



CD102 Series

Mini-ITX Industrial Motherboard

User's Manual

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Trademarks

Product names or trademarks appearing in this manual are for identification purpose only and are the properties of the respective owners.

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

Copyright.....	2
Trademarks	2
FCC and DOC Statement on Class B.....	2
About this Manual	4
Warranty	4
Static Electricity Precautions.....	4
Safety Measures	4
About the Package.....	5
Chapter 1 - Introduction	6
Specifications	6
Features	7
Chapter 2 - Hardware Installation.....	9
Board Layout.....	9
System Memory.....	9
Installing the DIMM Module	10
Jumper Settings	11
Clear CMOS Data.....	11
Auto Power-on Select.....	12
USB Power Select	12
COM1 RS232/422/485 Select.....	13
COM1 RS232 Power Select.....	14
Mini PCIe Signal Select	14
LVDS Panel Select.....	15
Panel Power Select	16
Backlight Brightness Power Select	16
LCD/Inverter Power Select	17
SATA DOM Power Select	17
Digital I/O Power Select.....	18
Digital I/O Output State.....	18
PS/2 Keyboard/Mouse Power Select.....	19
Dimming Mode Select	19
Dimming Control Select.....	20
Rear Panel I/O Ports.....	21
12V DC-in (default).....	21
Graphics Interfaces.....	22

COM (Serial) Ports.....	22
RJ45 LAN Ports.....	23
USB Ports.....	23
Audio	24
I/O Connectors	25
Digital I/O Connector	25
Digital I/O Power Connector.....	25
SATA (Serial ATA) Connectors.....	25
Front Panel Connector	26
S/PDIF Connector	26
Parallel Port.....	27
I ² C Connector	27
Chassis Intrusion Connector	28
Cooling Fan Connectors.....	28
LVDS LCD Panel Connector	29
LCD/Inverter Power Connector	29
PS/2 Keyboard/Mouse Connector	30
Expansion Slots	31
LAN LED Connectors.....	31
Standby Power LED	32
Battery.....	32

Chapter 3 - BIOS Setup	33
Overview.....	33
AMI BIOS Setup Utility.....	34
Main	34
Advanced	35
Chipset	44
Boot.....	46
Security.....	47
Save & Exit.....	48
Updating the BIOS	48

Chapter 4 - Supported Software	49
--------------------------------------	----

Chapter 5 - Digital I/O Proramming Guide	61
--	----

Appendix A - NLITE and AHCI Installation Guide	63
--	----

Appendix B - Watchdog Sample Code.....	69
--	----

Appendix C - System Error Message.....	70
--	----

Appendix D - Troubleshooting.....	71
-----------------------------------	----

Appendix E - BIOS Status Code	73
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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 consequential 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 CD102 motherboard
- One Serial ATA data with power cable
- One I/O shield
- One DVD
- 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 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.

Optional Items

- USB port cable
- Serial ATA data with power cable
- COM port cable
- I/O shield
- Power adapter (100W, 12V)

The 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	<ul style="list-style-type: none"> Intel® Atom™ processors <ul style="list-style-type: none"> - CD102-25N: <ul style="list-style-type: none"> : Intel® Atom™ D2550, Dual core, 1M Cache, 1.86GHz, 10W - CD102-28N: <ul style="list-style-type: none"> : Intel® Atom™ N2800, Dual core, 1M Cache, 1.86GHz, 6.5W - CD102-26N: <ul style="list-style-type: none"> : Intel® Atom™ N2600, Dual core, 1M Cache, 1.6GHz, 3.5W BGA 559 packaging technology 32nm process technology
Chipset	<ul style="list-style-type: none"> Intel® NM10 Express chipset
System Memory	<ul style="list-style-type: none"> Supports DDR3 1066MHz (CD102-25N/CD102-28N) Supports DDR3 800MHz (CD102-26N) Supports single channel memory interface Two 204-pin DDR3 SODIMM sockets support up to 4GB system memory (CD102-25N/CD102-28N) One 204-pin DDR3 SODIMM socket supports up to 2GB system memory (CD102-26N) DRAM device technologies: 1Gb, 2Gb and 4Gb DDR3 DRAM technologies are supported for x8 and x16 devices, unbuffered, non-ECC
Expansion Slots	<ul style="list-style-type: none"> 1 PCIe x1 Gen 2 slot (PCIe 2.0) 1 Mini PCIe slot <ul style="list-style-type: none"> - Supports USB and PCIe signals - Supports mSATA - Supports half size and/or full size Mini PCIe card
Graphics	<ul style="list-style-type: none"> Intel® HD Graphics Supports HDMI, VGA, and LVDS interfaces HDMI: resolution up to 4096x2304 @24Hz or 2560x1600 @60Hz VGA: resolution up to 1920x1200 @60Hz LVDS: 24-bit, dual channel, resolution up to 1920x1200 @60Hz Supports Hardware H.264/AVC, MPEG-2 video decoder, VC-1, DirectX 9, 1080p decoder
Audio	<ul style="list-style-type: none"> Realtek ALC886 5.1-channel High Definition Audio
LAN	<ul style="list-style-type: none"> 2 Intel® 82574L Gigabit Ethernet Controllers; or 2 Intel® I210 PCI Express Gigabit Ethernet controllers* (optional) Integrated 10/100/1000 transceiver Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
Serial ATA	<ul style="list-style-type: none"> 2 SATA 2.0 ports with data transfer rate up to 3Gb/s <ul style="list-style-type: none"> - SATA port 0 provides adequate space for SATA DOM Integrated Advanced Host Controller Interface (AHCI) controller
Rear Panel I/O Ports	<ul style="list-style-type: none"> 1 12V DC-in jack (default) or 4-pin power connector* (optional) 1 HDMI port 1 VGA port 2 DB-9 serial ports <ul style="list-style-type: none"> - 1 RS232/422/485 (RS232 and/or Power) - 1 RS232 2 RJ45 LAN ports 4 USB 2.0/1.1 ports Mic-in, Line-in, and Line-out jacks

I/O Connectors	<ul style="list-style-type: none"> 2 connectors for 4 external USB 2.0/1.1 ports 1 vertical USB 2.0/1.1 port (optional) 2 connectors for 2 external RS232 serial ports (2.0mm pitch) 1 LVDS LCD panel connector 1 LCD/inverter power connector 1 8-bit Digital I/O connector 1 Digital I/O power connector 1 front audio connector for line-out and mic-in jacks 1 LPC connector 4 LAN LED connectors 1 PS/2 connector for keyboard/mouse port 1 S/PDIF connector 2 SATA 2.0 ports 2 SATA power connectors 1 parallel connector 1 I²C connector 1 chassis intrusion connector 1 front panel connector 3 fan connectors
Trusted Platform Module - TPM (optional)	<ul style="list-style-type: none"> Provides a Trusted PC for secure transactions Provides software license protection, enforcement and password protection
BIOS	<ul style="list-style-type: none"> AMI BIOS <ul style="list-style-type: none"> - 16Mbit SPI BIOS
Energy Efficient Design	<ul style="list-style-type: none"> ACPI v3.0 specification System Power Management Wake-On-Events include: <ul style="list-style-type: none"> - Wake-On-USB KB/Mouse - Wake-On-LAN - RTC timer to power-on the system AC power failure recovery
Damage Free Intelligence	<ul style="list-style-type: none"> Monitors CPU/system temperature and overheat alarm Monitors V_{CORE}/5V/12V/V_{SM} 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 <ul style="list-style-type: none"> - Watchdog timeout programmable via software from 1 to 255 seconds
Power Consumption	<ul style="list-style-type: none"> TBD
OS Support	<ul style="list-style-type: none"> Windows XP Professional x86 & SP3 (32-bit) Windows 7 Ultimate x86 & SP1 (32-bit)
Temperature	<ul style="list-style-type: none"> Operating: 0°C to 60°C Storage: -20°C to 85°C
Humidity	<ul style="list-style-type: none"> 5% to 90%
Dimensions	<ul style="list-style-type: none"> Mini-ITX form factor <ul style="list-style-type: none"> - 170mm (6.7") x 170mm (6.7")
Certification	<ul style="list-style-type: none"> 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. 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 HDMI, VGA, and LVDS interfaces for 3 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), it improves hard drive performance faster than the standard parallel ATA whose data transfer rate is 100MB/s.

• Gigabit LAN

Two Intel® 82574L or Intel® I210 PCI Express (optional) Gigabit Ethernet controllers support up to 1Gbps data transmission.

• Audio

The Realtek ALC886 audio codec provides 5.1-channel High Definition audio output.

• 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 $\geq 720\text{mA}$.

• 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 $\geq 1.5\text{A}$. For 3 or more USB ports, the 5V_standby power source of your power supply must support $\geq 2\text{A}$.

• 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:

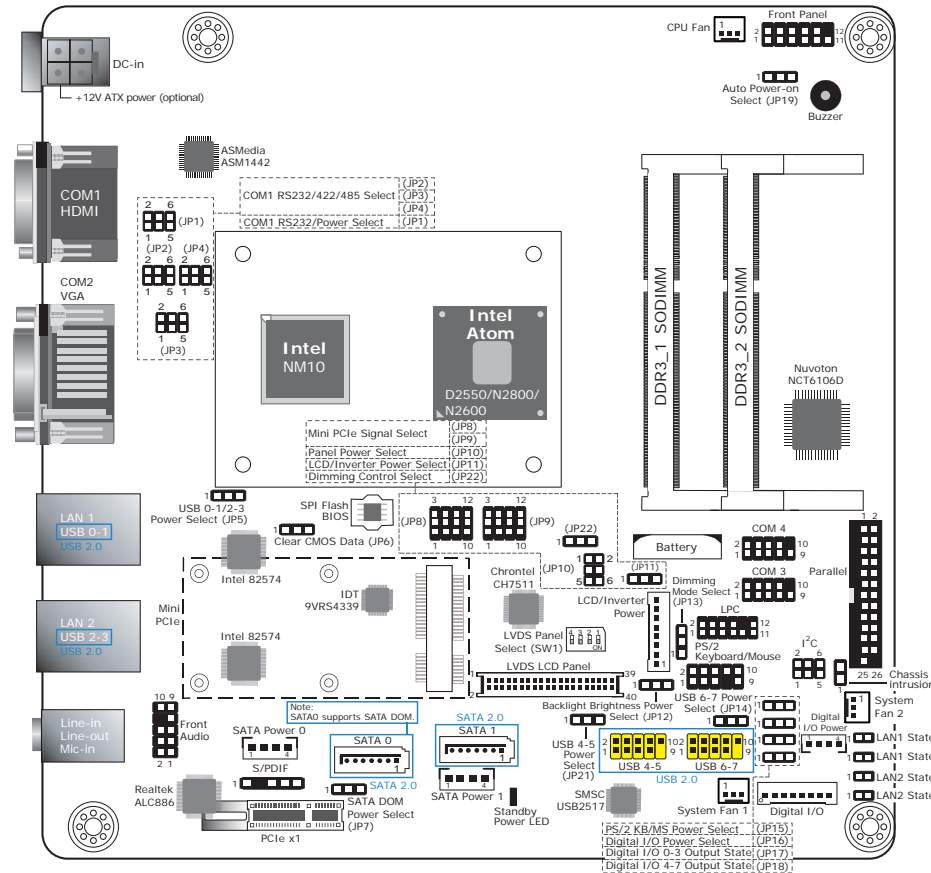
The 5V_standby power source of your power supply must support $\geq 720\text{mA}$.

- **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

Board Layout



Important:

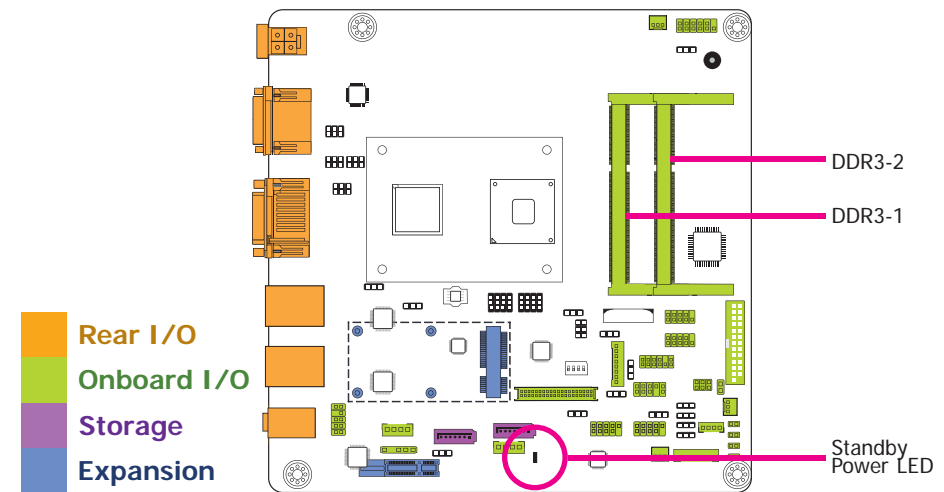
Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to 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



Important:

When the Standby Power LED lights red, it indicates that there is power on the system 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 motherboard and components.



Features

- Two 204-pin DDR3 SODIMM sockets (CD102-25N/CD102-28N)
One 204-pin DDR3 SODIMM socket (CD102-26N)
- Supports 800MHz (CD102-26N)/1066MHz (CD102-25N/CD102-28N) DDR3 SDRAM
- Single channel memory interface
- Supports maximum of 4GB (CD102-25N, CD102-28N)/2GB (CD102-26N) system memory

The system board supports the following memory interface.

Single Channel (SC)

Data will be accessed in chunks of 64 bits (8B) from the memory channels.

Dual Channel (DC)

Data will be accessed in chunks of 128 bits from the memory channels. Dual channel provides better system performance because it doubles the data transfer rate.

Single Channel	DIMMs are on the same channel. DIMMs in a channel can be identical or completely different. However, we highly recommend using identical DIMMs. Not all slots need to be populated.
Dual Channel	DIMMs of the same memory configuration are on different channels.



Important:

You can populate either Channel A or Channel B first.

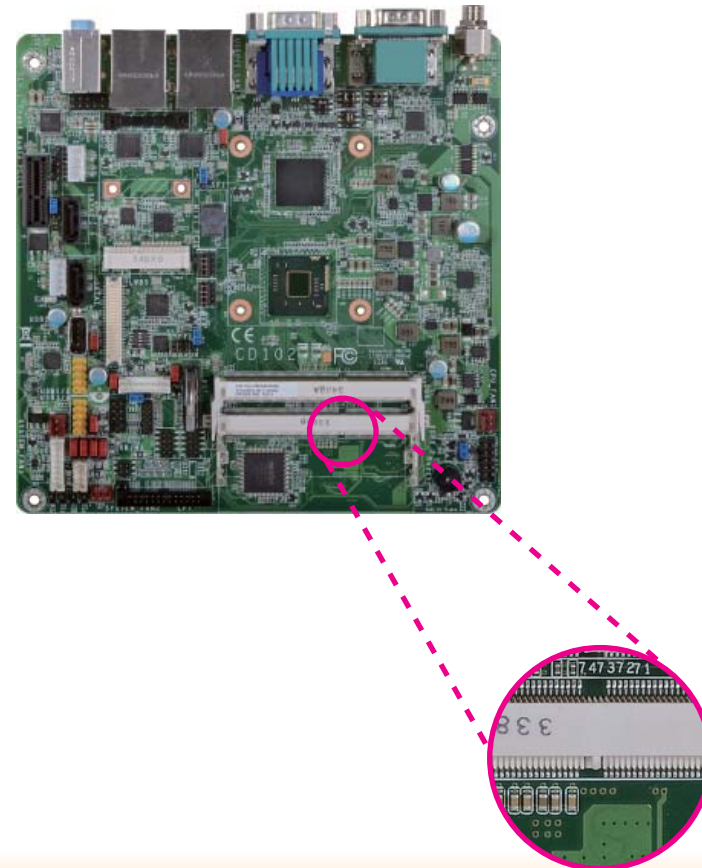
Installing the DIMM Module



Note:

The system board used in the following illustrations may not resemble the actual board. 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.



- 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.



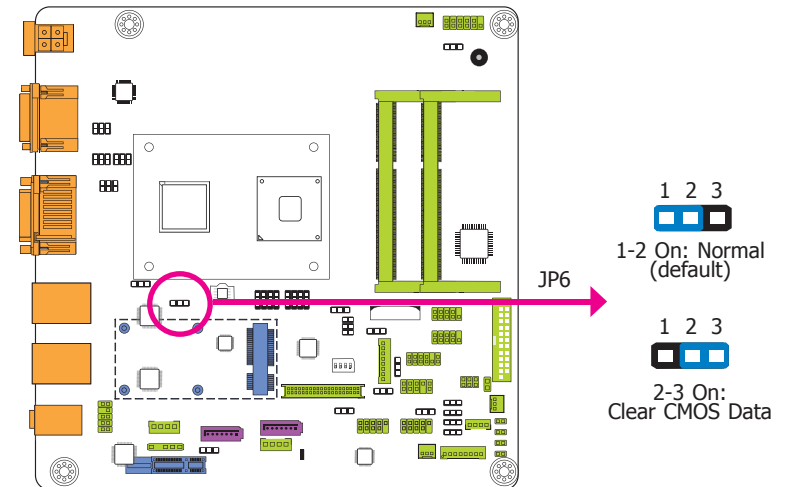
- Push down the module until the clips at each end of the socket lock into position. You will hear a distinctive "click", indicating the module is correctly locked into position.

**Note:**

If you are installing one DDR3 SODIMM only, make sure that the SODIMM 2 socket must be populated (CD102-25N/28N).

Jumper Settings

Clear CMOS Data



If you encounter the following,

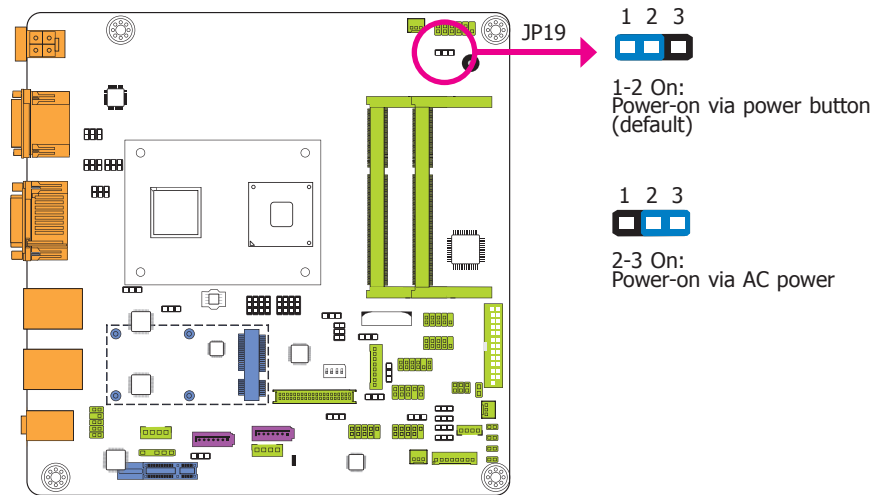
- CMOS data becomes corrupted.
- You forgot the supervisor or user password.

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.

- Power-off the system and unplug the power cord.
- Set JP6 pins 2 and 3 to On. Wait for a few seconds and set JP6 back to its default setting, pins 1 and 2 On.
- Now plug the power cord and power-on the system.

