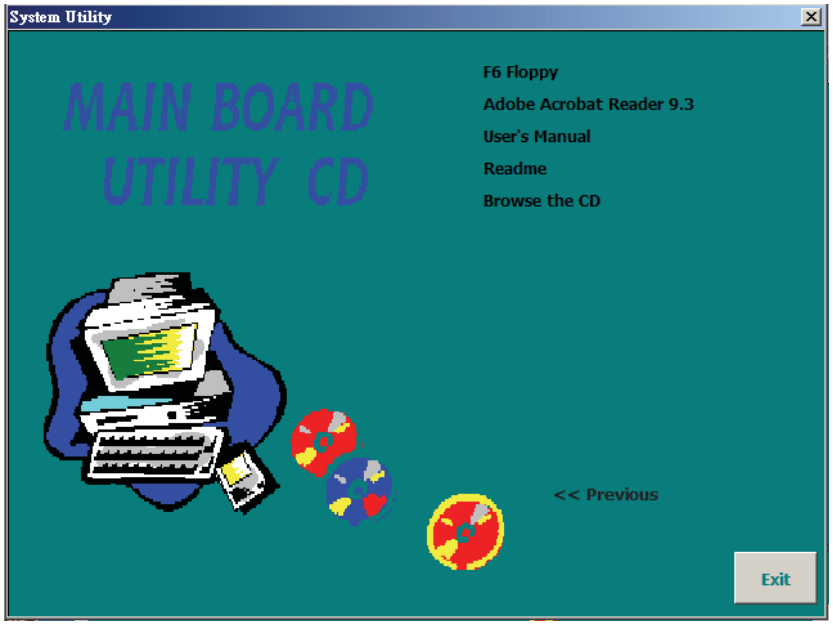
b. When the BIOS IC needs to be replaced, you have to populate it properly onto the system board after the EEPROM programmer has been burned and follow the technical person's instructions to confirm that the MAC address should be burned or not.

Chapter 4 - Supported Software

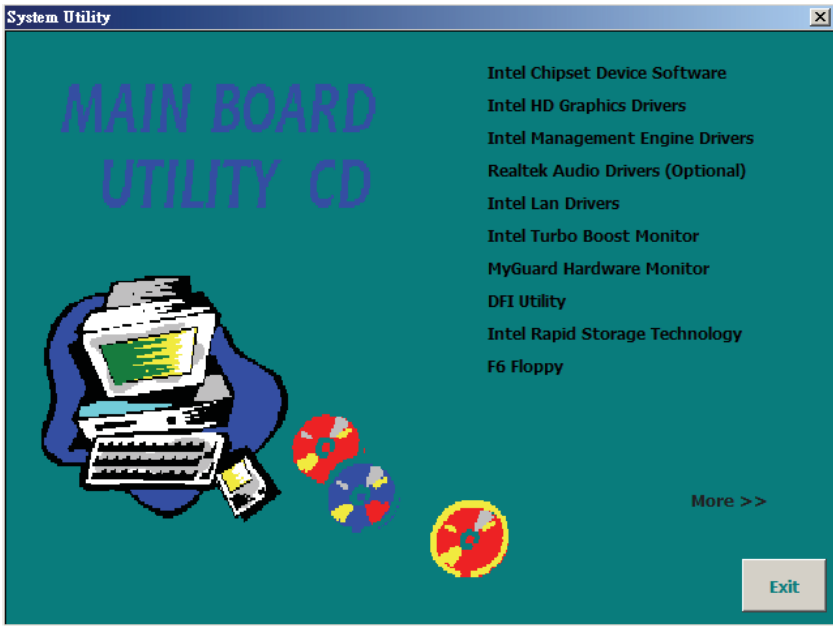
The CD that came with the system board contains drivers, utilities and software applications required to enhance the performance of the system board.

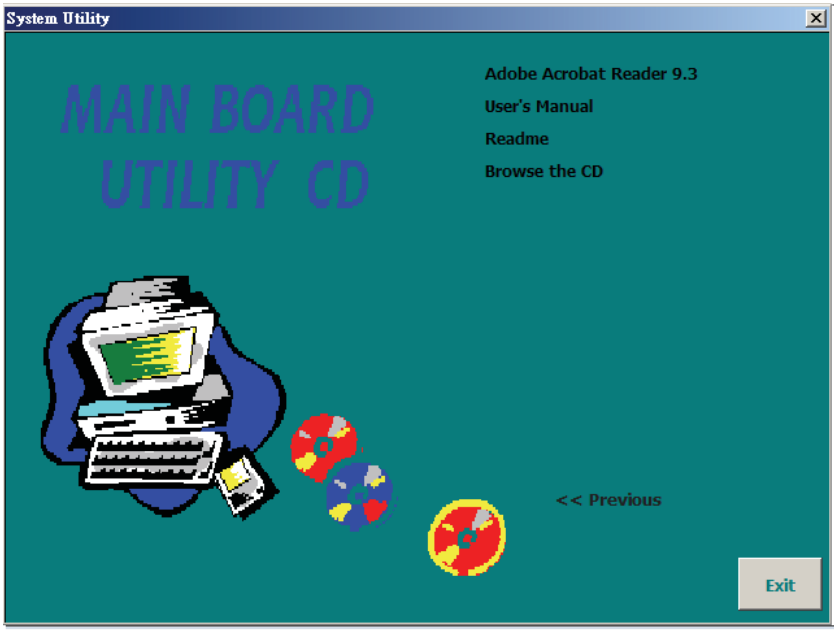
Insert the CD into a CD-ROM drive. The autorun screen (Mainboard Utility CD) will appear. If after inserting the CD, “Autorun” did not automatically start (which is, the Mainboard Utility CD screen did not appear), please go directly to the root directory of the CD and double-click “Setup”.



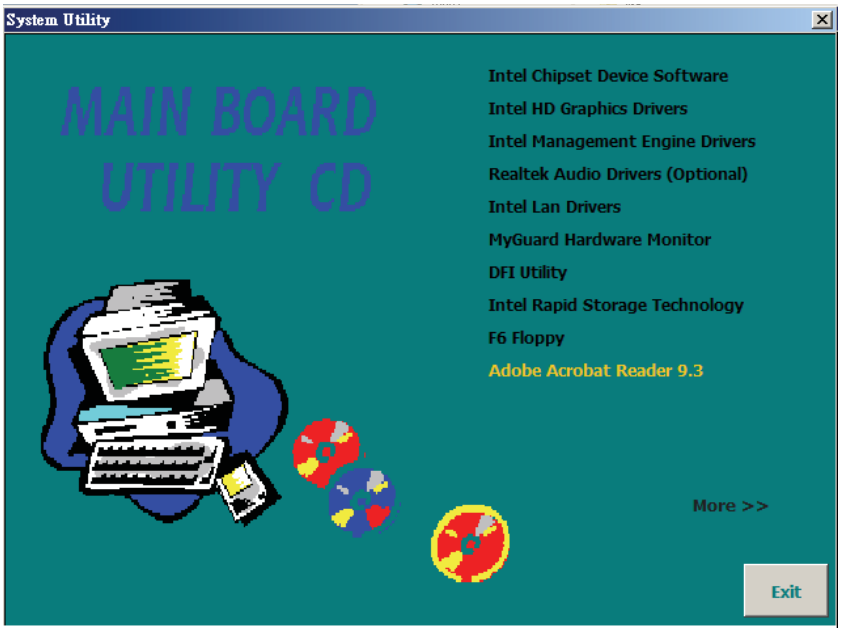


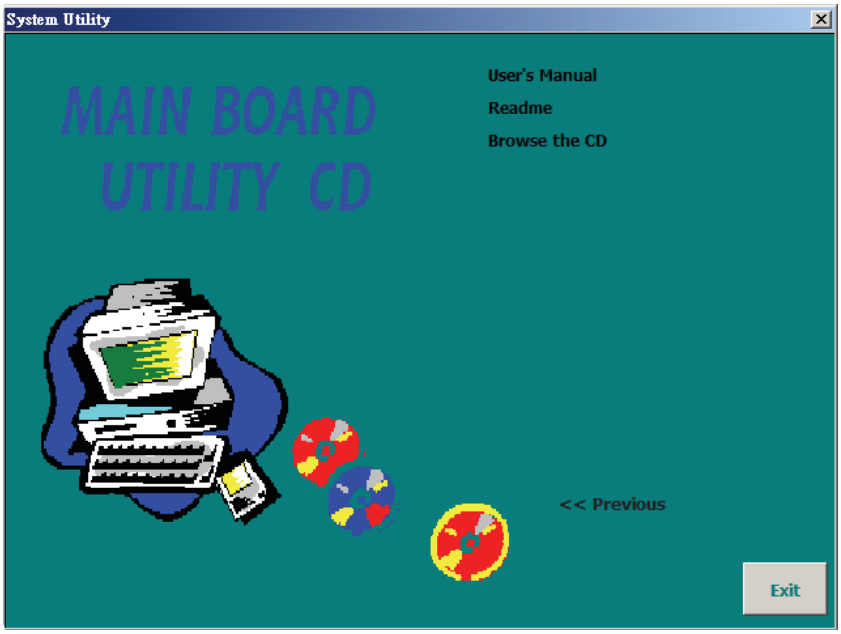
Auto Run Pages (for Windows 7)





Auto Run Pages (for Windows 8)





Microsoft .NET Framework 3.5 (for Windows XP only)

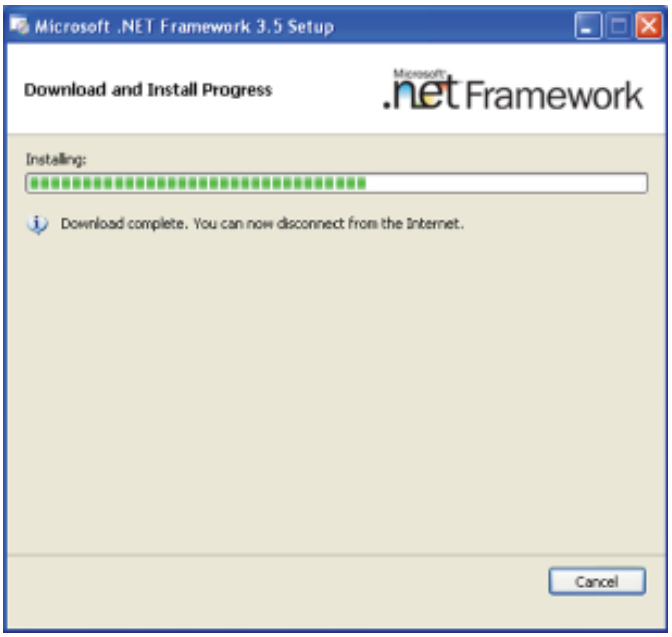
Note:
Before installing Microsoft .NET Framework 3.5 SP1, make sure you have updated your Windows XP operating system to Service Pack 3.

