OT951-D Series

System Board
User's Manual

A-216-M-2008

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

This manual can be downloaded from the website, or acquired as an electronic file included in the optional CD/DVD. The manual is subject to change and update without notice, and may be based on editions that do not resemble your actual products. Please visit our website or contact our sales representatives for the latest editions.

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.

Battery:
- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.

About the Package

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

☑ One OT951-D board
☑ One Serial ATA data cable
☑ One QR (Quick Reference)

Optional Items

☑ USB port cable
☑ COM port cable
☑ Serial ATA data cable
☑ Power adapter (60W, 12V)

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.

- An APU
- 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

APU (Accelerated Processing Unit)	• OT951-DT56N: - AMD® T56N, 1.65GHz, 2x 512KB L2, 18W TDP, dual-core - Cooling: heatsink with cooling fan • OT951-DT40N: - AMD® T40N, 1.0GHz, 2x 512KB L2, 9W TDP, dual-core - Cooling: heatsink without cooling fan
Chipset	• AMD® A50M Controller Hub
System Memory	• One 204-pin DDR3 SODIMM sockets • Supports DDR3 1066/1333MHz (OT951-DT56N) Supports DDR3 1066MHz (OT951-DT40N) • Supports single channel memory interface • Supports up to 8GB system memory • DRAM device technologies: 1Gb, 2Gb and 4Gb DDR3 DRAM technologies are supported for x8 and x16 devices, unbuffered, non-ECC
Expansion Slots	• 1 Mini PCIe slot - Supports half size Mini PCIe card • 1 CompactFlash socket • 1 connector for daughterboard expansion - 2 PCIe x1 - 4 USB 2.0 - 1 LPC
Graphics	• Advanced discrete-level GPU integrated in the processor - AMD Radeon™ HD 6320 (OT951-DT56N) - AMD Radeon™ HD 6290 (OT951-DT40N) • Supports HDMI, LVDS and VGA interfaces • Supports AMD Turbo Core 2.0 technology • LVDS: Chrontel CH7511B, 24-bit, dual channel, resolution up to 1920x1200 @60Hz • HDMI: resolution up to 1920x1080 @60Hz • VGA display resolution - Up to 2048x1536 (OT951-DT56N) - Up to 1920x1200 (OT951-DT40N) • Supports Hardware H.264, MPEG4 Part 2, VC-1, and MPEG2 decode • Supports DirectX 11, OpenGL 3.2 and OpenCL 1.1
Audio	• Realtek ALC886 5.1-channel High Definition Audio
LAN	• 2 Realtek RTL8111DL Gigabit Ethernet Controllers • Integrated 10/100/1000 transceiver • Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
Serial ATA	• Supports 1 Serial ATA interface • SATA 3.0 with data transfer rate up to 6Gb/s • Integrated Advanced Host Controller Interface (AHCI) controller

IDE	• JMicron JMB368 PCI Express to PATA host controller • Supports 1 CompactFlash interface
TPM (optional)	• Provides a Trusted PC for secure transactions • Provides software license protection, enforcement and password protection
Rear Panel I/O Ports	• 1 HDMI port • 1 DB-15 VGA port • 2 RJ45 LAN ports • 2 USB 2.0/1.1 ports • 1 12V DC-in jack (default) or 4-pin ATX power connector (optional)
I/O Connectors	• 1 connector for 2 external USB 2.0/1.1 ports • 2 connectors for 2 external RS232/422/485 serial ports • 1 LVDS LCD panel connector • 1 LCD/inverter power connector • 1 8-bit Digital I/O connector • 1 front audio connector for line-out and mic-in jacks • 1 Serial ATA port • 1 chassis intrusion connector • 1 front panel connector • 2 fan connectors
BIOS	• AMI BIOS - 64Mbit SPI BIOS
Energy Efficient Design	• Supports ACPI • System Power Management • Wake-On-Events include: - Wake-On-USB KB/Mouse - Wake-On-LAN - RTC timer to power-on the system • CPU stopped clock control • AC power failure recovery
Damage Free Intelligence	• Monitors CPU/system temperature and overheat alarm • Monitors Vcore/Vnb/V_DIMM/5V/12V voltages and failure alarm • Monitors CPU/system fan speed and failure alarm • Read back capability that displays temperature, voltage and fan speed • Watchdog timer function
Power Consumption	• 26.66 W with T56N at 1.65GHz and 1x 2GB DDR3 SODIMM • 19.23 W with T40N at 1.00GHz and 1x 1GB 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)
Temperature	• Operating: 0°C to 60°C • Storage: -20°C to 85°C
Humidity	• 10% to 90%
Dimensions	• 3.5” board • 146mm (5.75”) x 102mm (4.02”)
Certification	• CE, FCC Class B, UL, RoHS

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. It offers peak data transfer rate of up to 21 Gb/s bandwidth. The advantages of DDR3 are its higher bandwidth and its increase in performance at a lower power than DDR2.

Graphics

The integrated AMD HD graphics for graphics intensive applications delivers exceptional 3D, 2D and video capabilities. It supports HDMI, VGA, and LVDS interfaces.

CompactFlash

The system board is equipped with the CompactFlash™ socket for inserting a CompactFlash™ card. CompactFlash™ card is a small removable mass storage device designed with flash technology - a non-volatile storage solution that does not require a battery to retain data indefinitely. The CompactFlash™ technology is widely used in products such as portable and desktop computers, digital cameras, handheld data collection scanners, PDAs, Pocket PCs, handy terminals and personal communicators.

Audio

The Realtek ALC886 audio codec provides 7.1-channel High Definition audio output.

Serial ATA

Serial ATA is a storage interface that is compliant with SATA 1.0a specification. SATA 3.0 supports speed up to 6Gb/s while SATA 2.0 supports speed up to 3Gb/s. This improves hard drive performance faster than the standard parallel ATA whose data transfer rate is 100MB/s.

Gigabit LAN

The Realtek RTL8111DL PCI Express Gigabit controllers support up to 1Gbps data transmission.

USB

The system board supports USB 2.0 and USB 1.1 ports. USB 1.1 supports 12Mb/second bandwidth while USB 2.0 supports 480Mb/second bandwidth providing a marked improvement in device transfer speeds between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

Wake-On-LAN

This feature allows the network to remotely wake up a Soft Power Down (Soft-Off) PC. It is supported via the onboard LAN port or via a PCI LAN card that uses the PCI PME (Power Management Event) signal. However, if your system is in the Suspend mode, you can power-on the system only through an IRQ or DMA interrupt.

Important:
The 5V_standby power source of your power supply must support ≥720mA.

Wake-On-USB

This function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state.

Important:
If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the 5V_standby power source of your power supply must support ≥1.5A. For 3 or more USB ports, the 5V_standby power source of your power supply must support ≥2A.

RTC Timer

The RTC installed on the system board allows your system to automatically power-on on the set date and time.

ACPI STR

The system board is designed to meet the ACPI (Advanced Configuration and Power Interface) specification. ACPI has energy saving features that enables PCs to implement Power Management and Plug-and-Play with operating systems that support OS Direct Power Management. ACPI when enabled in the Power Management Setup will allow you to use the Suspend to RAM function.

With the Suspend to RAM function enabled, you can power-off the system at once by pressing the power button or selecting "Standby" when you shut down Windows® without having to go through the sometimes tiresome process of closing files, applications and operating system. This is because the system is capable of storing all programs and data files during the entire operating session into RAM (Random Access Memory) when it powers-off. The operating session will resume exactly where you left off the next time you power-on the system.

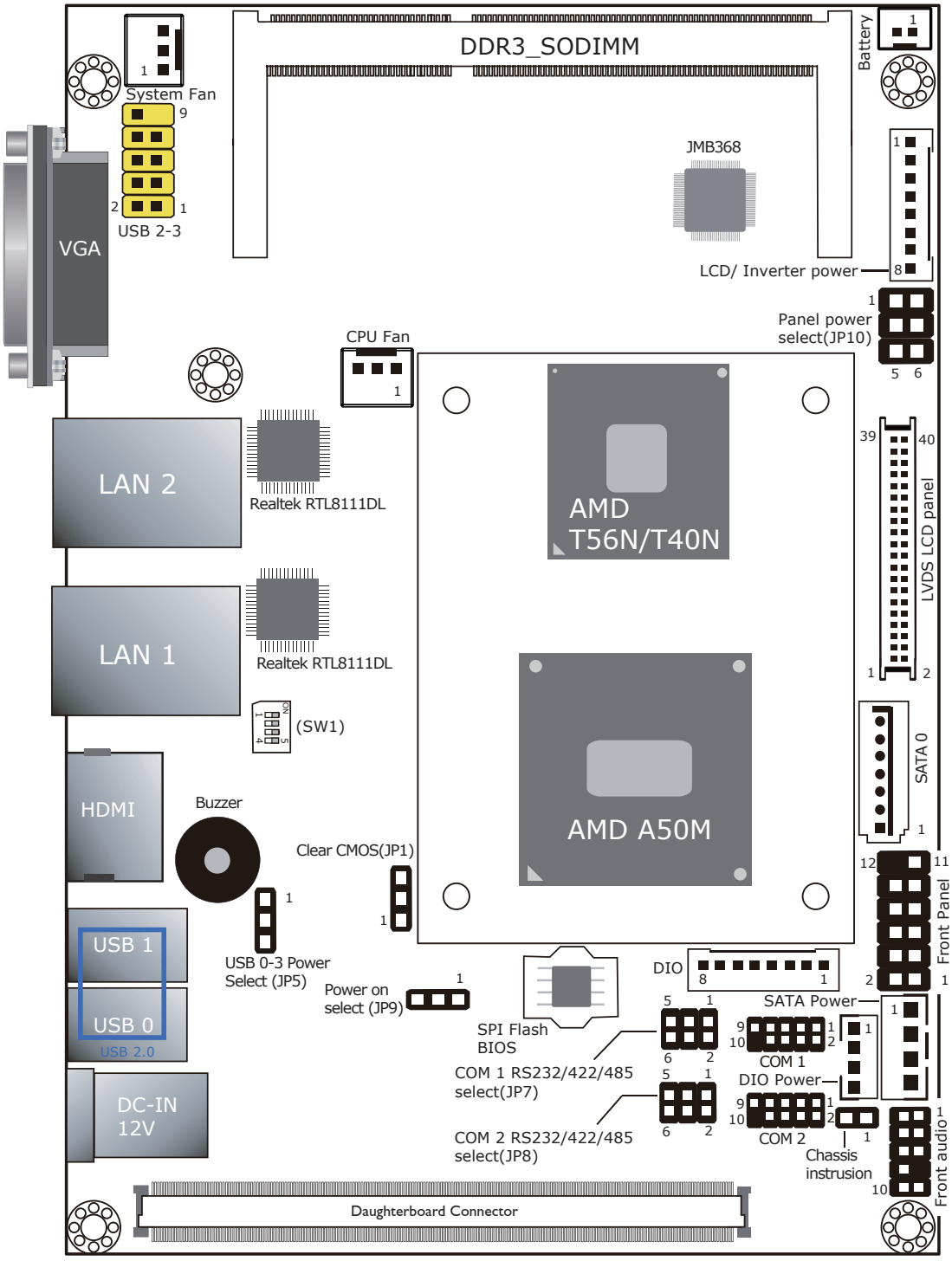
Important:
The 5V_standby power source of your power supply must support ≥720mA.

Power Failure Recovery

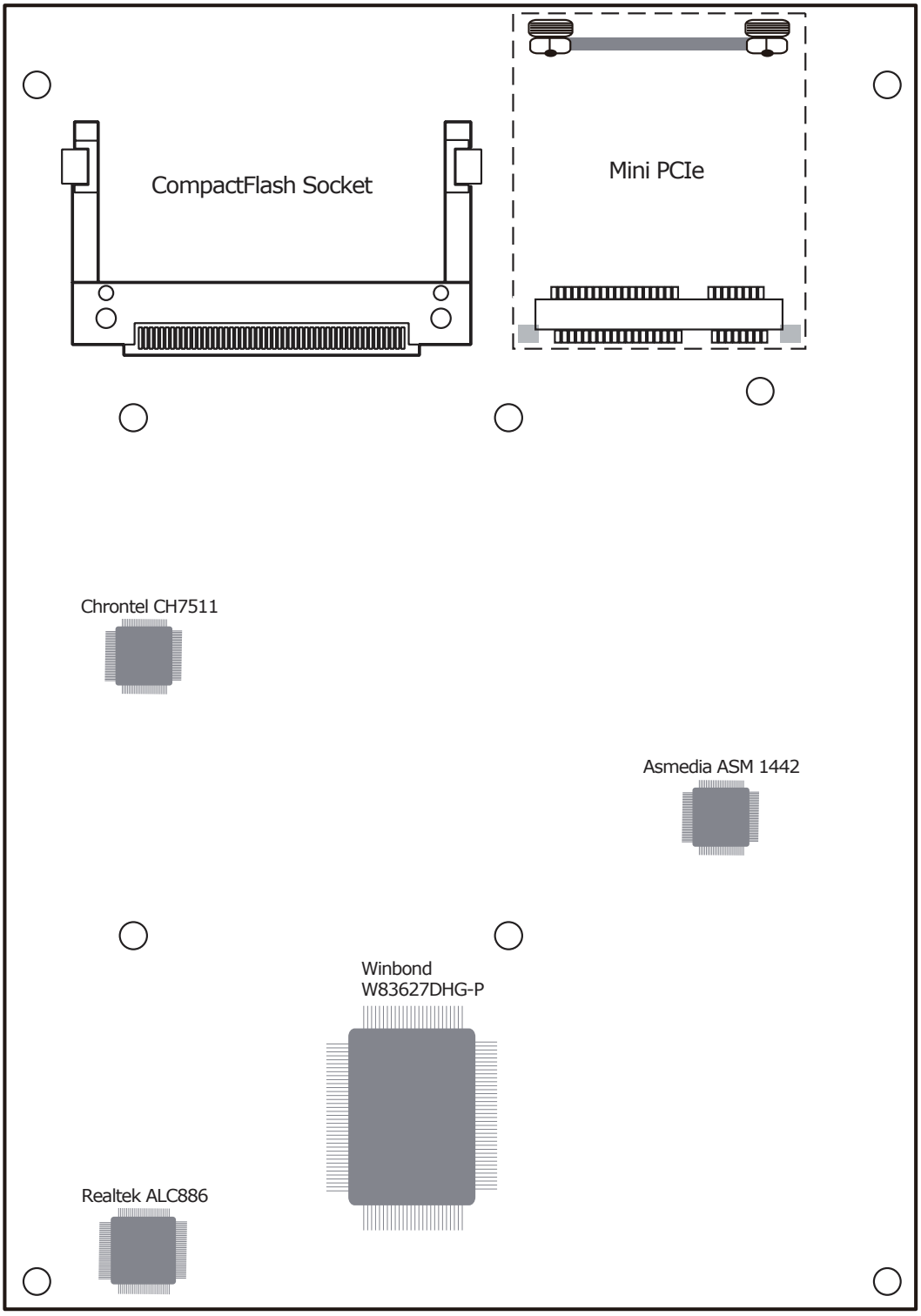
When power returns after an AC power failure, you may choose to either power-on the system manually or let the system power-on automatically.

Chapter 2 - Hardware Installation

System Board Layout



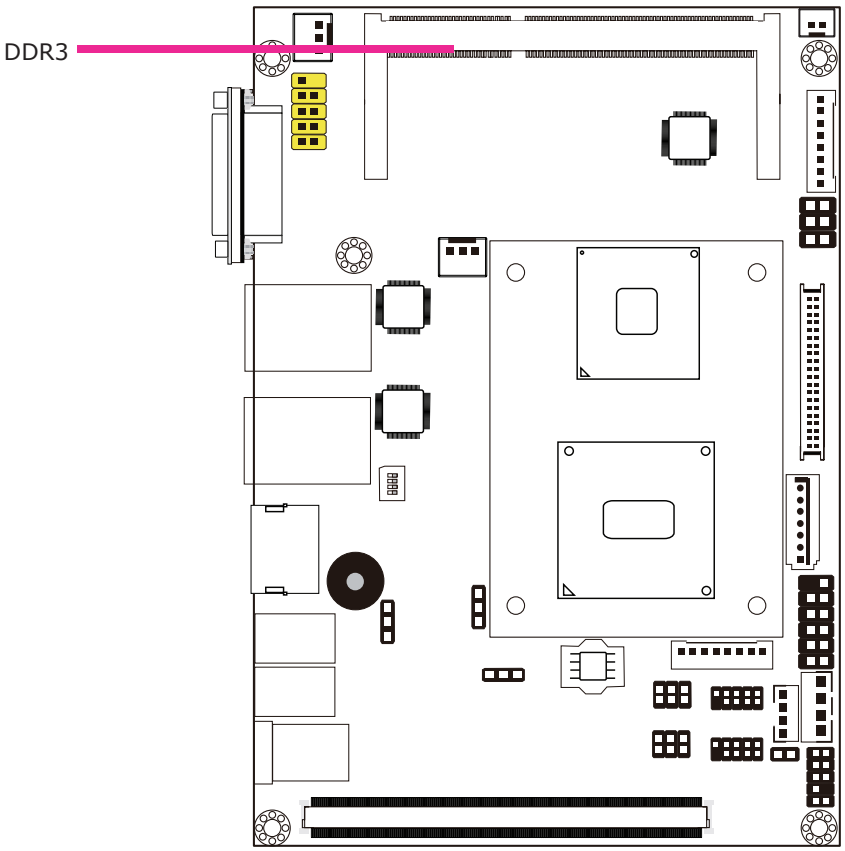
Top View


CompactFlash Socket
Mini PCIe
Chrontel CH7511
Asmedia ASM 1442
Winbond
W83627DHG-P
Realtek ALC886

Bottom View

Important:
Electrostatic discharge (ESD) can damage your system board, processor, disk drives, add-in boards, 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.

System Memory



Features

- One 204-pin DDR3 SODIMM socket
- Supports 1066/1333MHz DDR3 SDRAM
- Singal channel memory interface
- Supports maximum of 8GB system memory

Installing the DIM Module

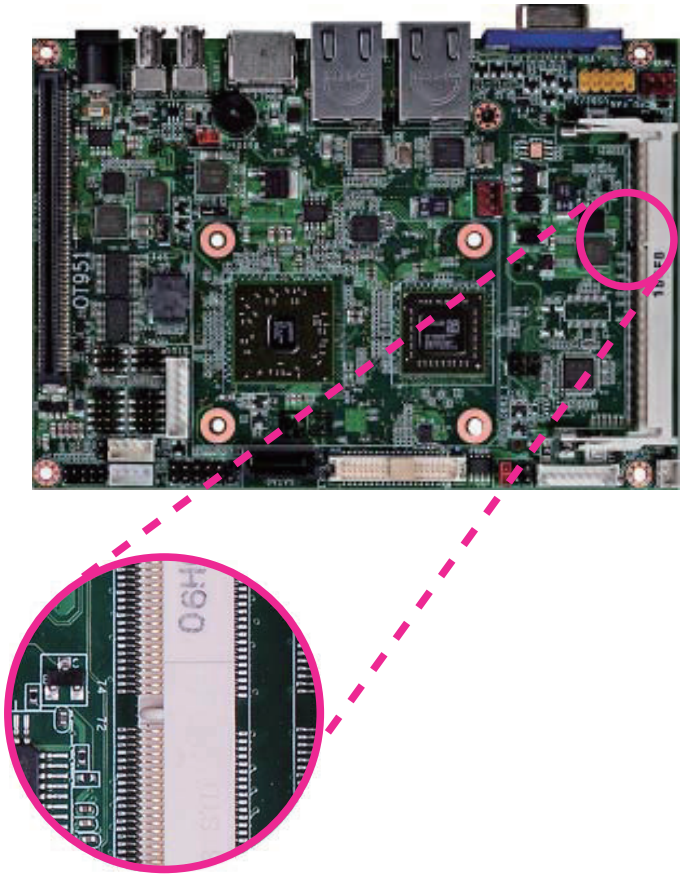
Note:
The system board used in the following illustrations may not resemble the actual one. These illustrations are for reference only.

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.

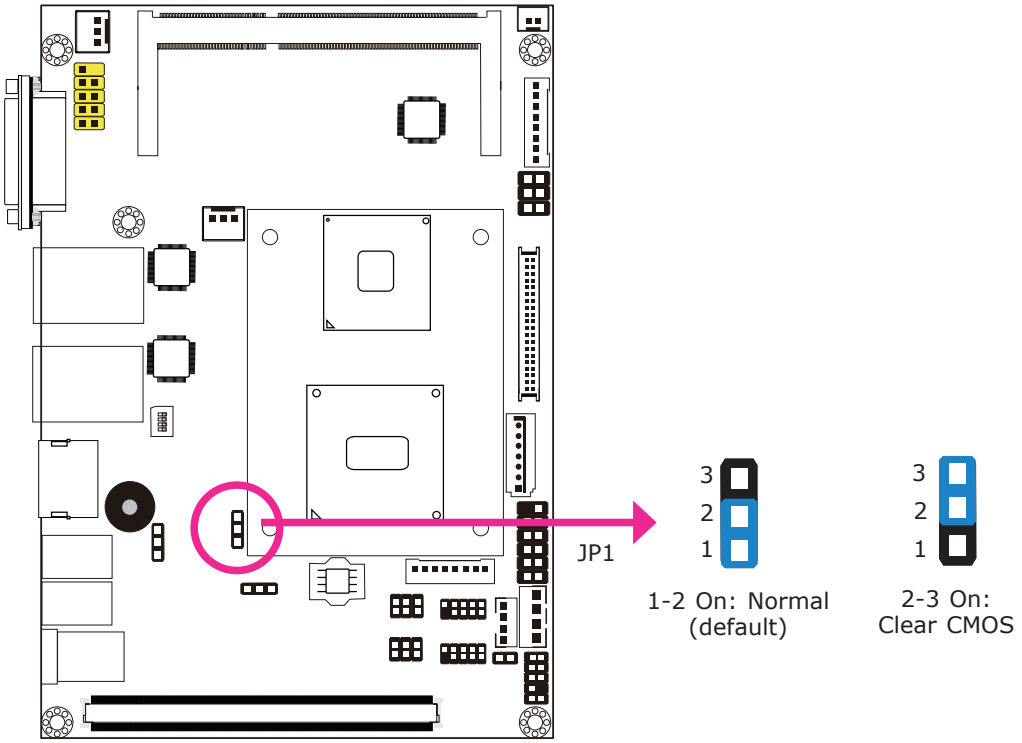


5. Grasping the module by its edges, align the module into the socket at an approximately 30 degrees angle. Apply firm even pressure to each end of the module until it slips down into the socket. The contact fingers on the edge of the module will almost completely disappear inside the socket.

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.

Jumper Settings

Clear CMOS



If you encounter the following,

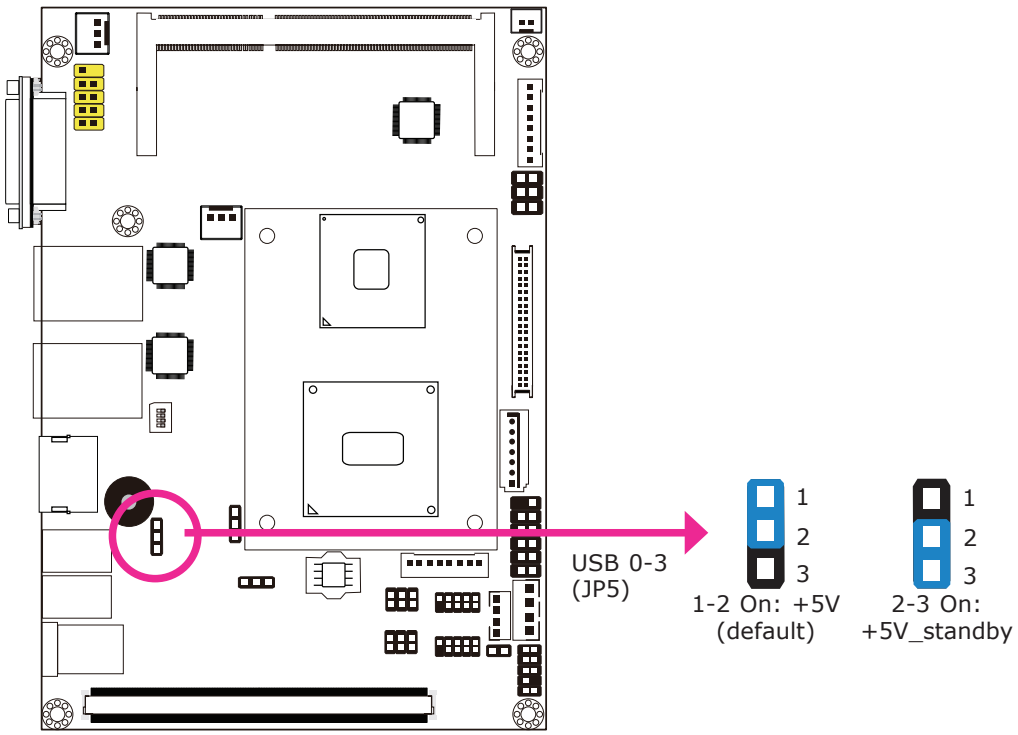
a) CMOS data becomes corrupted.
b) You forgot the supervisor or user password.

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 JP1 pins 2 and 3 to On. Wait for a few seconds and set JP1 back to its default setting, pins 1 and 2 On.
3. Now plug the power cord and power-on the system.