Auto Power-on Select



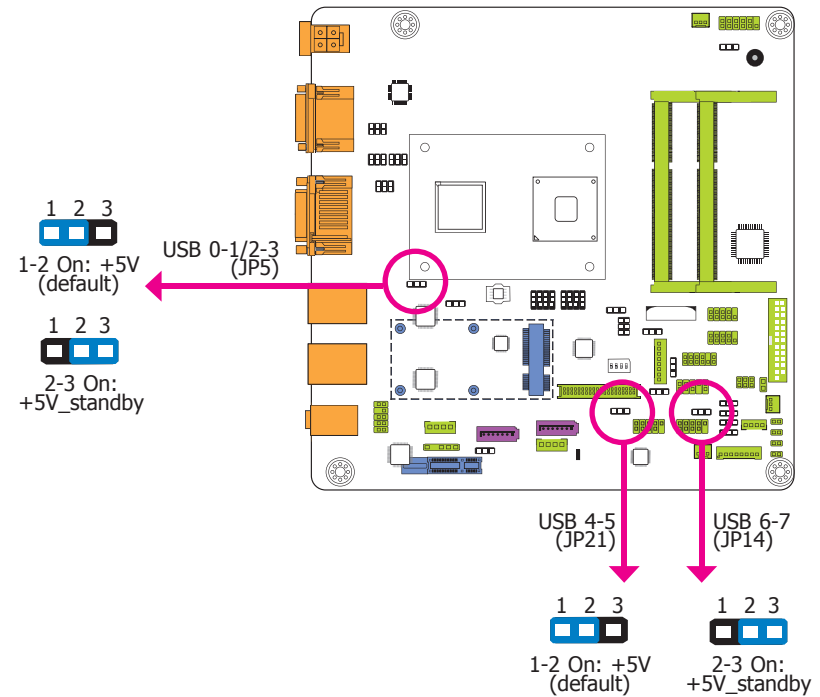
JP19 is used to select the method of powering on the system. If you want the system to power-on whenever AC power comes in, set JP19 pins 2 and 3 to On. If you want to use the power button, set pins 1 and 2 to On.

When using JP19 "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, JP19 must be set to pins 2-3 and the "Power Failure Control" in CMOS is set to "Always On".

USB Power Select

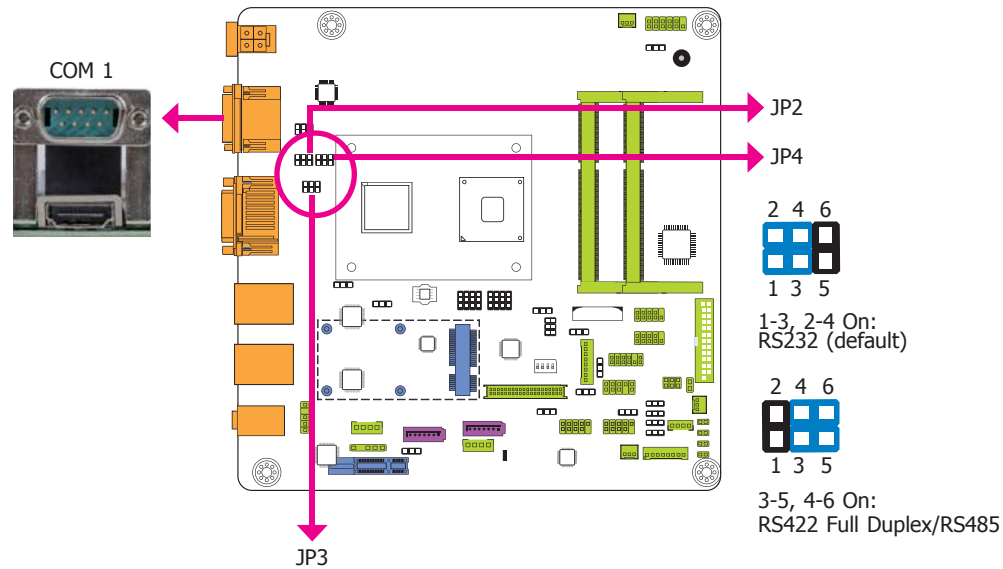


JP5, JP14 and JP21 are used to select the power of the USB ports. Selecting +5V_standby will allow you to use a USB device to wake up the system.

**Important:**

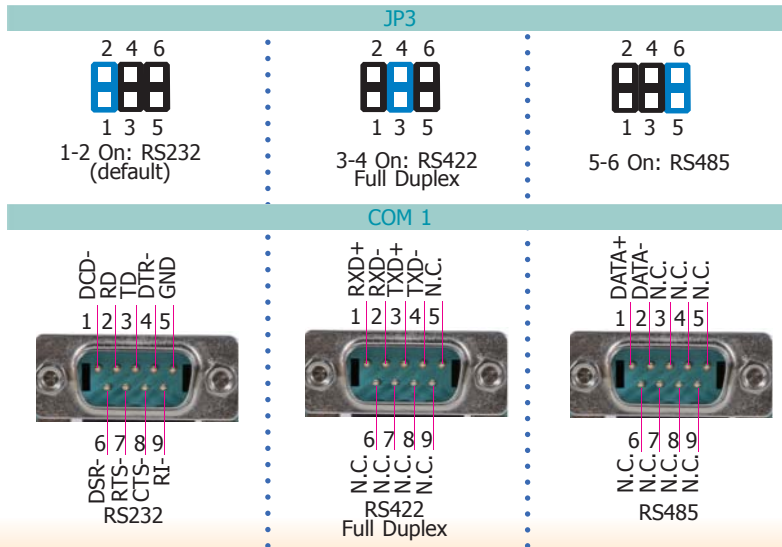
If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the +5V_standby power source of your power supply must support $\geq 1.5A$. For 3 or more USB ports, the +5V_standby power source of your power supply must support $\geq 2A$.

COM1 RS232/RS422/RS485 Select

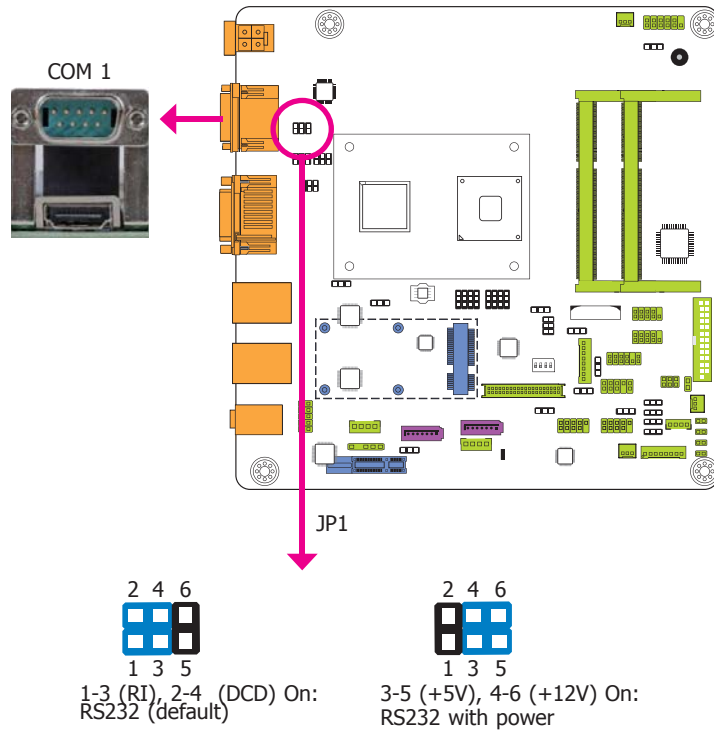


Note: When COM1 RS232/422/485 is selected, JP2 and JP4 must be set in accordance to JP3.

JP2, JP3 and JP4 (for COM 1) are used to configure the Serial COM port to RS232, RS422 (Full Duplex) or RS485. The pin functions of the COM 1 port will vary according to these jumpers' setting.

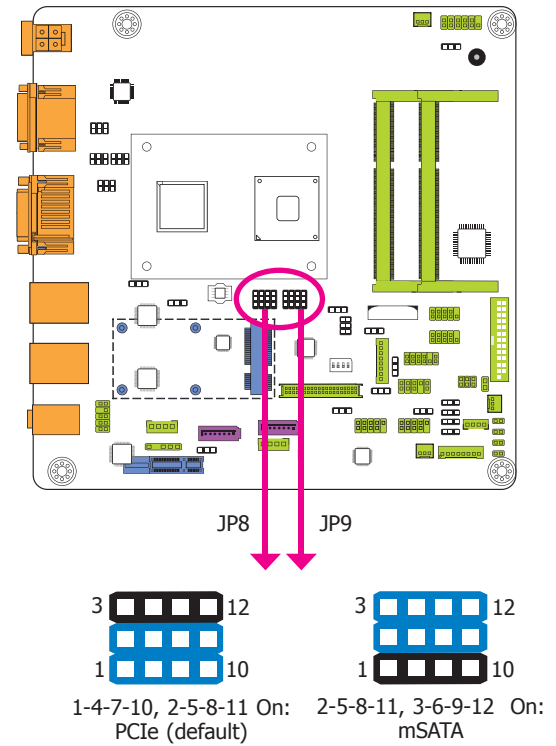


COM1 RS232/Power Select



JP1 (for COM 1) is used to configure the Serial COM port to pure RS232 or RS232 with power.

Mini PCIe Signal Select

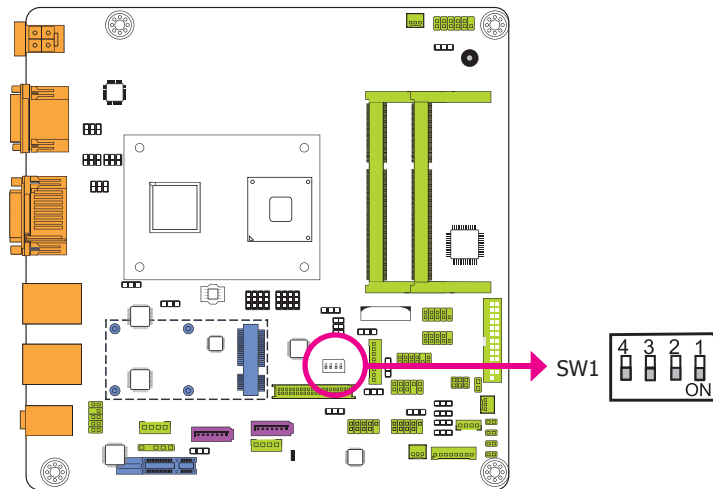


JP8 and JP9 are used to select the Mini PCIe signal: PCIe or mSATA.



Note:
JP8 and JP9 must be set simultaneously.

LVDS Panel Select

**Note:**

The default setting is eDP.



1. 1366x768: N2000 series processor supports eDP only.
2. 1600x1200: N2000 series processor supports DP only.
3. 1920x1080: D2000 series processor supports eDP only.
4. 1920x1200: D2000 series processor supports DP only.

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

LVDS Panel Select		Channel	SW2
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

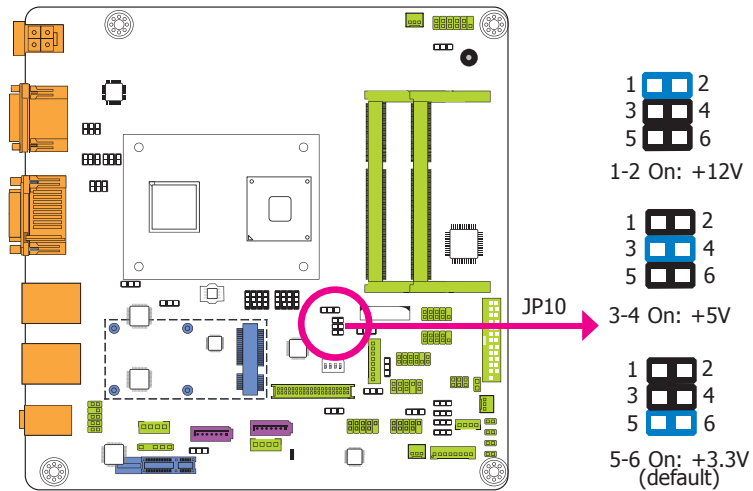
*1

*2

*3

*4

Panel Power Select

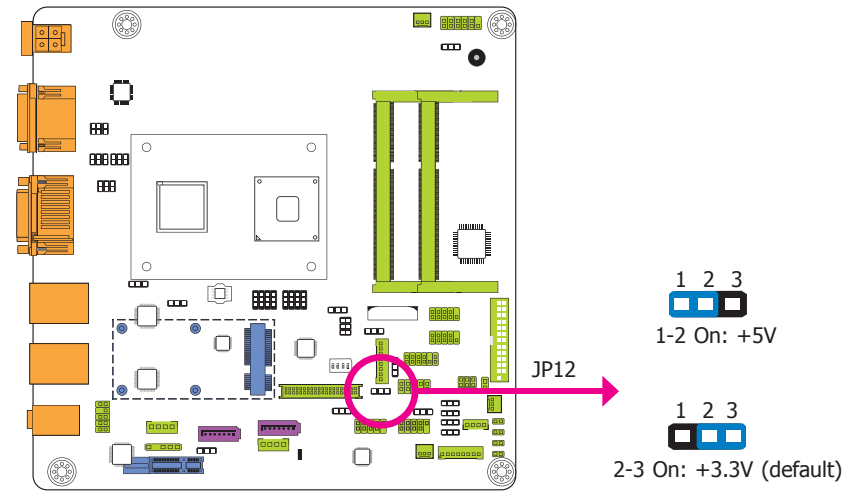


JP10 is used to select the power supplied with the LCD panel.

**Important:**

Before powering-on the system, make sure that the power settings of JP10 match the LCD panel's specification. Selecting the incorrect voltage will seriously damage the LCD panel.

Backlight Brightness Power Select

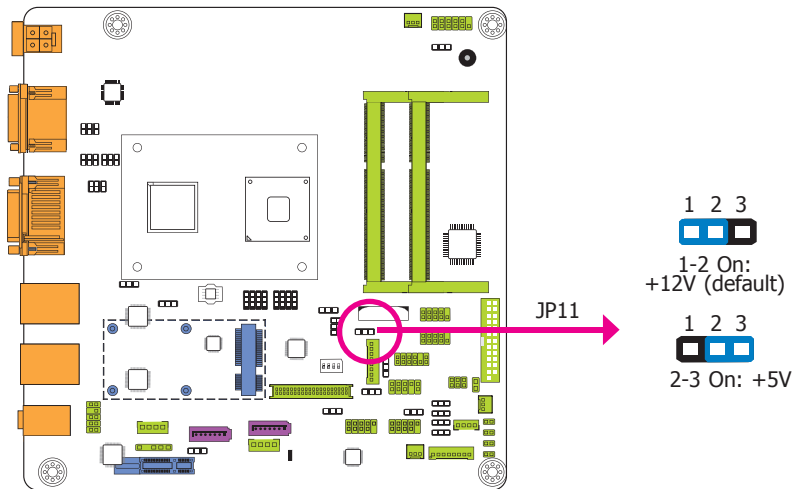


JP12 is used to select the power level of backlight brightness control: +5V or +3.3V.

**Important:**

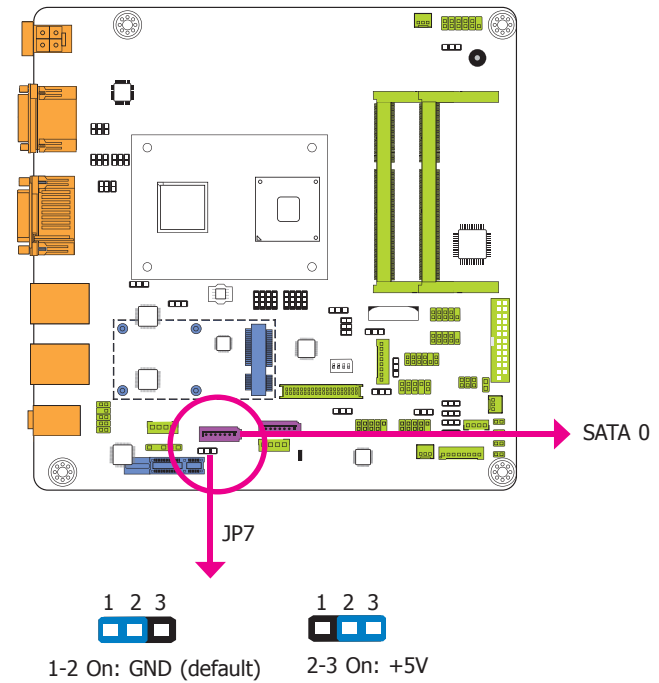
Before powering-on the system, make sure that the power settings of JP12 match the power specification of backlight control. Selecting the incorrect voltage will seriously damage the backlight.

LCD/Inverter Power Select



JP11 is used to select the power level of LVDS LCD inverter connector.

SATA DOM Power Select

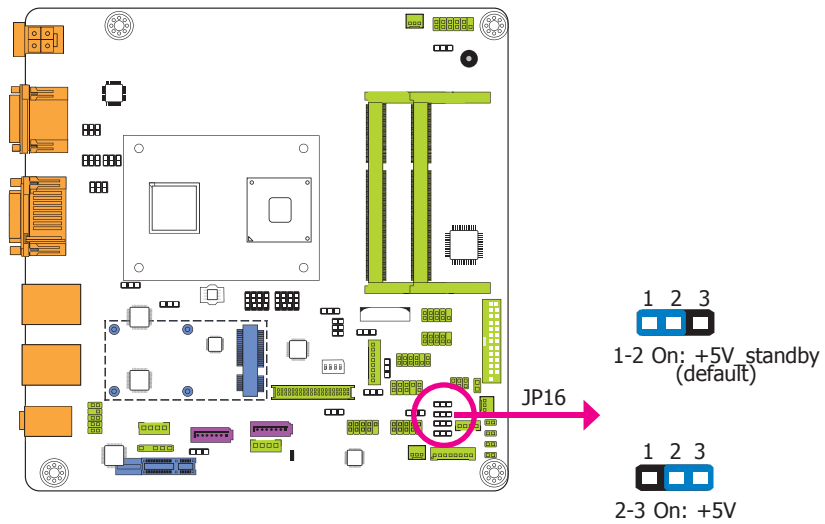


JP7 is used to select the power level of SATA DOM.



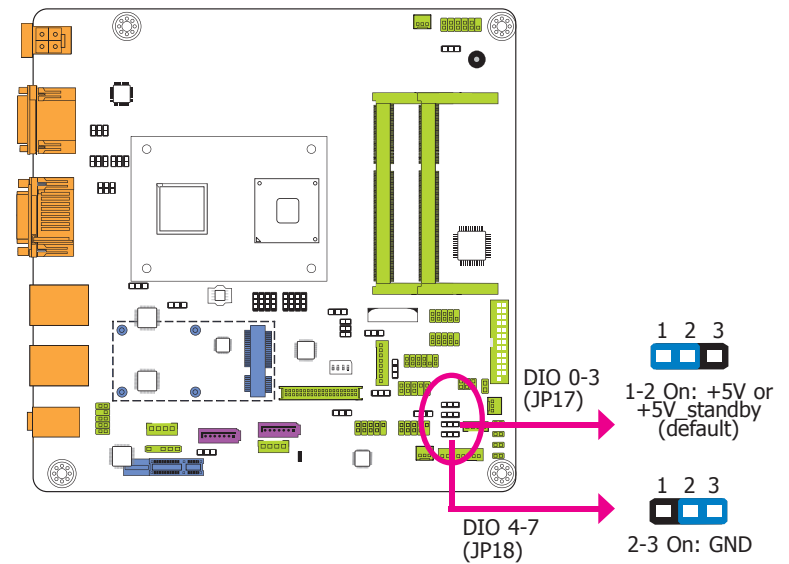
Note:
SATA port 0 provides adequate space for SATA DOM.