To install the driver, click “Microsoft .NET Framework 3.5 SP1” on the main menu.

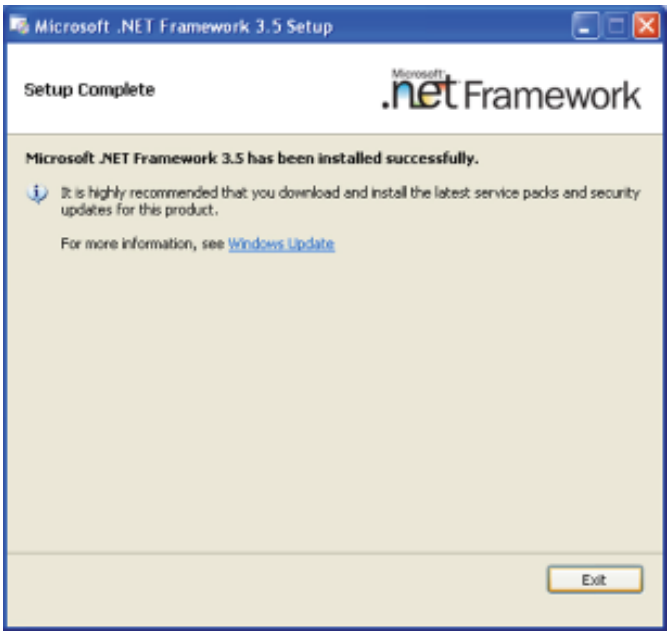
1. Read the license agreement carefully.

   Click “I have read and accept the terms of the License Agreement” then click Install.

2. Setup is now installing the driver.



3. Click Exit.


Microsoft .NET Framework 3.5 Setup
Setup Complete
Microsoft .NET Framework
Microsoft .NET Framework 3.5 has been installed successfully.
It is highly recommended that you download and install the latest service packs and security updates for this product.
For more information, see Windows Update
Exit

Intel Chipset Device Software

The Intel Chipset Device Software is used for updating Windows® INF files so that the Intel chipset can be recognized and configured properly in the system.

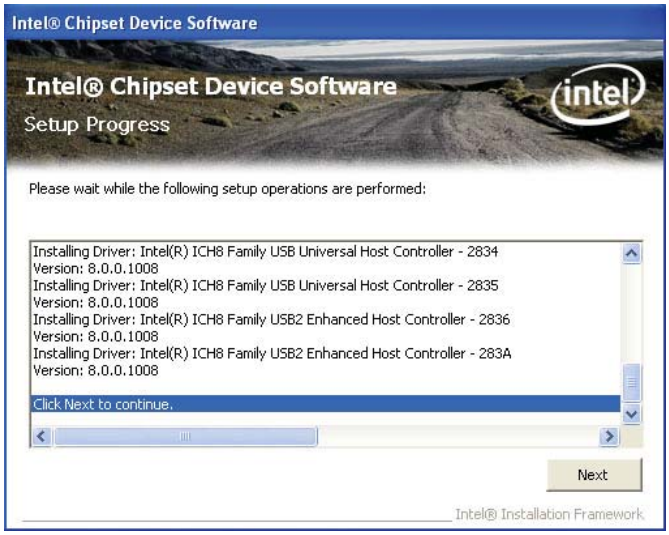
To install the utility, click “Intel Chipset Device Software” on the main menu.

1. Setup is ready to install the utility. Click Next.

2. Read the license agreement then click Yes.

3. Go through the readme document for more installation tips then click Next.

4. After all setup operations are done, click Next.



5. Click “Yes, I want to restart this computer now” then click Finish.

   Restarting the system will allow the new software installation to take effect.

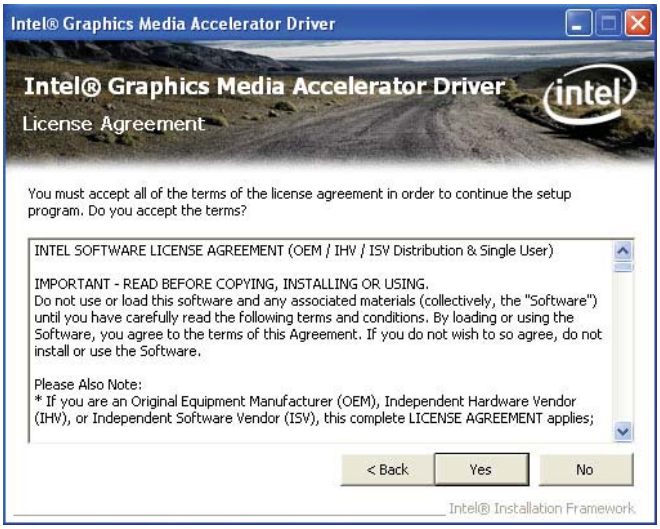
Intel HD Graphics Drivers

Note:
Before installing Intel HD Graphics Drivers, make sure you have installed Microsoft .NET Framework 3.5 SP1.

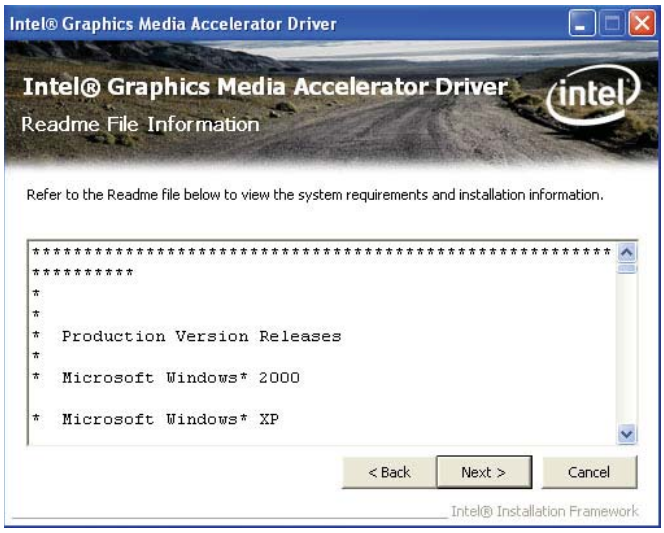
To install the driver, click “Intel HD Graphics Drivers” on the main menu.

1. Setup is ready to install the graphics driver. Click Next.

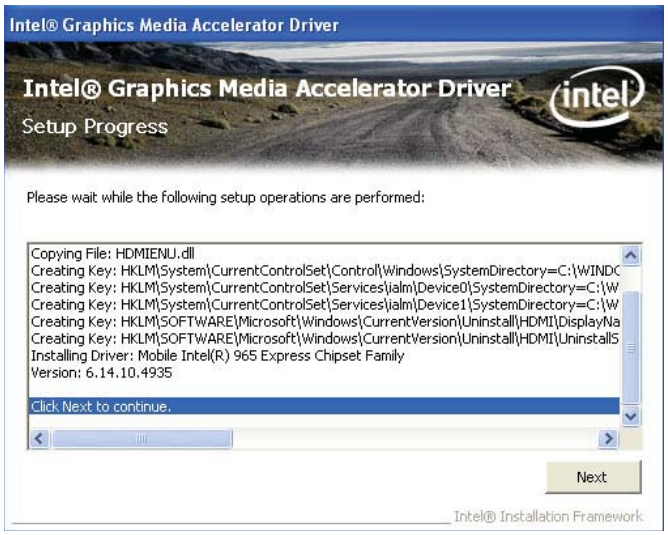
2. Read the license agreement then click Yes.



3. Go through the readme document for more installation tips then click Next.



4. Setup is currently installing the driver. After installation has completed, click Next.



5. Click “Yes, I want to restart this computer now.” then click Finish.

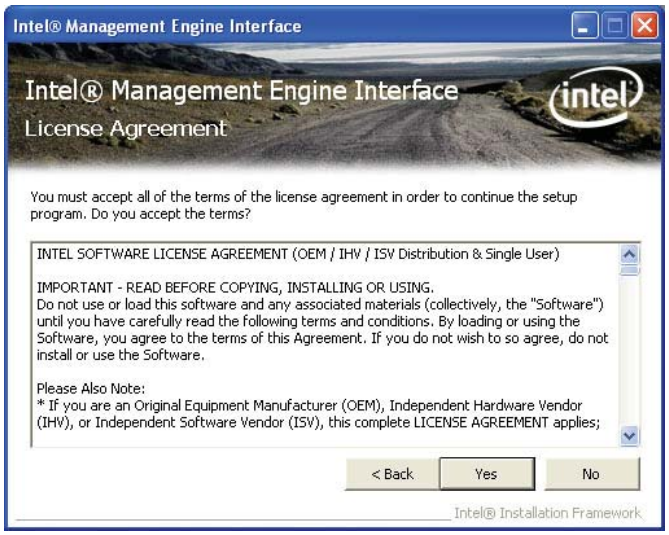
   Restarting the system will allow the new software installlation to take effect.

Intel Management Engine Drivers

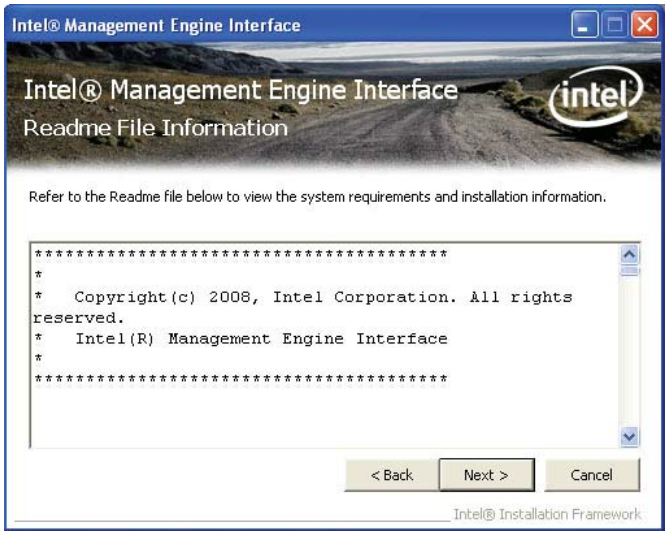
To install the driver, click “Intel Management Engine Drivers” on the main menu.