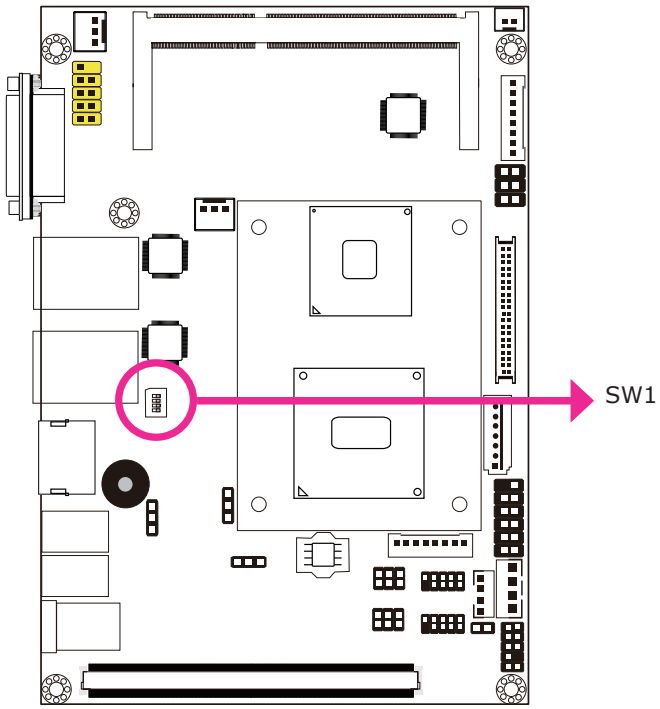
USB Power Select



This jumper is used to select the power of the USB ports. Selecting +5V_standby will allow you to use a USB device to wake up the system.

Important:
If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the +5V_standby power source of your power supply must support ≥1.5A. For 3 or more USB ports, the +5V_standby power source of your power supply must support ≥2A.

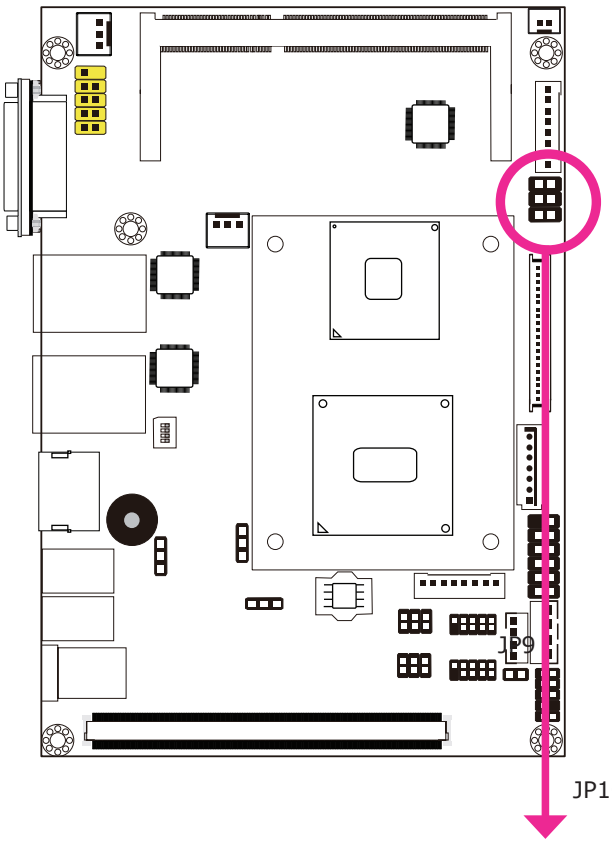
LVDS Panel Select

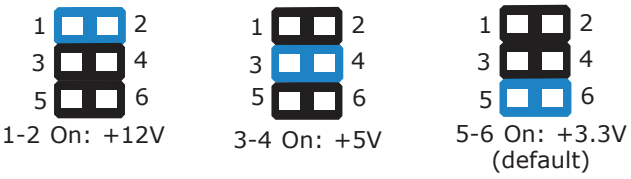


SW1 is used to select the resolution of LVDS panel on the system.

LVDS Panel Select		Channel	SW1
800x600	6/18 bit	Single	1-4 On
1024x768	6/18 bit	Single	2-4 On, 1 Off
1024x768	8/24 bit	Single	1,3,4 On, 2 Off
1280x768	6/18 bit	Single	3-4 On, 1-2 Off
1280x800	6/18 bit	Single	1,2,4 On, 3 Off
1280x960	6/18 bit	Single	2,4 On, 1,3 Off
1280x1024	8/24 bit	Dual	1,4 On, 2,3 Off
1366x768	6/18 bit	Single	4 On, 1-3 Off
1366x768	8/24 bit	Single	1-3 On, 4 Off
1440x900	8/24 bit	Dual	2-3 On, 1,4 Off
1400x1050	8/24 bit	Dual	1,3 On, 2,4 Off
1600x900	8/24 bit	Dual	3 On, 1,2,4 Off
1680x1050	8/24 bit	Dual	1-2 On, 3-4 Off
1600x1200	8/24 bit	Dual	2 On, 1,3,4 Off
1920x1080	8/24 bit	Dual	1 On, 2-4 Off
1920x1200	8/24 bit	Dual	1-4 Off

Panel Power Select

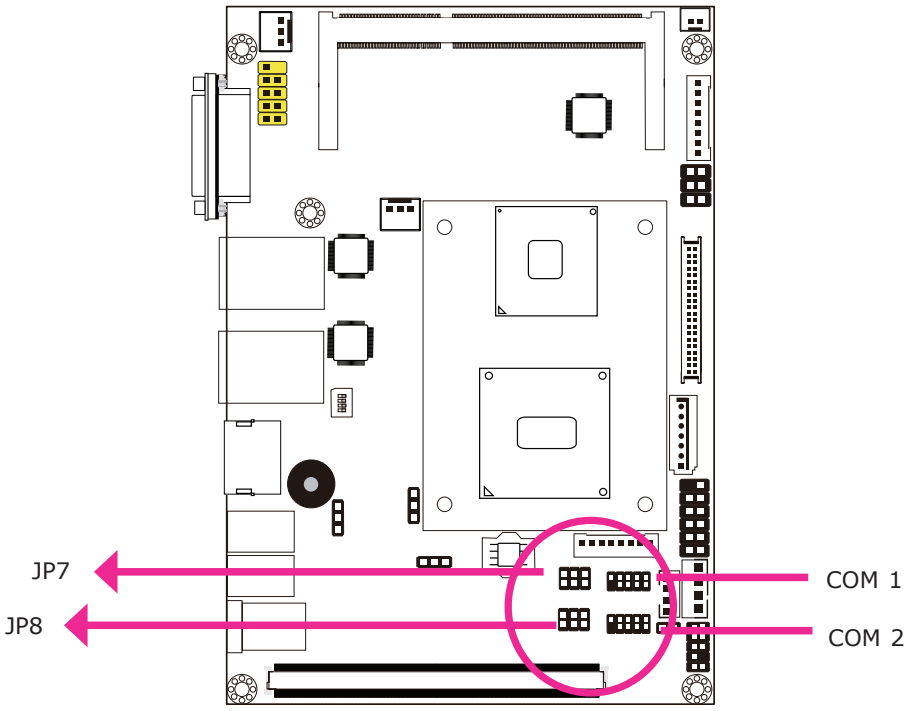




JP10 is used to select the power supplied to the LCD panel.

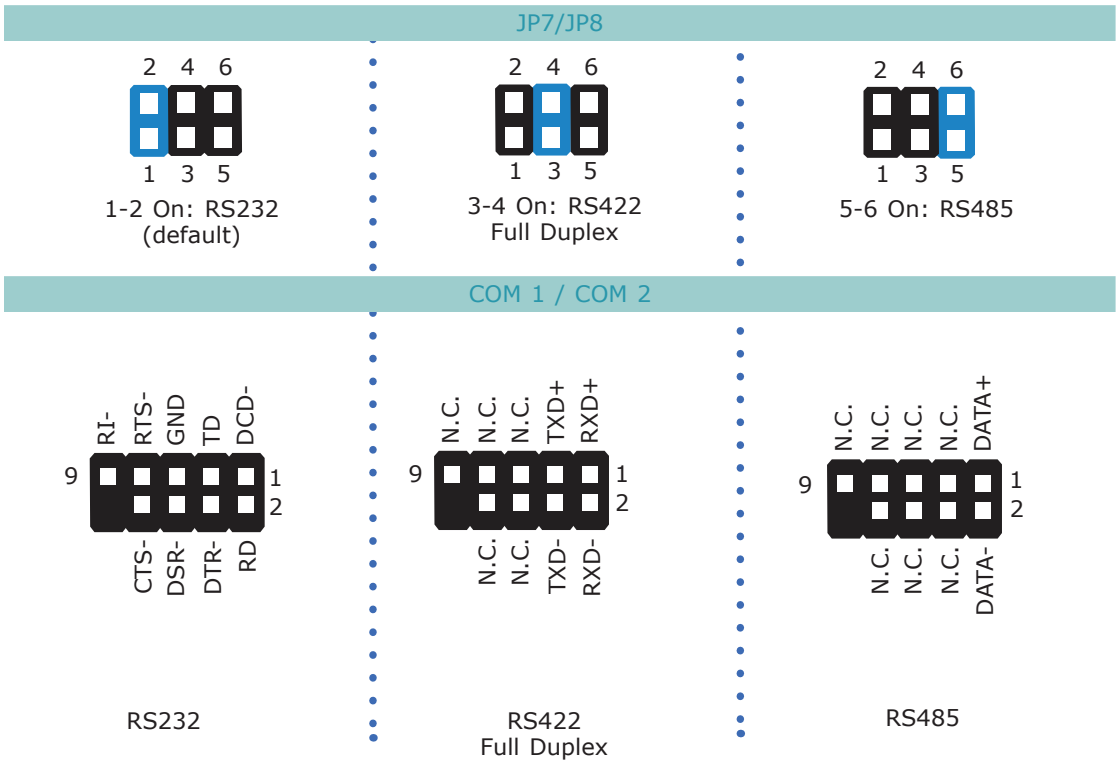
Important:
Before powering-on the system, make sure JP10's setting matches the LCD panel's specification. Selecting the incorrect voltage will seriously damage the LCD panel.

COM1/COM2 RS232/RS422/RS485 Select

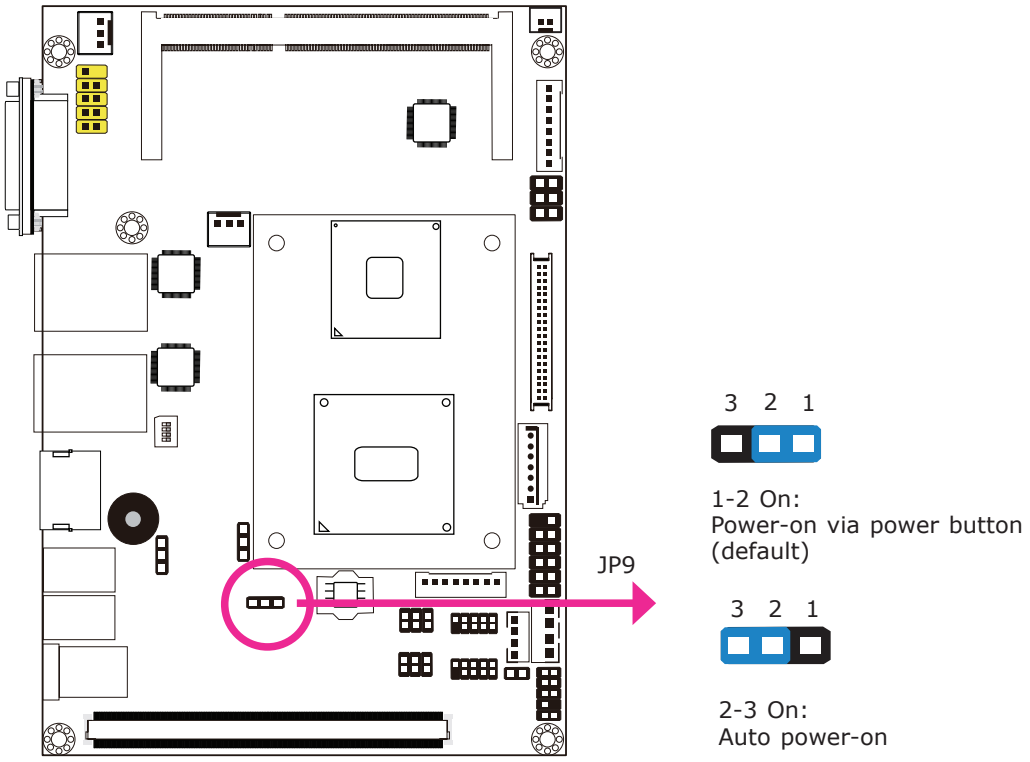


JP7 (for COM1) and JP8 (for COM2) are used to configure the COM ports to RS232, RS422 (Full Duplex) or RS485.

The pin function of the COM ports will vary according to the jumper's setting.



Power-on Select

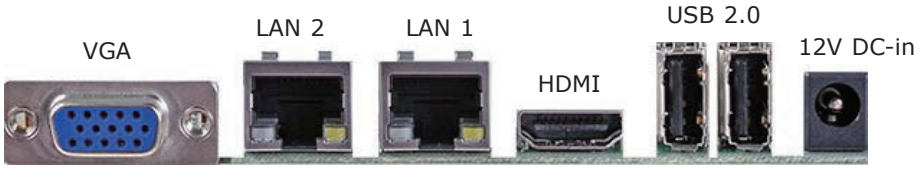


JP9 is used to select the method of powering on the system. If you want the system to power-on whenever AC power comes in, set JP9 pins 2 and 3 to On. If you want to use the power button, set pins 1 and 2 to On.

When using the JP9 "Power On" feature to power the system back on after a power failure occurs, the system may not power on if the power lost is resumed within 5 seconds (power flicker).

Note:
In order to ensure that power is resumed after a power failure that recovers within a 5 second period, JP9 must be set to pins 2-3 and the "AC Power Lose" in CMOS is set to "On".

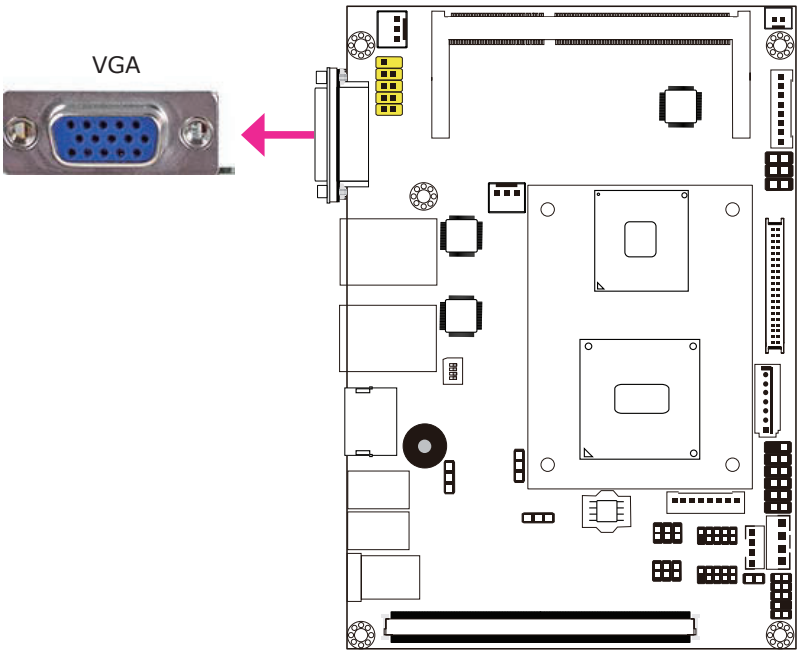
Rear Panel I/O Ports



The rear panel I/O ports consist of the following:

- VGA
- 2 Realtek LAN ports
- HDMI
- 2 USB ports
- 12V DC-in

VGA Port



The VGA port is used for connecting a VGA monitor. Connect the monitor's 15-pin D-shell cable connector to the VGA port. After you plug the monitor's cable connector into the VGA port, gently tighten the cable screws to hold the connector in place.

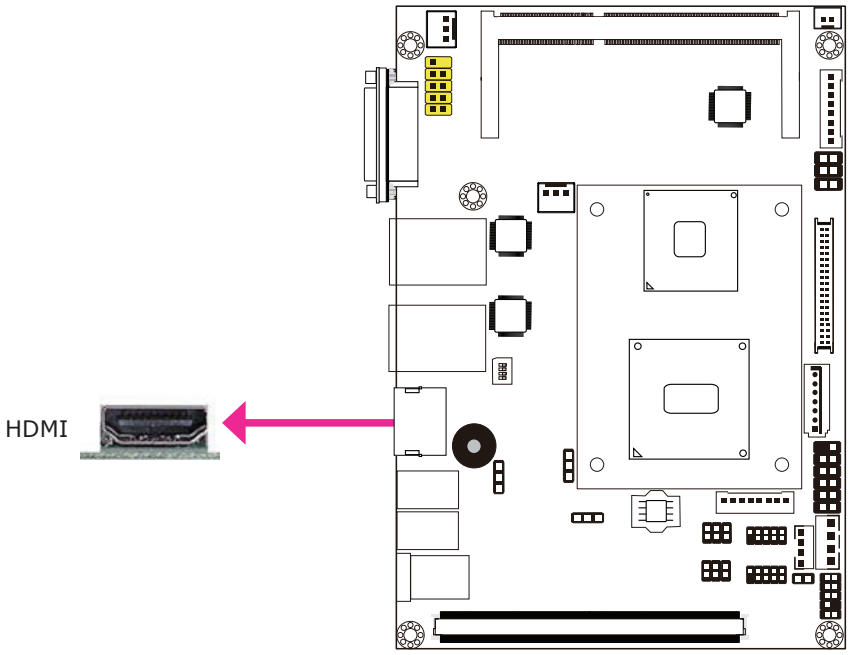
BIOS Setting

Configure VGA in the Chipset menu ("North Bridge Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

Driver Installation

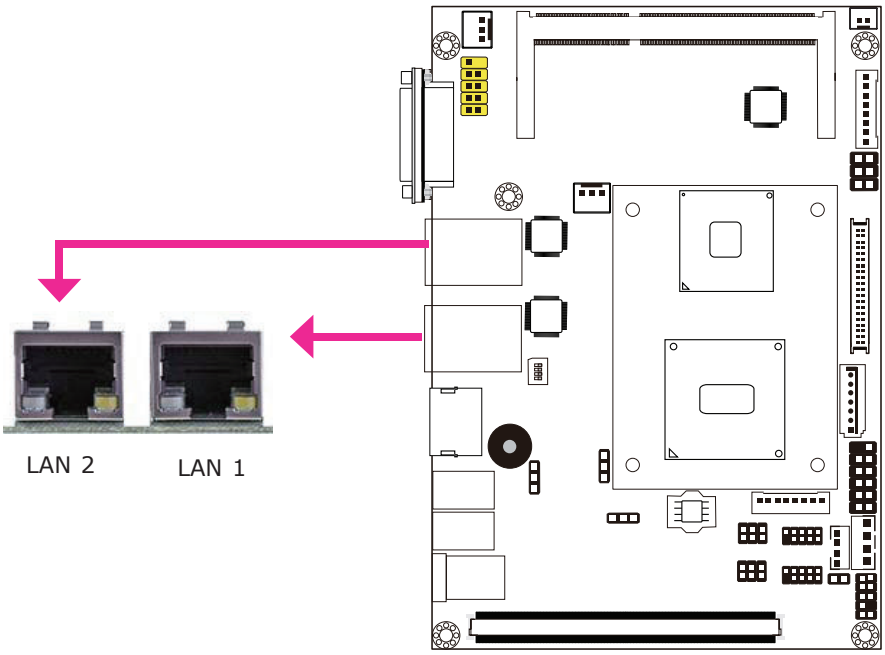
Install the graphics driver. Refer to chapter 4 for more information.

HDMI Port



The HDMI port which carries both digital audio and video signals is used to connect a LCD monitor or digital TV that has the HDMI port.

RJ45 LAN Ports



Features

- 2 Realtek RTL8111DL PCI Express Gigabit LAN controller

The LAN ports allow the system board to connect to a local area network by means of a network hub.

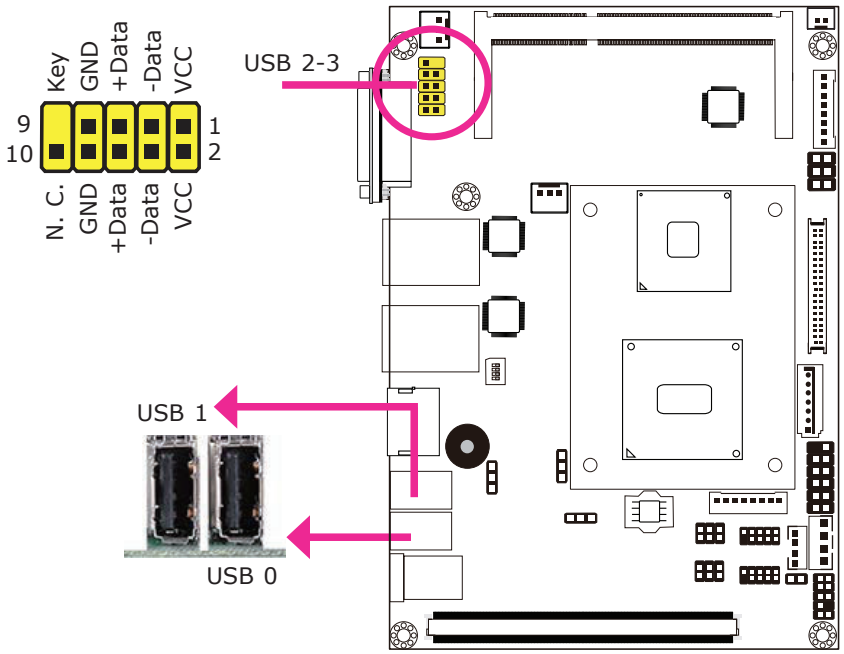
BIOS Setting

Configure the onboard LAN in the Chipset menu ("South Bridge Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

Driver Installation

Install the LAN drivers. Refer to chapter 4 for more information.

USB Ports



USB allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

The system board is equipped with four onboard USB 2.0/1.1 ports. The two 10-pin connectors allow you to connect 4 additional USB 2.0/1.1 ports. The additional USB ports may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis and then insert the USB port cables to a connector.

BIOS Setting

Configure the onboard USB in the Advanced menu ("USB Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

Driver Installation

You may need to install the proper drivers in your operating system to use the USB device. Refer to your operating system's manual or documentation for more information.

Wake-On-USB Keyboard/Mouse

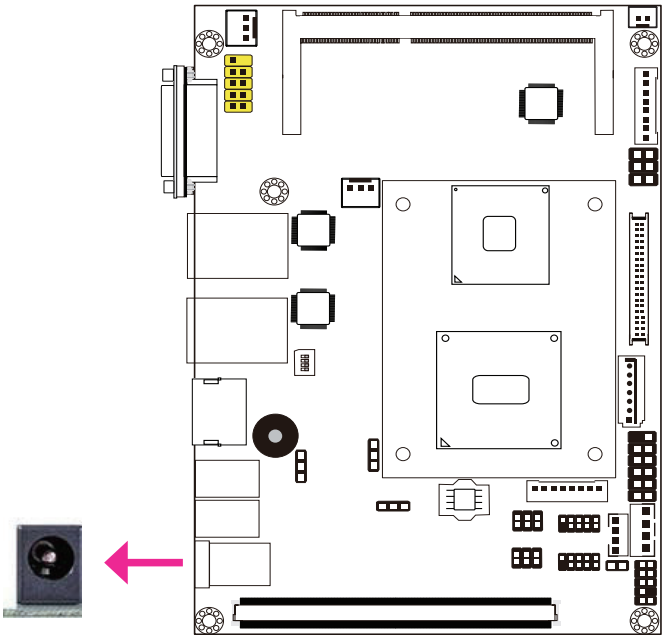
The Wake-On-USB Keyboard/Mouse function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state. To use this function:

- Jumper Setting

  JP3 must be set to "2-3 On: +5V_standby". Refer to "USB Power Select" in this chapter for more information.

Important:
If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the +5V_standby power source of your power supply must support ≥1.5A. For 3 or more USB ports, the +5V_standby power source of your power supply must support ≥2A.

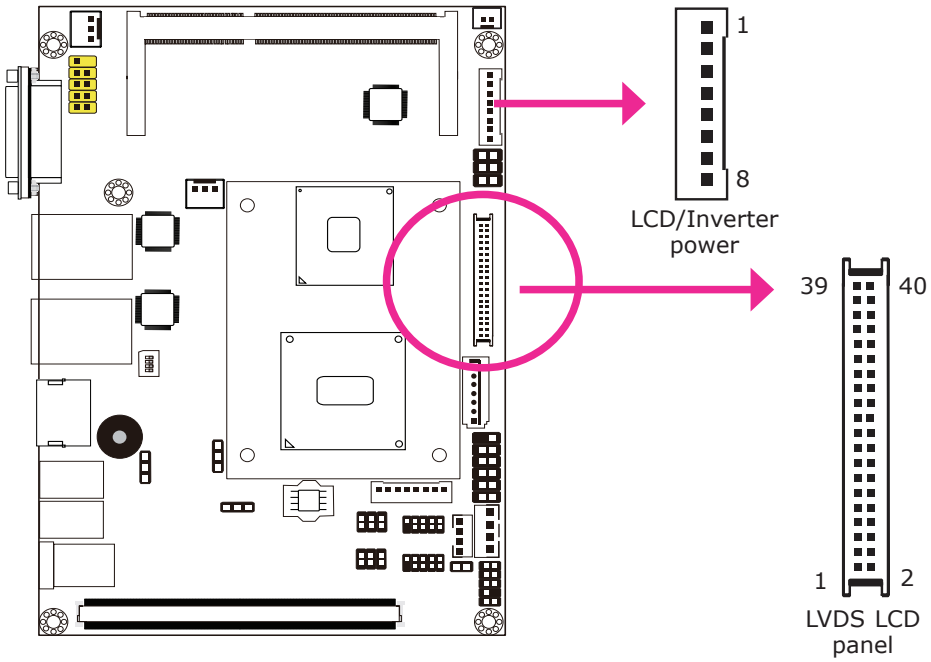
DC-in 12V



This jack provides maximum of 60W power and is considered a low power solution. Connect a DC power cord to this jack. Use a power adapter with 12V DC output voltage. Using a voltage higher than the recommended one may fail to boot the system or cause damage to the system board.

I/O Connectors

LVDS LCD Panel Connector
LCD/Inverter Power Connector



The system board allows you to connect a LCD Display Panel by means of the LVDS LCD panel connector and the LCD/Inverter power connector. These connectors transmit video signals and power from the system board to the LCD Display Panel.

Refer to the next page for the pin functions of these connectors.

BIOS Setting

Configure the LCD panel in the Advanced Chipset Features submenu of the BIOS. Refer to chapter 3 for more information.