Digital I/O Power Select



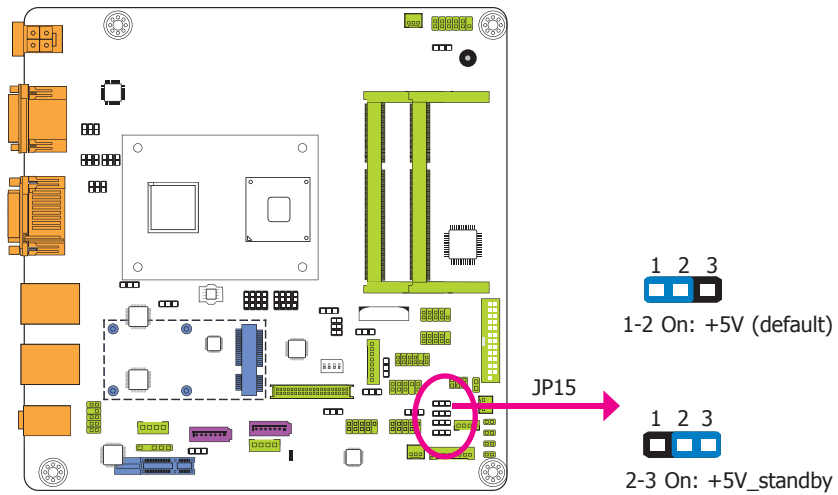
JP16 is used to select the power of DIO (Digital I/O) signal.

Digital I/O Output State



Based on the power level of DIO (Digital I/O) selected on JP16, JP17 (DIO pin 0-3) and JP18 (DIO pin 4-7) are used to select the state of DIO output: pull high or pull low. When selecting pull high, the power selection will be the same as JP16's setting.

PS/2 Keyboard/Mouse Power Select

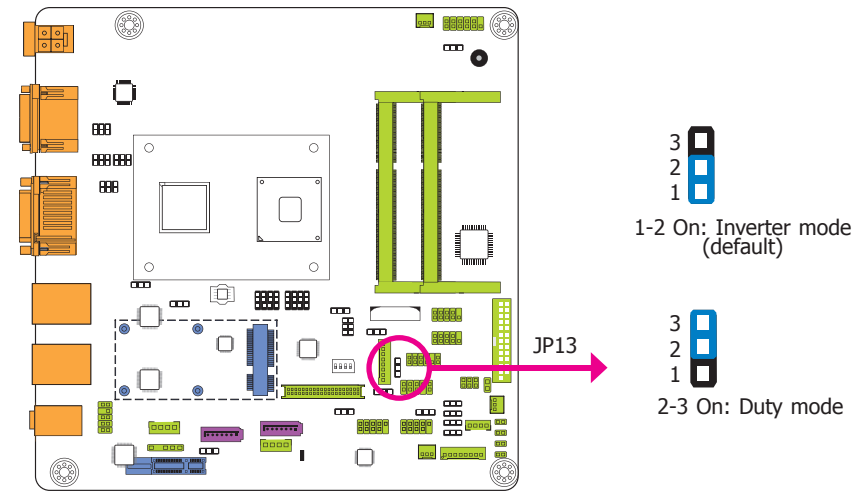


JP15 is used to select the power of the PS/2 keyboard/mouse port. Selecting +5V_standby will allow you to use the PS/2 keyboard or PS/2 mouse to wake up the system.

**Important:**

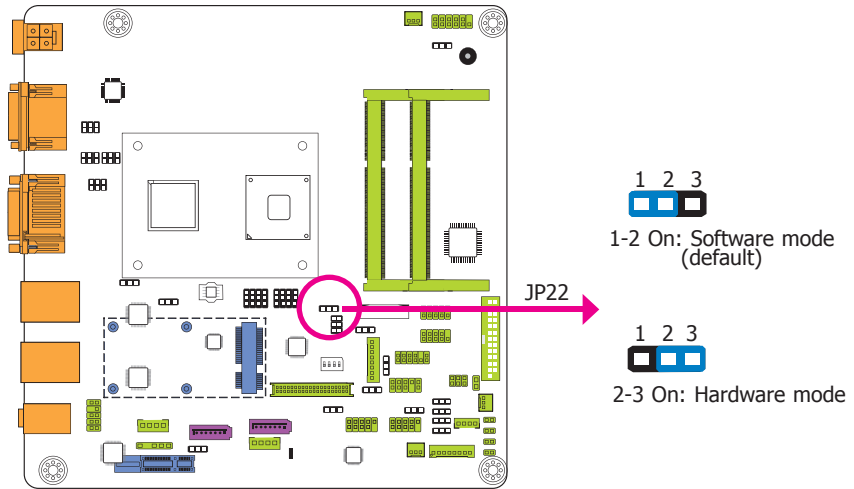
The +5VSB power source of your power supply must support $\geq 720\text{mA}$.

Dimming Mode Select



JP13 allows you to select the mode for the lightness control of LVDS panel.

Dimming Control Select



JP22 allows you to select the mode for the lightness source of LVDS panel via the Software mode or the Hardware mode.

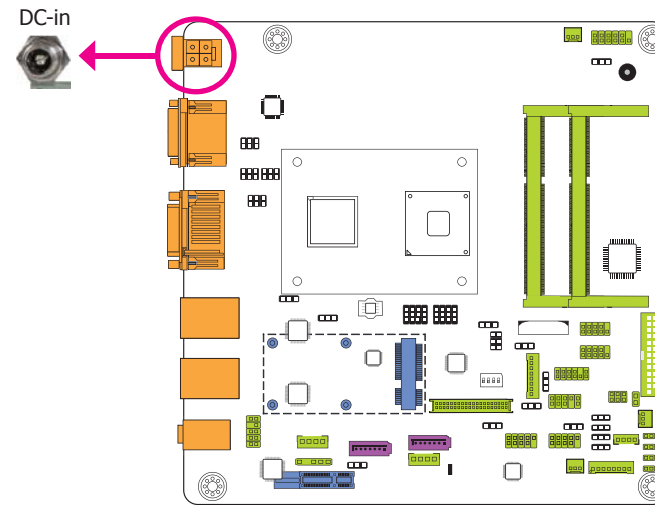
Rear Panel I/O Ports



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

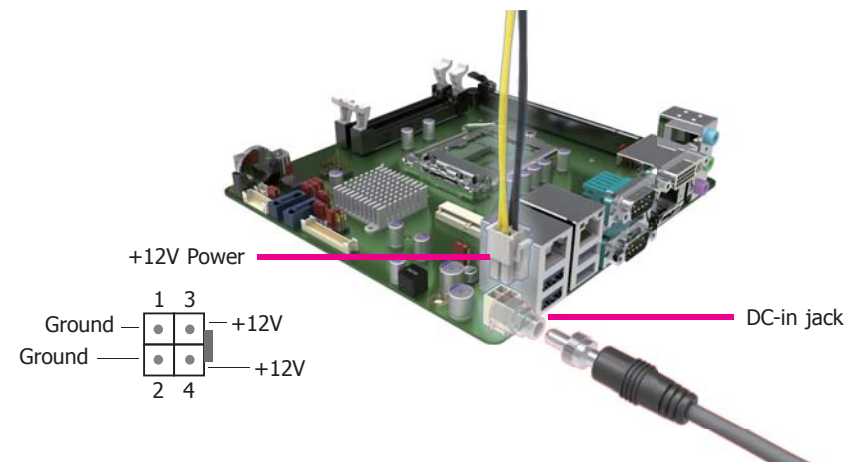
- 1 12V DC-in jack (default) or 4-pin ATX power connector (optional)
- 1 HDMI port
- 1 VGA port
- 2 Serial COM ports
- 2 RJ45 LAN ports
- 4 USB 2.0/1.1 ports
- Line-in jack
- Line-out jack
- Mic-in jack

12V DC-in (default)



This jack provides maximum of 100W 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.

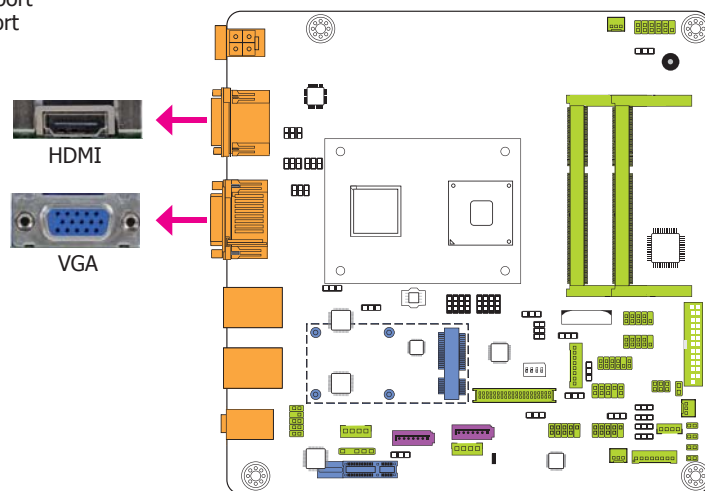
The 12V DC-in jack on the system board co-lays with a 4-pin power connector (optional) as the figure displayed below.



Graphics Interfaces

The display ports consist of the following:

- 1 HDMI port
- 1 VGA port



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.

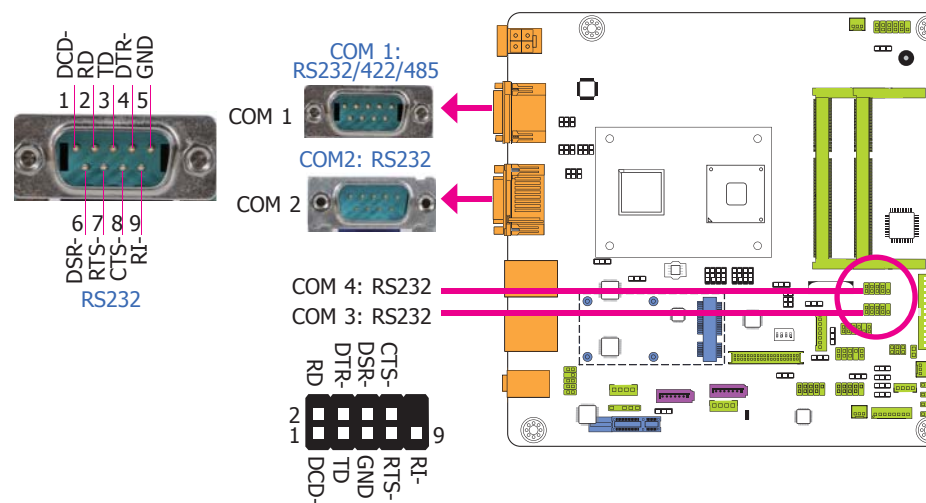
VGA Port

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.

Driver Installation

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

COM (Serial) Ports



COM 2 to COM 4 are fixed at RS232.

The pin function of COM 1 port will vary according to JP3's and JP2's/JP4's setting. Refer to "COM1 RS232/RS422/RS485 Select" in this chapter for more information.

The serial ports are asynchronous communication ports with 16C550A-compatible UARTs that can be used with modems, serial printers, remote display terminals, and other serial devices.

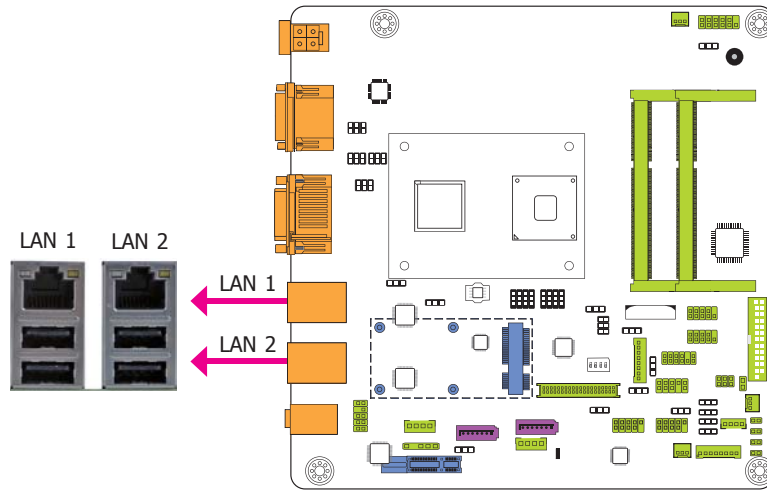
Connecting External Serial Ports

Your COM port may come mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then insert the serial port cable to the COM connector. Make sure the colored stripe on the ribbon cable is aligned with pin 1 of the COM connector.

BIOS Setting

Configure the serial ports in the Advanced menu ("Super IO Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

RJ45 LAN Ports



Features

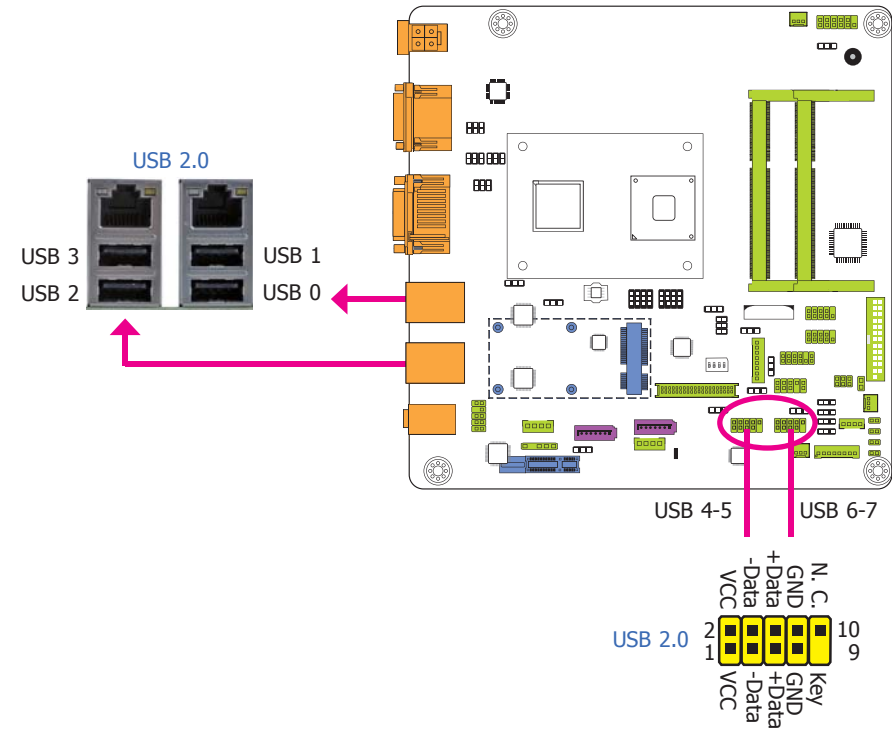
- 2 Intel® 82574L PCI Express Gigabit Ethernet controllers or 2 Intel® WGI210AT PCI Express Gigabit Ethernet controllers (optional)

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

Driver Installation

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

USB Ports



The USB device 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 (USB 0-1/2-3). The two 10-pin connectors allow you to connect four additional USB 2.0/1.1 ports (USB 4-5/6-7). 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**

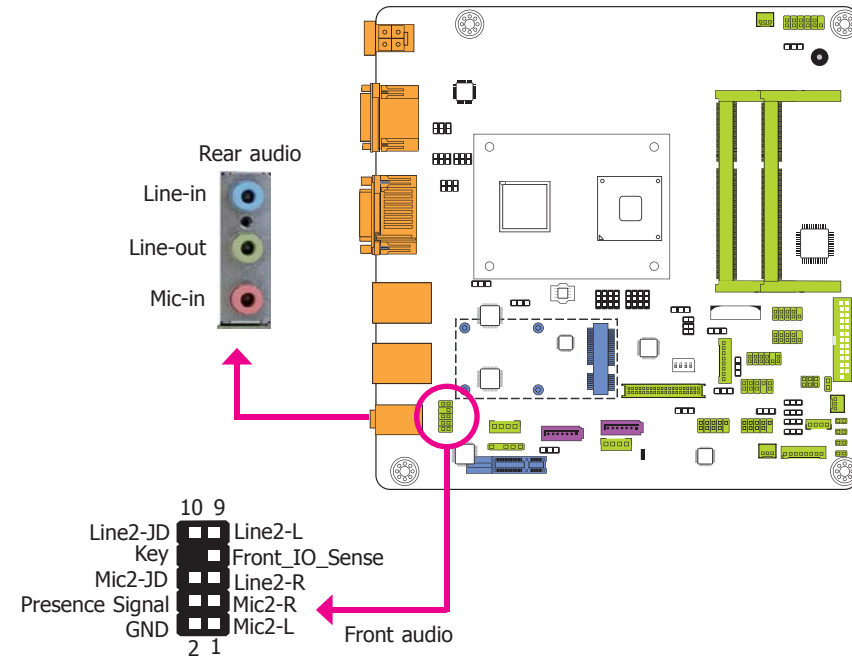
JP5, JP14 and JP21 must be set to "2-3 On: +5V_standby". Refer to "USB Power Select" in this chapter for more information.



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 $\geq 1.5A$. For 3 or more USB ports, the +5V_standby power source of your power supply must support $\geq 2A$.

Audio



Rear Audio

The system board is equipped with 3 audio jacks. A jack is a one-hole connecting interface for inserting a plug.

- **Line-in Jack (Light Blue)**
This jack is used to connect any audio devices such as Hi-fi set, CD player, tape player, AM/FM radio tuner, synthesizer, etc.
- **Line-out Jack (Lime)**
This jack is used to connect a headphone or external speakers.
- **Mic-in Jack (Pink)**
This jack is used to connect an external microphone.

Front Audio

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.

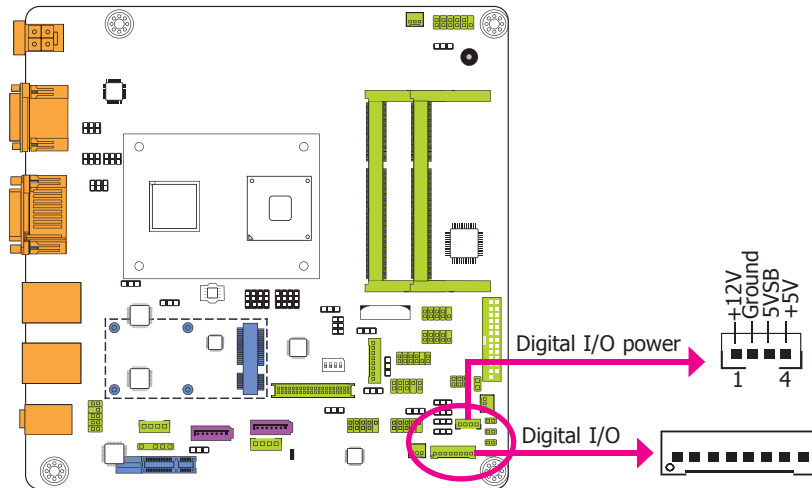
Driver Installation

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

I/O Connectors

Digital I/O Connector

Digital I/O Power Connector

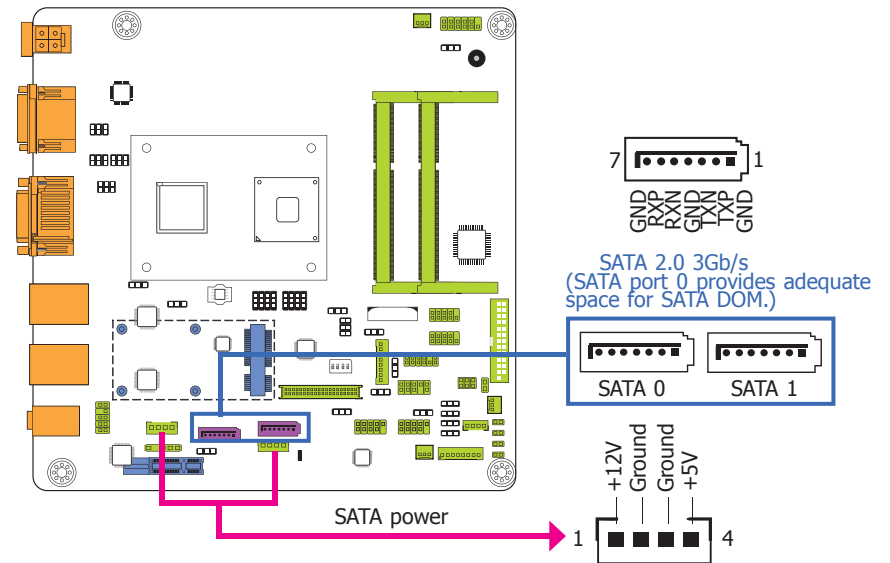


The 8-bit Digital I/O connector provides powering-on function to external devices that are connected to these connectors.