1. Setup is ready to install the driver. Click Next.

2. Read the license agreement then click Yes.



3. Go through the readme document for more installation tips then click Next.



4. Setup is currently installing the driver. After installation has completed, click Next.

5. After completing installation, click Finish.

Realtek Audio Drivers (Optional)

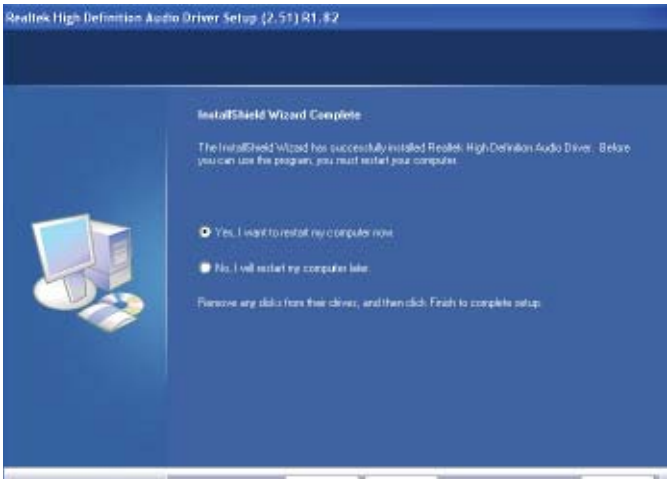
To install the driver, click “Realtek Audio Drivers” on the main menu.

1. Setup is now ready to install the audio driver. Click Next.

2. Follow the remainder of the steps on the screen; clicking “Next” each time you finish a step.

3. Click “Yes, I want to restart my computer now” then click Finish.

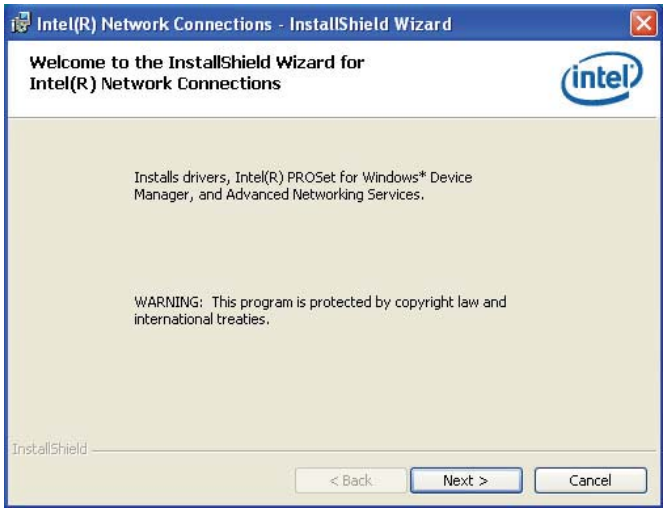
   Restarting the system will allow the new software installation to take effect.



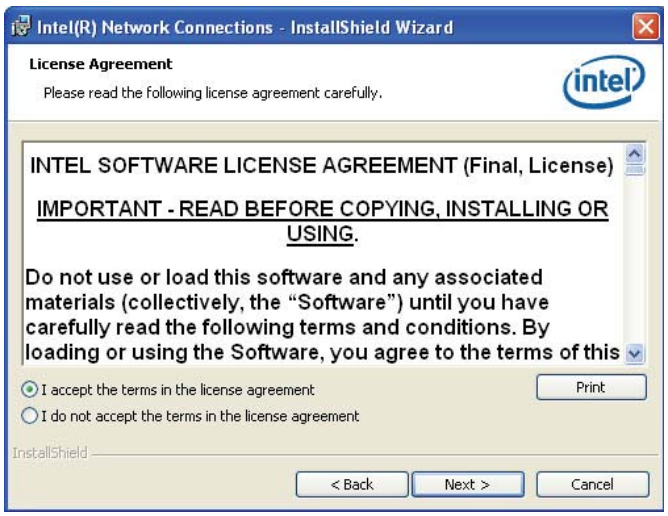
Intel LAN Drivers

To install the driver, click “Intel LAN Drivers” on the main menu.

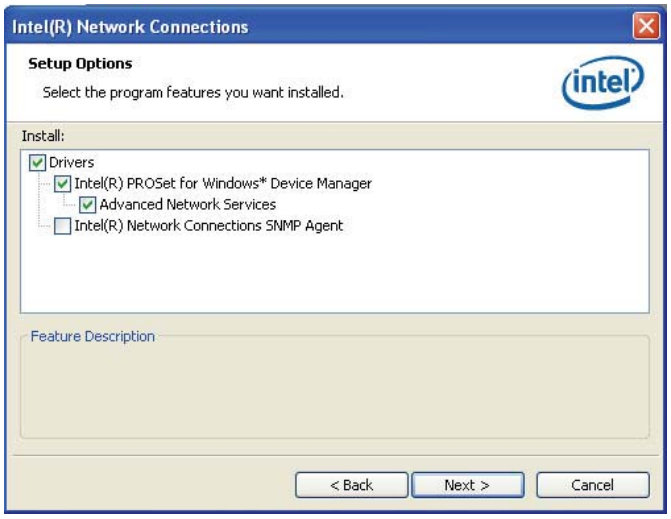
1. Setup is ready to install the driver. Click Next.



2. Click “I accept the terms in the license agreement” then click “Next”.

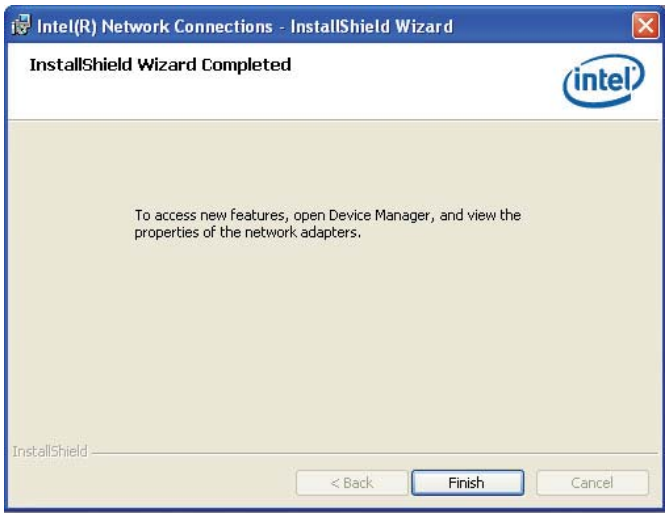


3. Select the program featuers you want installed then click Next.



4. Click Install to begin the installation.

5. After completing installation, click Finish.



Intel Turbo Boost Monitor (for Windows 7 only)

To install the driver, click “Intel Turbo Boost Monitor” on the main menu.

1. The setup program is configuring the new software installation.

2. Click Next.

3. Read the license agreement and then click “I accept the terms in the license agreement”. Click Next.

MyGuard Hardware Monitor

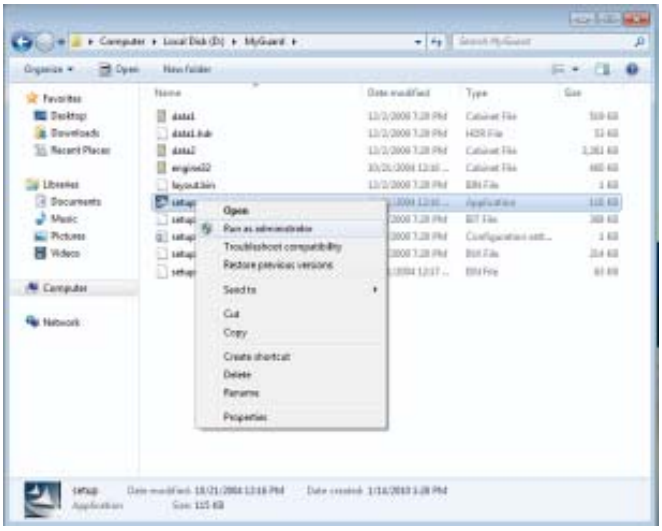
1. Locate for the MyGuard folder in the provided disc.

2. In the MyGuard folder, right-click on the “setup” file.

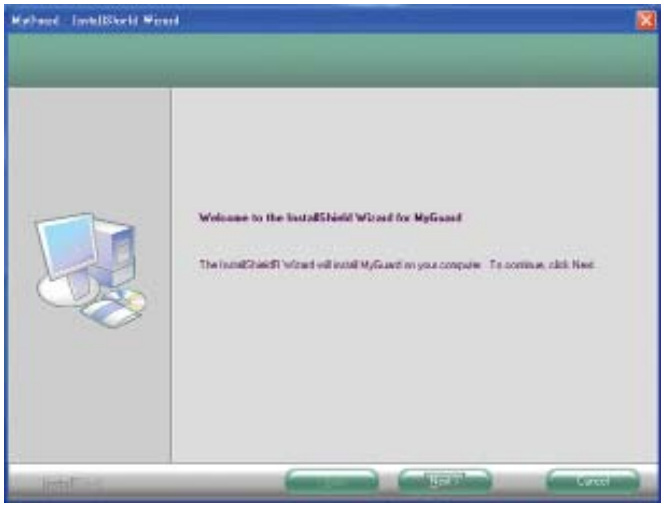
3. Select Run As Administrator.