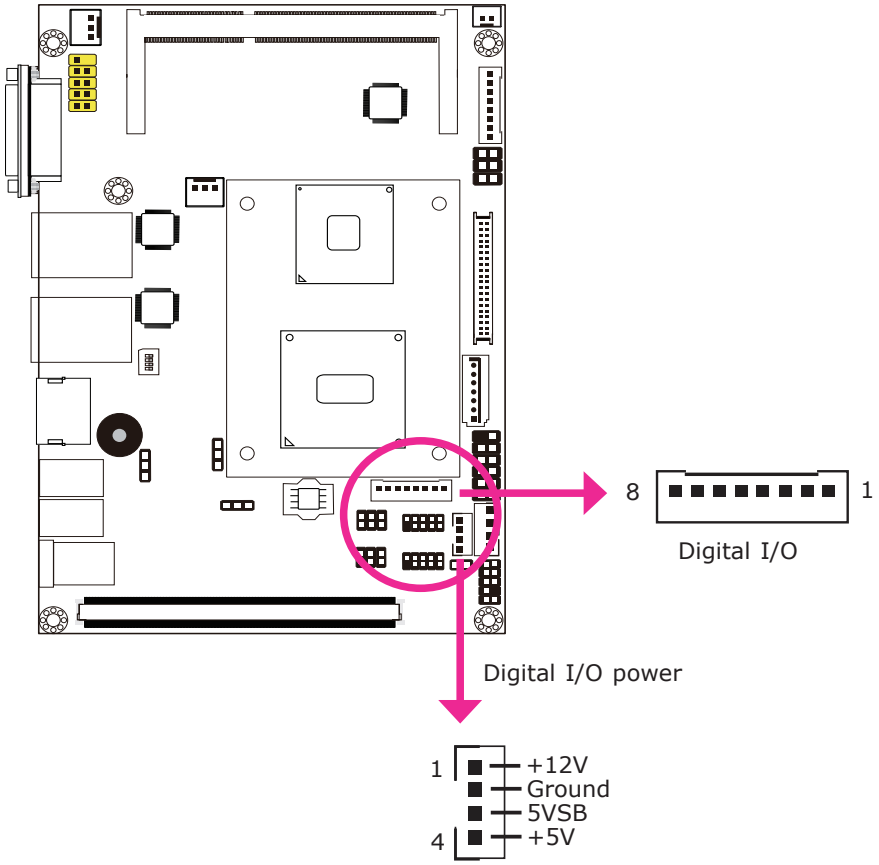
LVDS LCD Panel Connector

Pins	Function	Pins	Function
1	GND	2	GND
3	LVDS_Out3+	4	LVDS_Out7+
5	LVDS_Out3-	6	LVDS_Out7-
7	GND	8	GND
9	LVDS_Out2+	10	LVDS_Out6+
11	LVDS_Out2-	12	LVDS_Out6-
13	GND	14	GND
15	LVDS_Out1+	16	LVDS_Out5+
17	LVDS_Out1-	18	LVDS_Out5-
19	GND	20	GND
21	LVDS_Out0+	22	LVDS_Out4+
23	LVDS_Out0-	24	LVDS_Out4-
25	GND	26	GND
27	LVDS_CLK1+	28	LVDS_CLK2+
29	LVDS_CLK1-	30	LVDS_CLK2-
31	GND	32	GND
33	LVDS_DDCCLK	34	N. C.
35	LVDS_DDCDAA	36	N. C.
37	Panel Power	38	Panel Power
39	Panel Power	40	Panel Power

LCD/Inverter Power Connector

Pins	Function
1	GND
2	GND
3	Panel Inverter Brightness Voltage Control
4	Panel Power
5	+3.3V
6	Panel Backlight On/Off Control
7	+12V
8	+12V

Digital I/O Connector
Digital I/O Power Connector

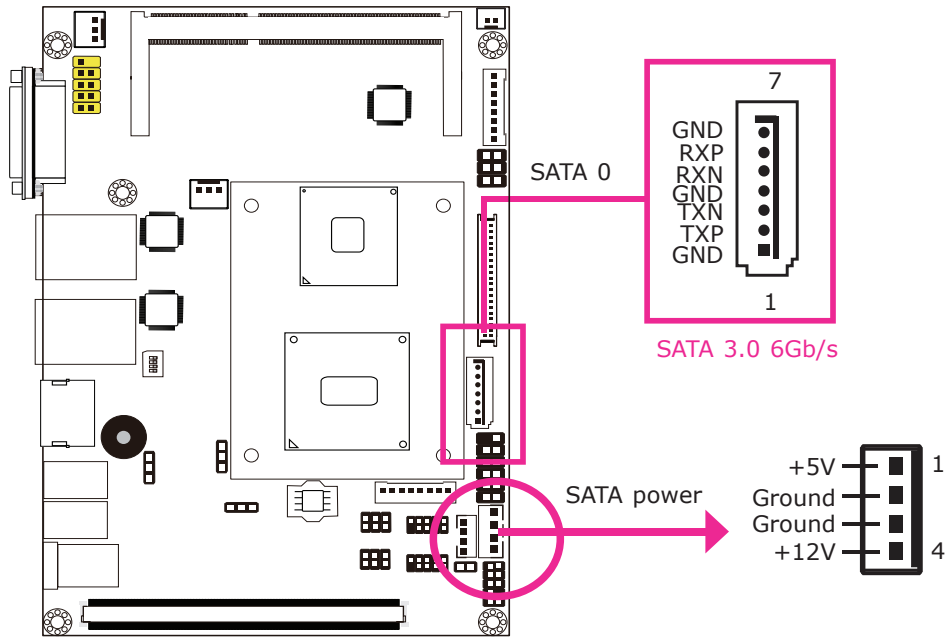


The 8-bit Digital I/O connector provides powering-on function to external devices that are connected to these connectors.

Digital I/O Connector

Pins	Function
1	DIO0
2	DIO1
3	DIO2
4	DIO3
5	DIO4
6	DIO5
7	DIO6
8	DIO7

SATA (Serial ATA) Connectors



Features

- 1 Serial ATA port
  - SATA 3.0 port with data transfer rate up to 6Gb/s
- Integrated Advanced Host Controller Interface (AHCI) controller
- Supports RAID 0, RAID 1, RAID 5 and RAID 10

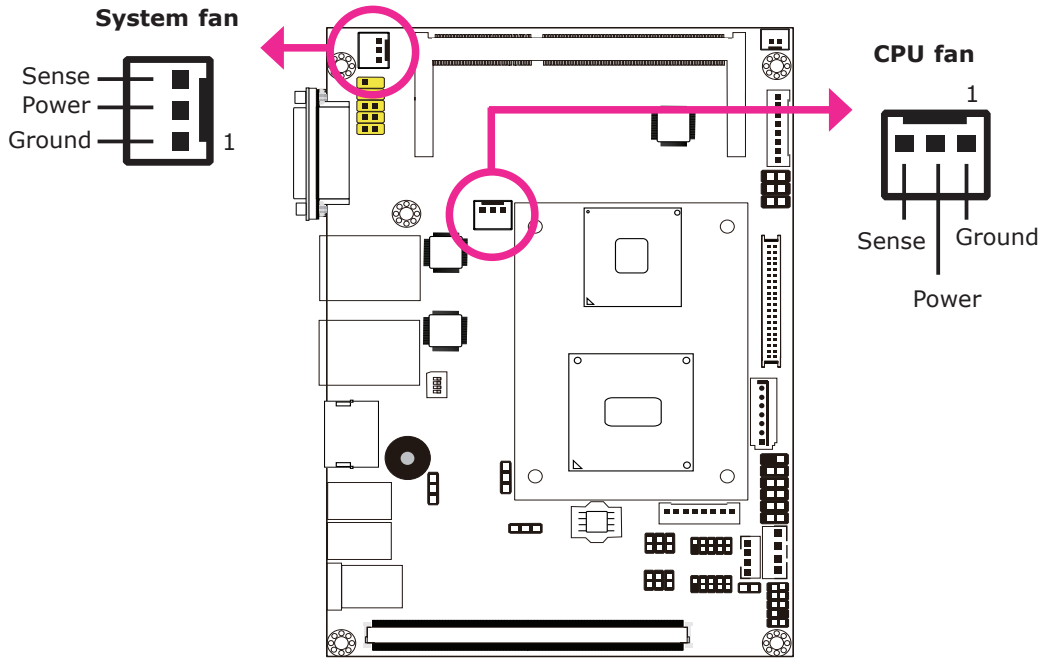
The Serial ATA connectors are used to connect Serial ATA devices. Connect one end of the Serial ATA data cable to a SATA connector and the other end to your Serial ATA device.

The system board package comes with a power cable that must be connected from the system board's peripheral power connector to the SATA drive's power connector in order to provide power to the drive.

BIOS Setting

Configure the Serial ATA drives in the Integrated Peripherals submenu ("OnChip IDE Device" section) of the BIOS. Refer to chapter 3 for more information.

Cooling Fan Connectors

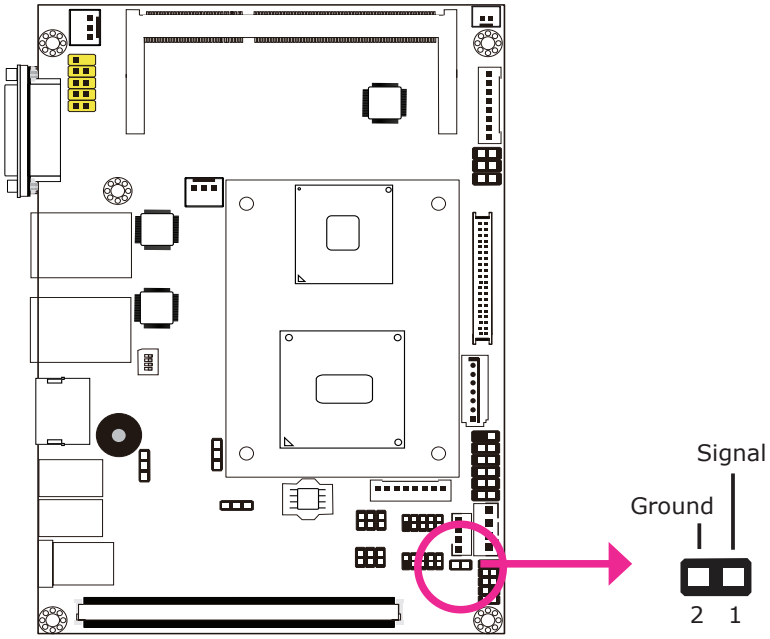


The fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

BIOS Setting

The Advanced menu ("Hardware Health Configuration" submenu) of the BIOS will display the current speed of the cooling fans. Refer to chapter 3 for more information.

Chassis Intrusion Connector

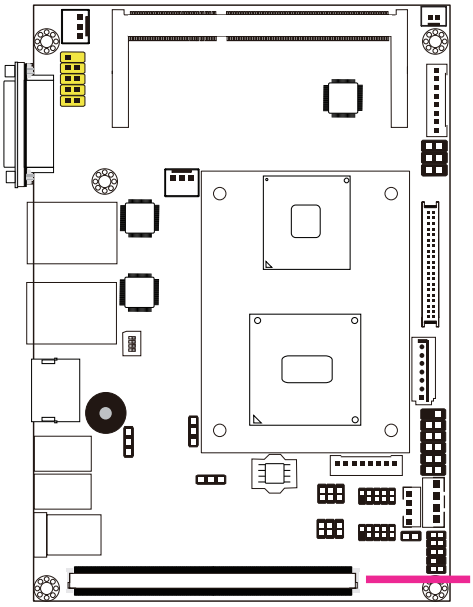


The board supports the chassis intrusion detection function. Connect the chassis intrusion sensor cable from the chassis to this connector. When the system's power is on and a chassis intrusion occurred, an alarm will sound. When the system's power is off and a chassis intrusion occurred, the alarm will sound only when the system restarts.

MyGuard Hardware Monitor

Install the "MyGuard Hardware Monitor" utility. By default, the chassis intrusion detection function is disabled. When enabled, a warning message will appear when the chassis is open. The utility can also be configured so that a beeping alarm will sound when the chassis is open. Refer to the "MyGuard Hardware Monitor" section in chapter 4 for more information.

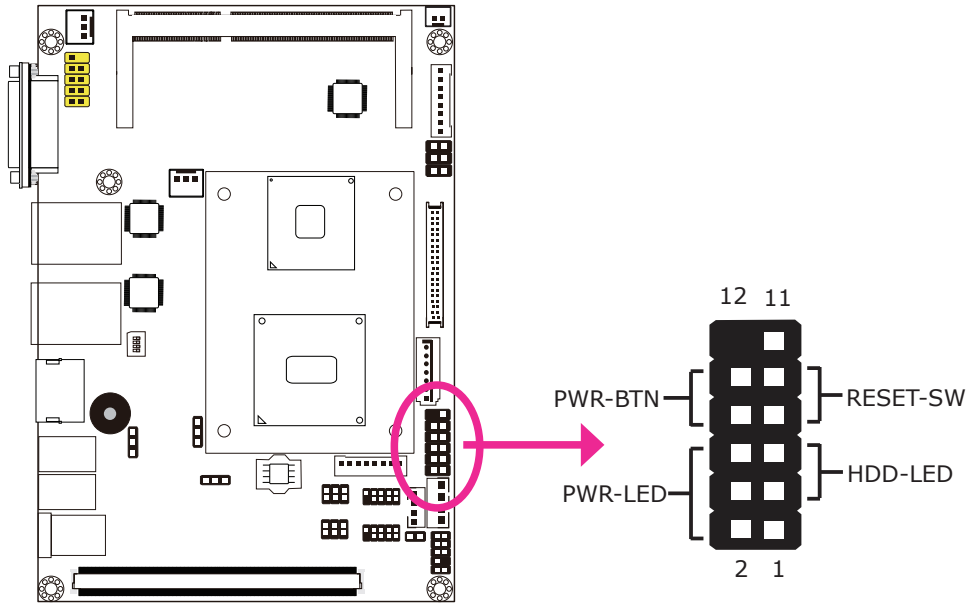
Daughterboard Connector



The daughterboard expansion slot is an interface for the daughterboard. The daughterboard features:

- 2 PCIe x1
- 4 USB 2.0
- 1 LPC

Front Panel Connectors



HDD-LED - HDD LED

This LED will light when the hard drive is being accessed.

RESET SW - Reset Switch

This switch allows you to reboot without having to power off the system.

PWR-BTN - Power Switch

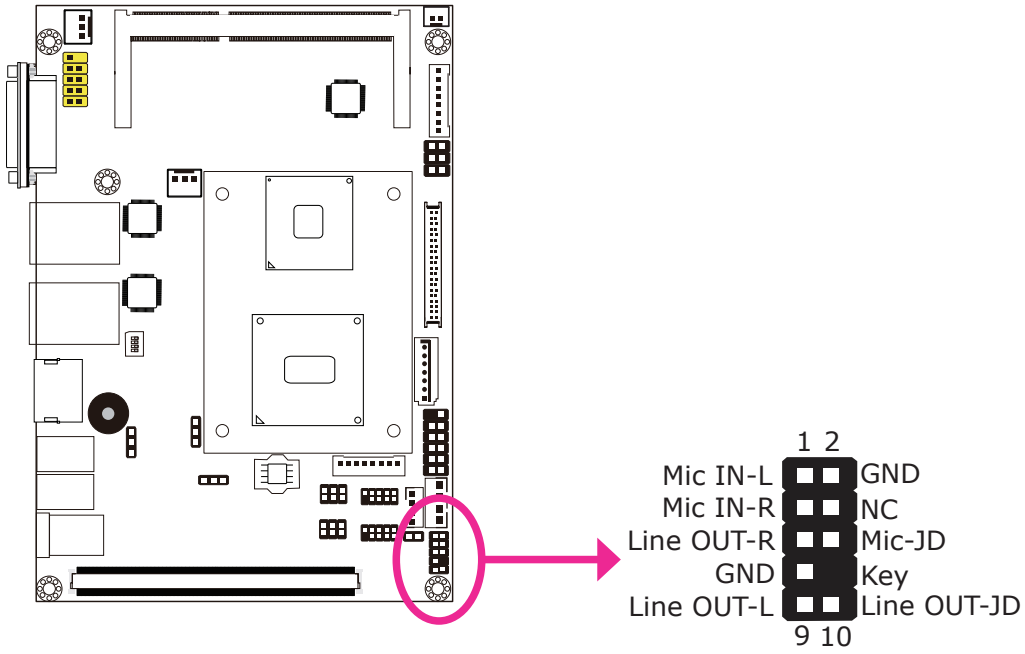
This switch is used to power on or off the system.

PWR-LED - Power/Standby LED

When the system's power is on, this LED will light. When the system is in the S1 (POS - Power On Suspend) state, it will blink every second. When the system is in the S3 (STR - Suspend To RAM) state, it will blink every 4 seconds.

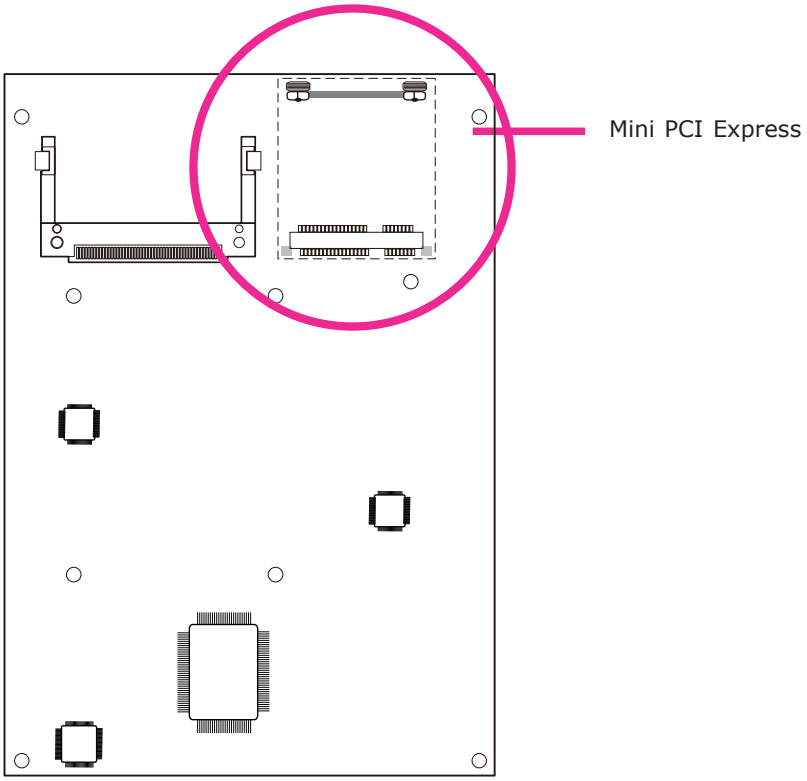
	Pin	Pin Assignment		Pin	Pin Assignment
HDD-LED	3	HDD Power	**PWR-LED**	2	LED Power
	5	Signal		4	LED Power
RESET SW	7	Ground		6	Signal
	9	RST Signal	**PWR-BTN**	8	Ground
	11	N.C.		10	Signal

Front Audio Connector



The front audio connector allows you to connect to the second line-out and mic-in jacks that are at the front panel of your system.

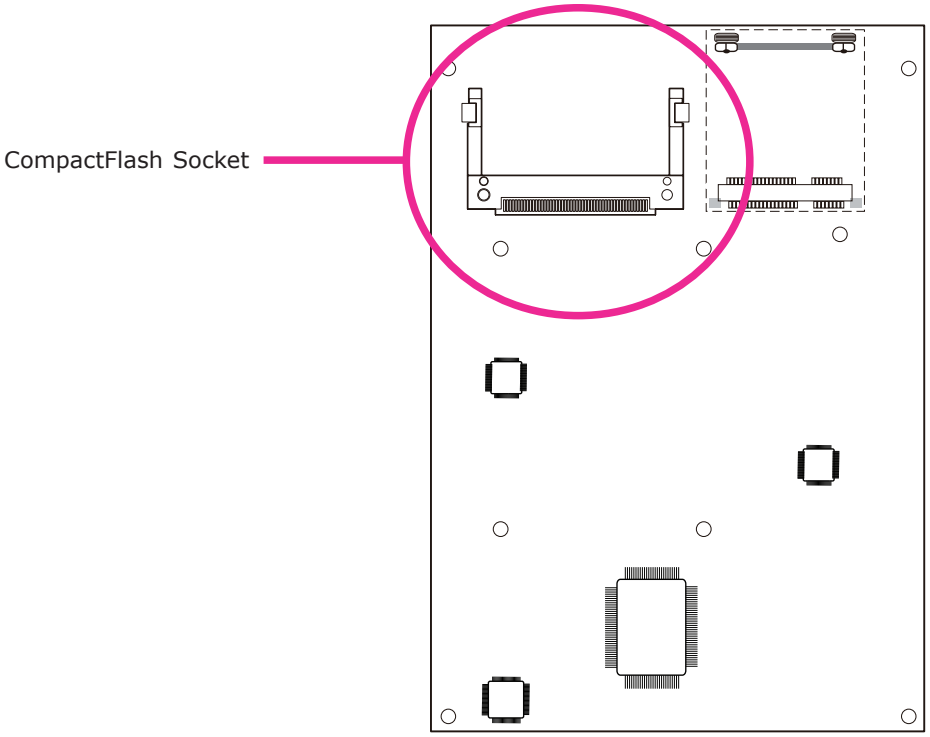
Expansion Slots



Mini PCIe Slot

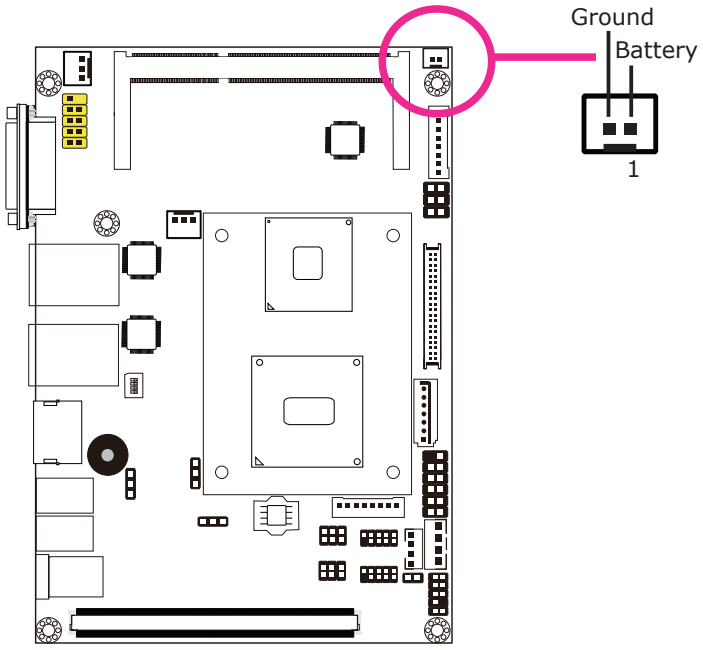
The Mini PCIe socket is used to install a Mini PCIe card. Mini PCIe card is a small form factor PCI card with the same signal protocol, electrical definitions, and configuration definitions as the conventional PCI.

CompactFlash Socket



The CompactFlash™ socket is used for inserting a CompactFlash™ card. CompactFlash™ card is a small removable mass storage device designed with flash technology - a non-volatile storage solution that does not require a battery to retain data indefinitely. The CompactFlash™ technology is widely used in products such as portable and desktop computers, digital cameras, handheld data collection scanners, PDAs, Pocket PCs, handy terminals and personal communicators.

Battery



The lithium ion battery powers the real-time clock and CMOS memory. It is an auxiliary source of power when the main power is shut off.

Safety Measures

- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.

3

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.

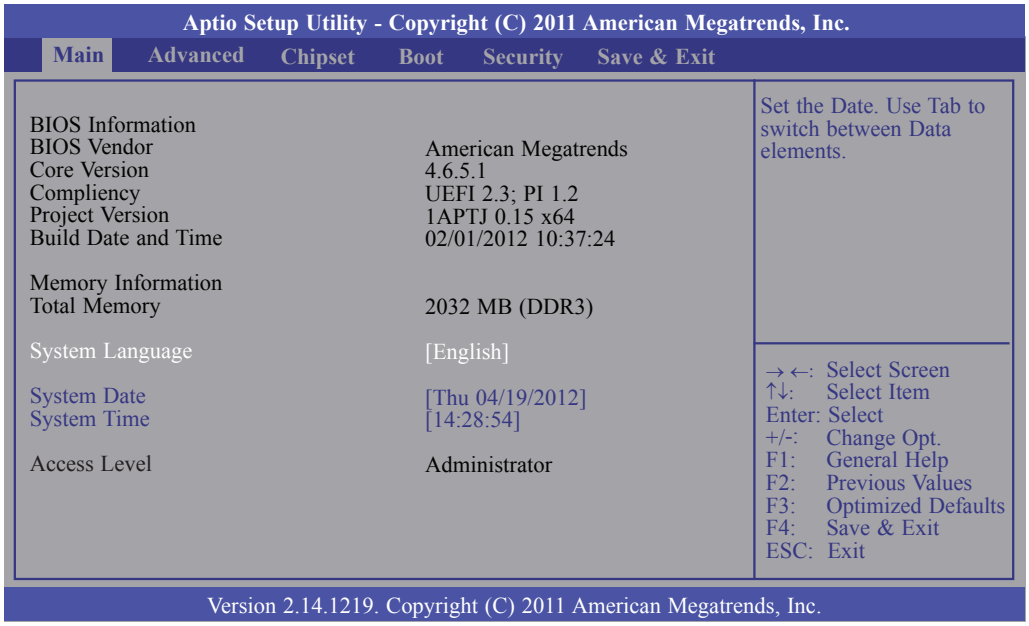
Submenu

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.