Digital I/O Connector

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

SATA (Serial ATA) Connectors



Features

- 2 Serial ATA ports
- SATA0/SATA1 port with data transfer rate up to 3Gb/s
- Integrated Advanced Host Controller Interface (AHCI) controller

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.

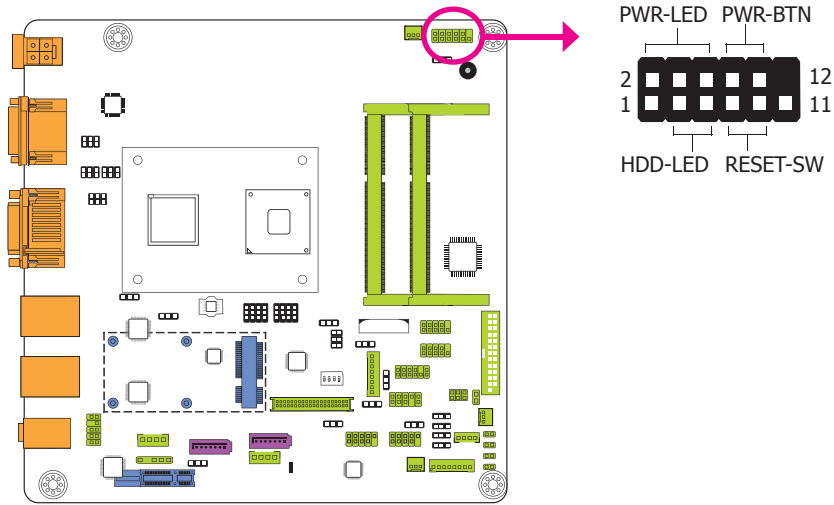
The system board package comes with a power cable that must be connected from the system board's peripheral power connector to the SATA drive's power connector in order to provide power to the drive.



BIOS Setting

Configure the Serial ATA drives in the Advanced menu ("IDE Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

Front Panel Connector



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

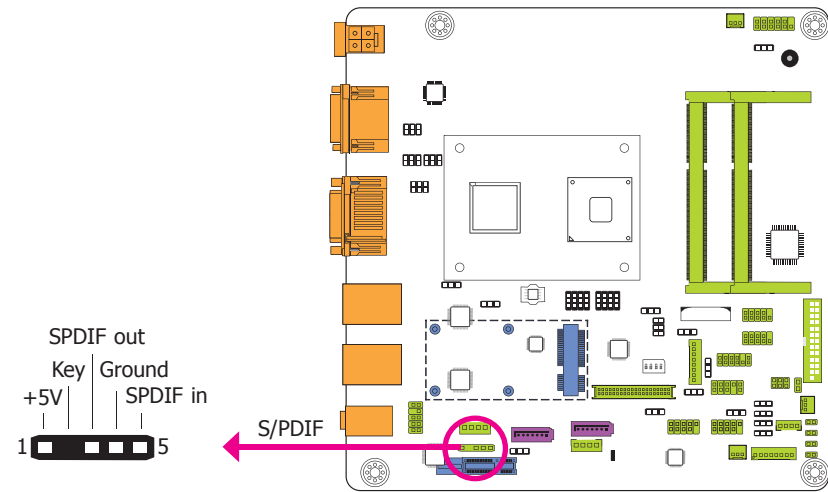
This switch is used to power on or off the system.

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.

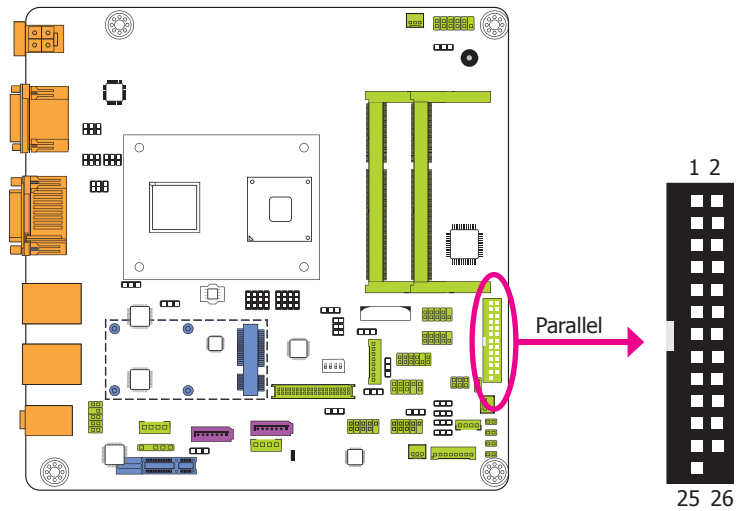
	Pin	Pin Assignment		Pin	Pin Assignment
HDD-LED	3	HDD Power	PWR-LED	2	LED Power
	5	Signal		4	LED Power
RESET-SW	7	Ground	PWR-BTN	6	Signal
	9	RST Signal		8	Ground
	11	N.C.		10	Signal

S/PDIF Connector



The S/PDIF connector is used to connect an external S/PDIF port. Your S/PDIF port may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then connect the audio cable to the S/PDIF connector. Make sure pin 1 of the audio cable is aligned with pin 1 of the S/PDIF connector.

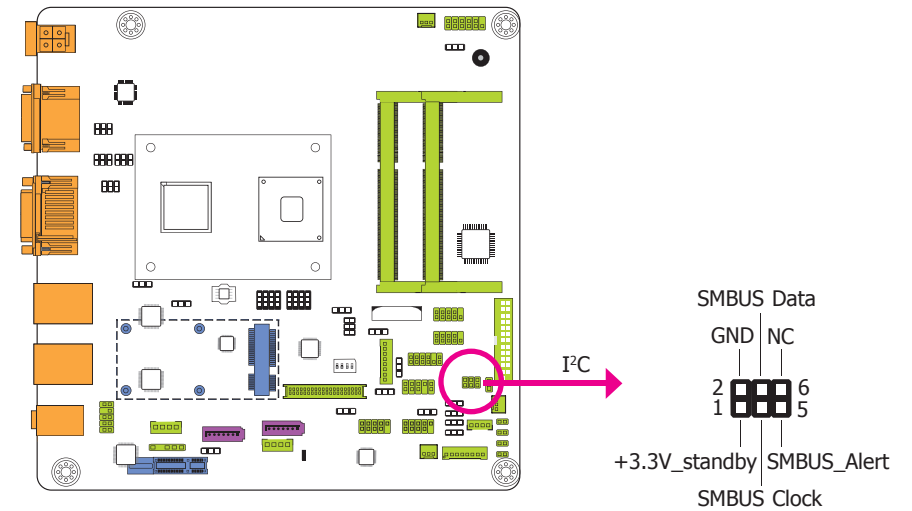
Parallel Port



The 25-pin connector is used to connect an external parallel port. The parallel port connects your PC to a parallel printer. It supports SPP, ECP and EPP.

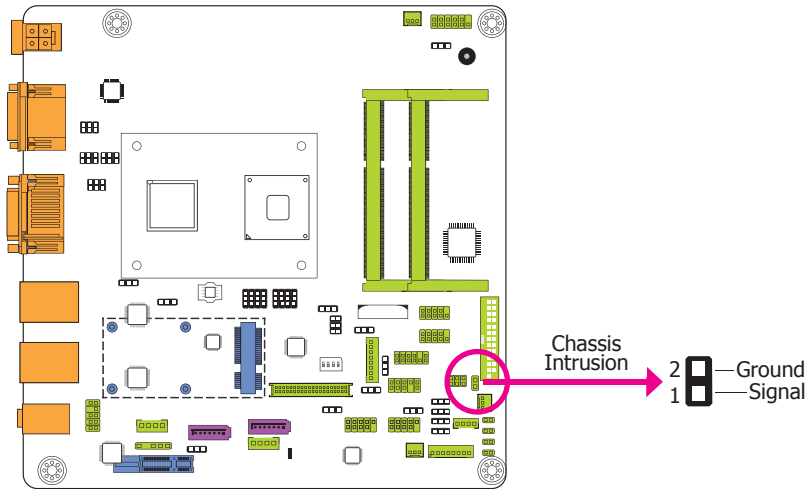
SPP (Standard Parallel Port)	Allows normal speed operation but in one direction only.
ECP (Extended Capabilities Port)	Allows parallel port to operate in bidirectional mode and at a speed faster than the SPP's data transfer rate.
EPP (Enhanced Parallel Port)	Allows bidirectional parallel port operation at maximum speed.

I²C Connector



The 1-channel I²C bus interface conforms to the version 2.1 I²C bus specification. It operates as a master or slave device and supports a multi-master bus.

Chassis Intrusion Connector

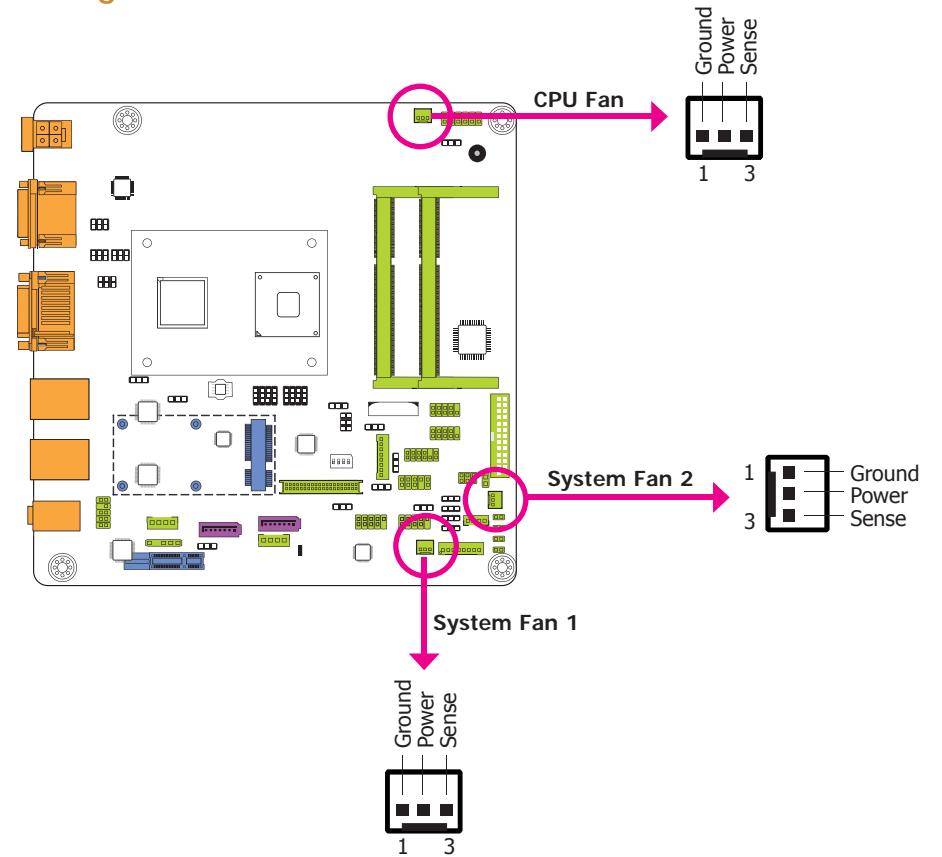


The board supports the chassis intrusion detection function. Connect the chassis intrusion sensor cable from the chassis to this connector. When the system's power is on and a chassis intrusion occurred, an alarm will sound. When the system's power is off and a chassis intrusion occurred, the alarm will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

DFI Utility

Install the "DFI Utility" 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 "DFI Utility" section in chapter 4 for more information.

Cooling Fan Connectors



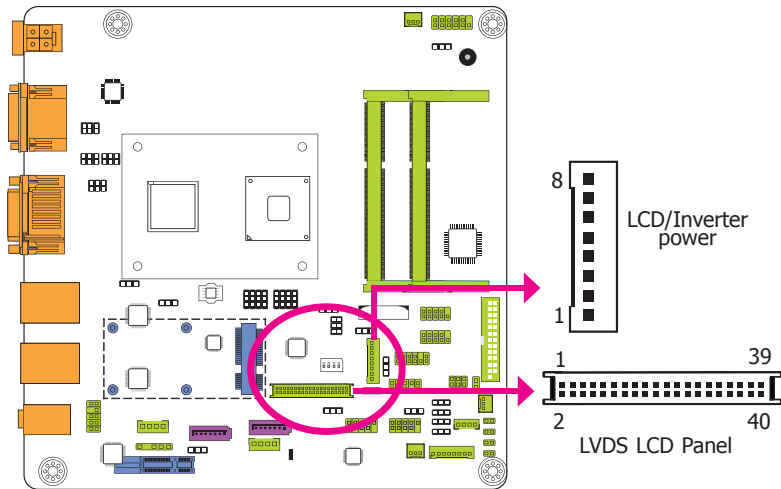
The fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

BIOS Setting

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

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 right size 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

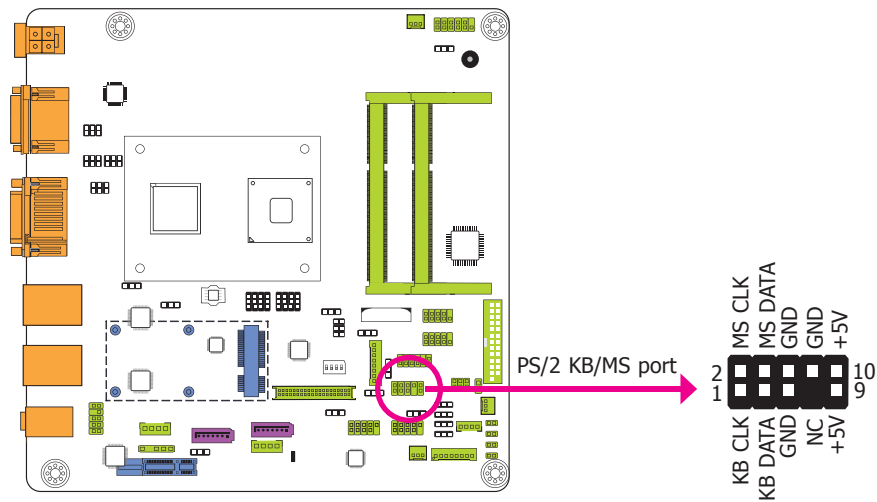
Pins	Function	Pins	Function
1	GND	2	GND
3	LVDS_Out3+	4	LVDS_Out7+
5	LVDS_Out3-	6	LVDS_Out7-
7	GND	8	GND
9	LVDS_Out2+	10	LVDS_Out6+
11	LVDS_Out2-	12	LVDS_Out6-
13	GND	14	GND
15	LVDS_Out1+	16	LVDS_Out5+
17	LVDS_Out1-	18	LVDS_Out5-
19	GND	20	GND
21	LVDS_Out0+	22	LVDS_Out4+
23	LVDS_Out0-	24	LVDS_Out4-
25	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_DDCDTA	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	LCD/Inverter Power
8	LCD/Inverter Power

Note:
DFI board's LVDS connector: Hirose DF13-40DP-1.25V(91)/40P/1.25mm; cable side connector: Hirose DF13-40DS-1.25C.

PS/2 Keyboard/Mouse Connector



Wake-On-PS/2 Keyboard/Mouse

The Wake-On-PS/2 Keyboard/Mouse function allows you to use the PS/2 keyboard or PS/2 mouse to power-on the system. To use this function:

- **Jumper Setting**

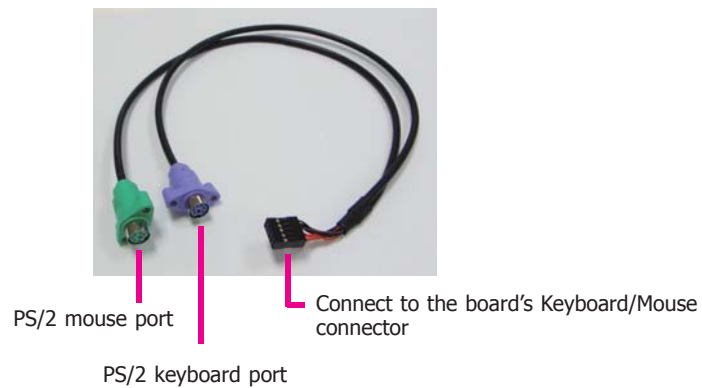
JP15 must be set to "2-3 On: 5V_standby". Refer to "PS/2 Keyboard/Mouse Power Select" in this chapter for more information.



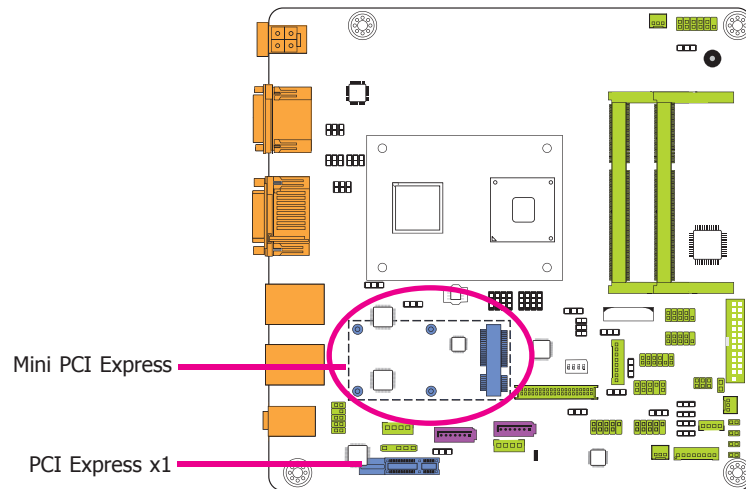
Important:

The 5V_standby power source of your power supply must support $\geq 720\text{mA}$.

The Keyboard/Mouse connector is used to connect PS/2 keyboard and PS/2 mouse by means of a PS/2 cable. Connect one end of the cable to the Keyboard/Mouse connector. The other ends are used to connect a PS/2 keyboard and a PS/2 mouse.



Expansion Slots



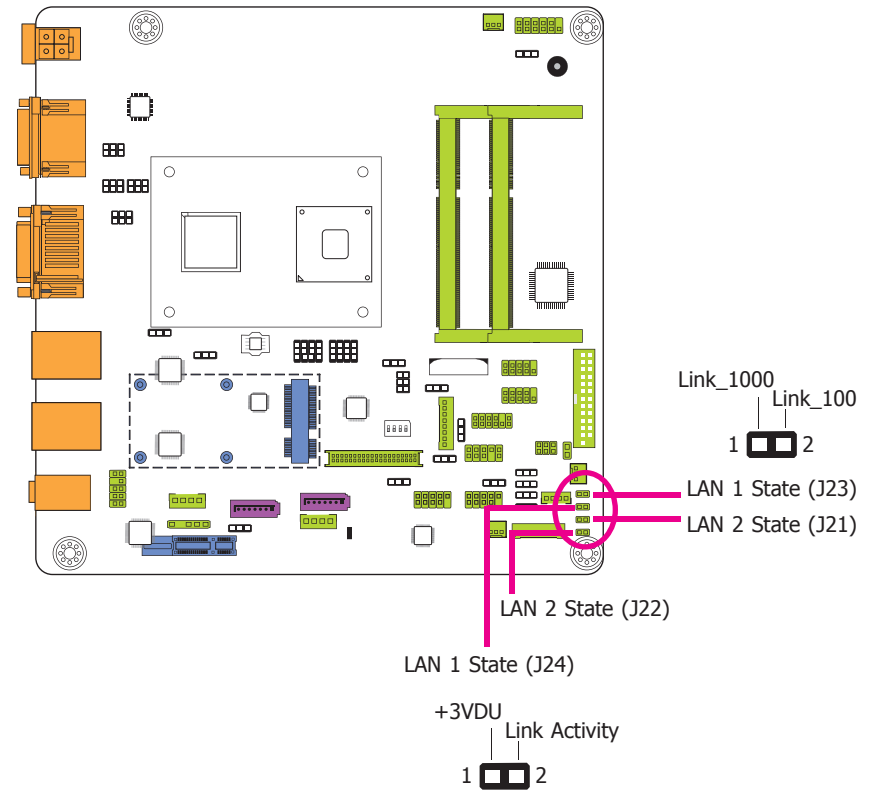
Mini PCIe Slot

The Mini PCIe socket is used to install a half size 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. It supports PCIe and USB signals. The Mini PCIe slot supports mSATA.