4. Double-click Setup.

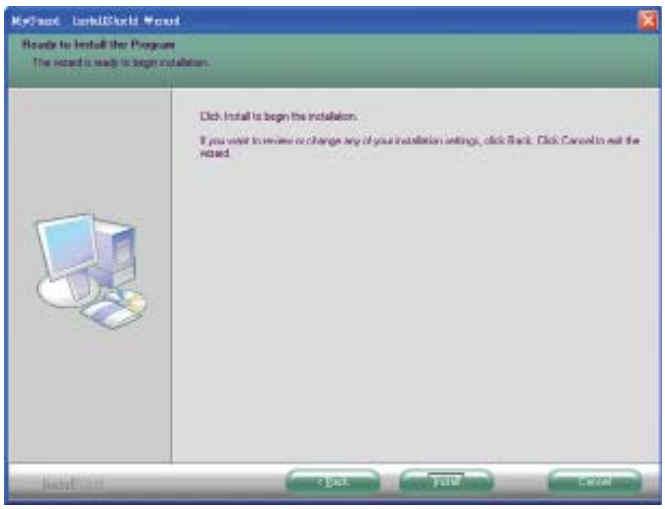
Important:
Perform steps 1-3 only when using Windows 7 or Windows Vista.



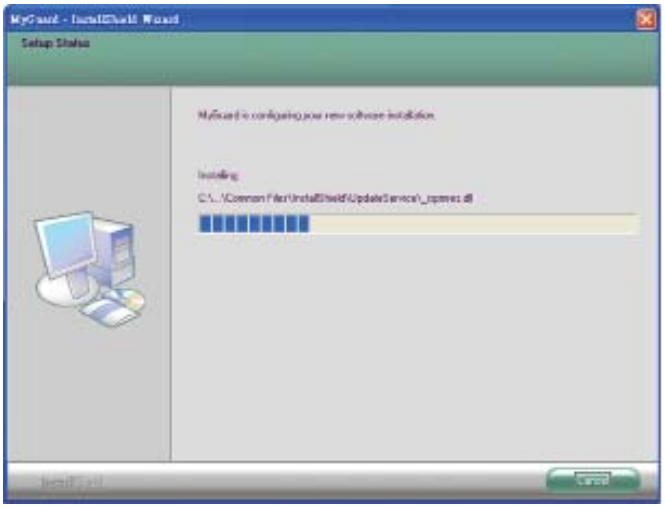
5. Setup is ready to install the utility. Click Next.



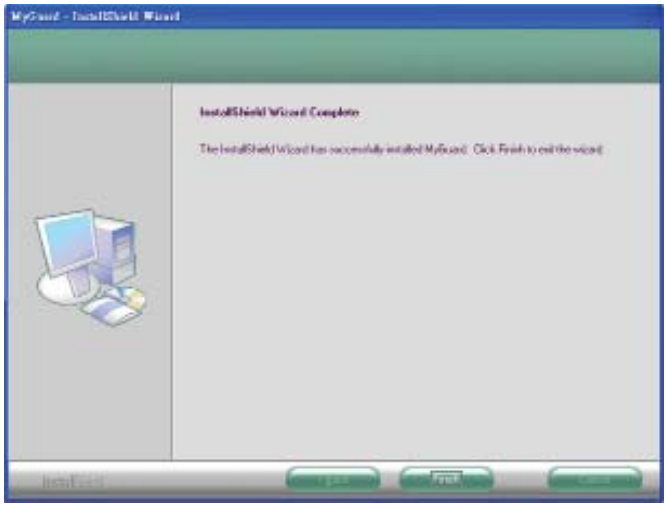
6. Click Install to begin installation.



7. Setup is currently installing the utility.

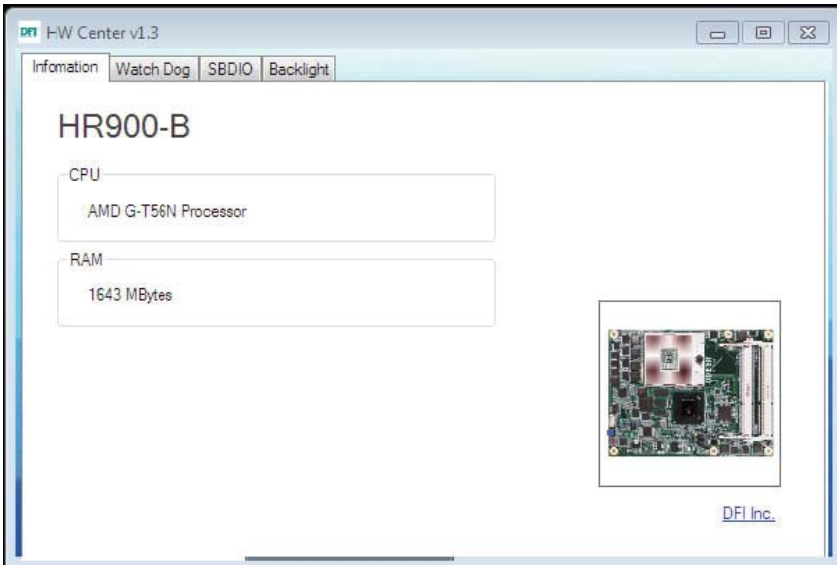


8. After completing installation, click Finish to exit setup.



DFI Utility

Click “DFI Utility” on the main menu, it provides Board Information, Watchdog, SBDIO and Backlight information.

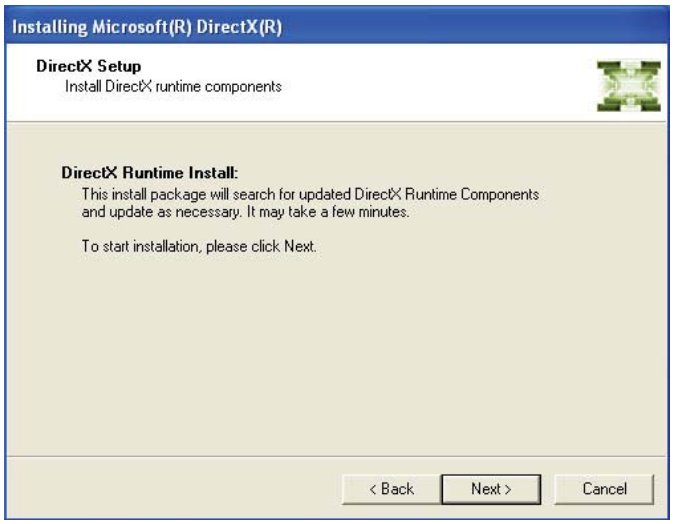


Microsoft DirectX 9.0C Driver (for Windows XP only)

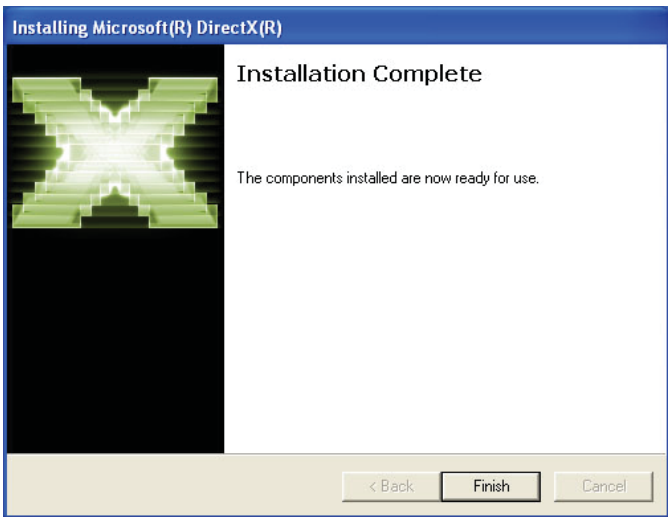
To install the driver, click “Microsoft DirectX 9.0C Driver” on the main menu.

1. Click “I accept the agreement” then click Next.

2. To start installation, click Next.



3. Click Finish. Reboot the system for DirectX to take effect.



Intel Rapid Storage Technology

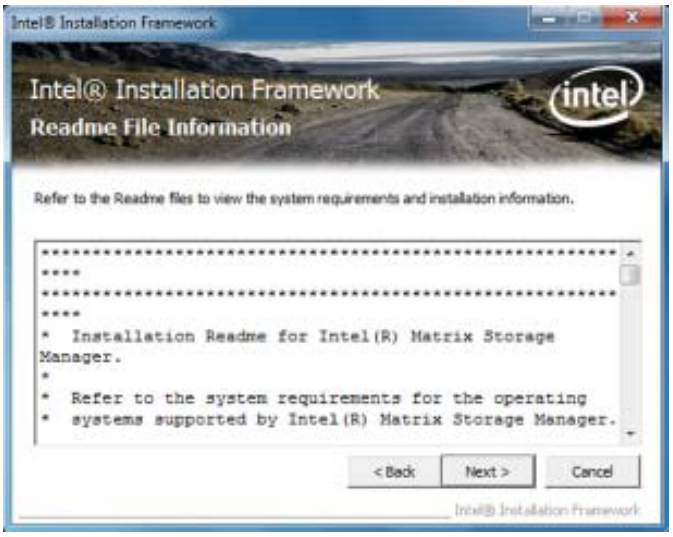
The Intel Rapid Storage Technology is a utility that allows you to monitor the current status of the SATA drives. It enables enhanced performance and power management for the storage subsystem.

To install the driver, click “Intel Rapid Storage Technology” on the main menu.

1. Setup is now ready to install the utility. Click Next.

2. Read the license agreement then click Yes.

3. Go through the readme document for system requirements and installation tips then click Next.

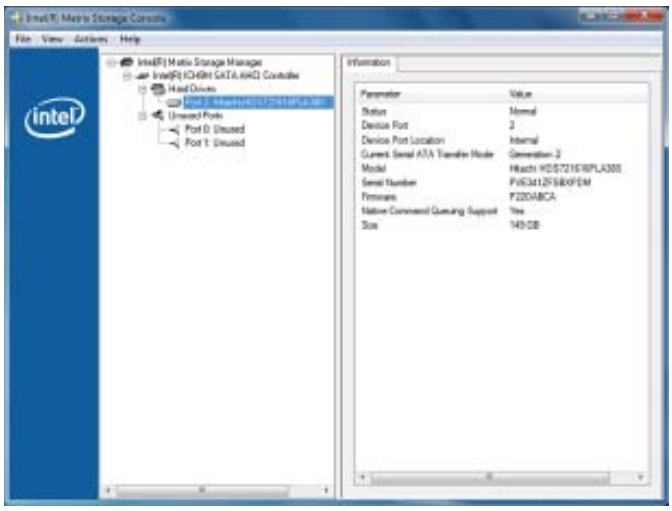


4. Setup is now installing the utility. Click Next to continue.

5. Click “Yes, I want to restart my computer now” then click Finish.

   Restarting the system will allow the new software installation to take effect.