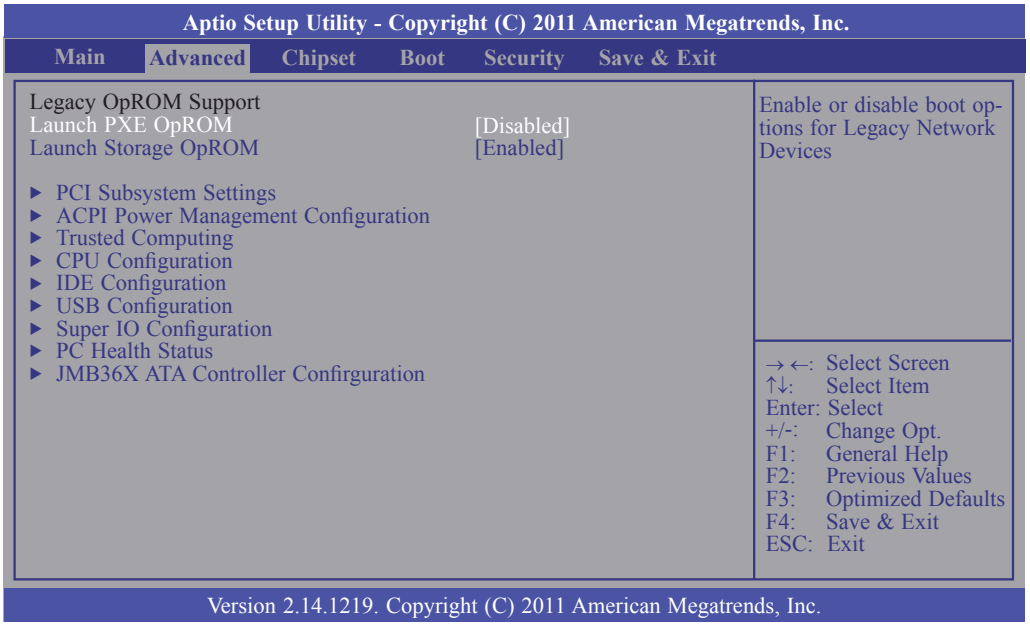
System Time

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

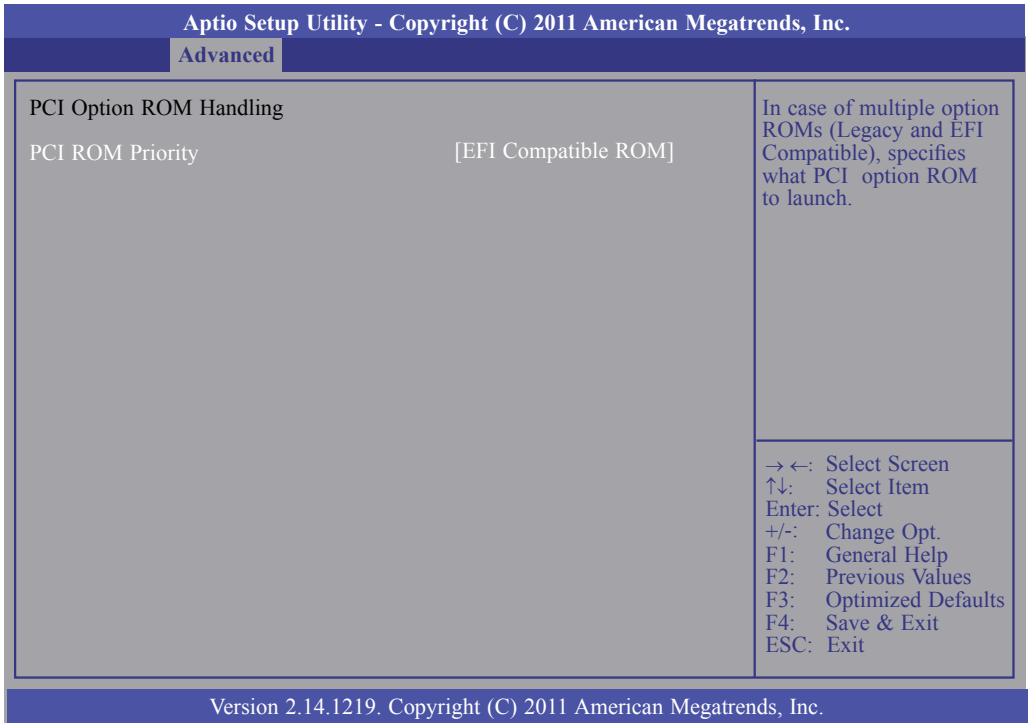
Enables or disables the boot option for legacy network devices.

Launch Storage OpROM

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

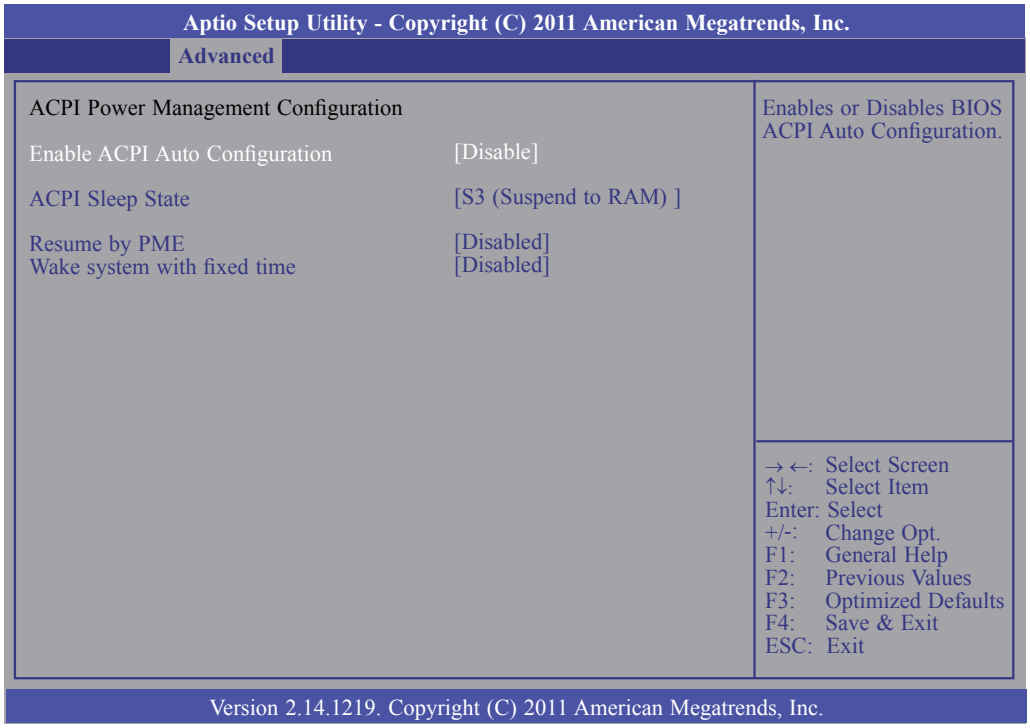
PCI Subsystem Settings

This section is used to configure the PCI subsystem settings.



ACPI Power Management Configuration

This section is used to configure the ACPI Power Management.



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

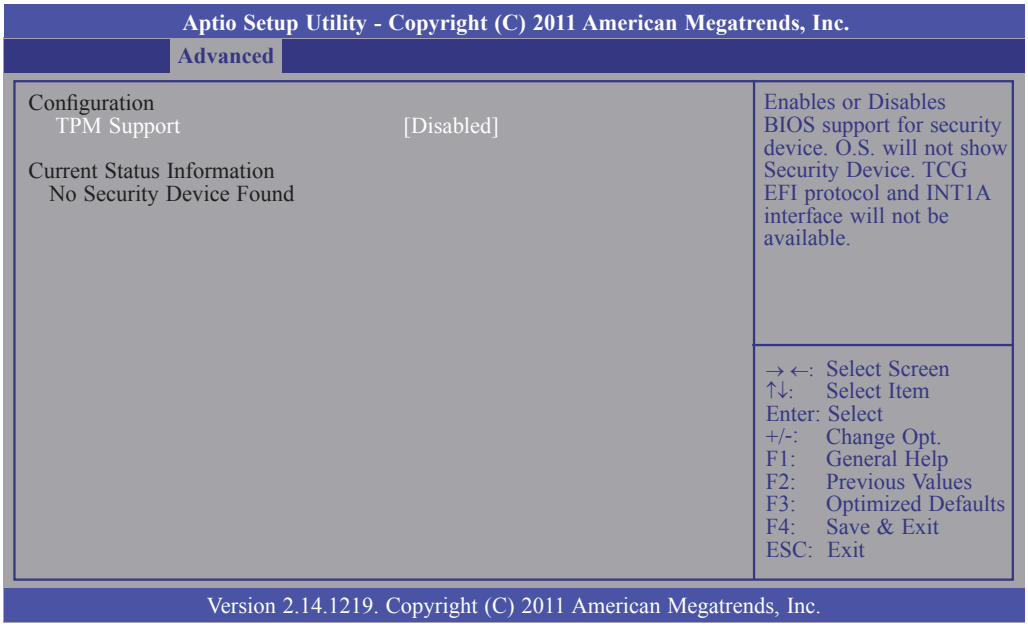
Enable this field to use the PME signal to wake up the system.

Wake system with fixed time

Enable or disable system wake on alarm event. When enabled, system will wake on the hr::min::sec specified.

Trusted Computing (optional)

This section configures settings relevant to Trusted Computing innovations.

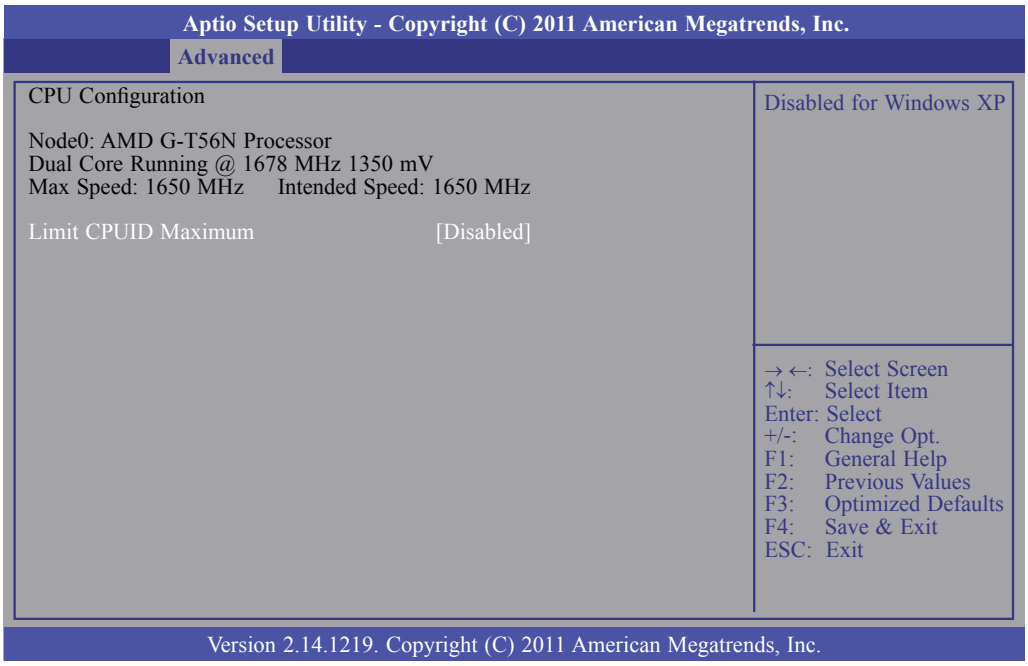


TPM Support

Enables or Disables TPM. O.S. will not show TPM. Resetting the platform is required.

CPU Configuration

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

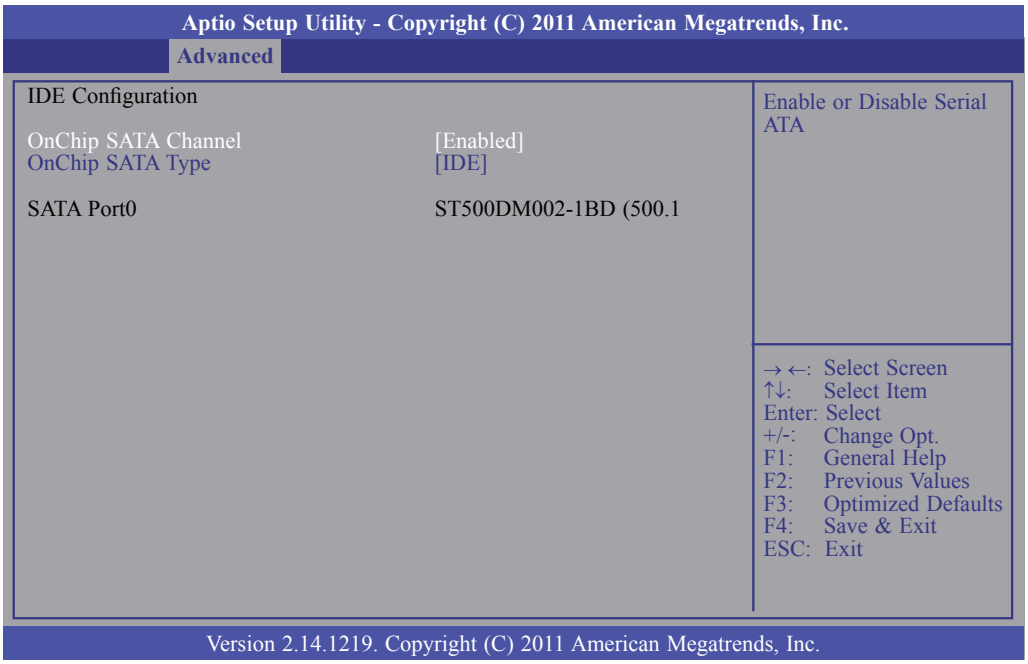


Limit CPUID Maximum

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.

IDE Configuration

This section is used to configure IDE functions.



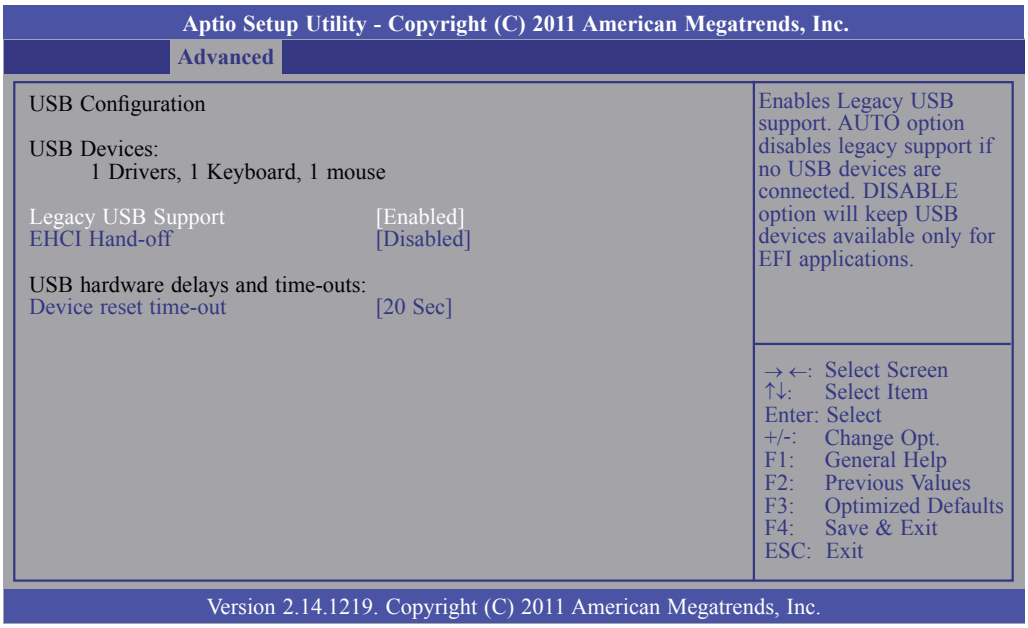
OnChip SATA Type

This field is used to configure the SATA devices supported by the AMD T56N/ T40N.

Native IDE	This option configures the Serial ATA drives as Parallel ATA storage devices.
RAID	This option allows you to create RAID on Serial ATA devices.
AHCI	This option allows the Serial ATA devices to use AHCI (Advanced Host Controller Interface).
Legacy IDE	This option configures the Serial ATA drives as Legacy IDE storage devices.

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

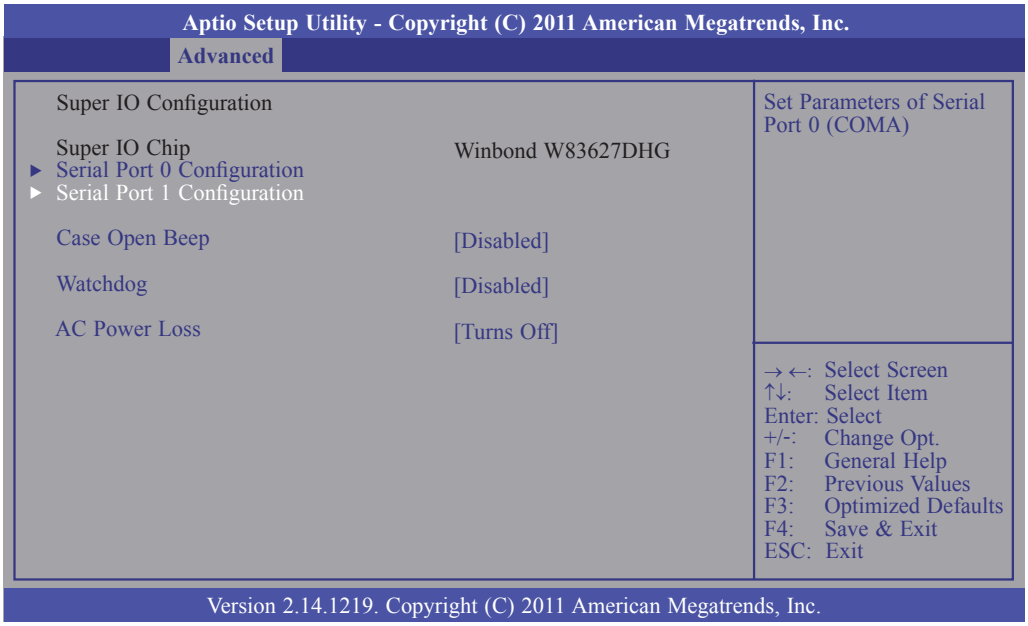
This is a workaround for OSes that does not support EHCI hand-off. The EHCI ownership change should be claimed by the EHCI driver.

Device reset time-out

Selects the USB mass storage device start unit command timeout.

Super IO Configuration

This section is used to configure the serial port functions.



Case Open Beep

Set this field to Enabled to allow the system to alert you of a chassis intrusion event.

Watchdog

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

AC Power Loss

Turns 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.

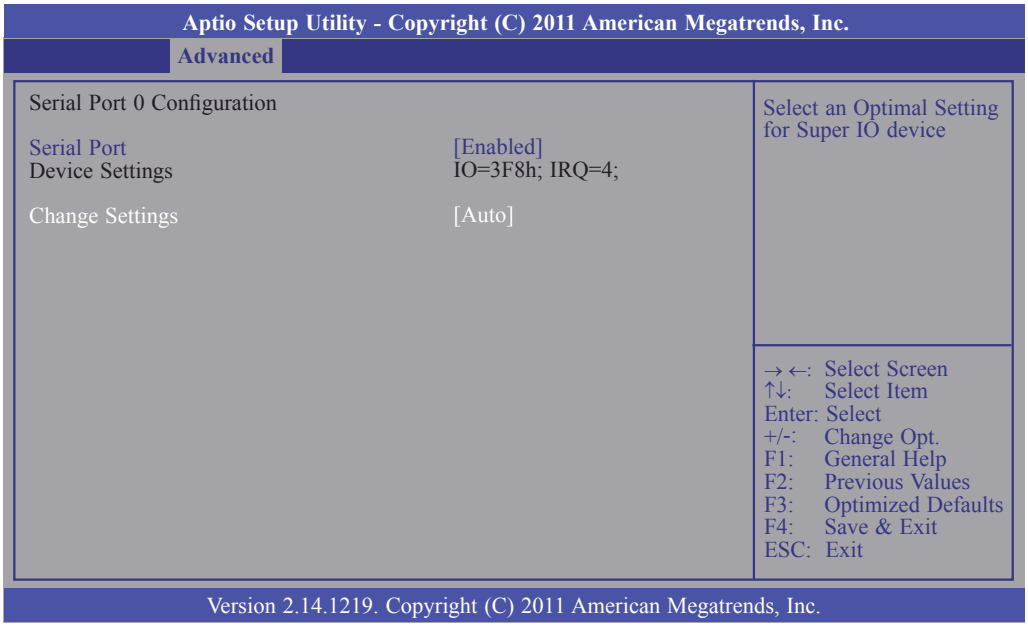
Turns On

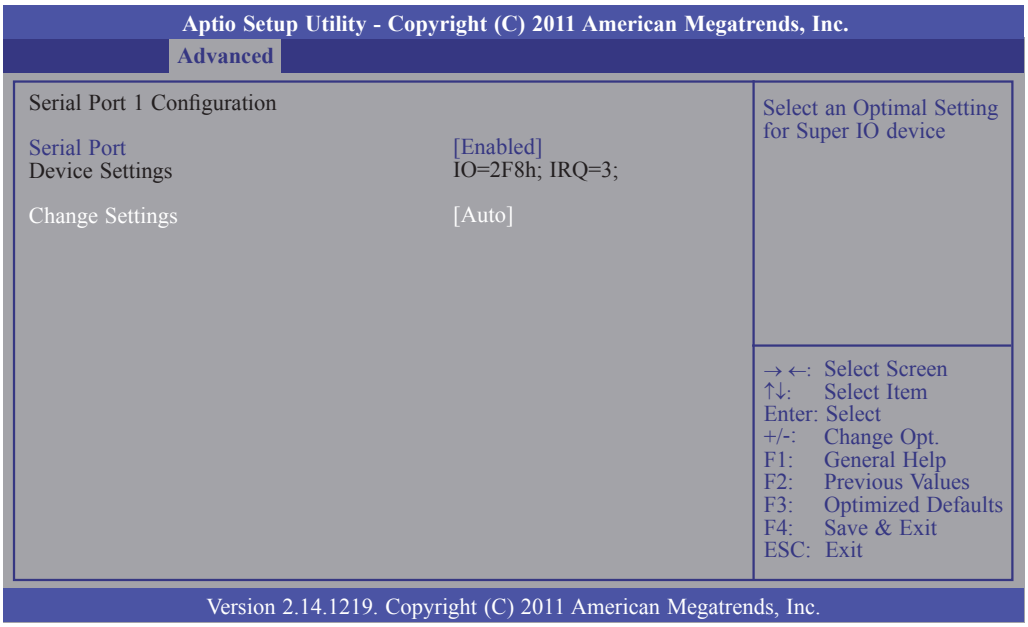
When power returns after an AC power failure, the system will automatically power-on.

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

Serial Port 0 Configuration to Serial Port 1 Configuration





Serial Port

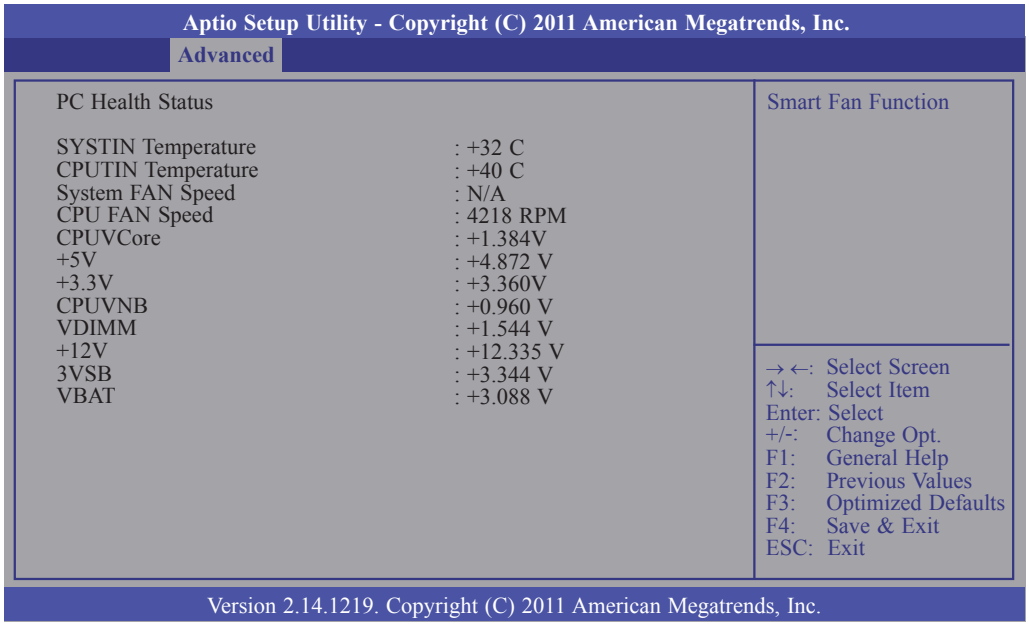
Enables or disables the serial port.

Change Settings

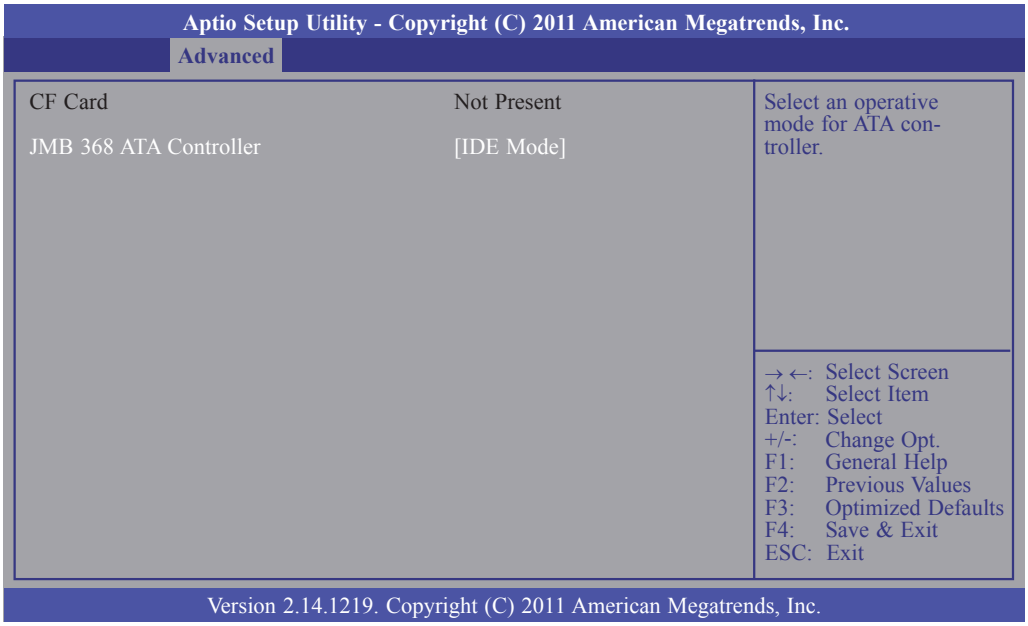
Selects the IO/IRQ setting of the I/O device.