PCI Express x1 Slot

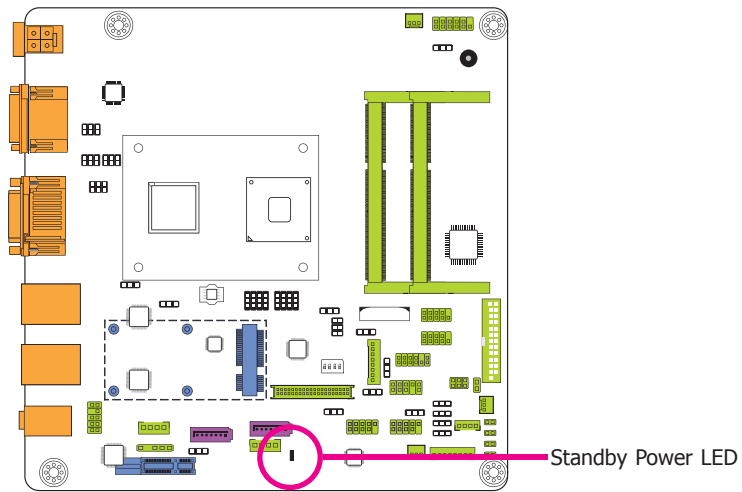
Install PCI Express cards such as network cards or other cards that comply to the PCI Express specifications into the PCI Express x1 slot.

LAN LED Connectors



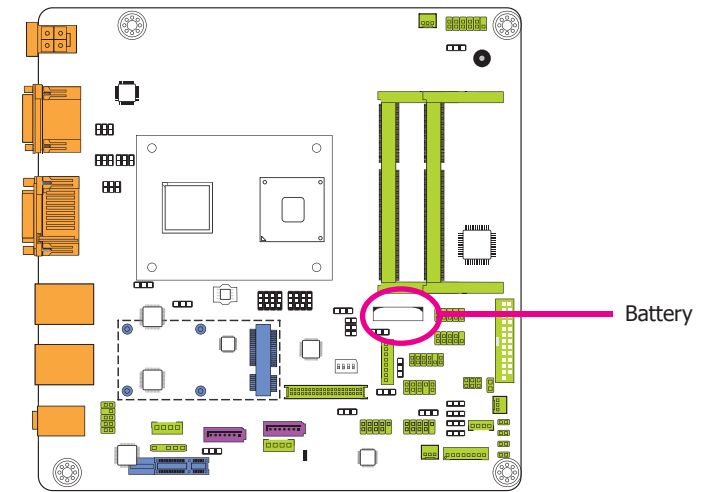
These LAN LED connectors are used to detect the connection state of the RJ45 LAN ports (J23 and J24 for LAN 1, and J21 and J22 for LAN 2) when the connection is made to an active network via a cable.

Standby Power LED



This LED will lit red when the system is in the standby mode. It indicates that there is power on the system board. Power-off the PC and then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.

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.

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 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 submenu or fields.
<Esc>	Exit 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	Select a field.
<F1>	Displays general help
<F2>	Pervious values
<F3>	Optimized defaults
<F4>	Saves and resets 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.

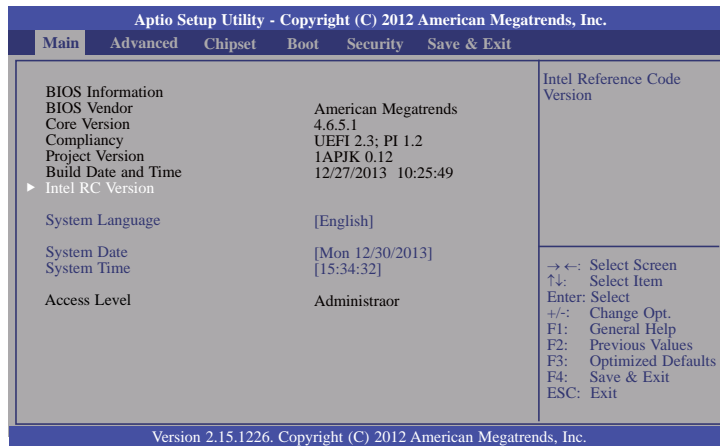
Submenu

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 Language

The default language is English.

System Date

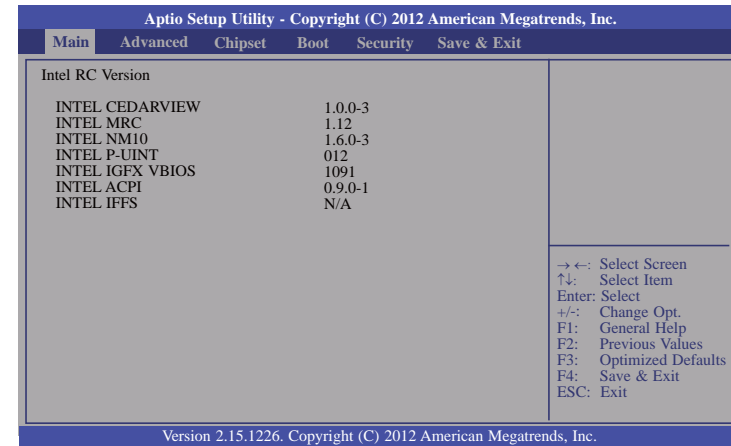
The date format is <day>, <month>, <date>, <year>. Day displays a day, from Sunday to Saturday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1980 to 2099.

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.

Intel RC Version

The field only displays the version of the Intel reference code.



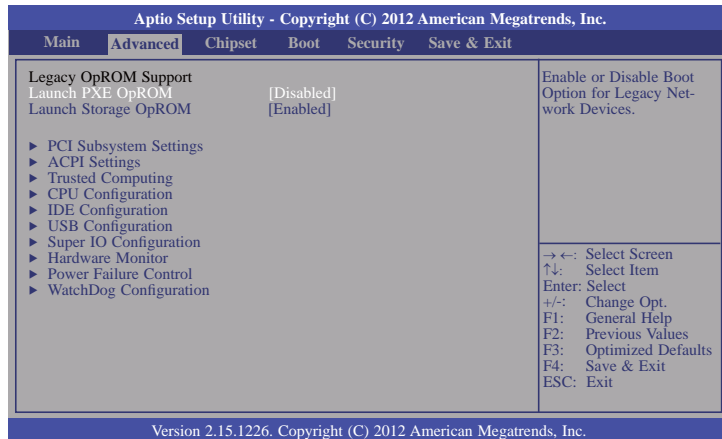
Advanced

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

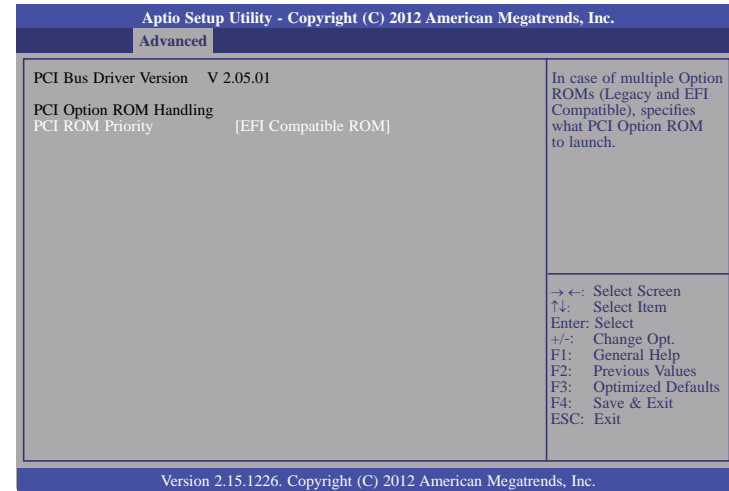
Enables or disables the boot option for legacy network devices.

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, PCI-X and PCI Express settings.

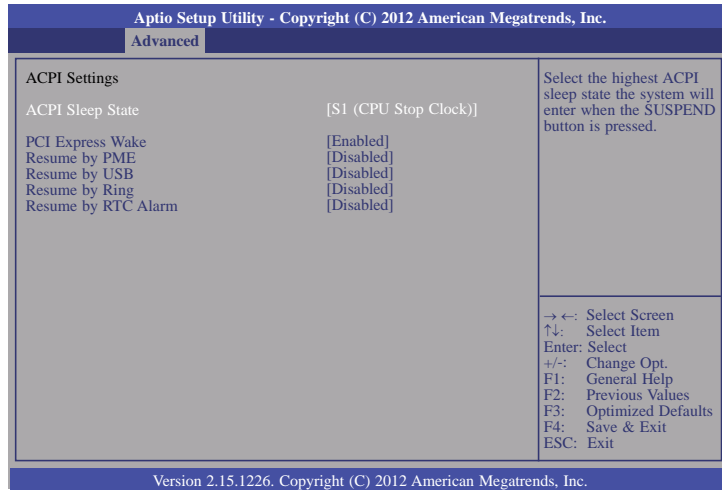


PCI ROM Priority

In case of multiple Option ROMs (Legacy and EFI Compatible), it specifies what PCI Option ROM to launch.

ACPI Settings

This section is used to configure the system ACPI parameters.



ACPI Sleep State

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

S1(CSC) Enables the CPU Stop Clock function.

S3(STR) Enables the Suspend to RAM function.

PCI Express Wake

Enables resume by PCI Express.

Resume by PME

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

Resume by USB

Enables this field to use the USB signal to wake up the system.

Resume by Ring

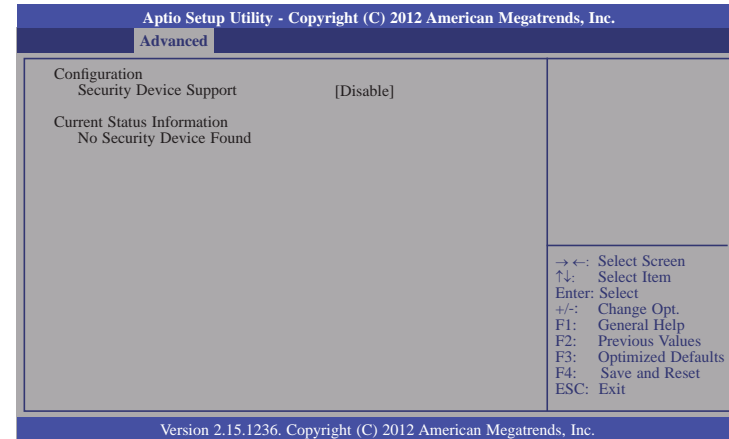
Enables this field to use the Ring signal to wake up the system.

Resume by RTC Alarm

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

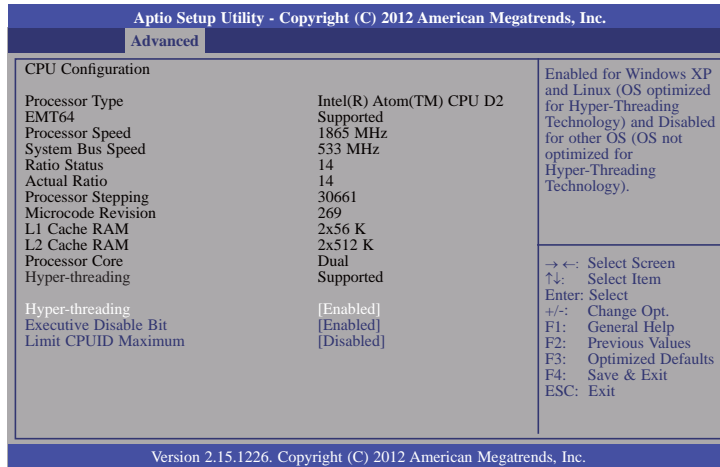
Trusted Computing

This section configures settings relevant to Trusted Computing innovations.



CPU Configuration

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



Hyper-threading

Enables this field for Windows XP and Linux which are optimized for Hyper-Threading technology. Selects disabled for other OSes which are not optimized for Hyper-Threading technology.

Executive Disable Bit

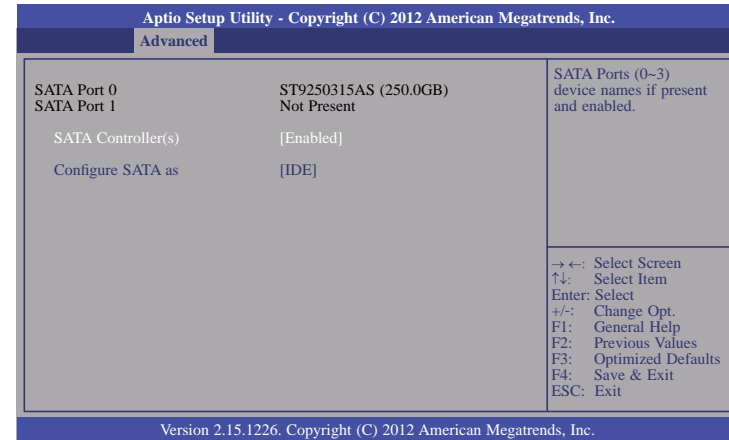
XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3.)

Limit CPUID Maximum

Disable for Windows XP.

IDE Configuration

This section is used to configure IDE devices.



SATA Controller(s)

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

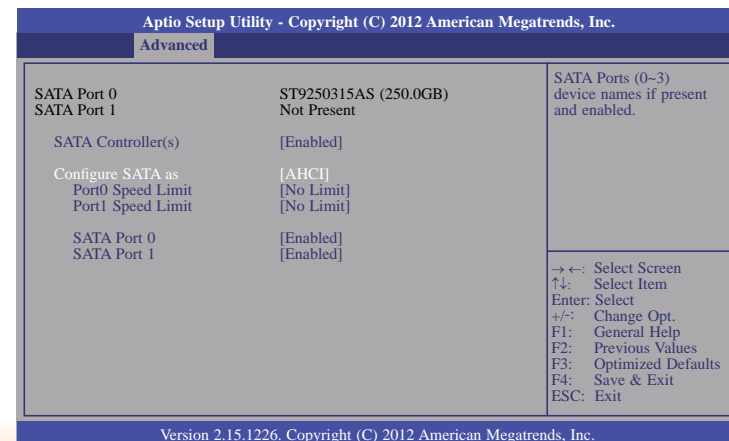
Configure SATA as

IDE Mode

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

AHCI Mode

Select a configuration for SATA configuration.



Port 0 and Port 1 Speed Limit

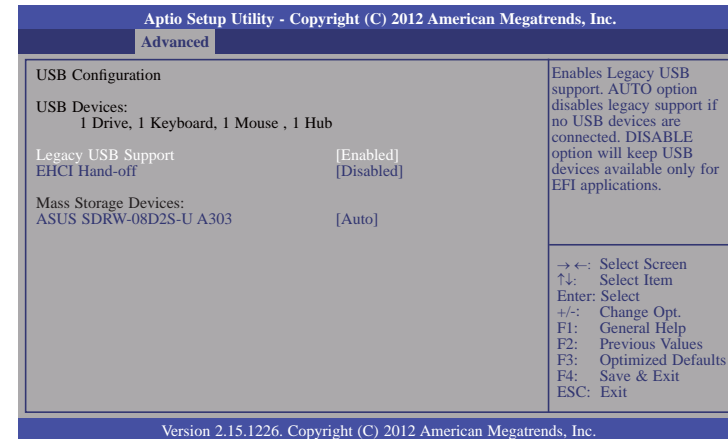
Selects the limitation of the Serial ATA port AHCI speed rate: No Limit, Gen 1 or Gen2.

SATA Port 0 and 1

Enables or disables the Serial ATA port.

USB Configuration

This section is used to configure USB parameters.

**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.

ASUS SDRW-08D2S-U A303

Selects the emulation type of the mass storage device.

Auto

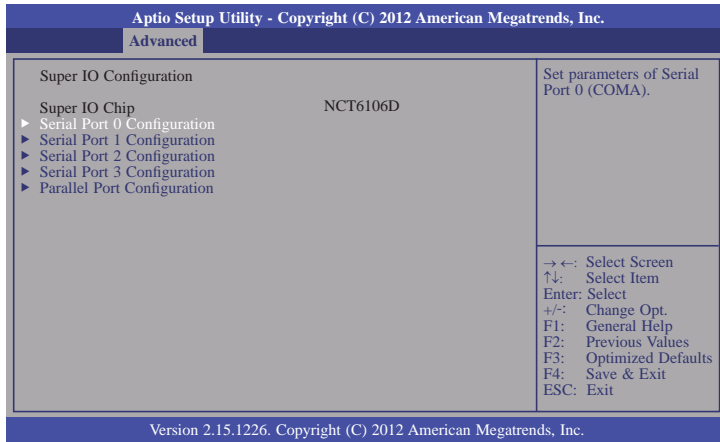
Enumerates devices less than 530MB as floppies.

Forced FDD

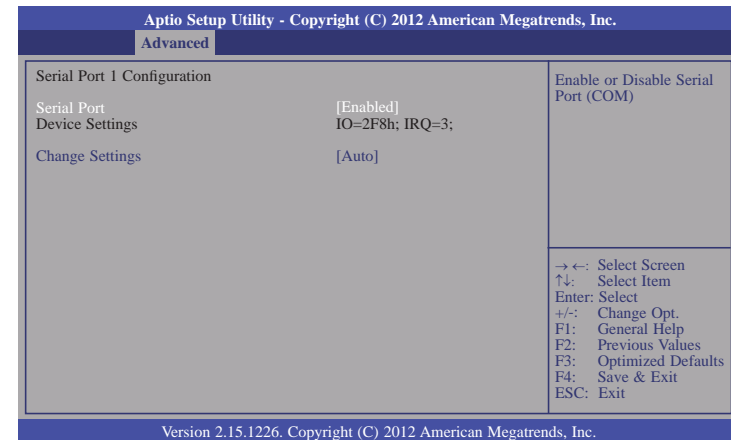
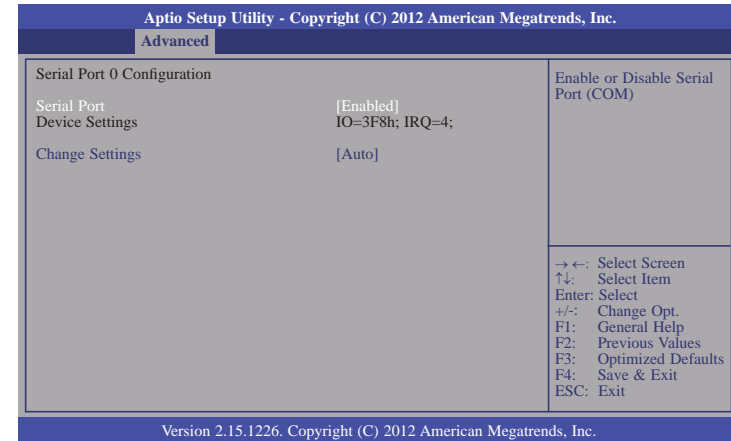
Forces HDD formatted drive to boot as FDD (e.g. ZIP drive).