6. Run the Intel Matrix Storage Console utility to view the hard drives' configuration.



F6 Floppy

This is used to create a floppy driver diskette needed when you install Windows® XP using the F6 installation method. This will allow you to install the operating system onto a hard drive when in AHCI mode.

1. Insert a blank floppy diskette.

2. Locate for the drivers in the CD then copy them to the floppy diskette. The CD includes drivers for both 32-bit and 64-bit operating systems. The path to the drivers are shown below.

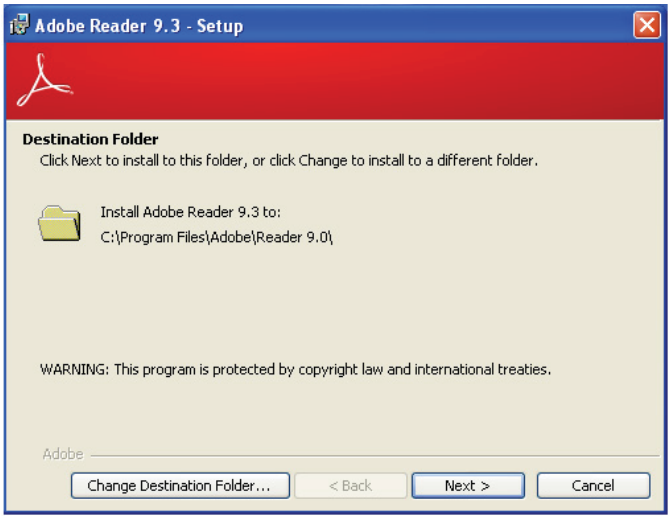
   32-bit
   CD Drive:\AHCI_RAID\F6FLOPPY\f6flpy32

   64-bit
   CD Drive:\AHCI_RAID\F6FLOPPY\f6flpy64

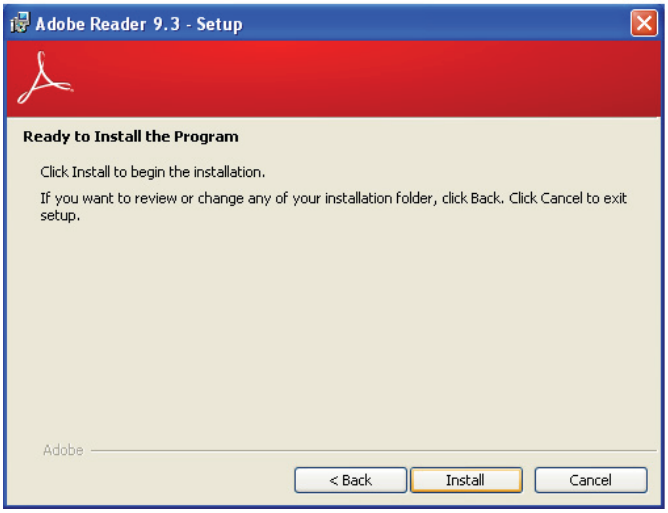
Adobe Acrobat Reader 9.3

To install the reader, click “Adobe Acrobat Reader 9.3” on the main menu.

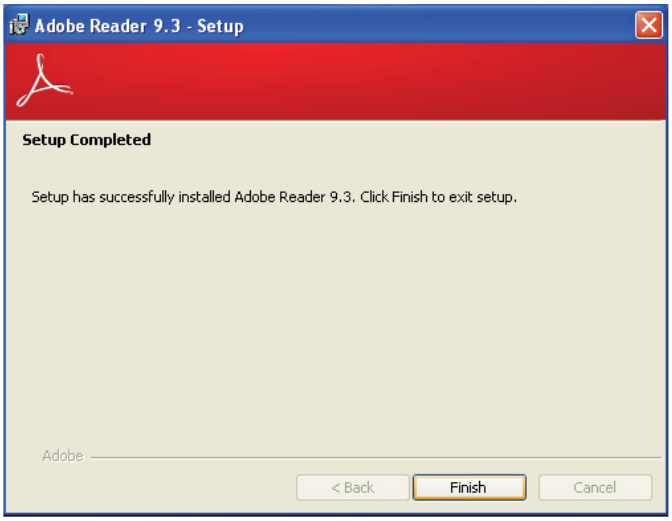
1. Click Next to install or click Change Destination Folder to select another folder.



2. Click Install to begin installation.



3. Click Finish to exit installation.



Appendix A - NLITE and AHCI Installation Guide

nLite

nLite is an application program that allows you to customize your XP installation disc by integrating the RAID/AHCI drivers into the disc. By using nLite, the F6 function key usually required during installation is no longer needed.

Note:
The installation steps below are based on nLite version 1.4.9. Installation procedures may slightly vary if you're using another version of the program.

1. Download the program from nLite's offical website.

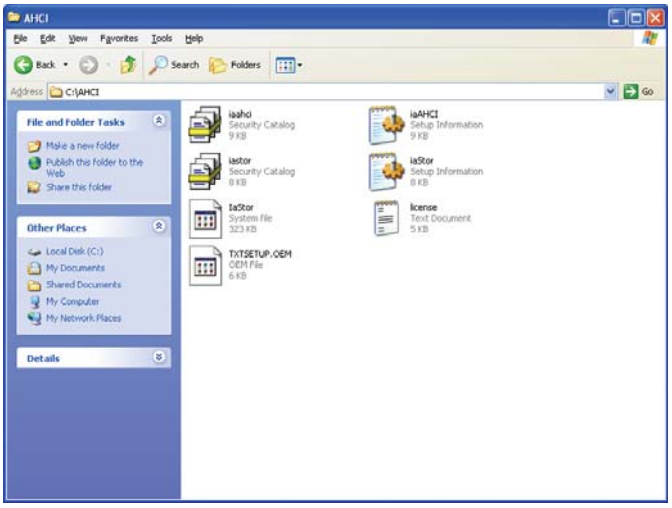
   http://www.nliteos.com/download.html

2. Install nLite.

   Important:
   Due to it's coding with Visual.Net, you may need to first install .NET Framework prior to installing nLite.

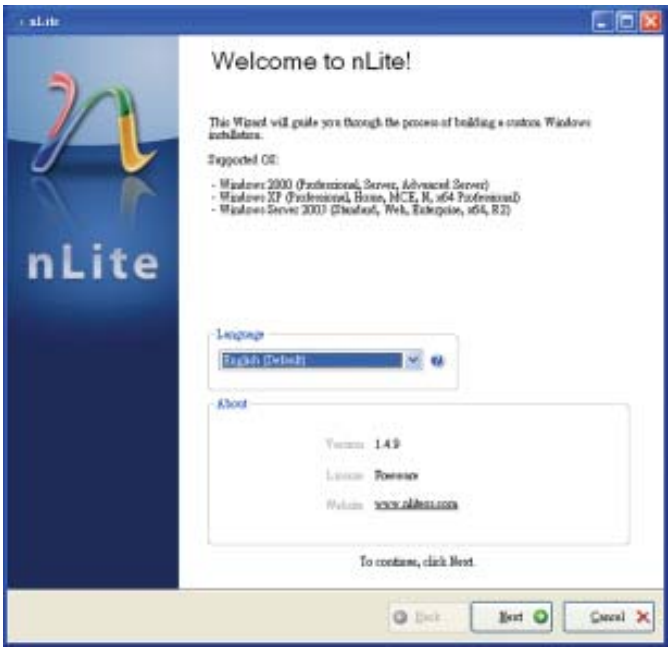
3. Download relevant RAID/AHCI driver files from Intel's website. The drivers you choose will depend on the operating system and chipset used by your computer.

   The downloaded driver files should include iaahci.cat, iaAHCI.inf, iastor.cat, iaStor.inf, IaStor.sys, license.txt and TXTSETUP.OEM.



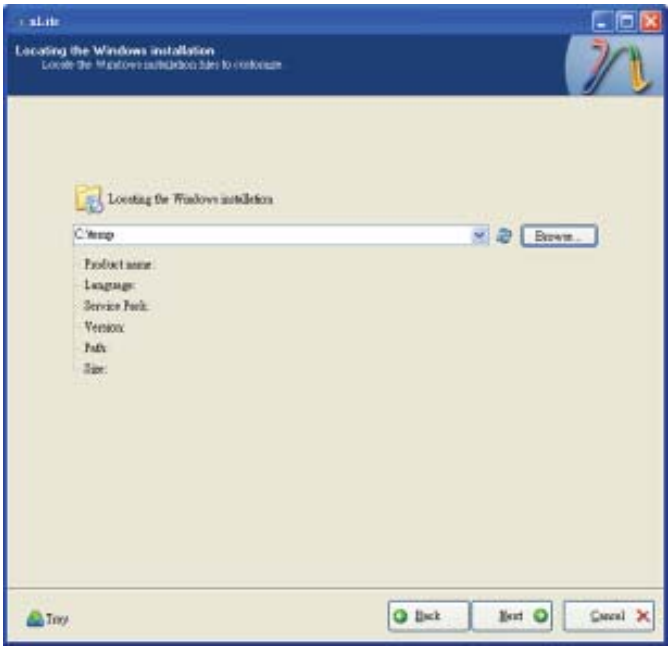
4. Insert the XP installation disc into an optical drive.