PC Health Status

This section displays the SIO hardware health monitor.

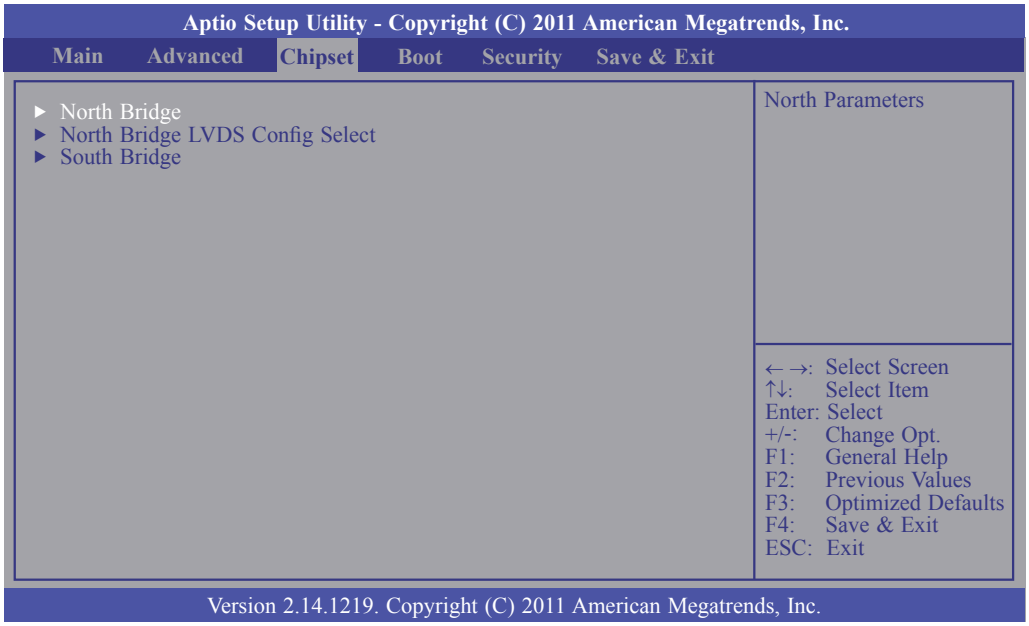


JMB36X ATA Controller Configuration

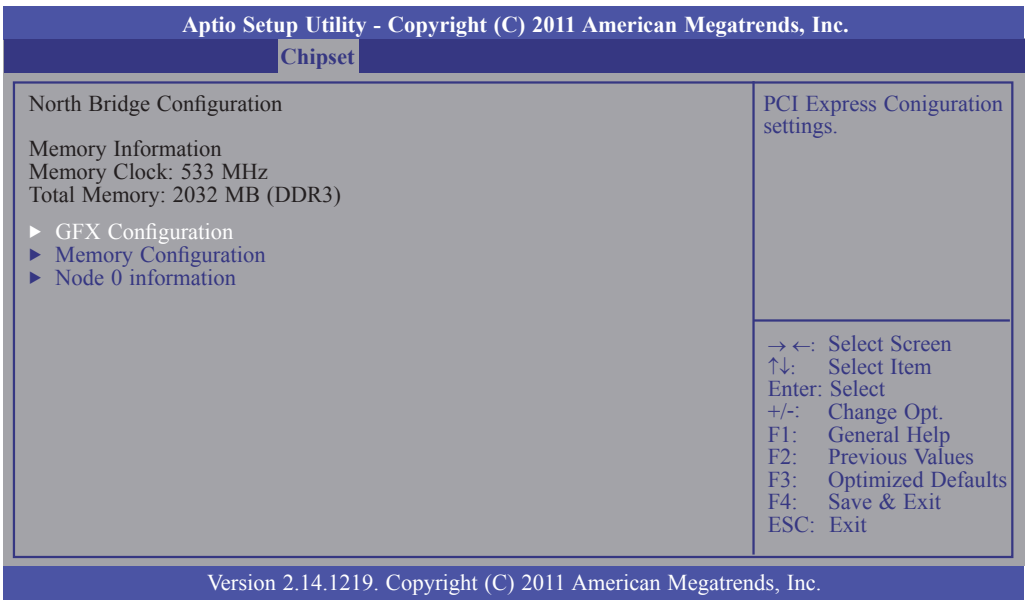


Chipset

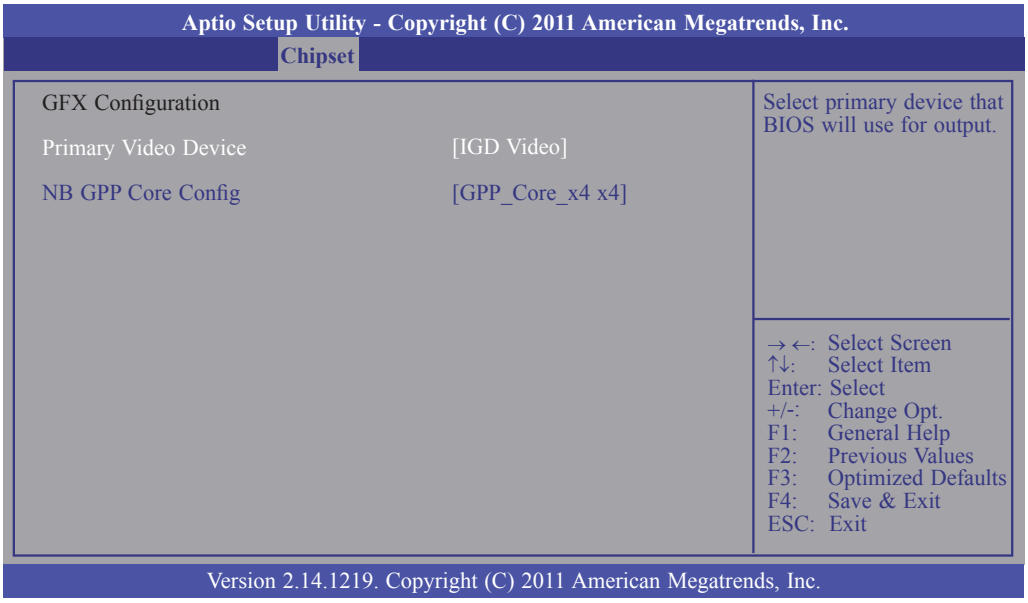
Configures relevant chipset functions.



North Bridge Configuration



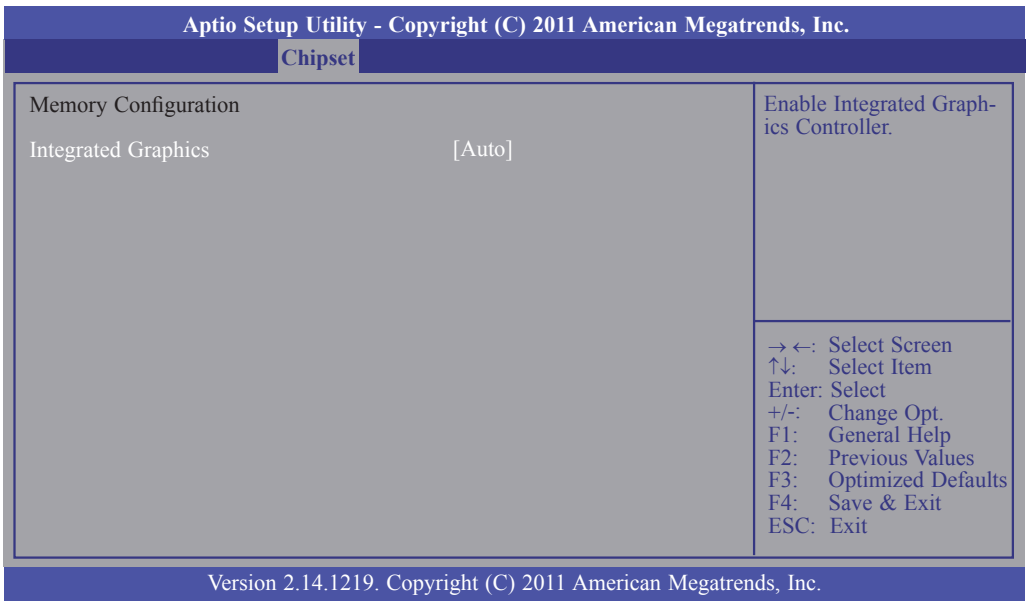
GFX Configuration



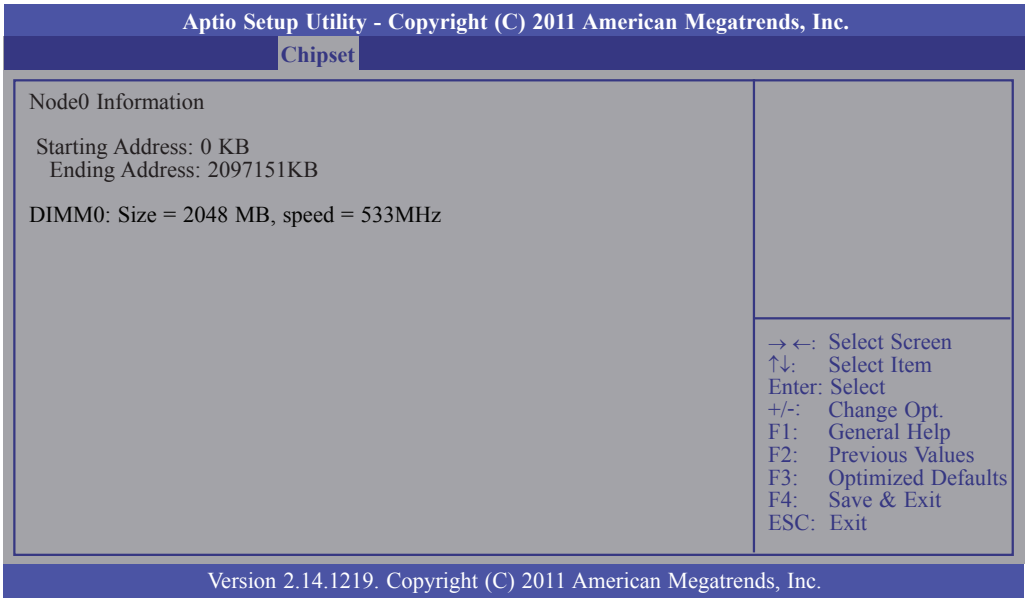
NB GPP Core Config

Selects the NB GPP Core confi guration.

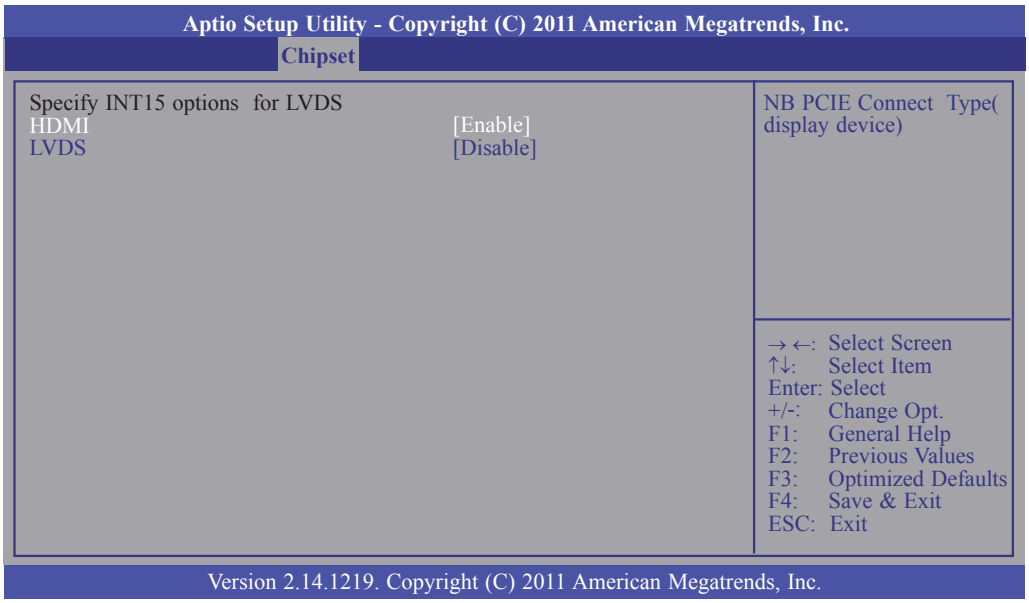
Memory Configuration



Node 0 Information



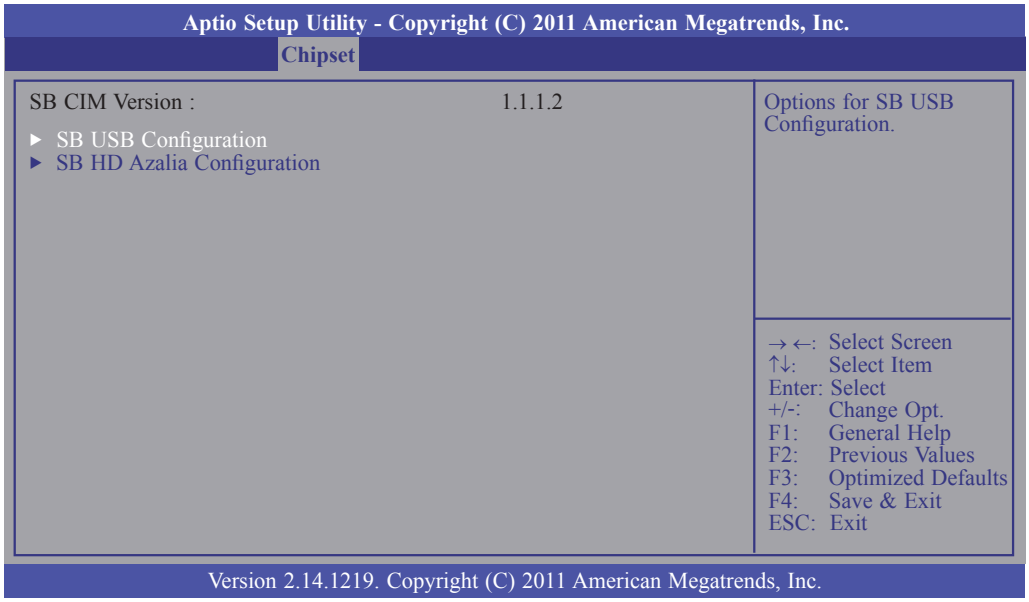
North Bridge LVDS Config Select



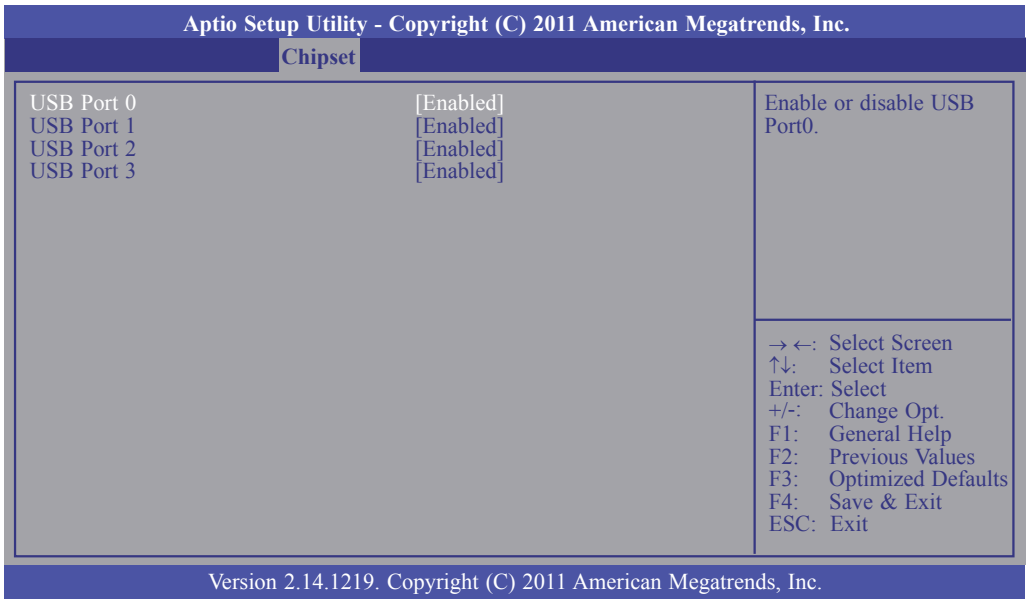
LVDS

This field is used to enable or disable the LVDS Panel

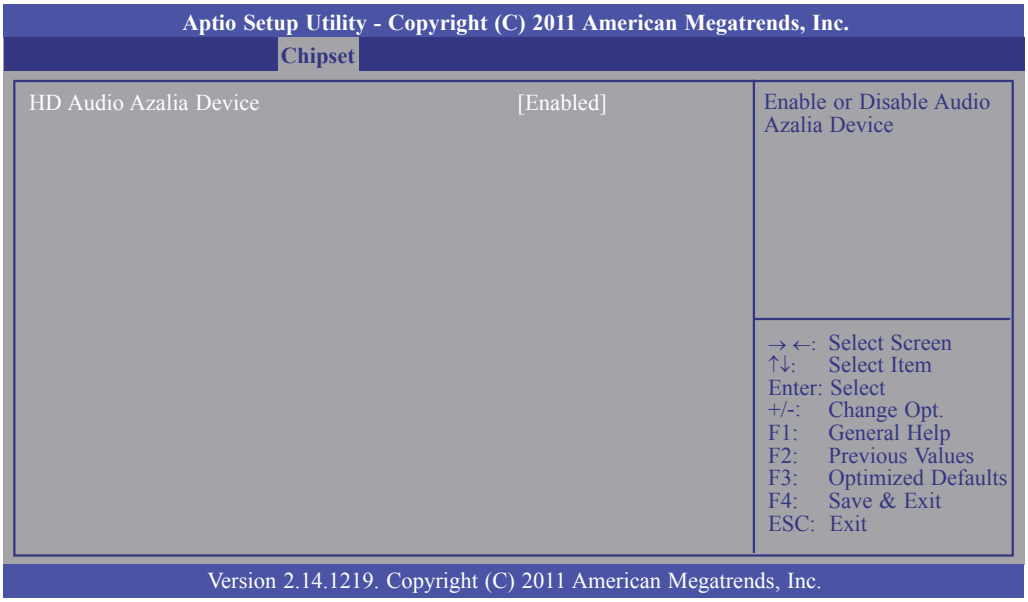
South Bridge



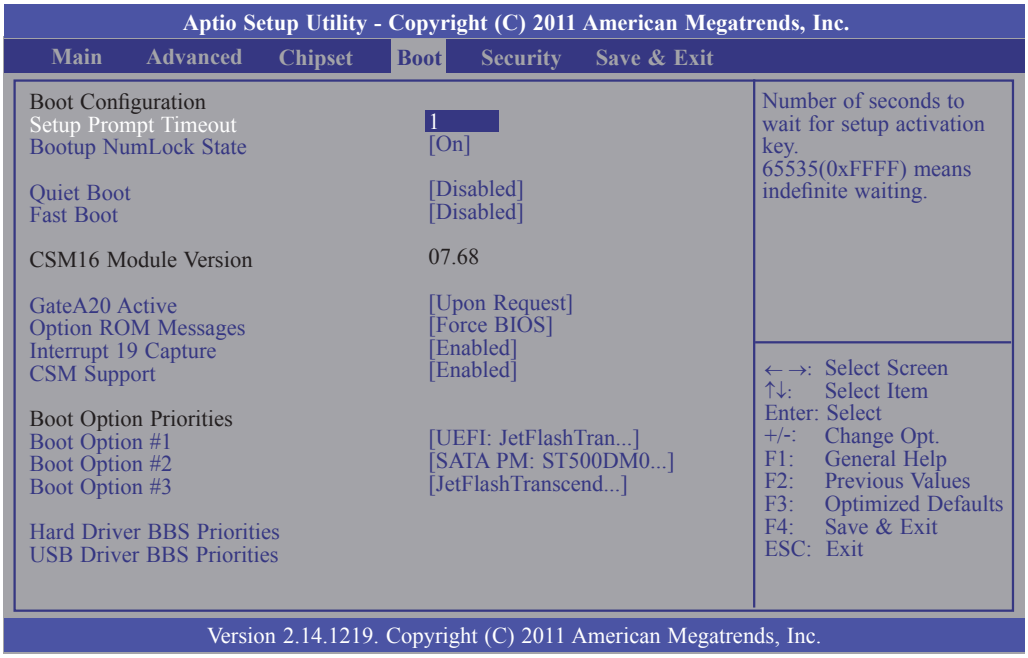
SB USB configuration



SB HD Azalia configuration



Boot



Setup Prompt Timeout

Selects the number of seconds to wait for the setup activation key. 65535(0xFFFF) denotes indefinite waiting.

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 re quired to launch active boot option. Has no effect for BBS boot options.

GateA20 Active

Upon Request- GA20 can be disabled using BIOS services.

Alwasy- Do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.

Option ROM Messages

Set display mode for option ROM.

Interrupt 19 Capture

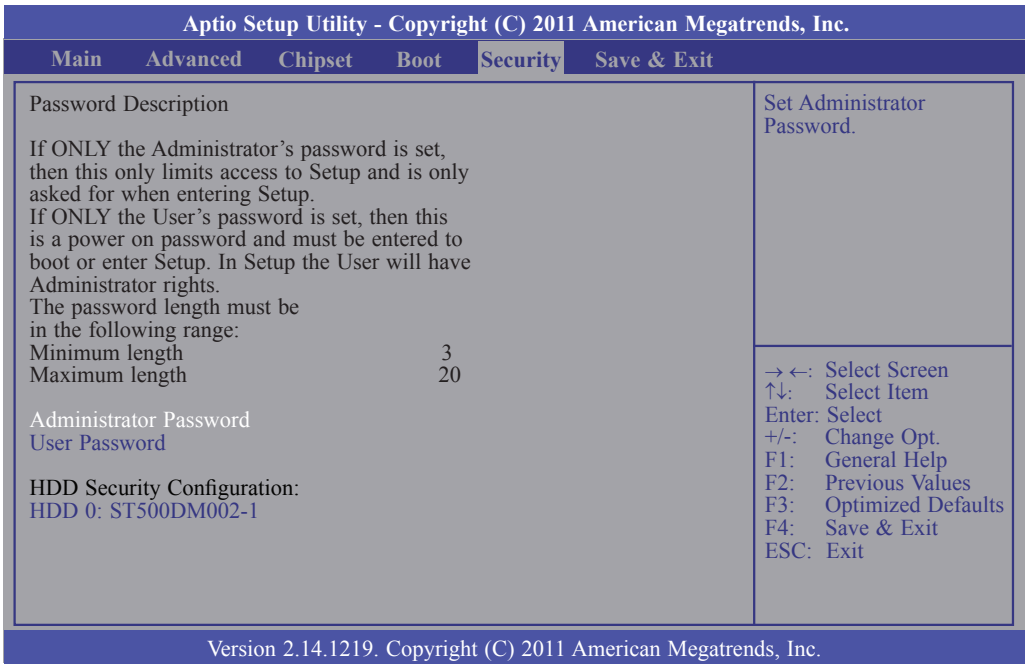
Enabled: Allows option ROMs to trap Int 19.

Disabled:

CSM Support

Enabled/ disabled CSM support. If auto is selected, based on OS, CSM will be enabled/ disabled automatically.

Security



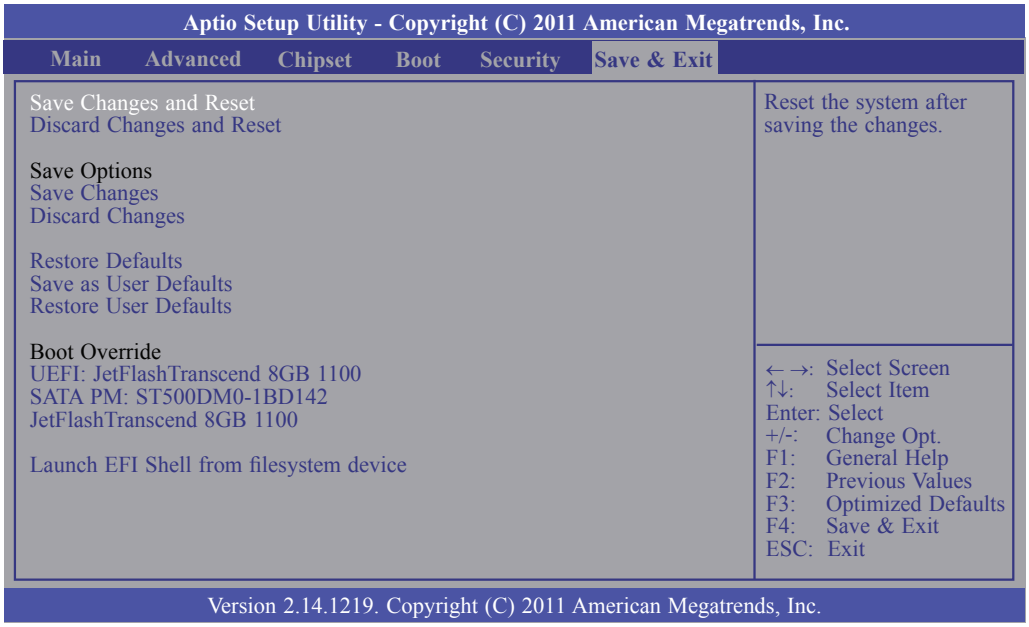
Administrator Password

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.

Save Changes

Save the changes done so far to any of the setup options.

Discard Changes

Discard the changes done so far to any of the setup options.

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.