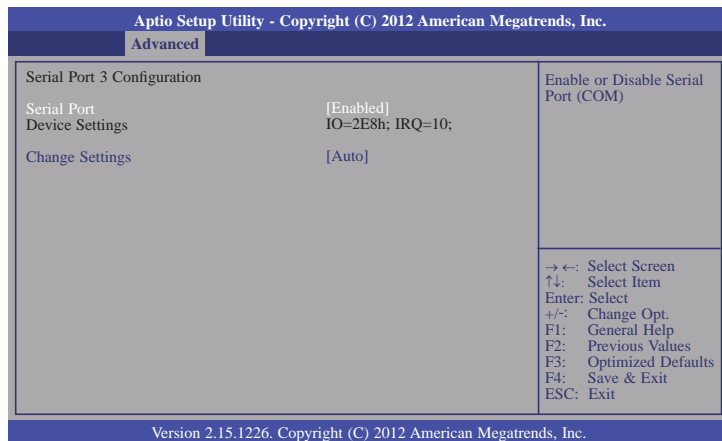
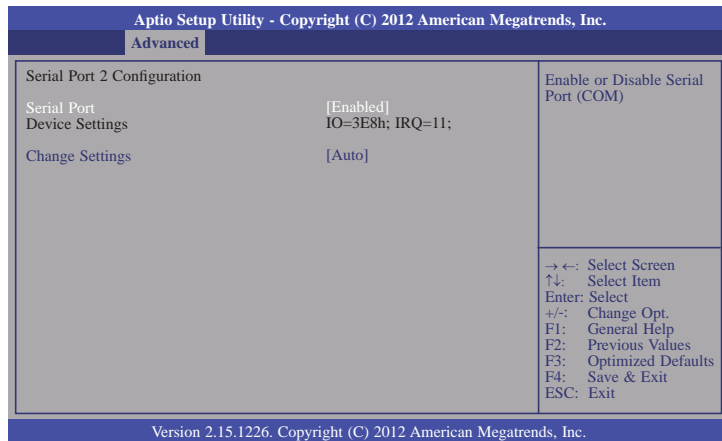
Super IO Configuration

This section is used to configure the I/O functions supported by the onboard Super I/O chip.



Serial Port 0 Configuration to Serial Port 3 Configuration





Serial Port

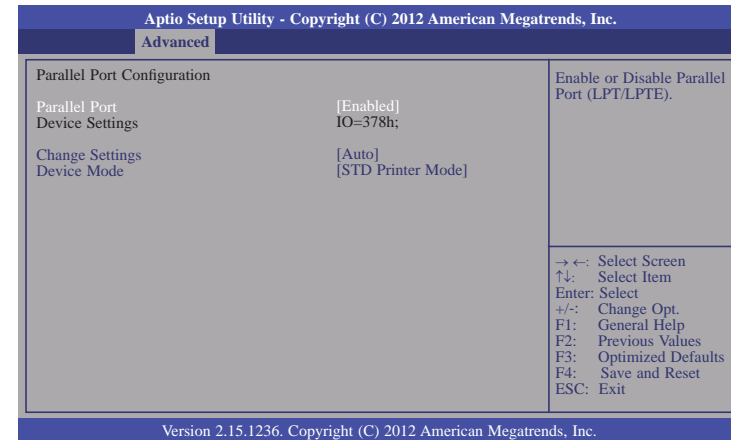
Enables or disables the serial port.

Change Settings

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

Parallel Port Configuration

Sets parameters of Parallel port (LPT/LPE).



Parallel Port

Enables or disables the parallel port (LPT/LPTE).

Change Settings

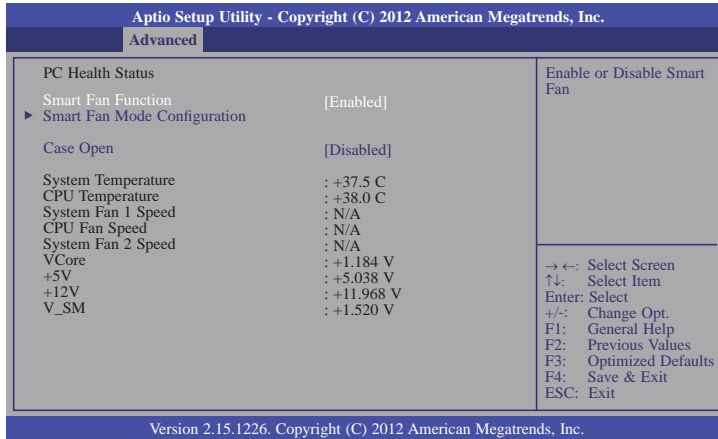
Selects the IO setting for the super I/O device.

Device Mode.

Changes the mode for the printer port.

Hardware Monitor

This section displays the hardware monitor status.



Smart Fan Function

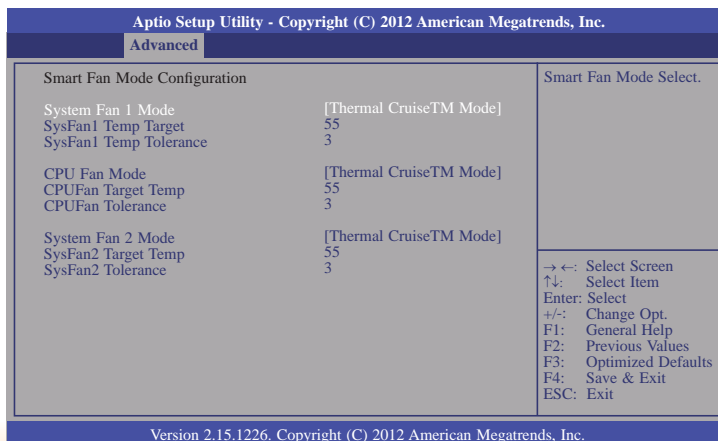
Enables or disables the smart fan.

Smart Fan Mode Configuration

Selects the smart fan mode.

Case Open

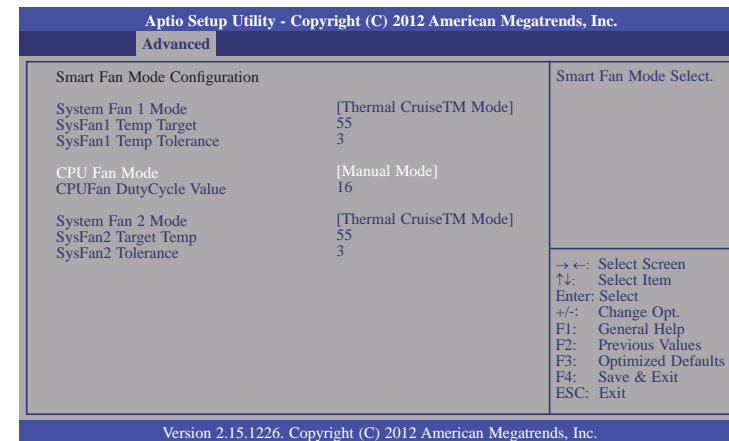
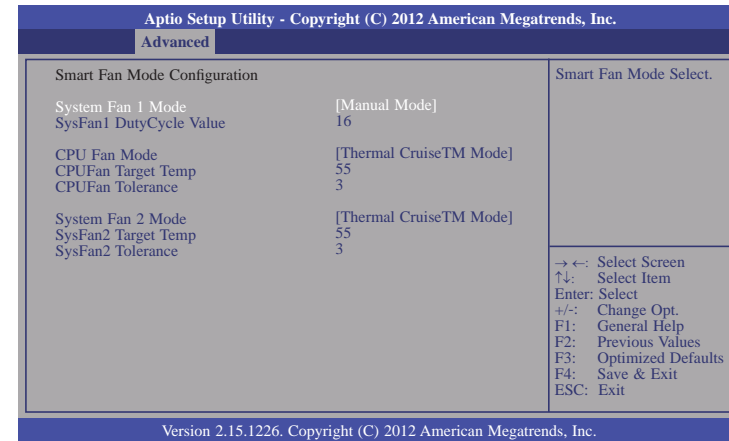
Selects the smart fan mode.



System/CPU Fan Mode

Selects the smart fan mode.

When the Manual Mode is selected, it will display the following information:



When the Fan Speed Cruise™ Mode is selected, it will display the following information:

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Smart Fan Mode Configuration		Smart Fan Mode Select.
System Fan 1 Mode	[Fan Speed Cruise™.....]	
SysFan1 Speed Target	150	
SysFan1 Speed Tolerance	5	
CPU Fan Mode	[Thermal Cruise™ Mode]	
CPUFan Target Temp	55	
CPUFan Tolerance	3	
System Fan 2 Mode	[Thermal Cruise™ Mode]	
SysFan2 Target Temp	55	
SysFan2 Tolerance	3	
		→ ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.		

When the SmartFan™ TM IV Mode is selected, it will display the following information:

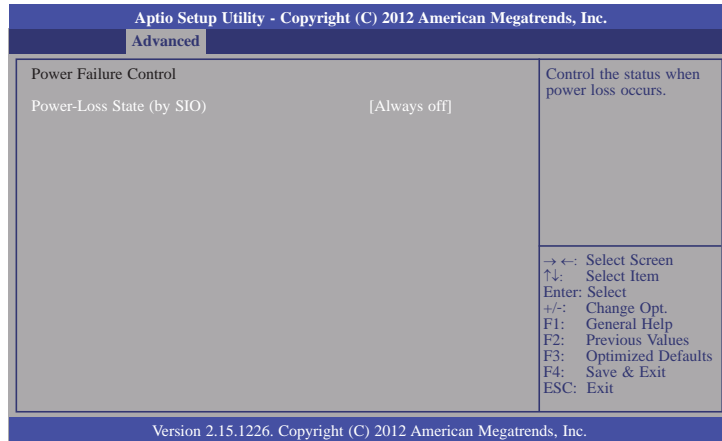
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Smart Fan Mode Configuration		Smart Fan Mode Select.
System Fan 1 Mode	[SmartFan™ TM IV Mode]	
CPU Fan Mode	[Thermal Cruise™ Mode]	
CPUFan Target Temp	55	
CPUFan Tolerance	3	
System Fan 2 Mode	[Thermal Cruise™ Mode]	
SysFan2 Target Temp	55	
SysFan2 Tolerance	3	
		→ ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.		

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Smart Fan Mode Configuration		Smart Fan Mode Select.
System Fan 1 Mode	[Thermal Cruise™ Mode]	
SysFan1 Temp Target	55	
SysFan1 Temp Tolerance	3	
CPU Fan Mode	[Fan Speed Cruise™.....]	
CPUFan Speed Target	150	
CPUFan Speed Tolerance	5	
System Fan 2 Mode	[Thermal Cruise™ Mode]	
SysFan2 Target Temp	55	
SysFan2 Tolerance	3	
		→ ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.		

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Smart Fan Mode Configuration		Smart Fan Mode Select.
System Fan 1 Mode	[Thermal Cruise™ Mode]	
SysFan1 Temp Target	55	
SysFan1 Temp Tolerance	3	
CPU Fan Mode	[SmartFan™ TM IV Mode]	
System Fan 2 Mode	[Thermal Cruise™ Mode]	
SysFan2 Target Temp	55	
SysFan2 Tolerance	3	
		→ ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.		

Power Failure Control

This section is used to control the status when the power fails.



Power-Loss State (by SIO)

Always 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.

Always On

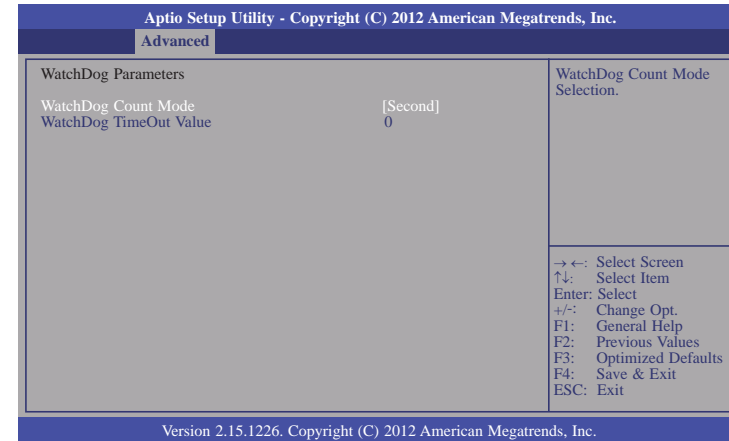
When power returns after an AC power failure, the system will automatically power-on.

Keeps Last State

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.

WatchDog Configuration

This field sets system WatchDog parameters.



WatchDog Count Mode

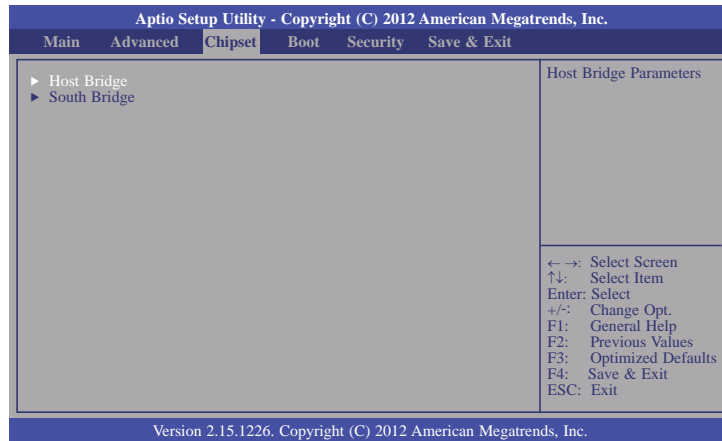
This field is used to select the WatchDog count mode.

WatchDog TimeOut Value

This field is used to fill the WatchDog timeout value. 0 means disabled.

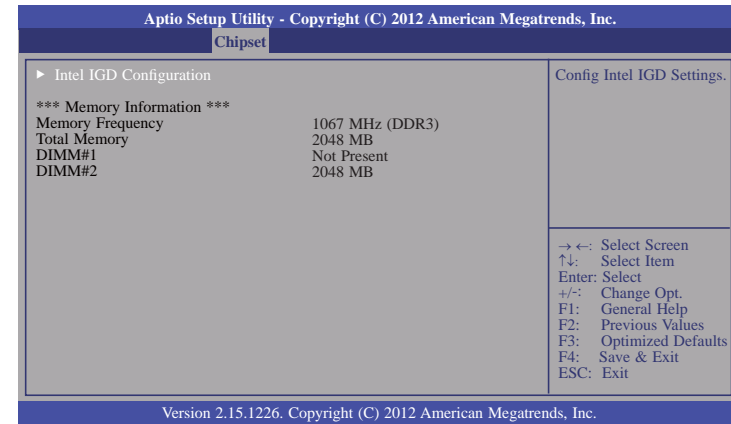
Chipset

This field configures relevant chipset functions.

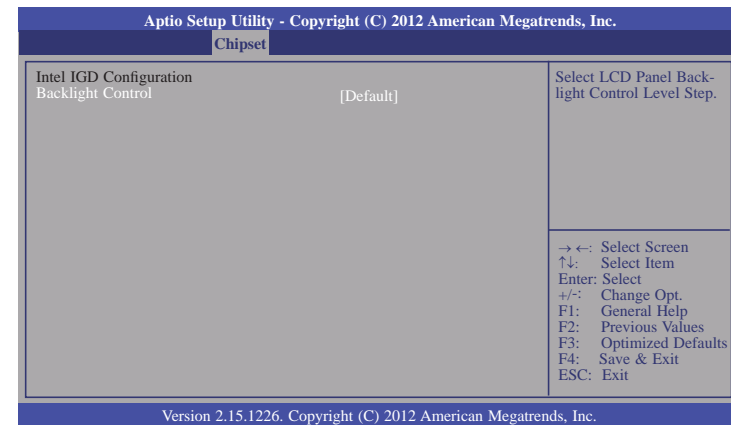


Host Bridge

This field configures Host Bridge parameters.



Intel IGD Configuration

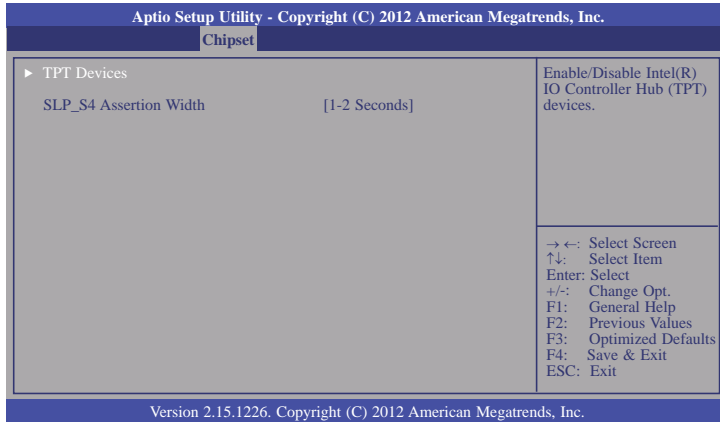


Backlight Control

Selects LCD panel backlight control level step: Step 1 to Step 16.

South Bridge

This field configures South Bridge parameters.

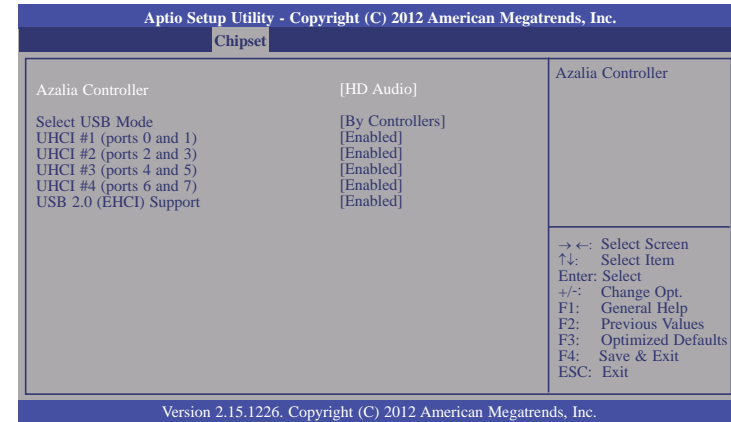


SLP_S4 Assertion Width

Selects a minimum assertion width of the SLP_S4# signal.

TPT Device

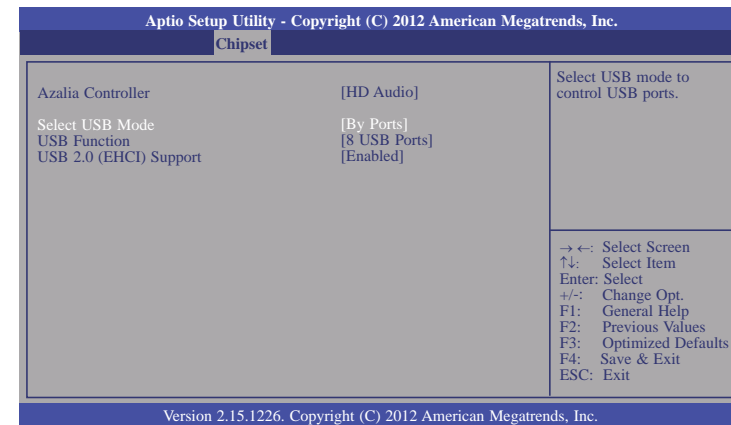
Enables or disables Intel(R) IO Controller Hub (TPT) devices.



Select USB Mode

Selects the USB mode to control USB ports: By ports or By controllers.