5. Launch nLite. The Welcome screen will appear. Click **Next**.

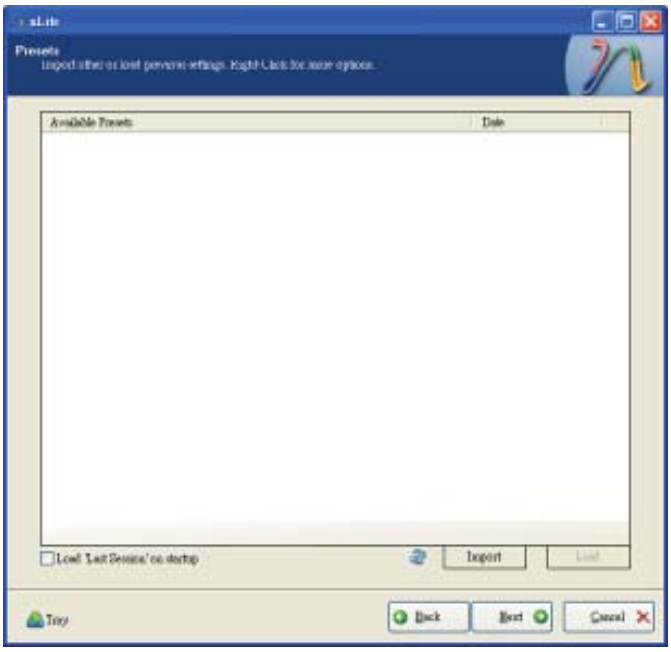


6. Click **Next** to temporarily save the Windows installation files to the designated default folder.

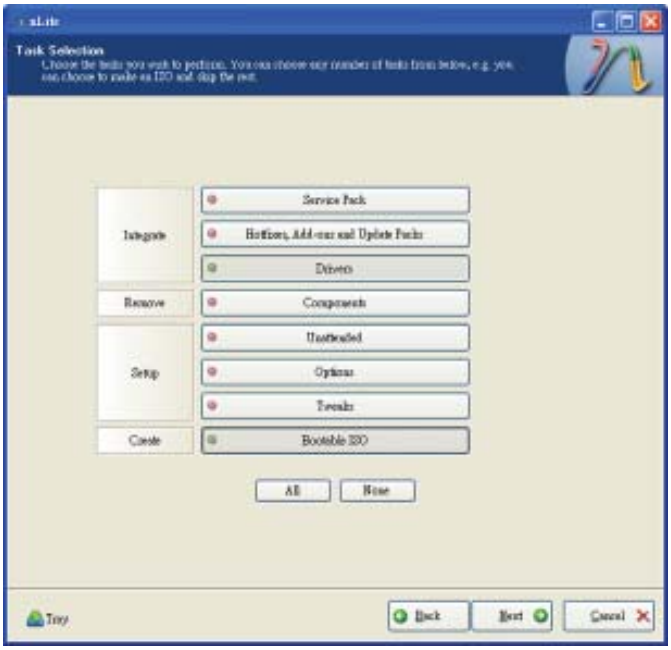
   If you want to save them in another folder, click **Browse**, select the folder and then click **Next**.



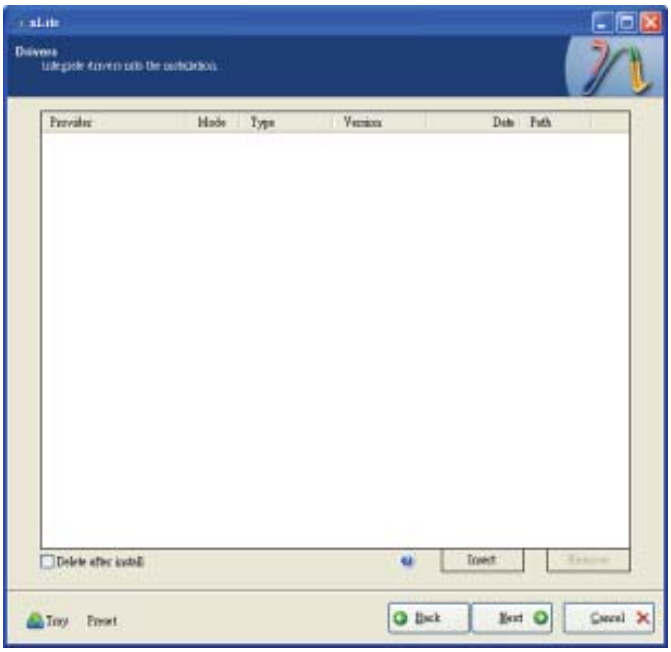
7. Click **Next**.



8. In the Task Selection dialog box, click **Drivers** and **Bootable ISO**. Click **Next**.



9. Click **Insert** and then select **Multiple driver folder** to select the drivers you will integrate. Click **Next**.

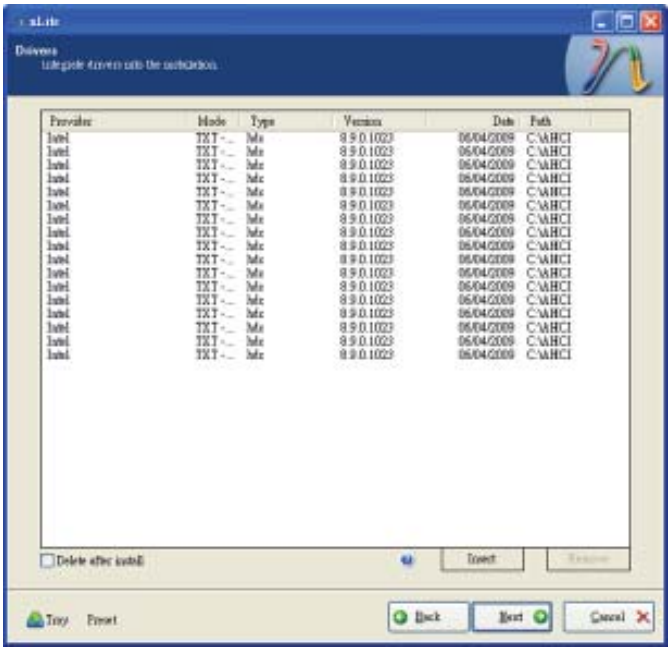


10. Select only the drivers appropriate for the Windows version that you are using and then click **OK**.

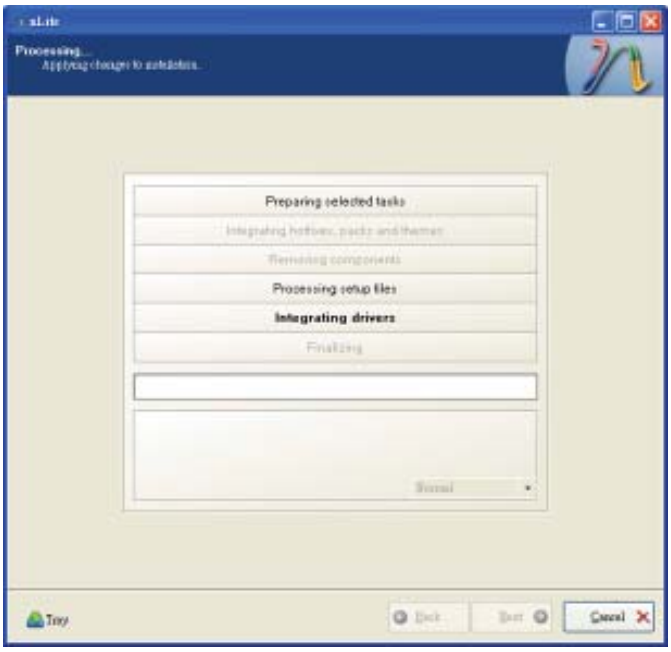
    Integrating 64-bit drivers into 32-bit Windows or vice versa will cause file load errors and failed installation.

11. If you are uncertain of the southbridge chip used on your motherboard, select all RAID/AHCI controllers and then click **OK**.

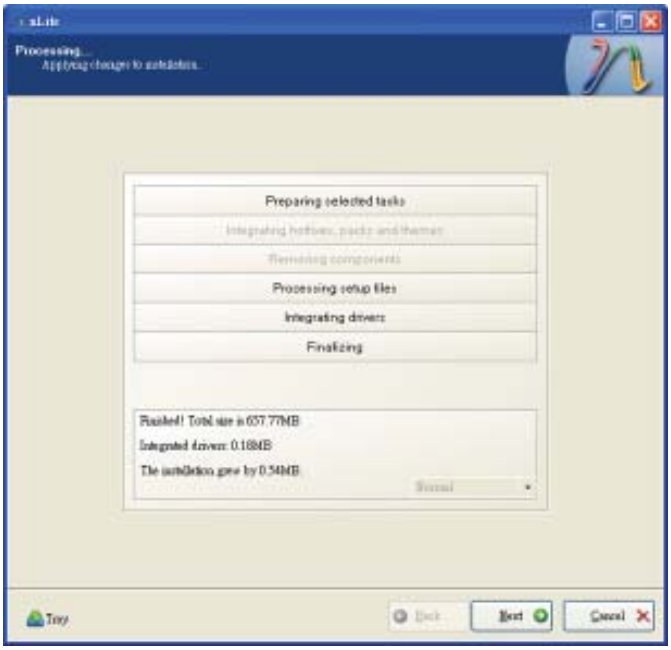
12. Click **Next**.



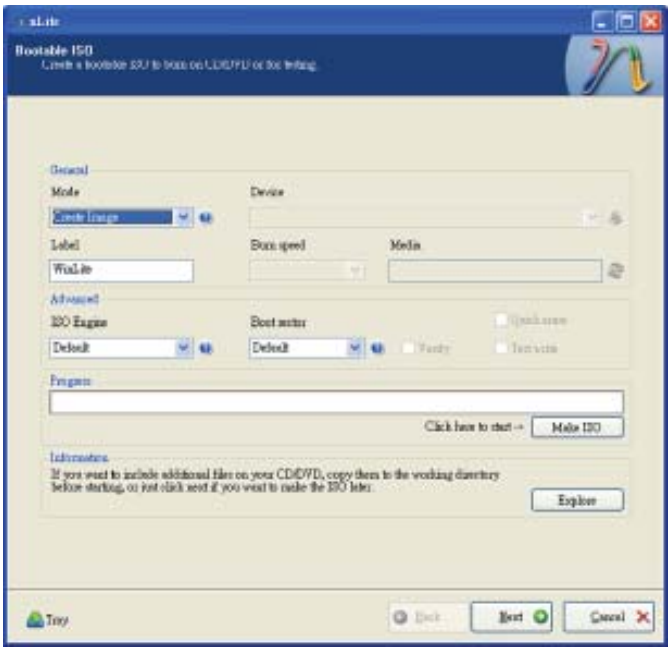
13. The program is currently integrating the drivers and applying changes to the installation.