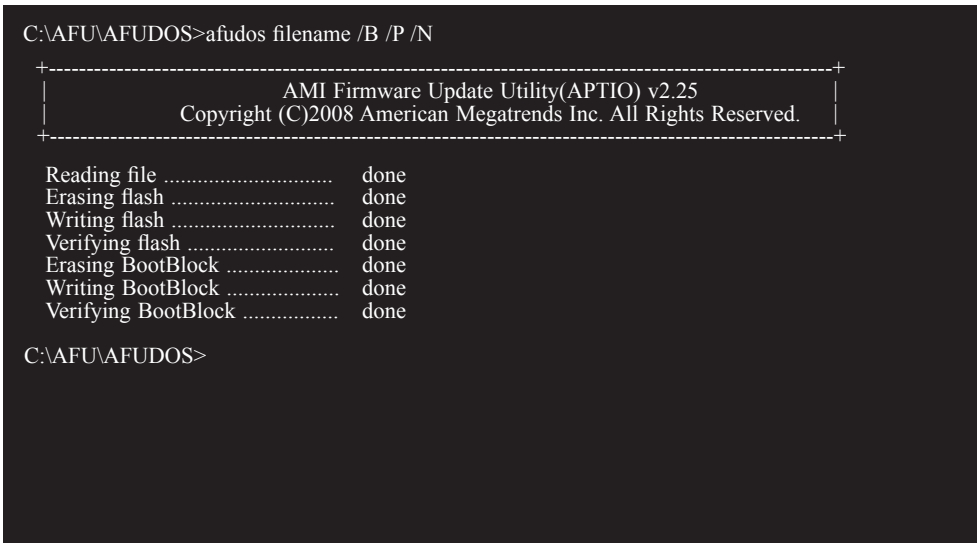
Updating the BIOS

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:

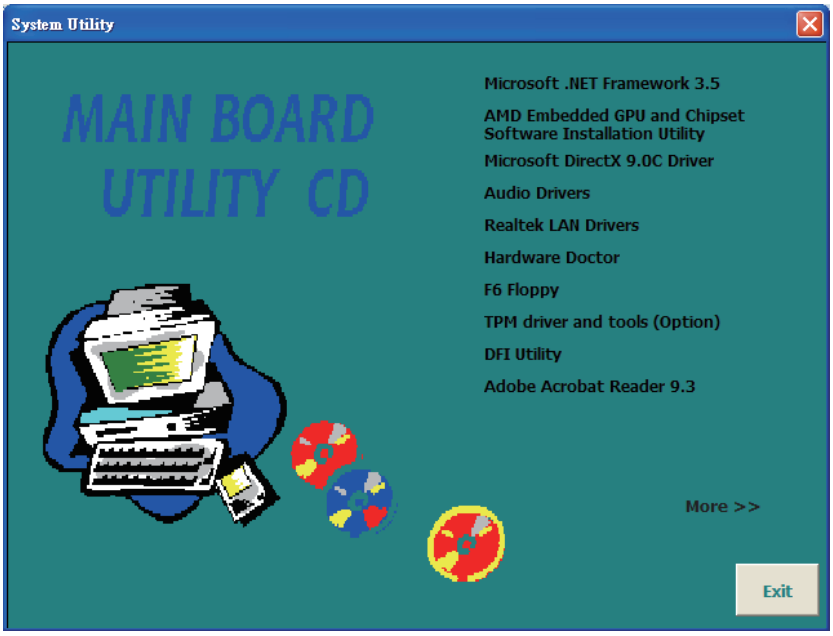
A:> AFUDOS BIOS_File_Name /b /p /n

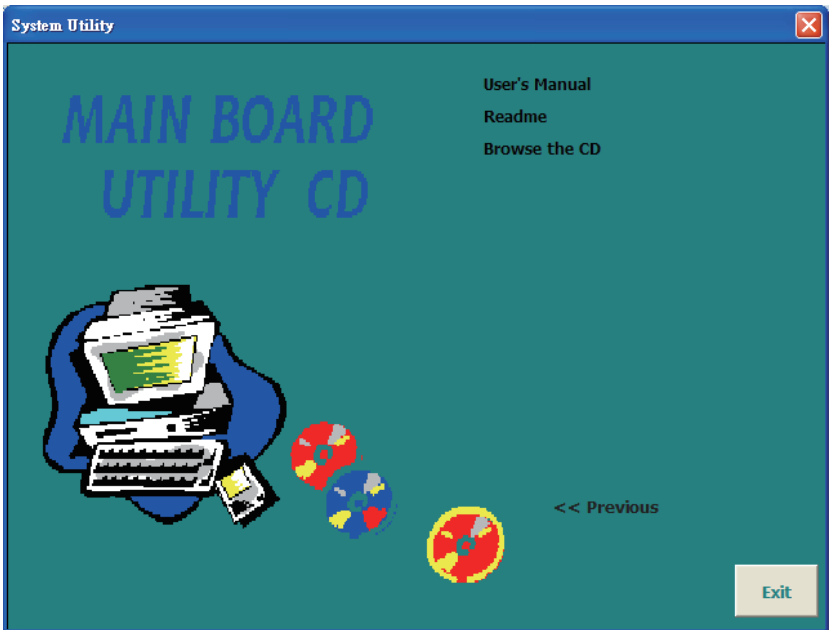
then press <Enter>.



Chapter 4 - Supported Software

Install drivers, utilities and software applications that are required to facilitate and enhance the performance of the system board. You may acquire the software from your sales representatives, from an optional DVD included in the shipment, or from the website download page at https://www.dfi.com/DownloadCenter.





Microsoft .NET Framework 3.5 (for Windows XP only)

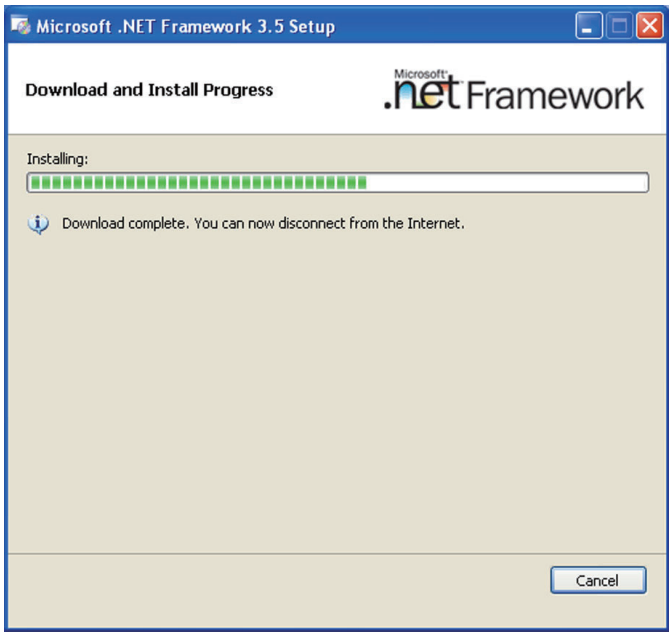
Note:
Before installing Microsoft .NET Framework 3.5, make sure you have updated your Windows XP operating system to Service Pack 3.

To install the driver, click "Microsoft .NET Framework 3.5" on the main menu.

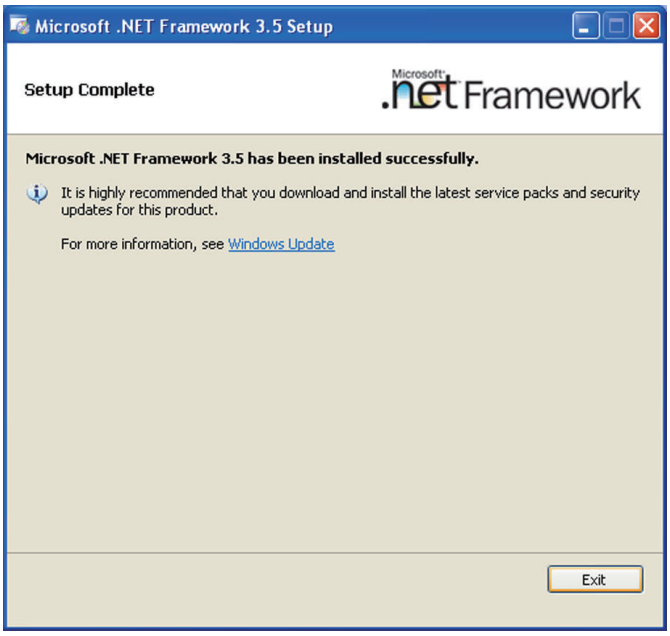
1. Read the license agreement carefully.

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

2. Setup is now installing the driver.



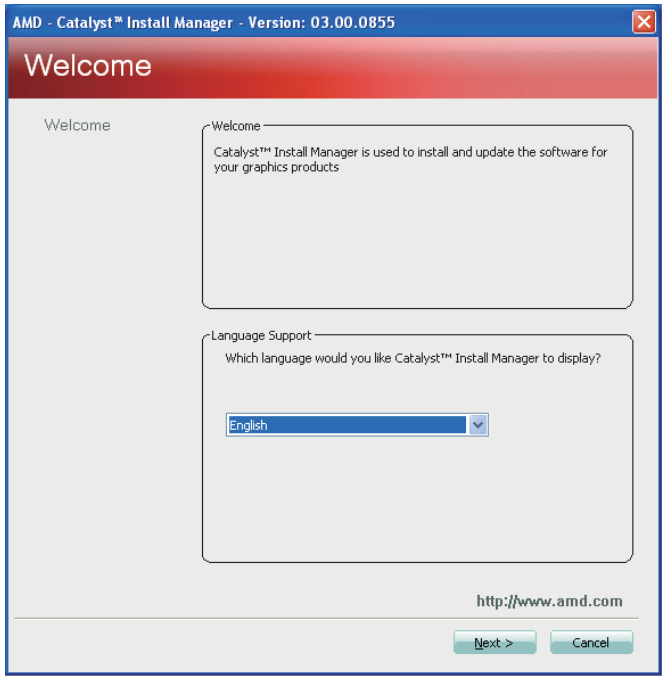
3. Click Exit.


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

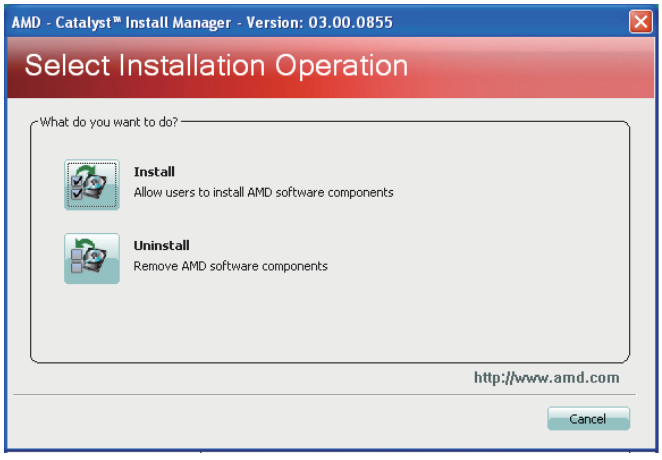
AMD Embedded GPU and Chipset Software Installation Utility

To install the driver, click "AMD Embedded GPU and Chipset Software Installation Utility" on the main menu.

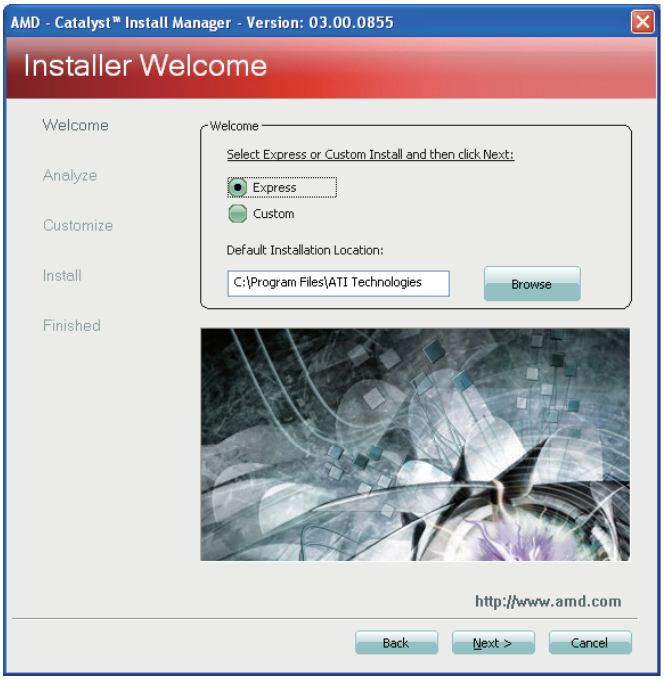
1. Under the Language Support section, select the language you would like the installation to display and then click Next.



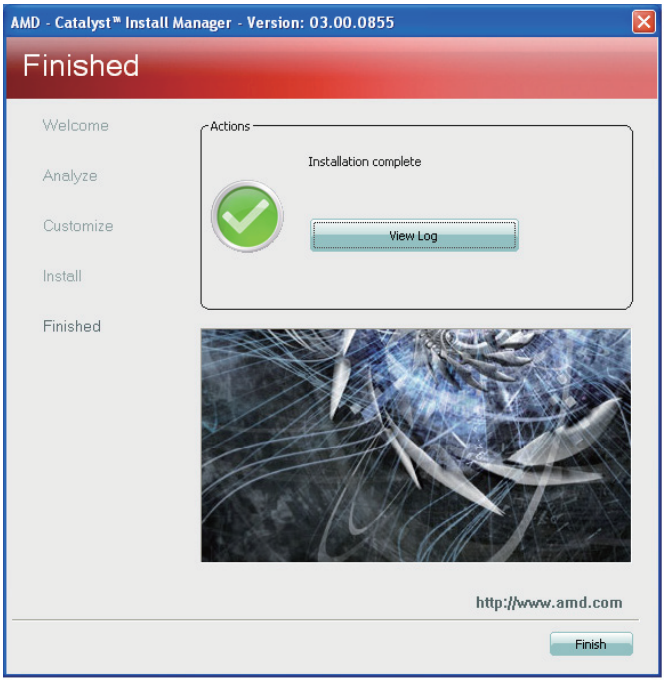
2. Click Install to begin the installation.



3. Click Express and then click Next.



4. After completing installation, click Finish.

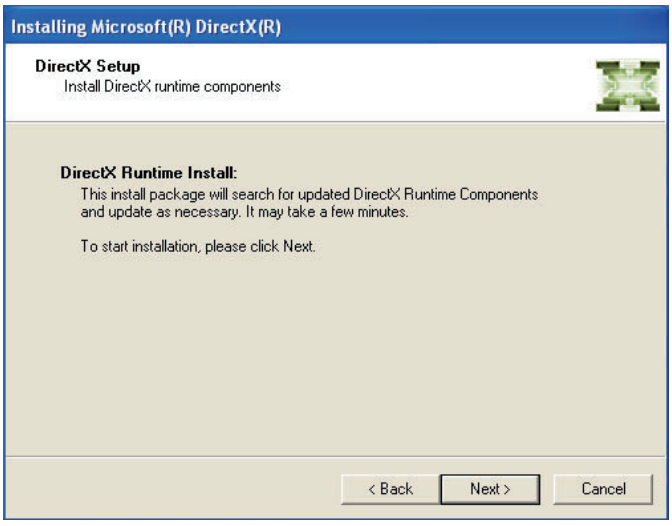


Microsoft DirectX 9.0C (for Windows XP only)

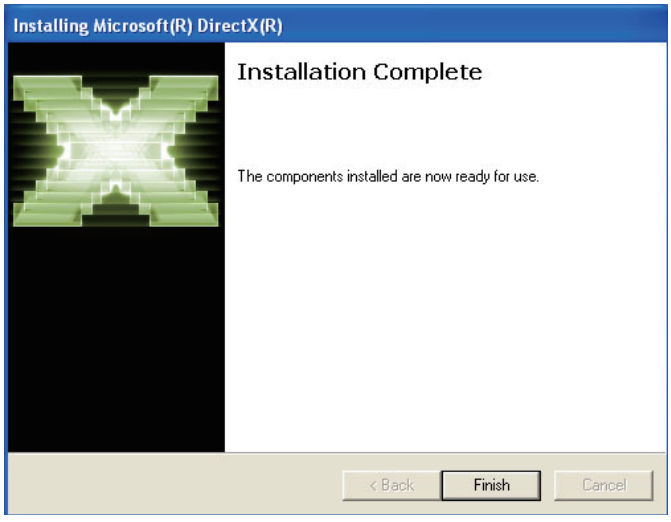
To install the driver, click "Microsoft DirectX 9.0C" on the main menu.

1. Click "I accept the agreement" then click Next.

2. To start installation, click Next.



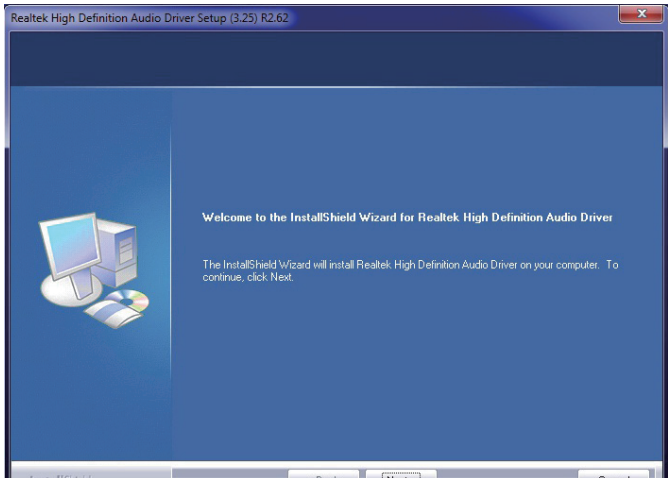
3. Click Finish. Reboot the system for DirectX to take effect.



Audio Drivers

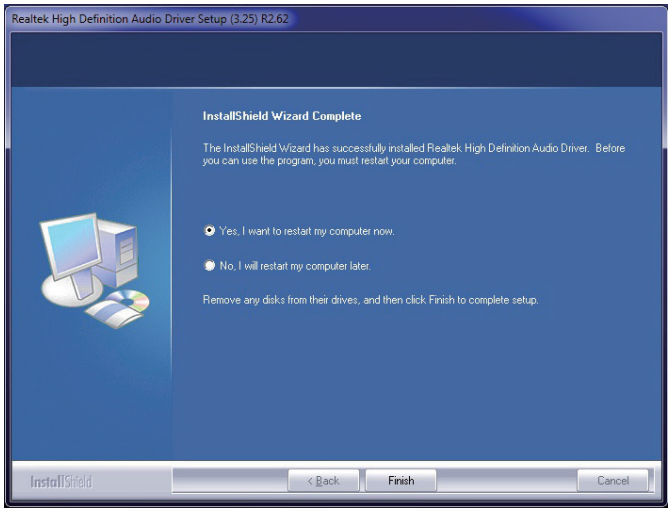
To install the driver, click "Audio Drivers" on the main menu.

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



2. Click "Yes, I want to restart my computer now" then click Finish.

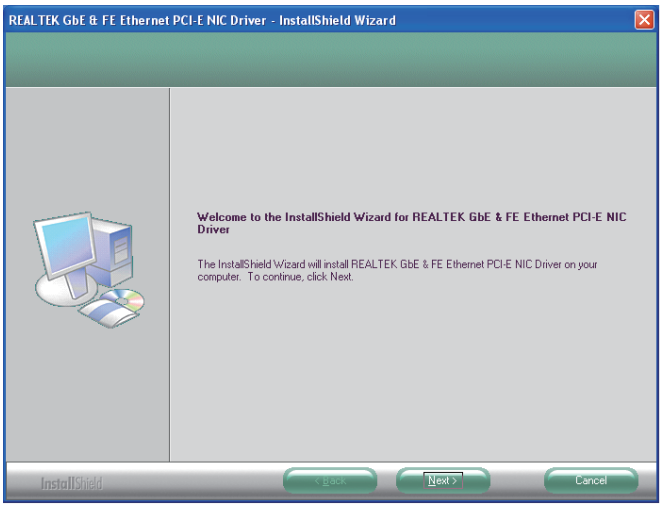
   Restarting the system will allow the new software installation to take effect.



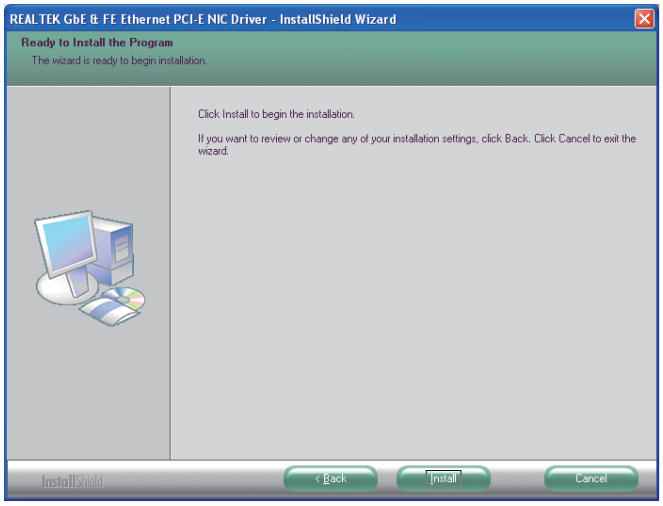
Realtek LAN Drivers

To install the driver, click "Realtek LAN Drivers" on the main menu.

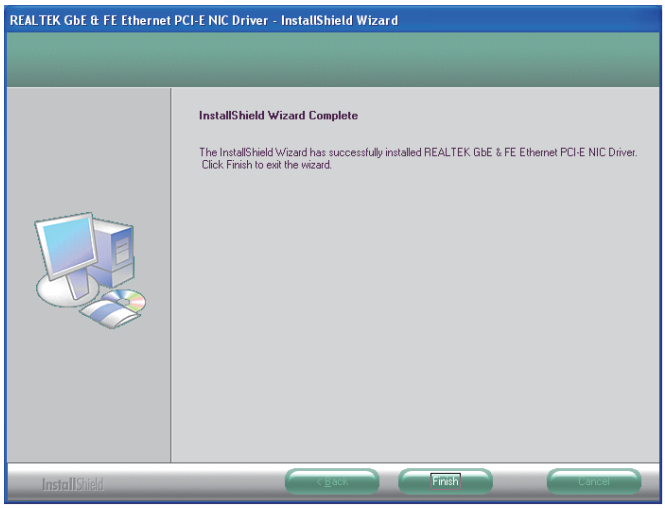
1. Setup is ready to install the driver. Click Next.



2. Click Install to begin the installation.



3. After completing installation, click Finish.

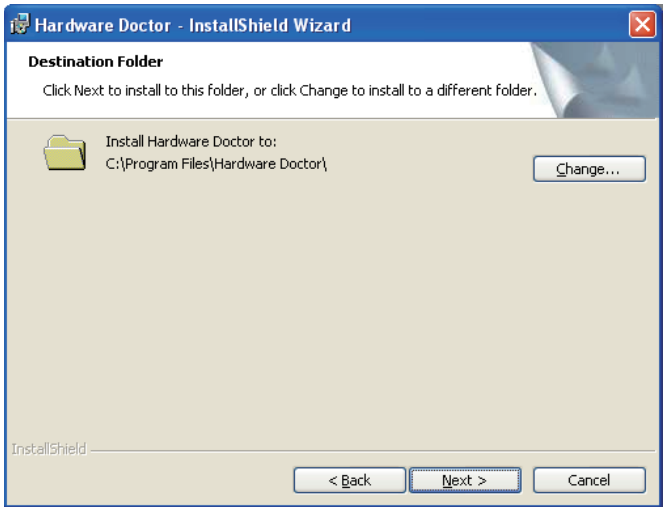


Hardware Doctor

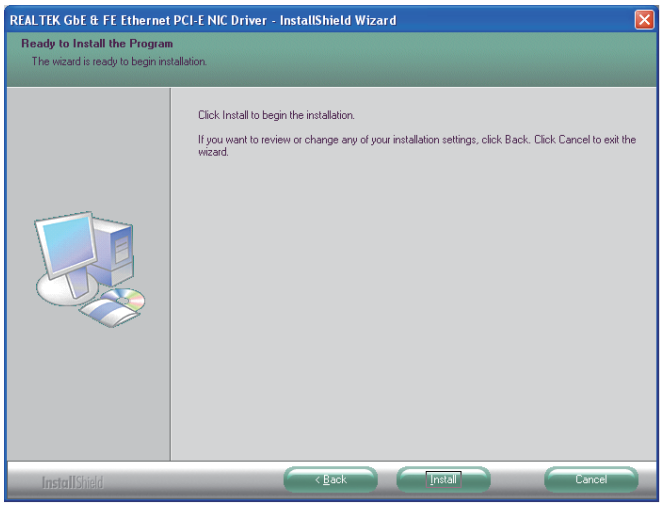
To install the driver, click "Hardware Doctor" on the main menu.

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

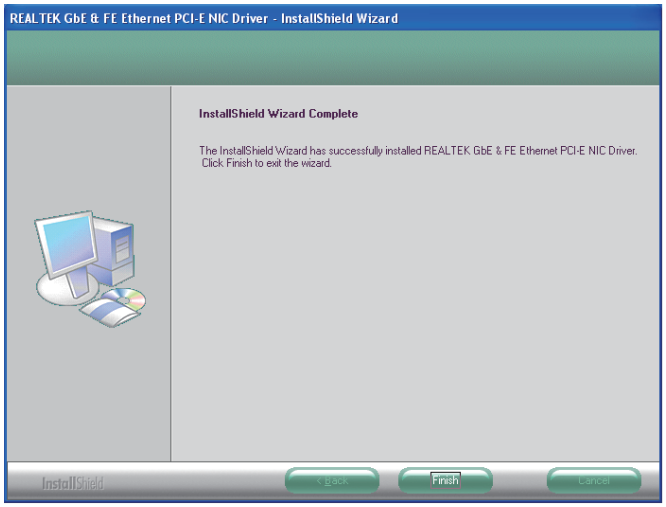
2. Click Next to install to this folder, or click Change to install to a different folder.



3. Click Install to begin the installation.



4. After completing installation, click Finish.



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.