When selecting "By Ports", it will display the following information:



USB Function

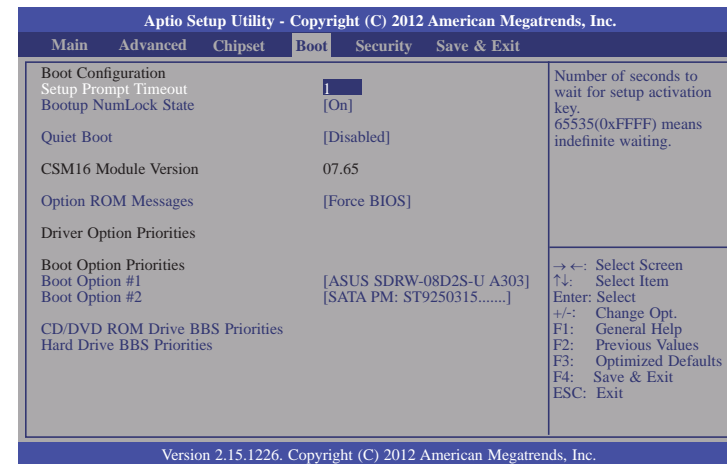
Enables or disables the USB function.

UHCI #1~UHCI#4

Controls the USB UHCI (USB 1.1) function. Disables from highest to lowest controller.

USB 2.0(EHCI) Support

Enables or disables the USB 2.0 (EHCI) support.

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.

Option ROM Messages

This field is used to set the display mode of Option ROM.

Boot Option #1/#2

Sets the system boot order.

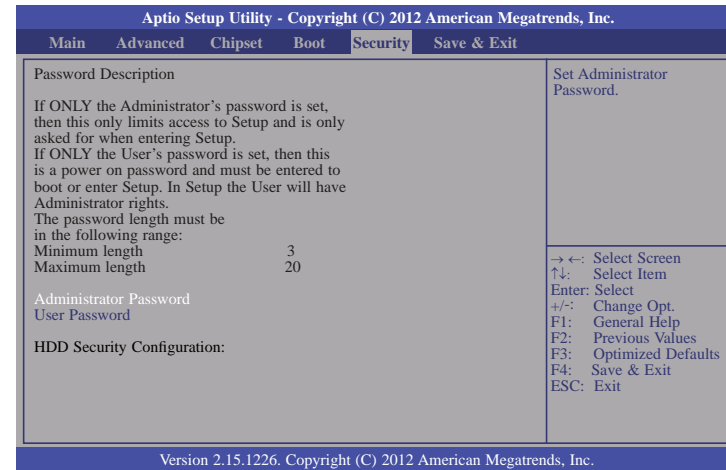
CD/DVD ROM Drive BBS Priorities

This field is used to select the boot sequence of the CD/DVD-ROM drives. Move the cursor to this field then press <Enter>. Use the Up or Down arrow keys to select a device then press <+> to move it up or <-> to move it down the list.

Hard Drive BBS Priorities

Sets the order of the legacy devices in this group.

Security



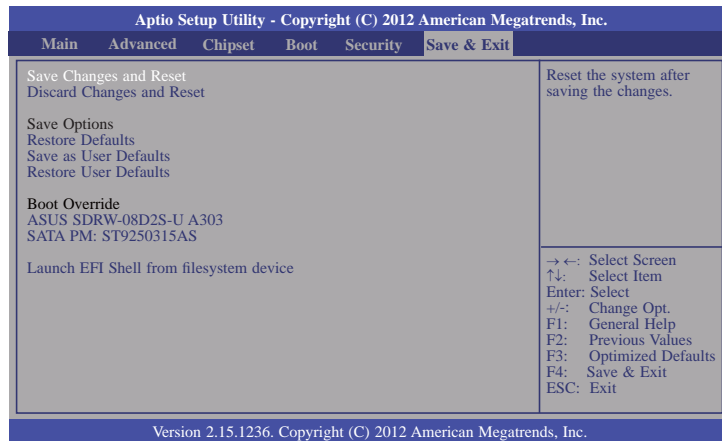
Administrator Password

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.

Launch EFI Shell from filesystem device

Attempts to launch EFI shell application (Shellx64.efi) from one of the available filesystem devices.

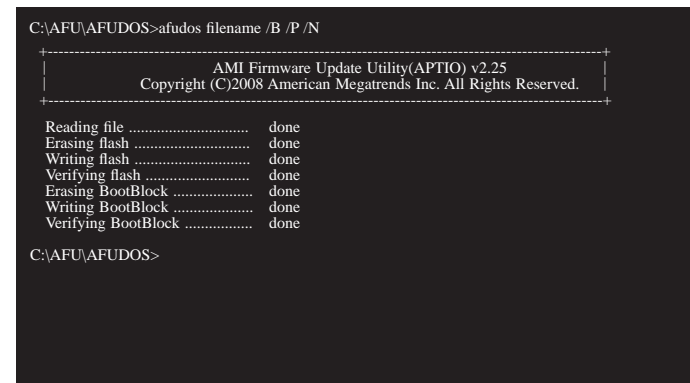
Updating the BIOS

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>.

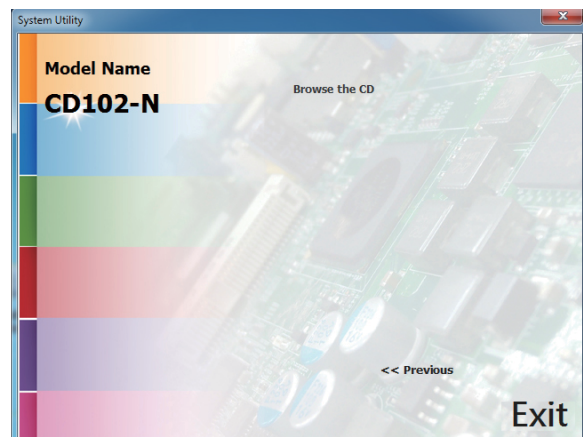
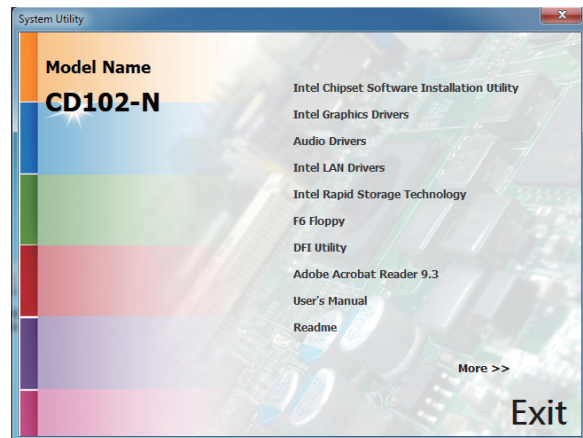


Chapter 4 - Supported Software

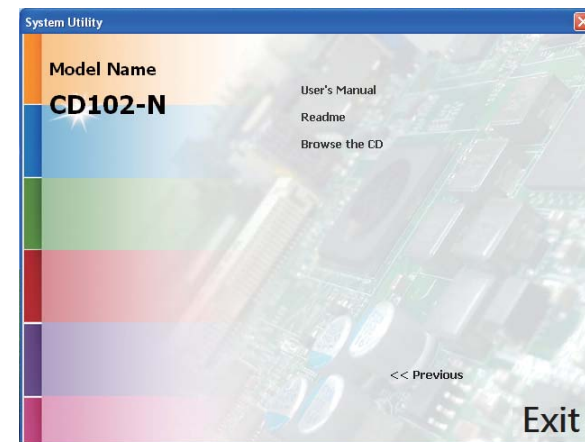
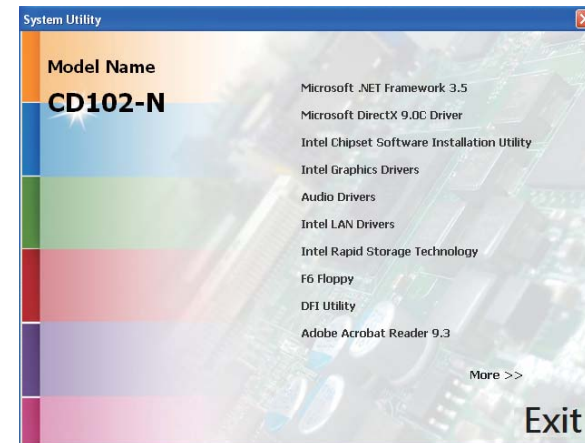
The CD that came with the system board contains drivers, utilities and software applications required to enhance the performance of the system board.

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 Page (For Windows 7)



Auto Run Page (For Windows XP)



Microsoft .NET Framework 3.5 (For Windows XP only)



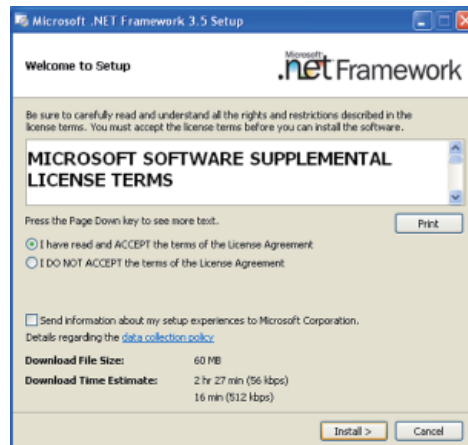
Note:

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

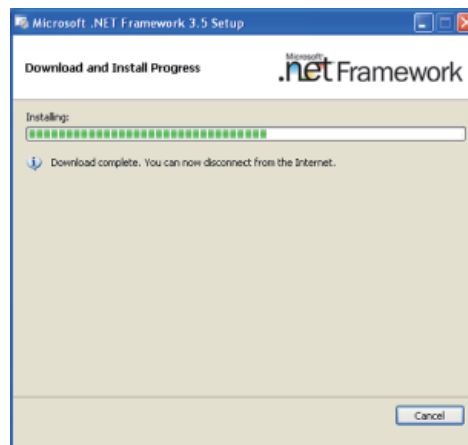
To install the driver, click “Microsoft .NET Framework 3.5” on the main menu.

1. Read the license agreement carefully.

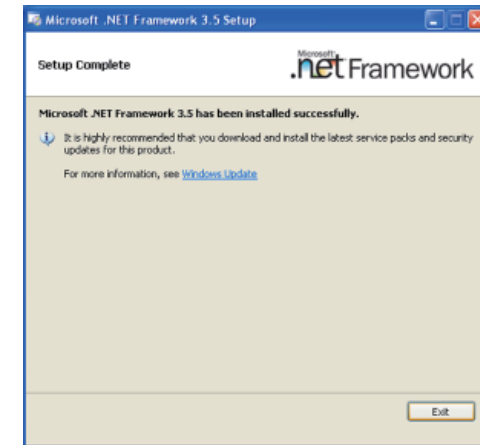
Click “I have read and accept the terms of the License Agreement” then click Install.



2. Setup is now installing the driver.



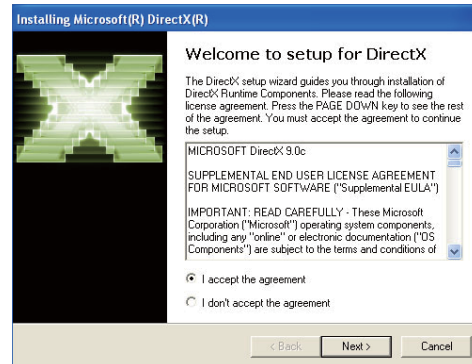
3. Click Exit.



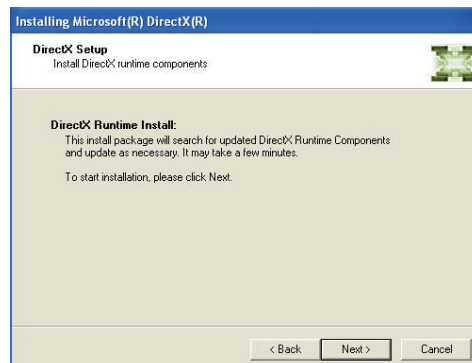
Microsoft DirectX 9.0C (For Windows XP only)

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

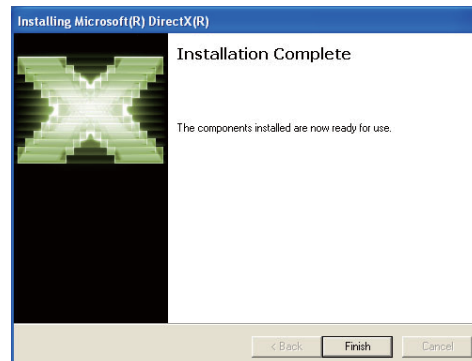
1. Click “I accept the agreement” then click Next.



2. To start installation, click Next.



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



Intel Chipset Software Installation Utility

The Intel Chipset Software Installation Utility 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 Software Installation Utility” on the main menu.

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



2. Read the license agreement then click Yes.



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



- After completing installation, click Finish to exit setup.



Intel Graphics Drivers (For Windows XP)



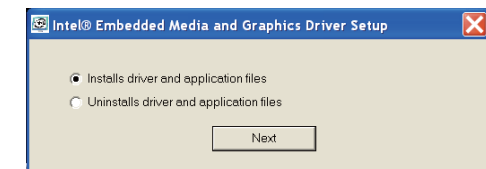
Note:
Before installing Intel Graphics Drivers, make sure you have installed Microsoft .NET Framework 3.5 SP1.

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

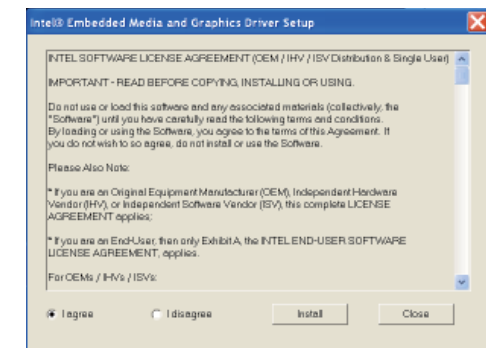
- Select the resolution manually.



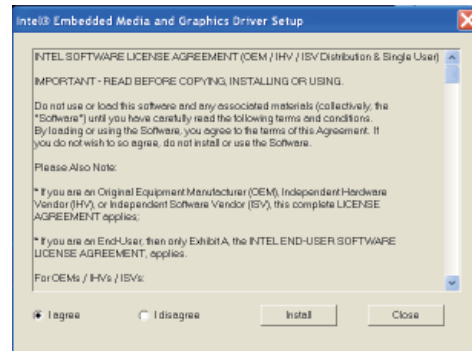
- Select “Installs driver and application files” to start the setup. Then, click “Next.”



- Read the license agreement and click “Install.”



4. Click “Continue Anyway”.



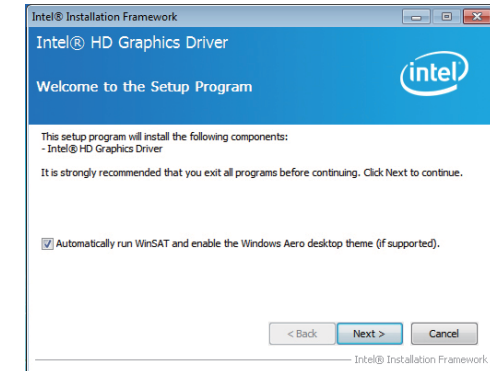
5. Click “Yes” to restart this computer now in order to complete installation.



Intel Graphics Drivers (For Windows 7)

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

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



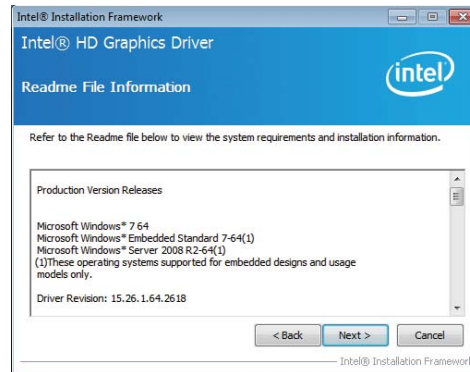
By default, the “Automatically run WinSAT and enable the Windows Aero desktop theme” is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows Vista desktop appears. The “blank screen” period is the time Windows is testing the graphics performance.

We recommend that you skip this process by disabling this function then click Next.

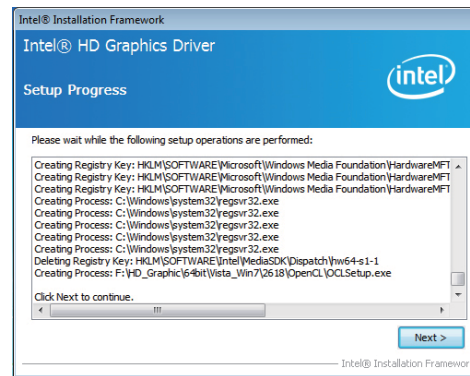
2. Read the license agreement then click Yes.



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

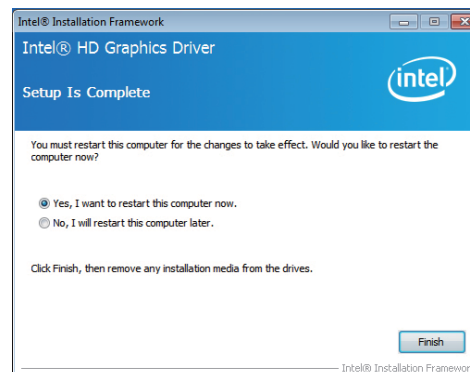


- Setup is now installing the driver. Click Next to continue.



- Click "Yes, I want to restart this computer now" then click Finish.

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



Audio Drivers

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

- Setup is now ready to install the driver. Click Next.
- Follow the remainder of the steps on the screen; clicking "Next" each time you finish a step.



- 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.

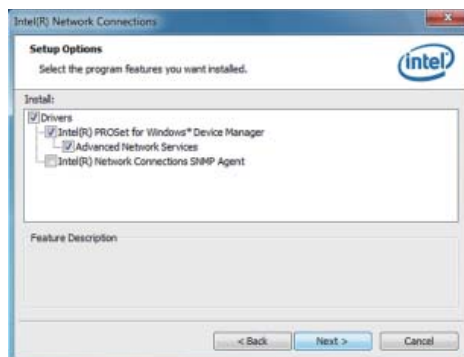
1. Setup is ready to install the driver. Click Next.



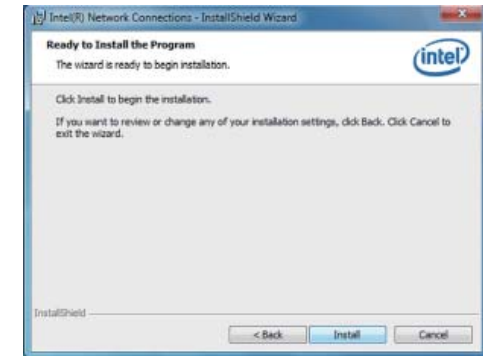
2. Click “I accept the terms in the license agreement” then click “Next”.



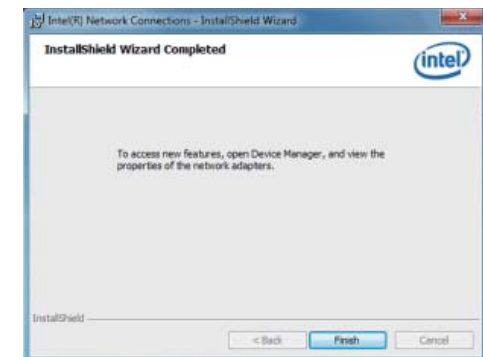
3. Select the program features you want installed then click Next.