14. When the program is finished applying the changes, click **Next**.

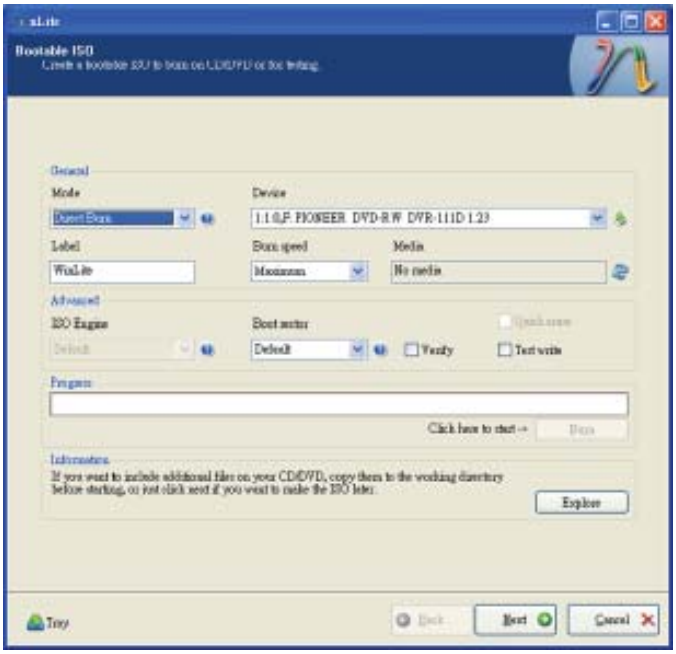


15. To create an image, select the **Create Image** mode under the General section and then click **Next**.



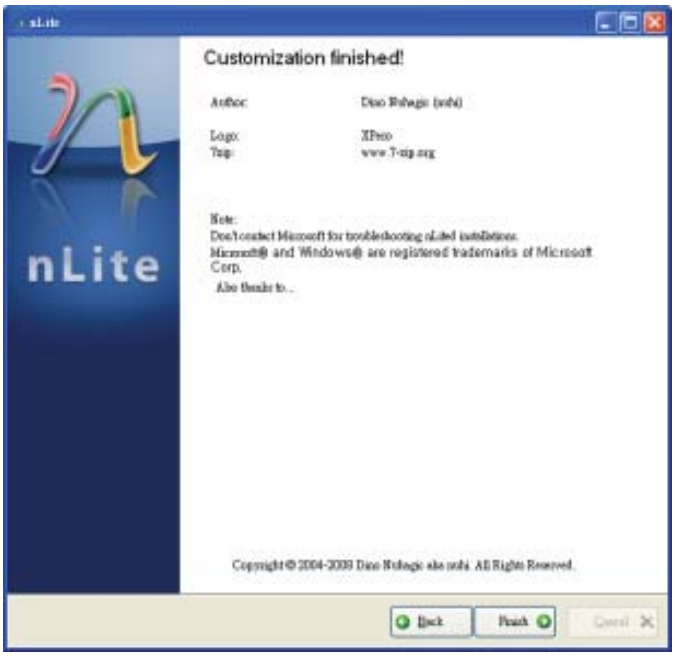
16. Or you can choose to burn it directly to a disc by selecting the **Direct Burn** mode under the General section.

    Select the optical device and all other necessary settings and then click **Next**.



17. You have finished customizing the Windows XP installation disc. Click **Finish**.

    Enter the BIOS utility to configure the SATA controller to RAID/AHCI. You can now install Windows XP.



AHCI

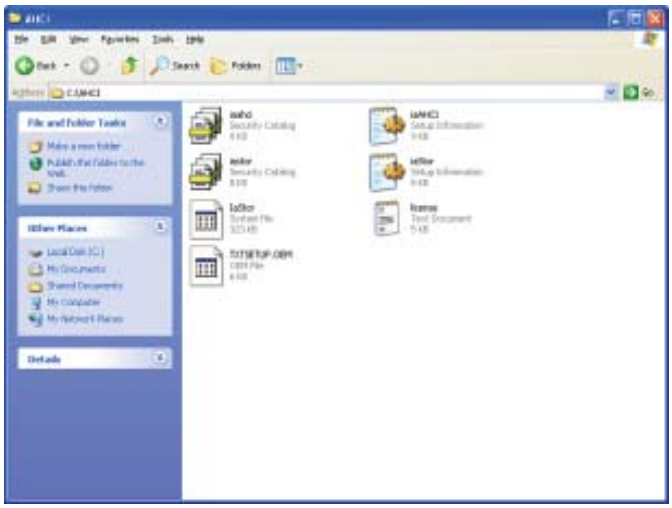
The installation steps below will guide you in configuring your SATA drive to AHCI mode.

1. Enter the BIOS utility and configure the SATA controller to IDE mode.

2. Install Windows XP but do not press F6.

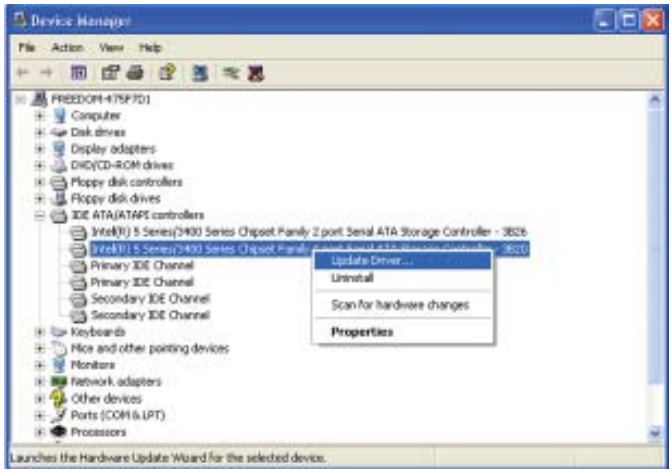
3. Download relevant RAID/AHCI driver files supported by the motherboard chipset from Intel's website.

   Transfer the downloaded driver files to C:\AHCI.



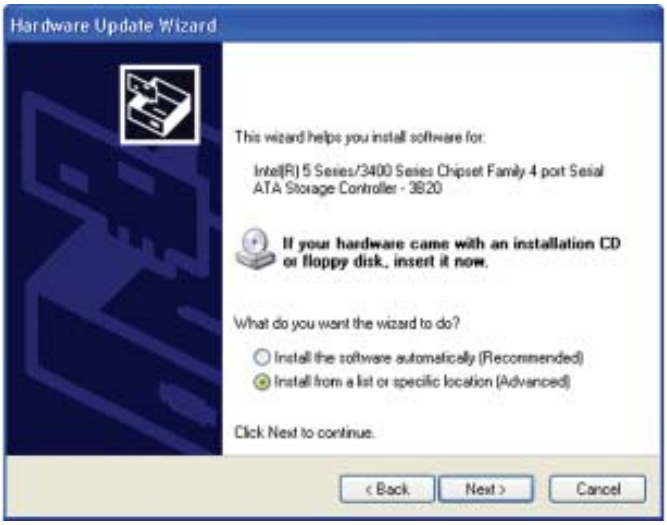
4. Open Device Manager and right click on one of the Intel Serial ATA Storage Controllers, then select **Update Driver**.

   If the controller you selected did not work, try selecting another one.

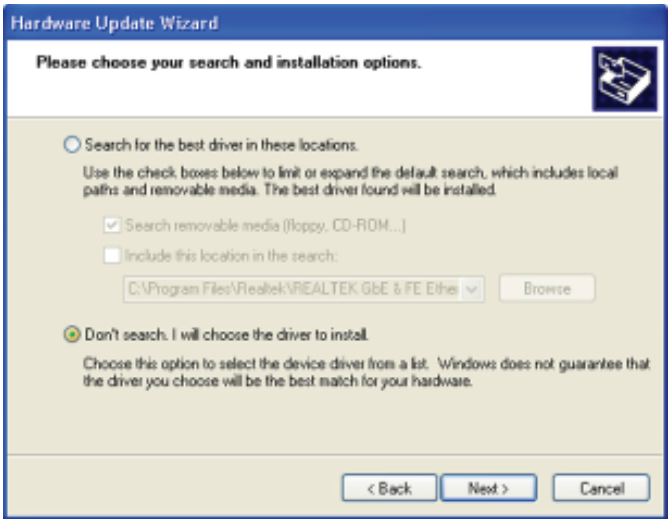


5. In the Hardware Update Wizard dialog box, select **"No, not this time"** then click **Next**.

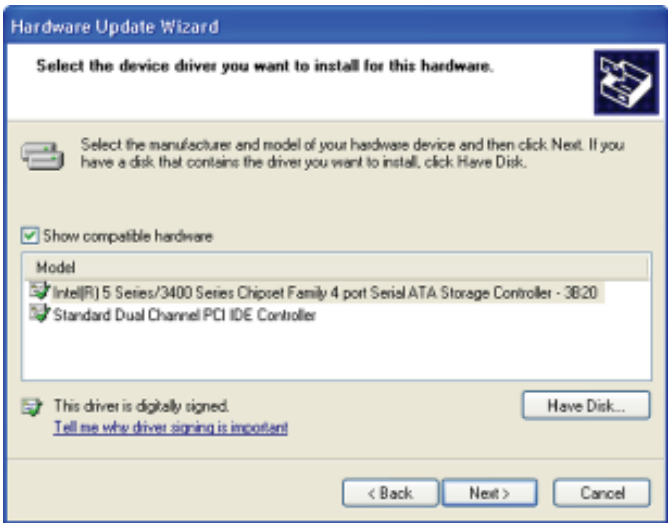
6. Select **"Install from a list or specific location (Advanced)"** and then click **Next**.



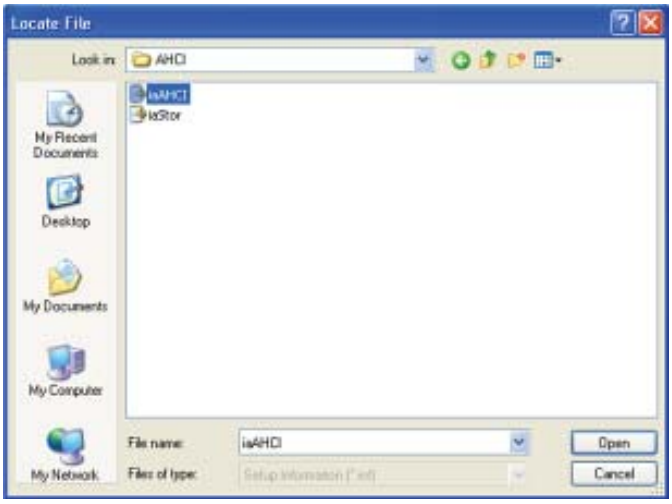
7. Select **"Don't search. I will choose the driver to install"** and then click **Next**.