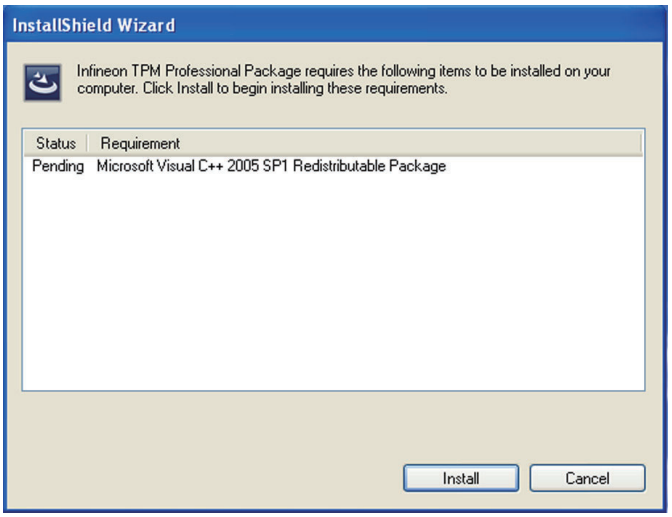
   32-bit
   CD Drive:\AHCI_RAID\F6FLOPPY\f6flpy32

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

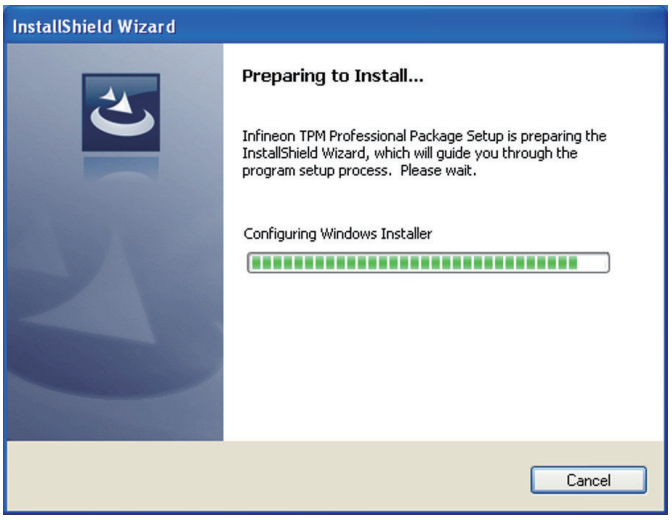
Infineon TPM Driver and Tool (optional)

To install the driver, click "Infineon TPM driver and tool (option)" on the main menu.

1. TPM requires installing the Microsoft Visual C++ package prior to installing the driver. Click Install.

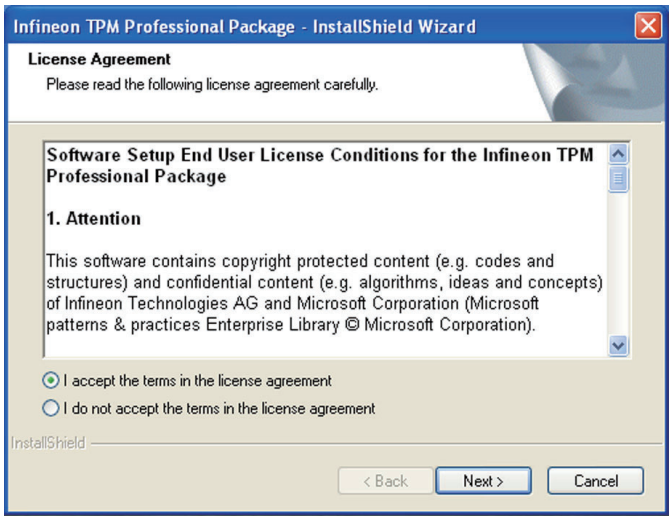


2. The setup program is preparing to install the driver.

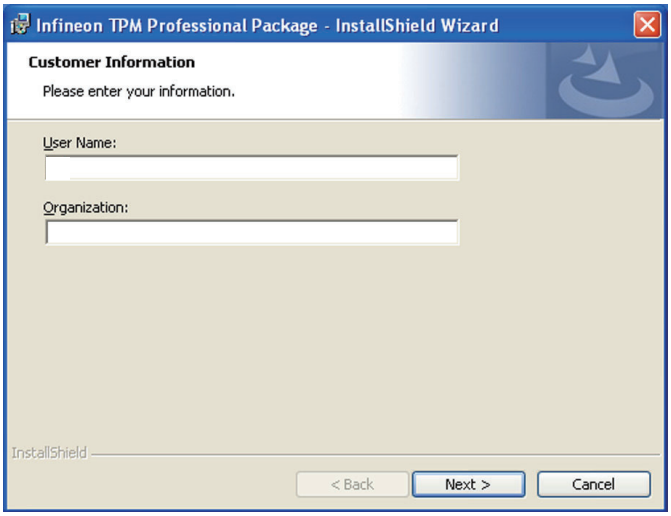


3. The setup program is ready to install the driver. Click Next.

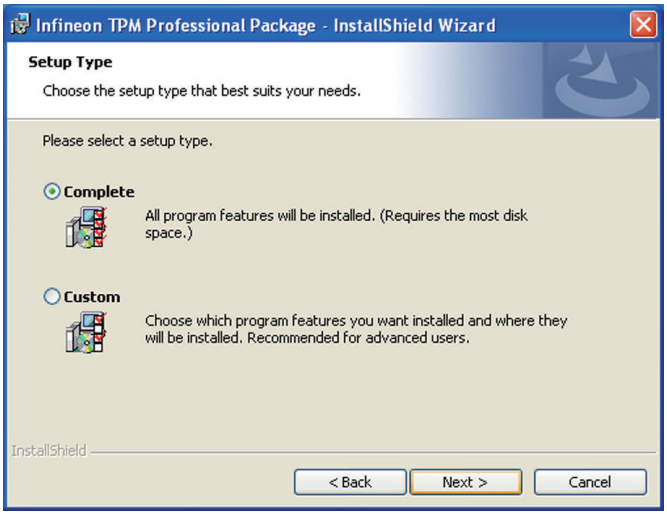
4. Click "I accept the terms in the license agreement" and then click "Next".



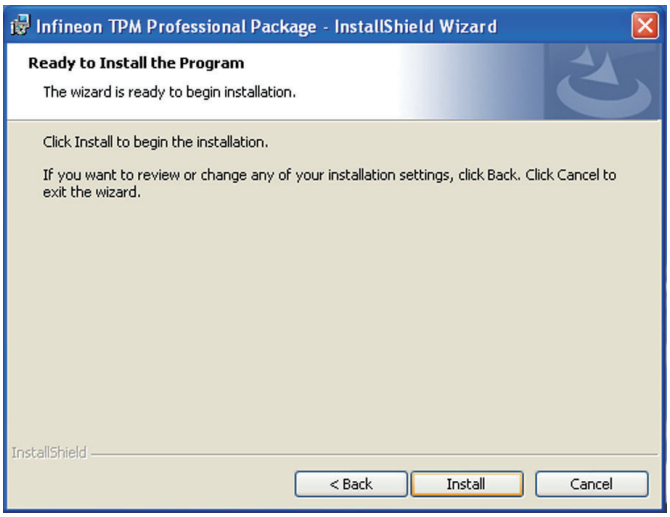
5. Enter the necessary information and then click Next.



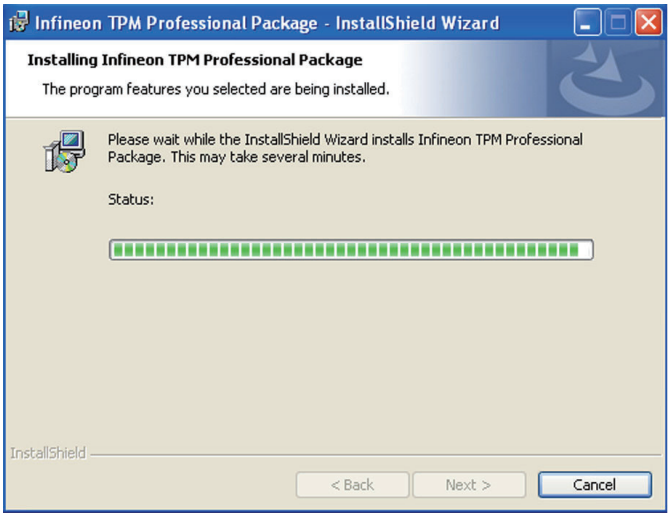
6. Select a setup type and then click Next.



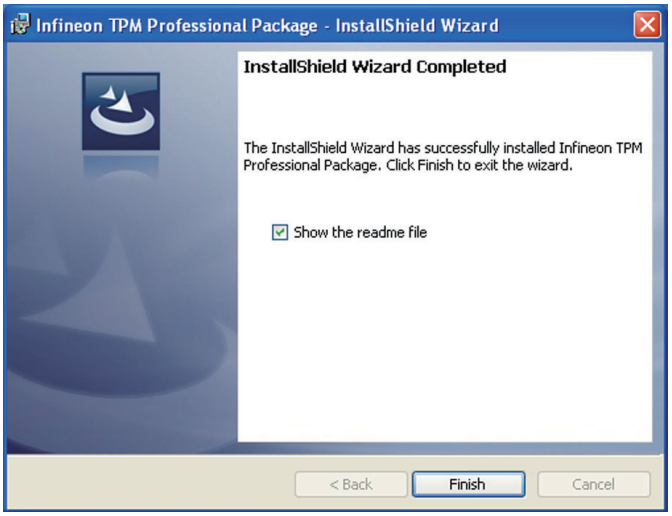
7. Click Install.



8. The setup program is currently installing the driver.

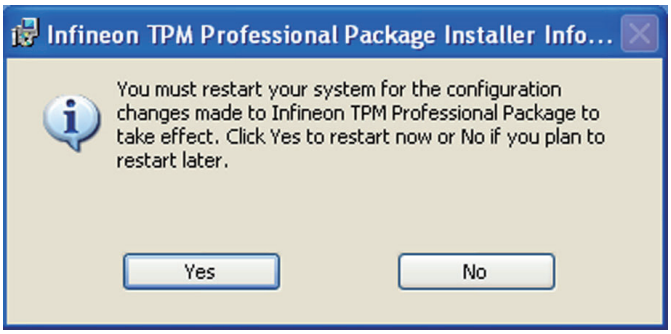


9. Click Finish.



10. Click Yes to restart the system.

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

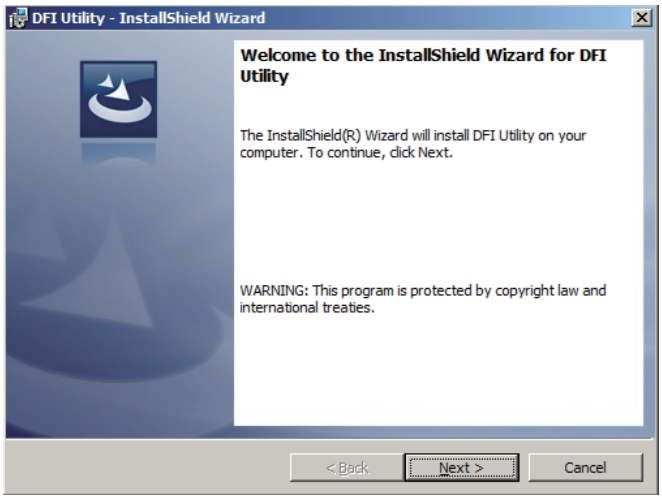


DFI Utility

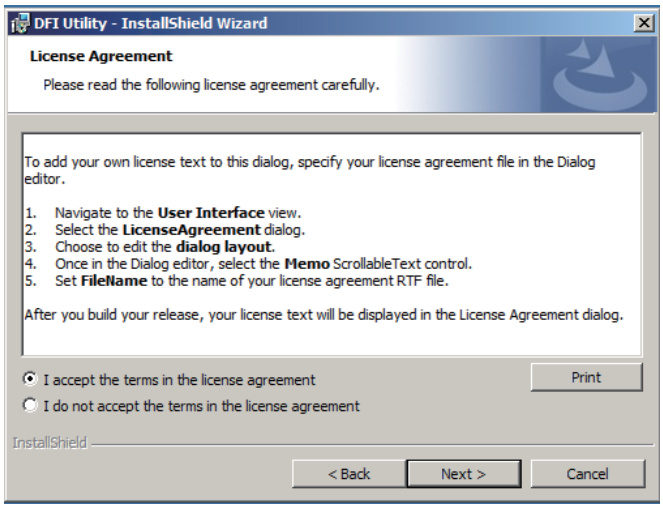
DFI Utility provides information about the board, Watchdog, DIO, and Backlight. To access the utility, click "DFI Utility" on the main menu.

Note:
If you are using Windows 7, you need to access the operating system as an administrator to be able to install the utility.

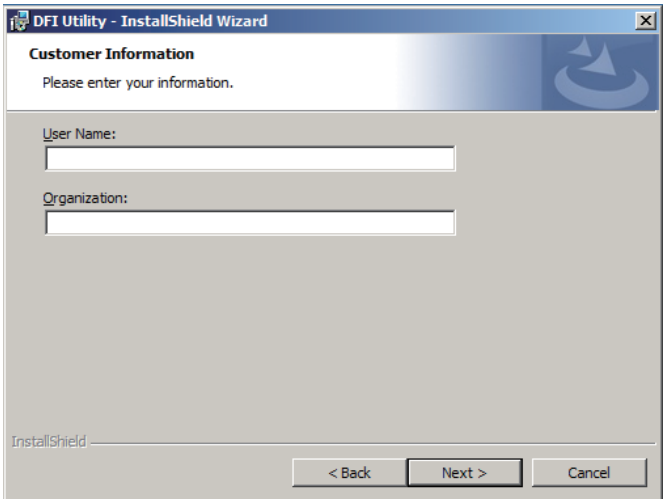
1. Setup is ready to instal the DFI Utility driver Click "Next".



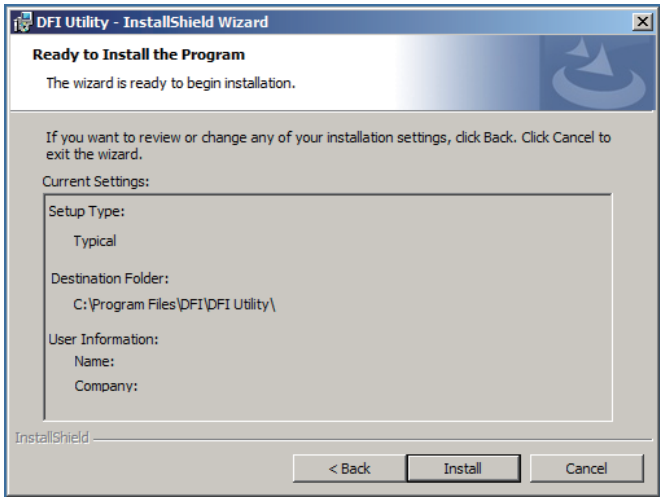
2. Click "I accept the terms in the license agreement" then click "Next".



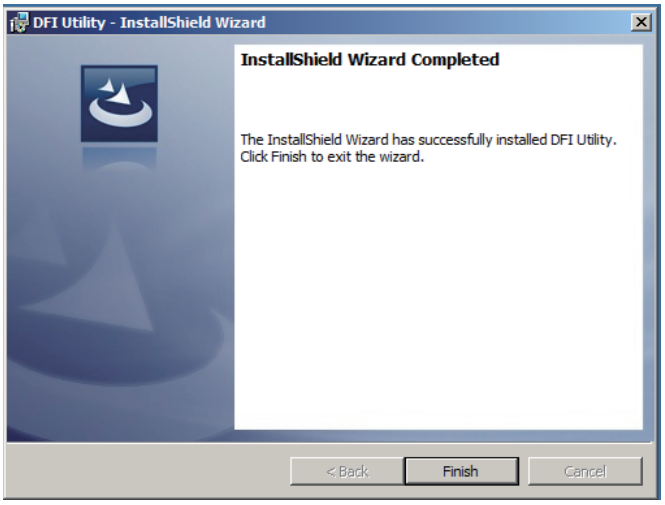
3. Enter "User name" and "Organization" information then click "Next".



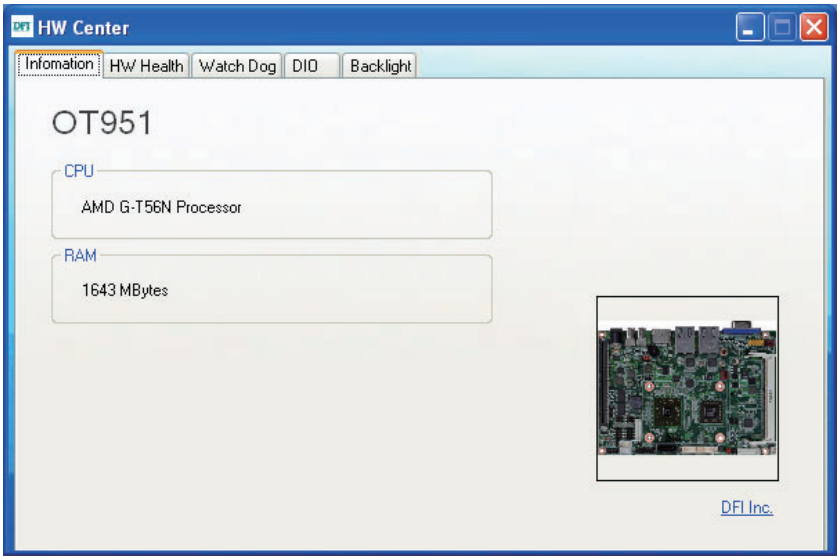
4. Click "Install" to begin the installation.



5. After completing installa tion, click "Finish".



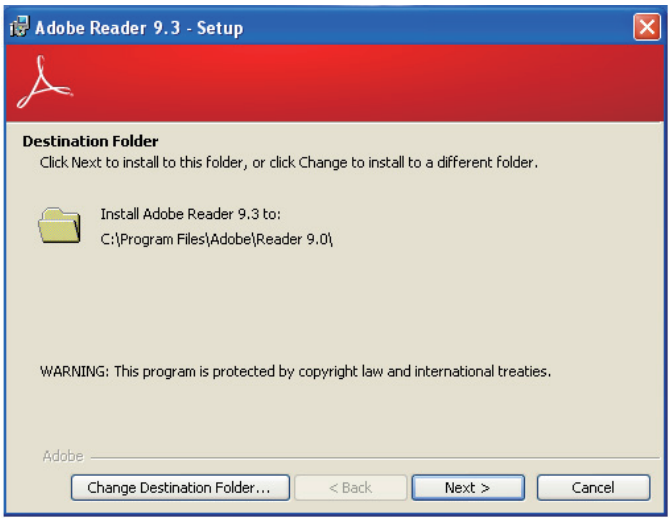
The DFI Utility icon will appear on the desktop. Double-click the icon to open the utility.



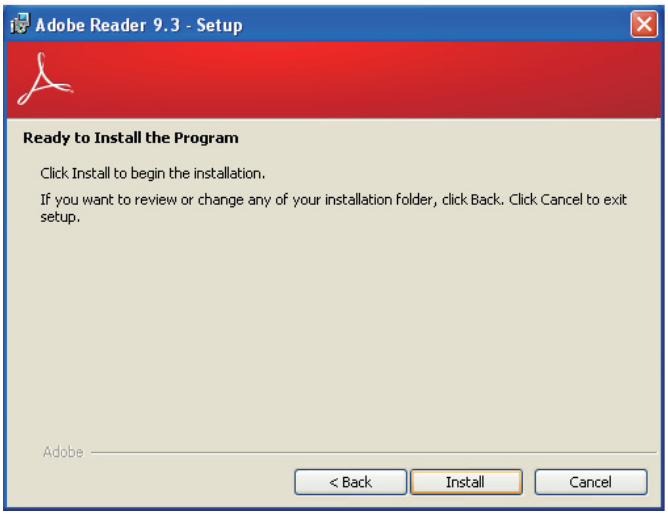
Adobe Acrobat Reader 9.3

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

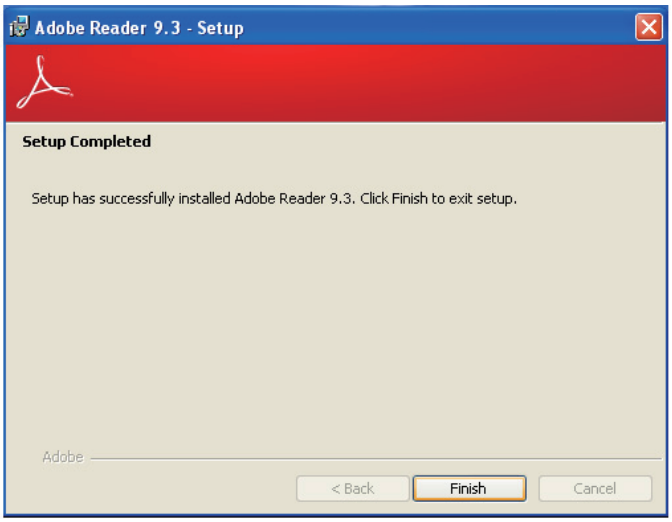
1. Click Next to install or click Change Destination Folder to select another folder.



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.

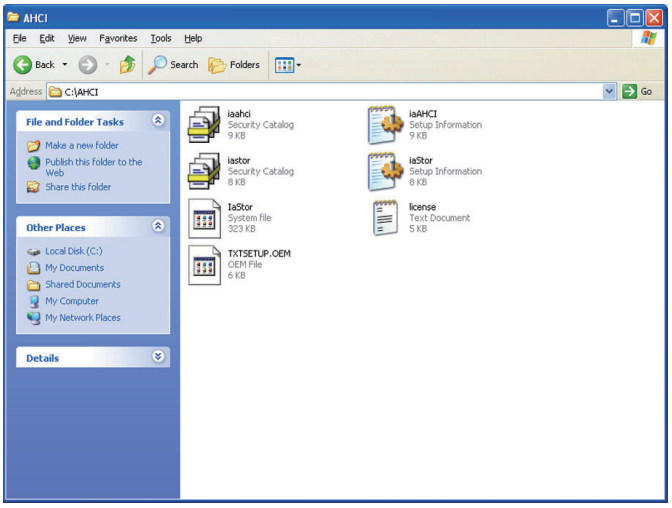
   http://www.nliteos.com/download.html

2. Install nLite.

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

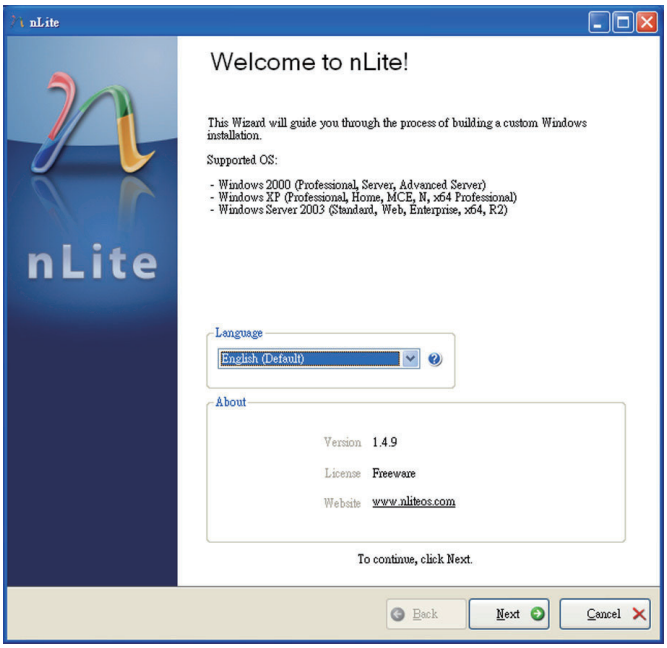
3. Download relevant RAID/AHCI driver files from Intel's website. The drivers you choose will depend on the operating system and chipset used by your computer.

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



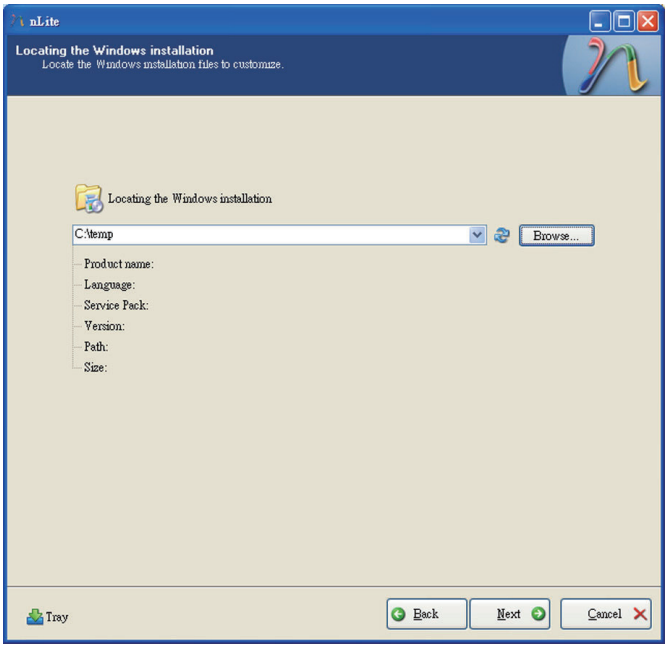
4. Insert the XP installation disc into an optical drive.