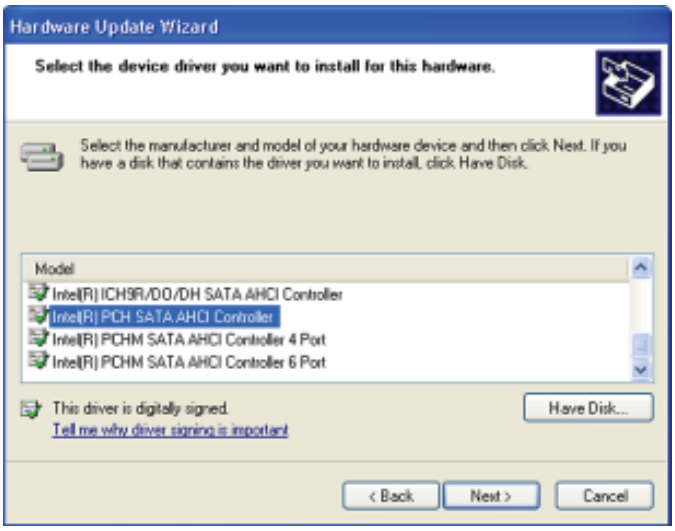
8. Click **"Have Disk"**.



9. Select C:\AHCI\iaAHCI.inf and then click **Open**.



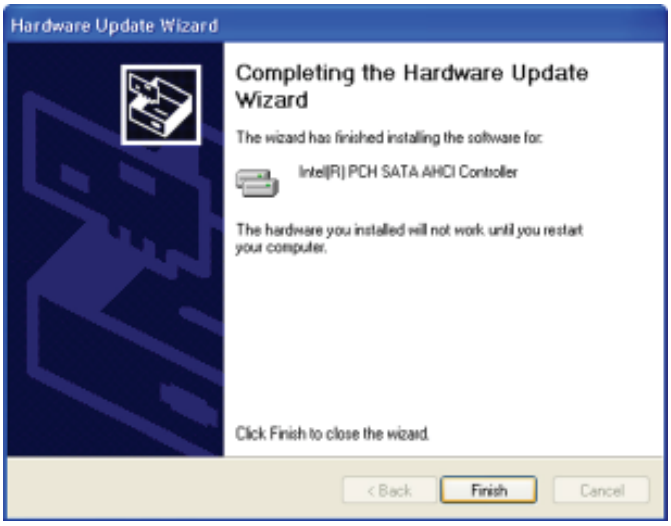
10. Select the appropriate AHCI Controller of your hardware device and then click **Next**.



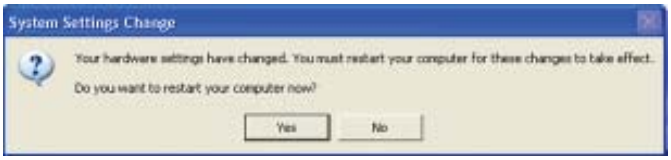
11. A warning message appeared because the selected SATA controller did not match your hardware device.

    Ignore the warning and click **Yes** to proceed.

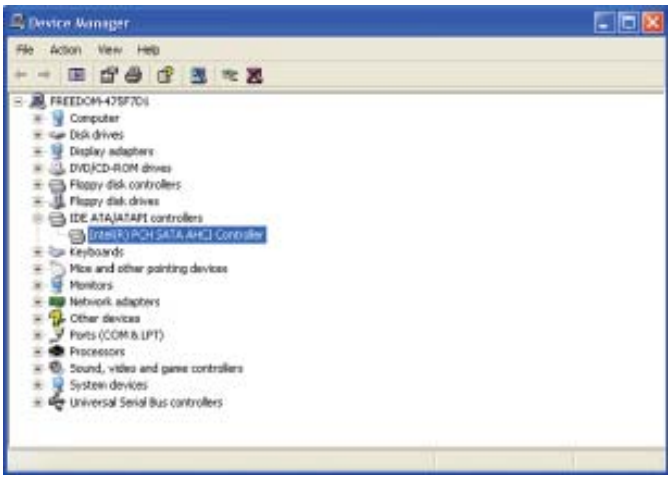
12. Click **Finish**.



13. The system's settings have been changed. Windows XP requires that you restart the computer. Click **Yes**.



14. Enter the BIOS utility and modify the SATA controller from IDE to AHCI. By doing so, Windows will work normally with the SATA controller that is in AHCI mode.



Appendix B - Watchdog Sample Code

```
;Software programming example:

;--------------------------------------------
;(1) Enter Super IO Configuration mode
;--------------------------------------------
MOV         DX,2EH
MOV         AL,87H
OUT         DX,AL
OUT         DX,AL

;-----------------------------------------------------------------------------------------
;(2) Configuration Logical Device 7, register CRF5/CRF6 (WDT Control /WDT
timer)
;-----------------------------------------------------------------------------------------
MOV         DX,2EH
MOV         AL,07H              ;Ready to Program Logical Device
OUT         DX,AL

MOV         DX,2FH
MOV         AL,07H              ;Select Logical Device 7
OUT         DX,AL

MOV         DX,2EH
MOV         AL, F6H             ;Select watchdog timer register
OUT         DX,AL

MOV         DX,2FH
MOV         AL,10H              ;Set watchdog timer value
OUT         DX,AL

MOV         DX,2EH
MOV         AL, F5H             ;Select watchdog Control Register
OUT         DX,AL

MOV         DX,2FH
MOV         AL,61H              ;Set Watchdog Control Value
OUT         DX,AL

;-------------------------------------------------------------
;(1) Exit extended function mode
;-------------------------------------------------------------
MOV          DX,2EH
MOV          AL,AAH
OUT           DX,AL
```

Appendix C - System Error Message

When the BIOS encounters an error that requires the user to correct something, either a beep code will sound or a message will be displayed in a box in the middle of the screen and the message, PRESS F1 TO CONTINUE, CTRL-ALT-ESC or DEL TO ENTER SETUP, will be shown in the information box at the bottom. Enter Setup to correct the error.

Error Messages

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list indicates the error messages for all Awards BIOSes:

CMOS BATTERY HAS FAILED

The CMOS battery is no longer functional. It should be replaced.

Important
Danger of explosion if battery incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the battery manufacturer's instructions.

CMOS CHECKSUM ERROR

Checksum of CMOS is incorrect. This can indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.

DISPLAY SWITCH IS SET INCORRECTLY

The display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than indicated in Setup. Determine which setting is correct, either turn off the system and change the jumper or enter Setup and change the VIDEO selection.

Appendix D - Troubleshooting

Troubleshooting Checklist

This chapter of the manual is designed to help you with problems that you may encounter with your personal computer. To efficiently troubleshoot your system, treat each problem individually. This is to ensure an accurate diagnosis of the problem in case a problem has multiple causes.

Some of the most common things to check when you encounter problems while using your system are listed below.

1. The power switch of each peripheral device is turned on.

2. All cables and power cords are tightly connected.

3. The electrical outlet to which your peripheral devices are connected is working. Test the outlet by plugging in a lamp or other electrical device.

4. The monitor is turned on.

5. The display's brightness and contrast controls are adjusted properly.

6. All add-in boards in the expansion slots are seated securely.

7. Any add-in board you have installed is designed for your system and is set up correctly.

Monitor/Display

If the display screen remains dark after the system is turned on:

1. Make sure that the monitor's power switch is on.

2. Check that one end of the monitor's power cord is properly attached to the monitor and the other end is plugged into a working AC outlet. If necessary, try another outlet.

3. Check that the video input cable is properly attached to the monitor and the system's display adapter.

4. Adjust the brightness of the display by turning the monitor's brightness control knob.

The picture seems to be constantly moving.

1. The monitor has lost its vertical sync. Adjust the monitor's vertical sync.

2. Move away any objects, such as another monitor or fan, that may be creating a magnetic field around the display.

3. Make sure your video card's output frequencies are supported by this monitor.

The screen seems to be constantly wavering.

1. If the monitor is close to another monitor, the adjacent monitor may need to be turned off. Fluorescent lights adjacent to the monitor may also cause screen wavering.

Power Supply

When the computer is turned on, nothing happens.

1. Check that one end of the AC power cord is plugged into a live outlet and the other end properly plugged into the back of the system.

2. Make sure that the voltage selection switch on the back panel is set for the correct type of voltage you are using.

3. The power cord may have a "short" or "open". Inspect the cord and install a new one if necessary.

Floppy Drive

The computer cannot access the floppy drive.

1. The floppy diskette may not be formatted. Format the diskette and try again.

2. The diskette may be write-protected. Use a diskette that is not write-protected.

3. You may be writing to the wrong drive. Check the path statement to make sure you are writing to the targeted drive.

4. There is not enough space left on the diskette. Use another diskette with adequate storage space.

Hard Drive

Hard disk failure.

1. Make sure the correct drive type for the hard disk drive has been entered in the BIOS.

2. If the system is configured with two hard drives, make sure the bootable (first) hard drive is configured as Master and the second hard drive is configured as Slave. The master hard drive must have an active/bootable partition.

Excessively long formatting period.

If your hard drive takes an excessively long period of time to format, it is likely a cable connection problem. However, if your hard drive has a large capacity, it will take a longer time to format.

Serial Port

The serial device (modem, printer) doesn't output anything or is outputting garbled characters.

1. Make sure that the serial device's power is turned on and that the device is on-line.

2. Verify that the device is plugged into the correct serial port on the rear of the computer.

3. Verify that the attached serial device works by attaching it to a serial port that is working and configured correctly. If the serial device does not work, either the cable or the serial device has a problem. If the serial device works, the problem may be due to the onboard I/O or the address setting.

4. Make sure the COM settings and I/O address are configured correctly.

Keyboard

Nothing happens when a key on the keyboard was pressed.

1. Make sure the keyboard is properly connected.

2. Make sure there are no objects resting on the keyboard and that no keys are pressed during the booting process.

System Board

1. Make sure the add-in card is seated securely in the expansion slot. If the add-in card is loose, power off the system, re-install the card and power up the system.

2. Check the jumper settings to ensure that the jumpers are properly set.

3. Verify that all memory modules are seated securely into the memory sockets.

4. Make sure the memory modules are in the correct locations.

5. If the board fails to function, place the board on a flat surface and seat all socketed components. Gently press each component into the socket.

6. If you made changes to the BIOS settings, re-enter setup and load the BIOS defaults.