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

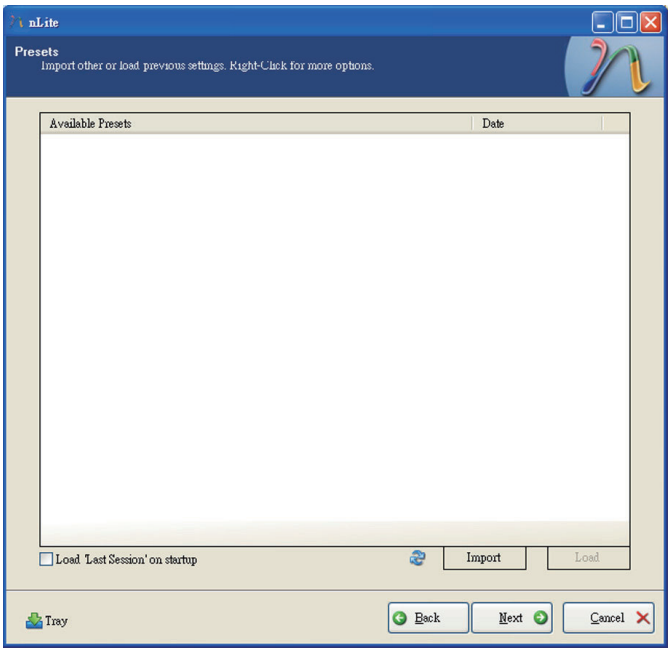


6. Click **Next** to temporarily save the Windows installation files to the designated default folder.

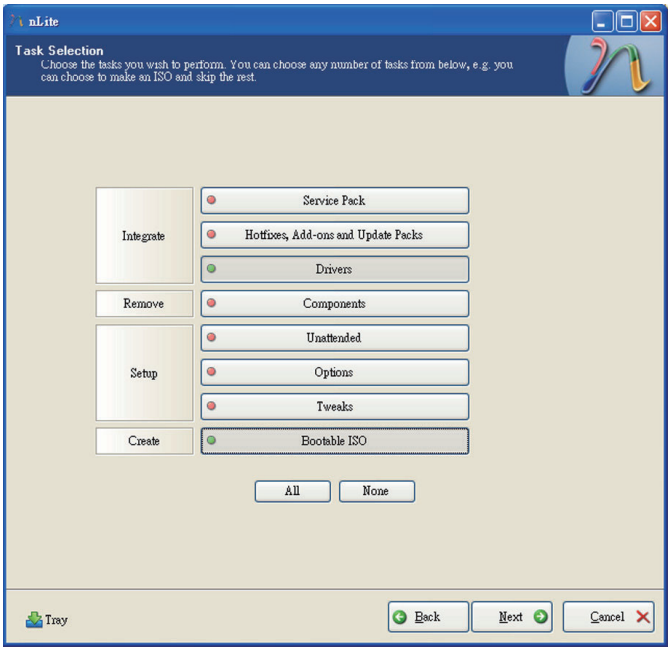
   If you want to save them in another folder, click **Browse**, select the folder and then click **Next**.



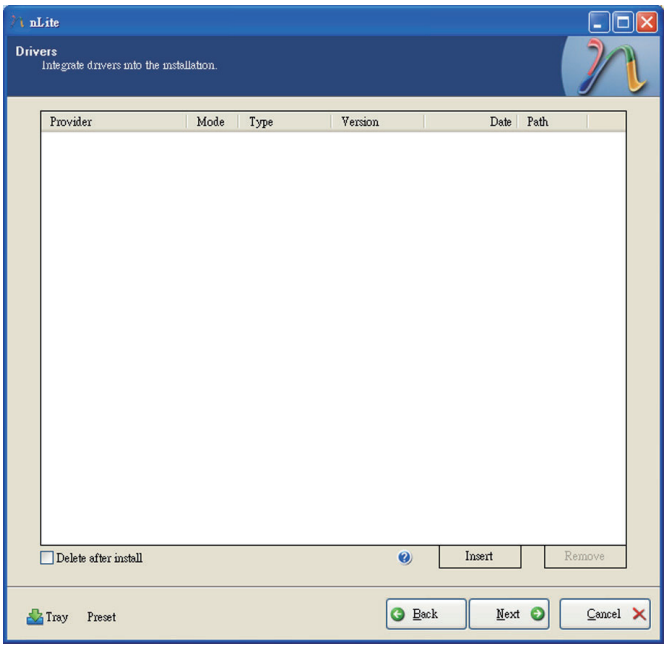
7. Click **Next**.



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

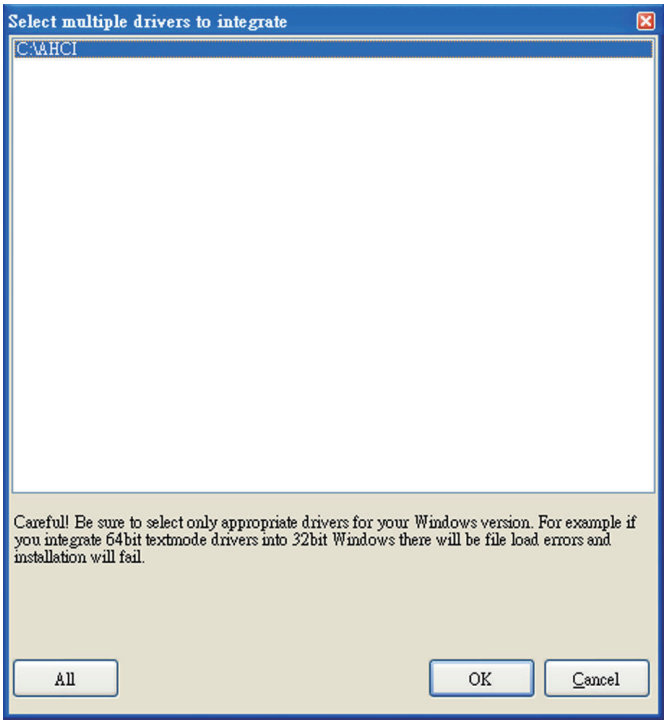


9. Click **Insert** and then select **Multiple driver folder** to select the drivers you will integrate. Click **Next**.



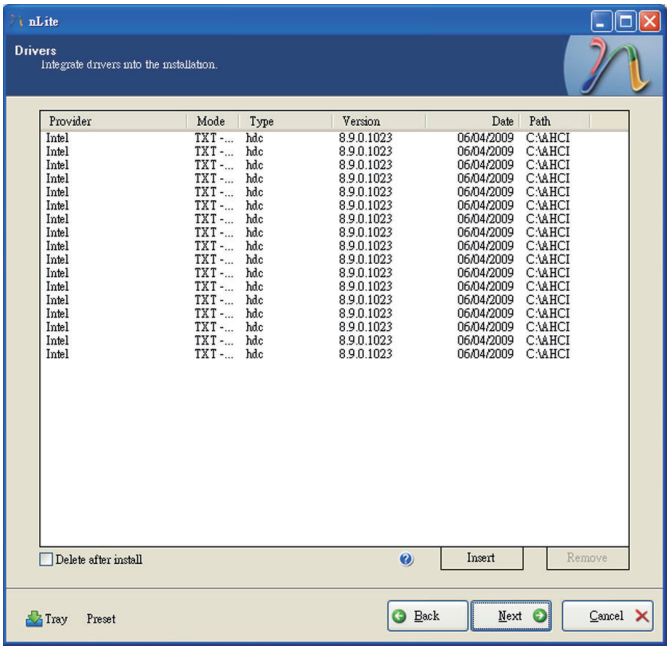
10. Select only the drivers appropriate for the Windows version that you are using and then click **OK**.

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

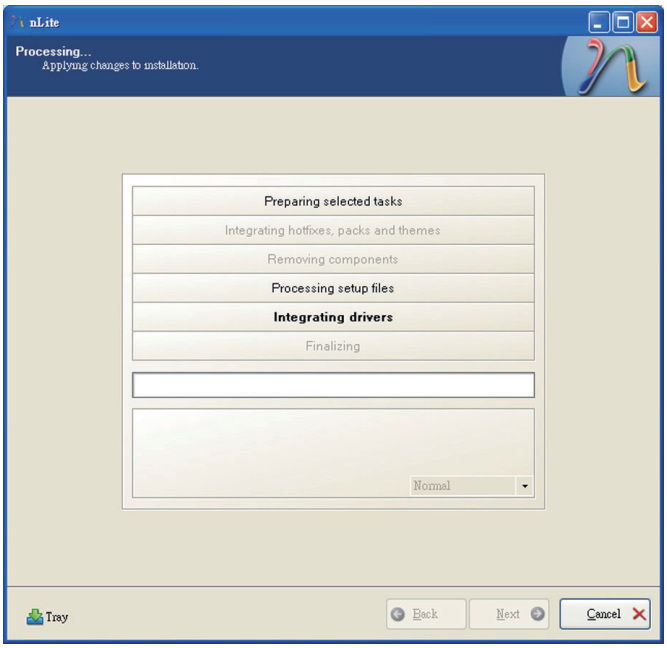


11. If you are uncertain of the southbridge chip used on your motherboard, select all RAID/AHCI controllers and then click **OK**.

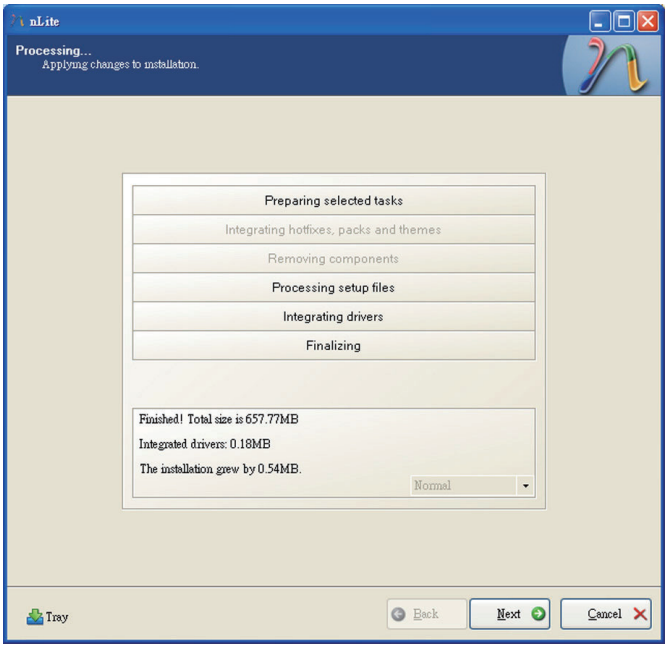
12. Click **Next**.



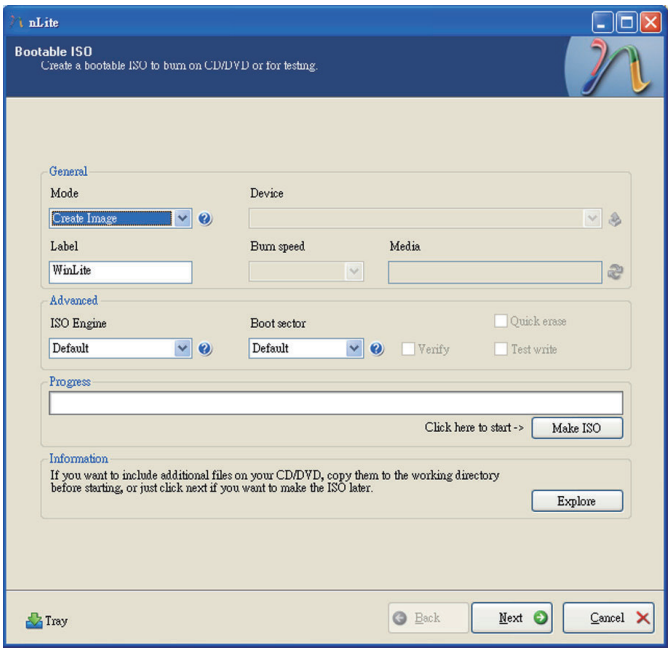
13. The program is currently integrating the drivers and applying changes to the installation.



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

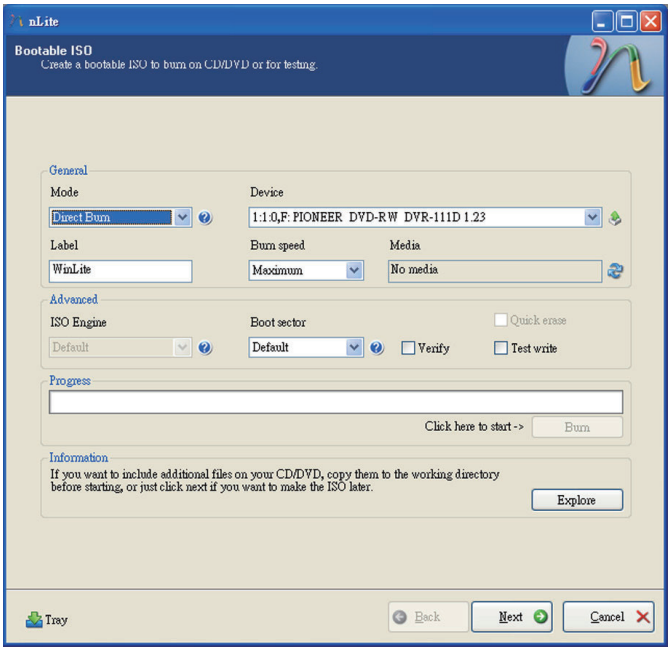


15. To create an image, select the **Create Image** mode under the General section and then click **Next**.



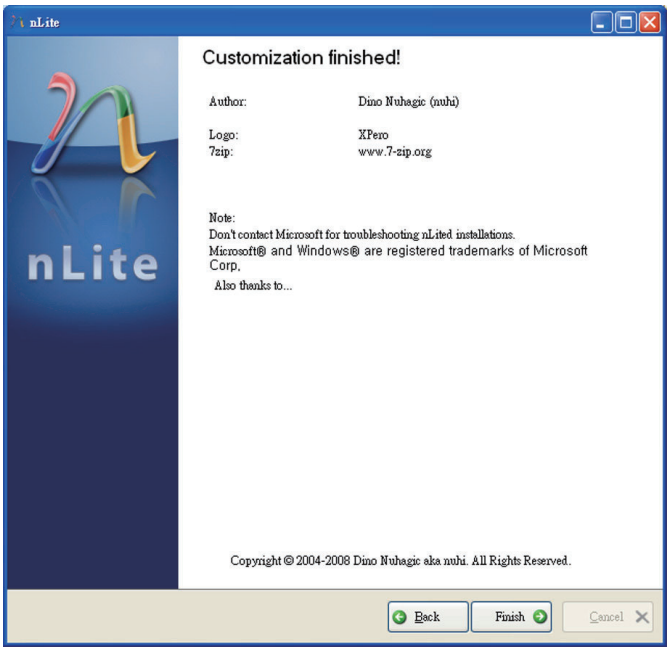
16. Or you can choose to burn it directly to a disc by selecting the **Direct Burn** mode under the General section.

    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

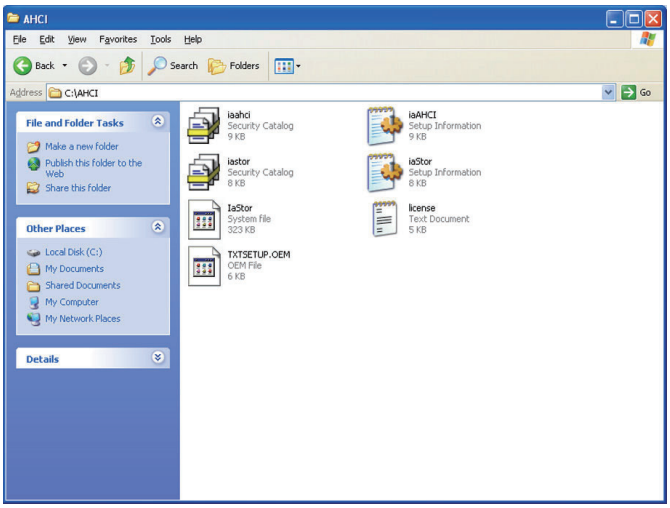
The installation steps below will guide you in configuring your SATA drive to AHCI mode.

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

2. Install Windows XP but do not press F6.

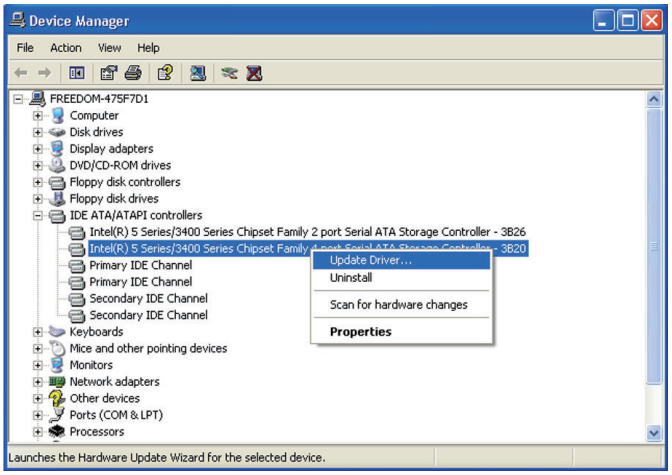
3. Download relevant RAID/AHCI driver files supported by the motherboard chipset from Intel's website.

   Transfer the downloaded driver files to C:\AHCI.



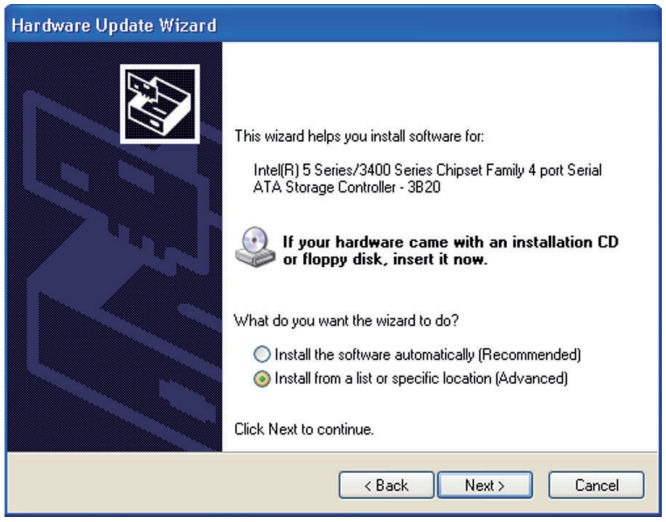
4. Open Device Manager and right click on one of the Intel Serial ATA Storage Controllers, then select **Update Driver**.

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

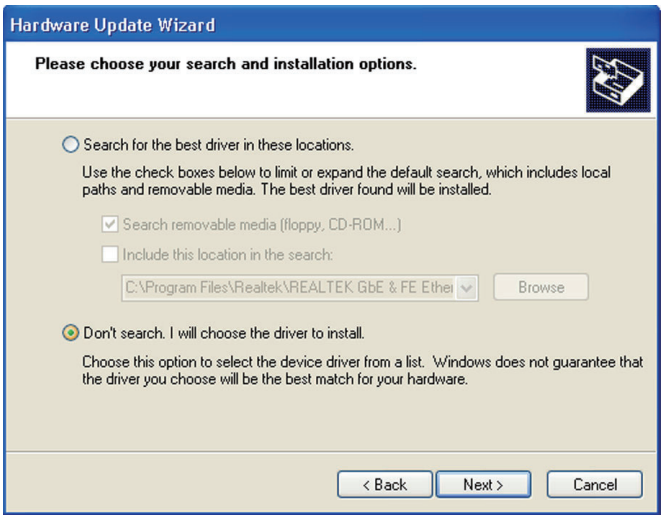


5. In the Hardware Update Wizard dialog box, select **"No, not this time"** then click **Next**.

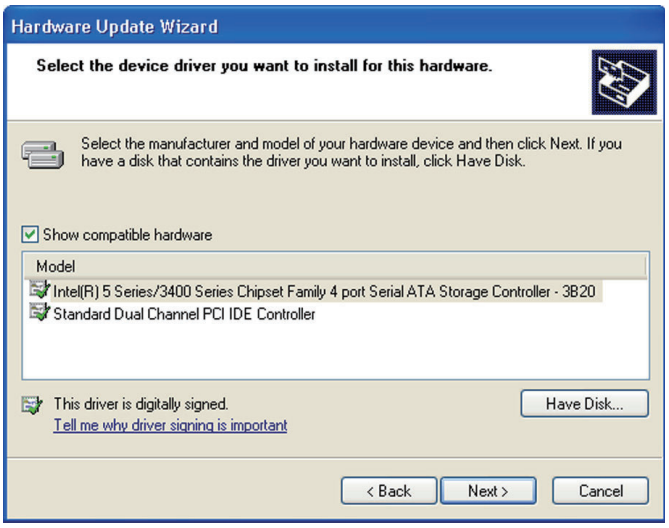
6. Select **"Install from a list or specific location (Advanced)"** and then click **Next**.



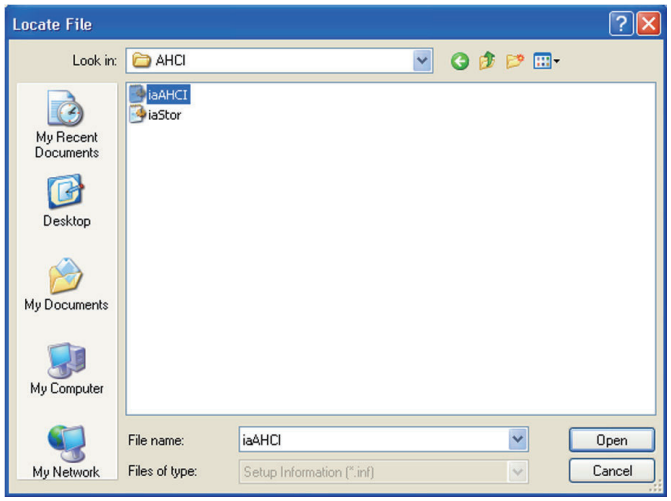
7. Select **"Don't search. I will choose the driver to install"** and then click **Next**.



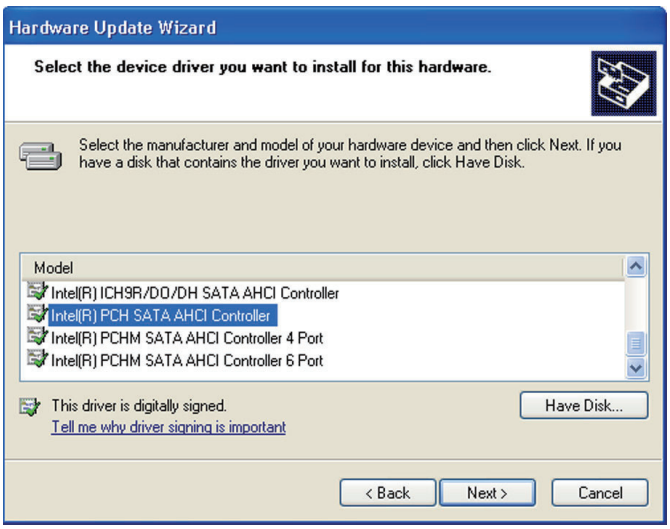
8. Click **"Have Disk"**.



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

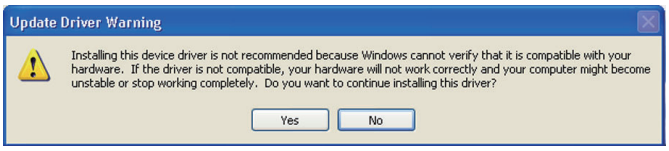


10. Select the appropriate AHCI Controller of your hardware device and then click **Next**.

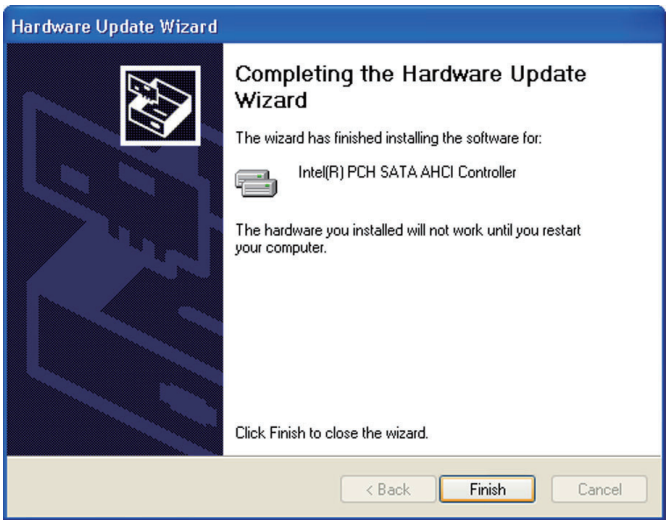


11. A warning message appeared because the selected SATA controller did not match your hardware device.

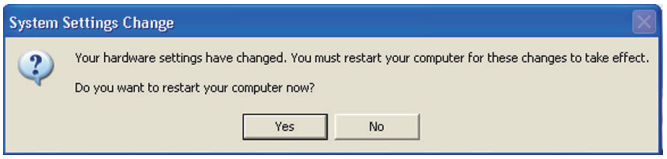
    Ignore the warning and click **Yes** to proceed.



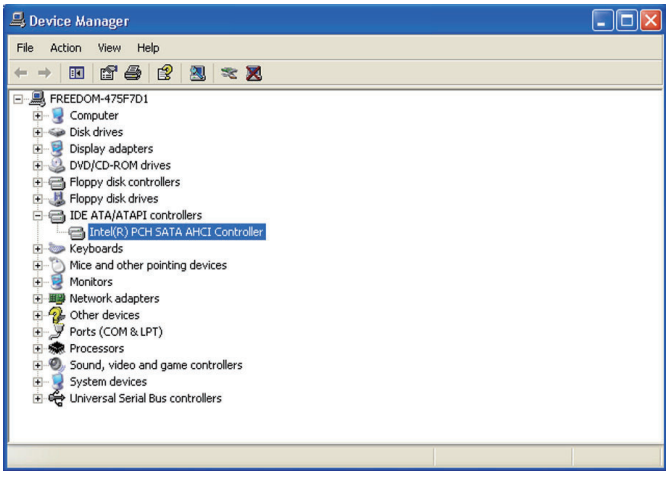
12. Click **Finish**.



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
```

C

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.

FLOPPY DISK(S) fail (80)

Unable to reset floppy subsystem.

FLOPPY DISK(S) fail (40)

Floppy type mismatch.

Hard Disk(s) fail (80)

HDD reset failed.

Hard Disk(s) fail (40)

HDD controller diagnostics failed.

Hard Disk(s) fail (20)

HDD initialization error.

Hard Disk(s) fail (10)

Unable to recalibrate fixed disk.

Hard Disk(s) fail (08)

Sector Verify failed.

Keyboard is locked out - Unlock the key

The BIOS detects that the keyboard is locked. Keyboard controller is pulled low.

Keyboard error or no keyboard present

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

Manufacturing POST loop

System will repeat POST procedure infinitely while the keyboard controller is pull low. This is also used for the M/B burn in test at the factory.

BIOS ROM checksum error - System halted

The checksum of ROM address F0000H-FFFFFH is bad.

Memory test fail

The BIOS reports memory test fail if the memory has error(s).

D

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.