4. Click Install to begin the installation.



5. After completing installation, click Finish.



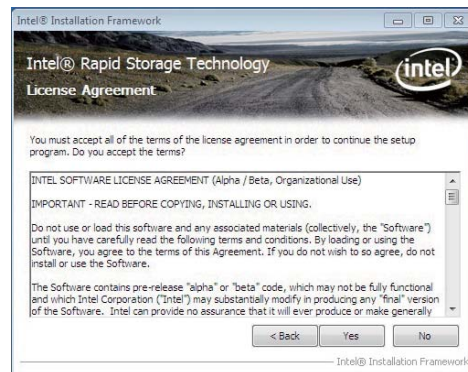
Intel Rapid Storage Technology

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

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



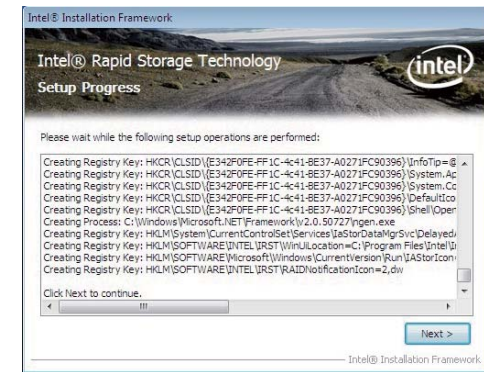
2. Read the license agreement then click Yes.



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

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



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

DFI Utility

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



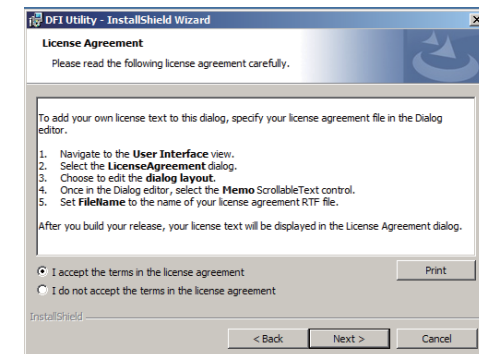
Note:

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

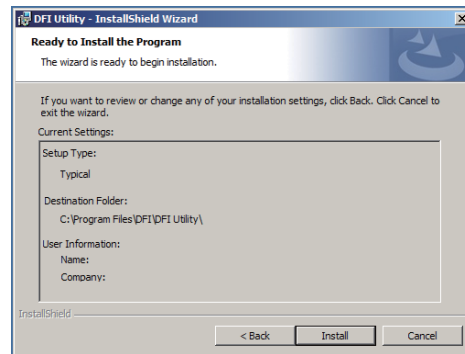
1. Setup is ready to install the DFI Utility driver
Click “Next”.



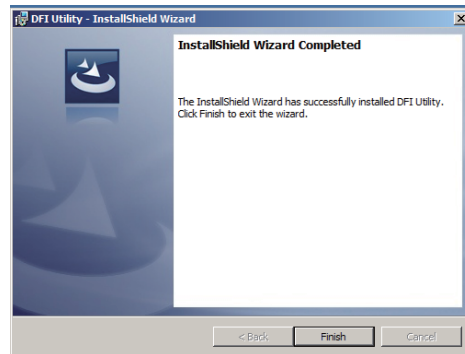
2. Click “I accept the terms in the license agreement” then click “Next”.



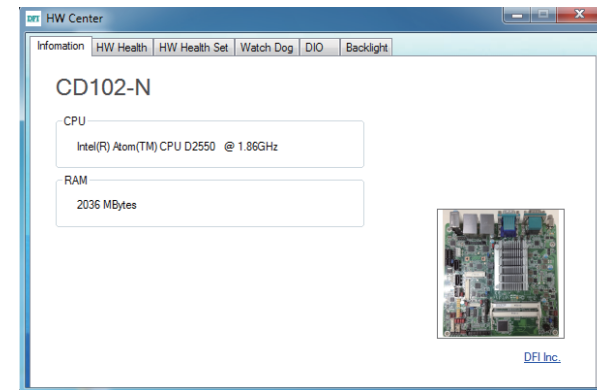
3. Click "Install" to begin the installation.



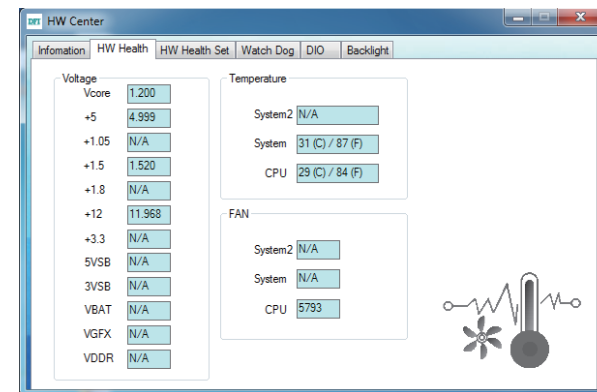
4. After completing installation, click "Finish".



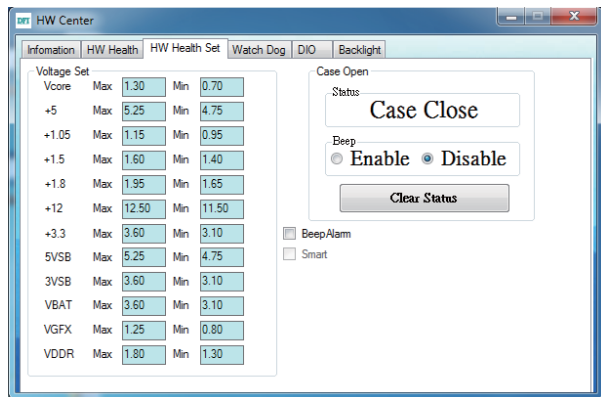
The DFI Utility icon will appear on the desktop. Double-click the icon to open the utility.



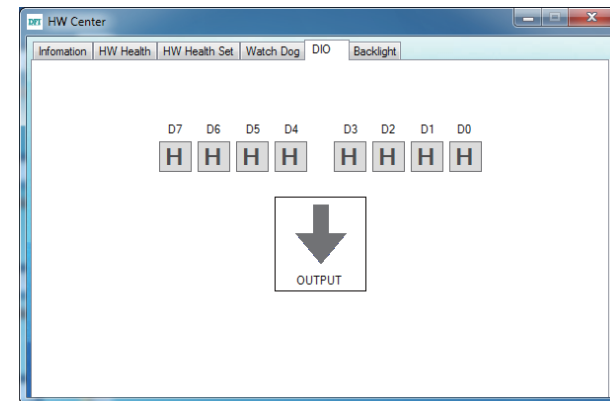
Information



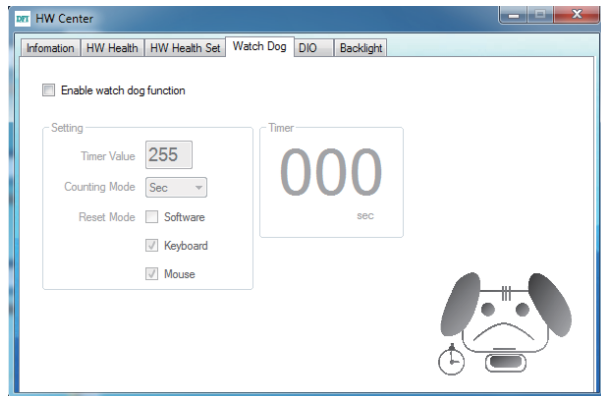
HW Health



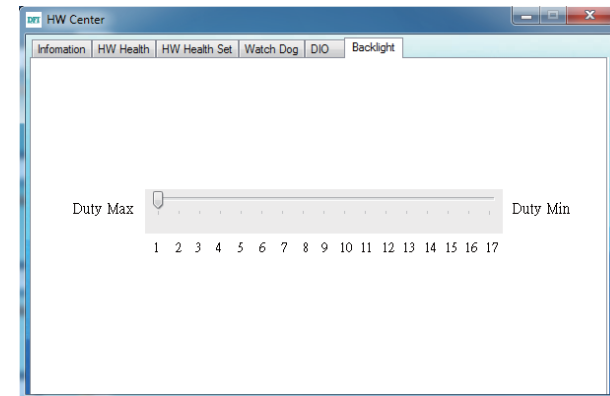
HW Health Set



DIO



WatchDog

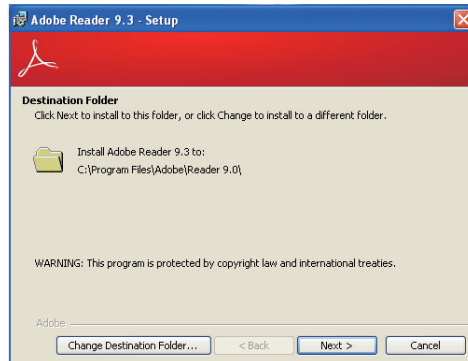


Backlight

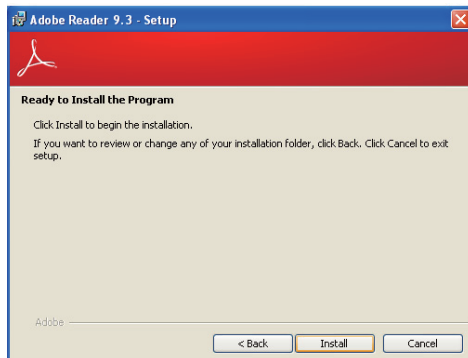
Adobe Acrobat Reader 9.3

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

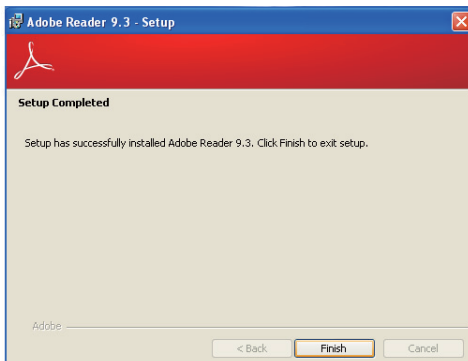
1. Click Next to install or click Change Destination Folder to select another folder.



2. Click Install to begin installation.



3. Click Finish to exit installation.



Chapter 5 - Digital I/O Programming Guide

Register Description

The Input Port Register (register 0) reflects the incoming logic levels of the pins, regardless of whether the pin is defined as an input or output by the Configuration Register. They act only on the read operation. Writes to this register have no effect. The default value (X) is determined by the externally applied logic level. Before a read operation, a write transmission is sent with the command byte to indicate to the I²C device that the Input Port Register will be accessed next.

Register 0 (Input Port Register)

BIT	I-7	I-6	I-5	I-4	I-3	I-2	I-1	I-0
DEFAULT	X	X	X	X	X	X	X	X

The Output Port Register (register 1) shows the outgoing logic levels of the pins defined as outputs by the Configuration Register. Bit values in this register have no effect on pins defined as inputs. In turns, reads from this register reflect the value that is in the flip-flop controlling the output selection, not the actual pin value.

Register 1 (Output Port Register)

BIT	O-7	O-6	O-5	O-4	O-3	O-2	O-1	O-0
DEFAULT	1	1	1	1	1	1	1	1

The Polarity Inversion Register (register 2) allows polarity inversion of the pins defined as inputs by the Configuration Register. If a bit in this register is set (written with 1), the corresponding port pin's polarity is inverted. If a bit in this register is clear (written with a 0), the corresponding port pin's original polarity is retained.

Register 2 (Polarity Inversion Register)

BIT	N-7	N-6	N-5	N-4	N-3	N-2	N-1	N-0
DEFAULT	0	0	0	0	0	0	0	0

The Configuration Register (register 3) configures the direction of the I/O pins. If a bit in this register is set to 1, the corresponding port pin is enabled as an input with a high-impedance output driver. If a bit in this register is cleared to 0, the corresponding port pin is enabled as an input.

Register 3 (Configuration Register)

BIT	C-7	C-6	C-5	C-4	C-3	C-2	C-1	C-0
DEFAULT	1	1	1	1	1	1	1	1

Function Description

I2CWriteByte(SlaveAddr, SubAddr, Data):
Write a Byte data to a specified I2C Device.

I2CReadByte(SlaveAddr, SubAddr, *Data):
Read a Byte data from a specified I2C Device.

SetBit(*Data, Bit) :
Set Data bit n as "1".

ClrBit(*Data, Bit) :
Set Data bit n as "0".

GetBit(Data, Bit) :
Return the value of data bit n.

Sample Code

GPIO Configuration

```
#define SLAVE_ADDR      0x40
#define INPUT_PORT     0x00
#define OUTPUT_PORT    0x01
#define INVERSION_PORT 0x02
#define COMFIG_PORT    0x03

GpioConfig(int PinNum, int Mode)
{
    BYTE Data;
    BYTE TempPinNum = PinNum%8;

    //Pin0-7 Input/Output Configuration
    I2C_ReadByte(SLAVE_ADDR, CONFIG_PORT, &Data);
    if(Mode == 1){SetBit(&Data, TempPinNum);} //Input
    else      {ClrBit(&Data, TempPinNum);} //Output
    I2C_WriteByte(SLAVE_ADDR, CONFIG_PORT, Data);

    return 1;
}
```

GPIO Output Process

```
#define SLAVE_ADDR      0x40
#define INPUT_PORT     0x00
#define OUTPUT_PORT    0x01
#define INVERSION_PORT 0x02
#define COMFIG_PORT    0x03

GpioOut(int PinNum, int Level)
{
    BYTE Data;
    BYTE TempPinNum = PinNum%8;

    //Pin0-7
    I2C_ReadByte(SLAVE_ADDR, OUTPUT_PORT, &Data);
    if(Level == 0){ClrBit(&Data, TempPinNum);}
    else      {SetBit(&Data, TempPinNum);}
    I2C_WriteByte(SLAVE_ADDR, OUTPUT_PORT, Data);

    return 1;
}
```

GPIO Input Process

```
#define SLAVE_ADDR      0x40
#define INPUT_PORT     0x00
#define OUTPUT_PORT    0x01
#define INVERSION_PORT 0x02
#define COMFIG_PORT    0x03

GpioIn(int PinNum, int *Status)
{
    BYTE Data;
    BYTE Group = PinNum/8;
    BYTE TempPinNum = PinNum%8;

    //Pin0-7
    I2C_ReadByte(SLAVE_ADDR, INPUT_PORT, &Data);
    *Status = GetBit(Data, TempPinNum);

    return 1;
}
```

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 official website.

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

2. Install nLite.

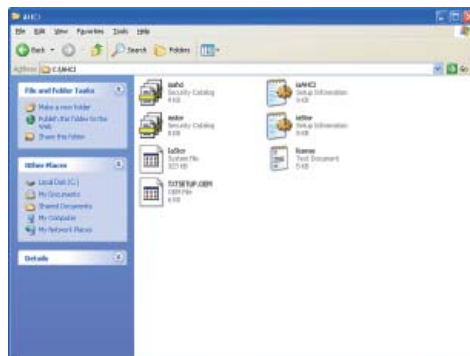


Important:

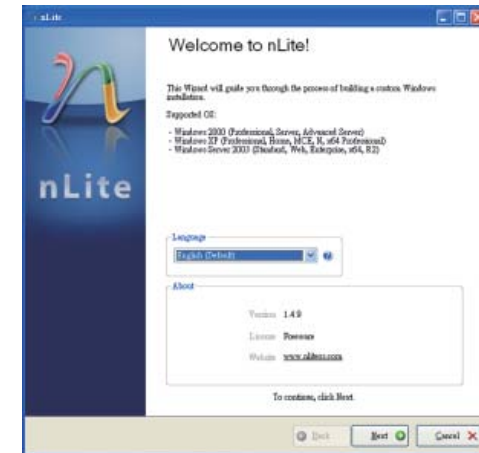
Due to its coding with Visual.Net, you may need to first install .NET Framework prior to installing nLite.

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.

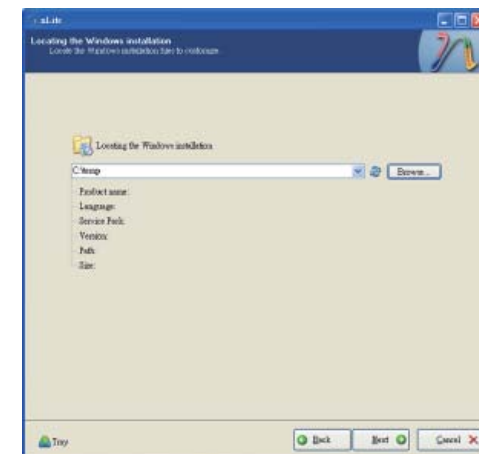


4. Insert the XP installation disc into an optical drive.
5. Launch nLite. The Welcome screen will appear. Click **Next**.

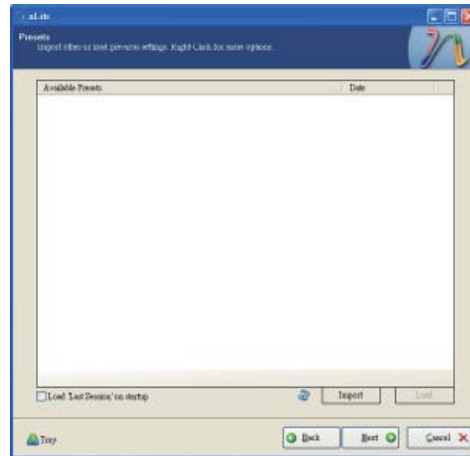


6. Click **Next** to temporarily save the Windows installation files to the designated default folder.

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



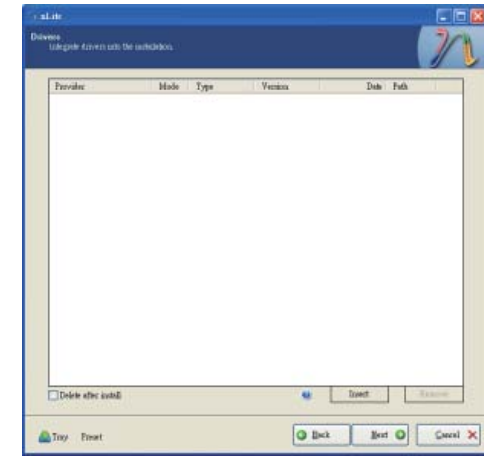
7. Click **Next**.



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

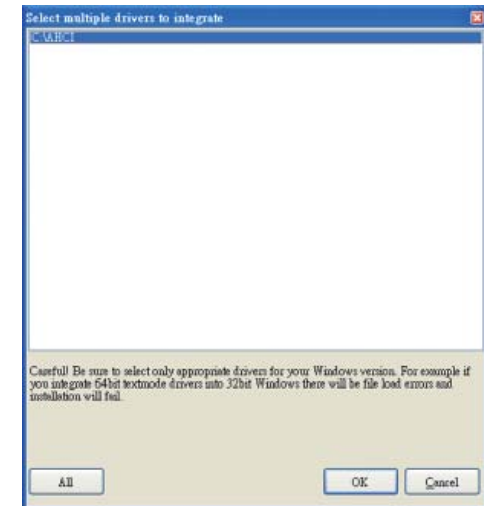


9. Click **Insert** and then select **Multiple driver folder** to select the drivers you will integrate. Click **Next**.



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

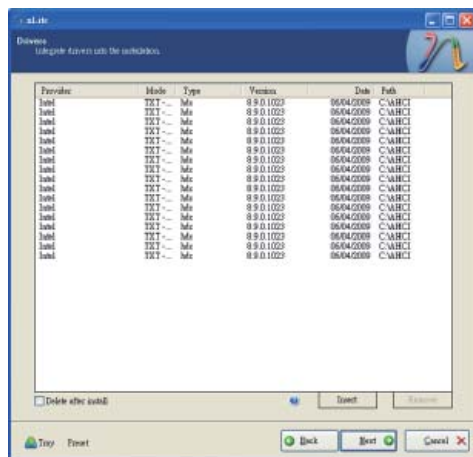
Integrating 64-bit drivers into 32-bit Windows or vice versa will cause file load errors and failed installation.



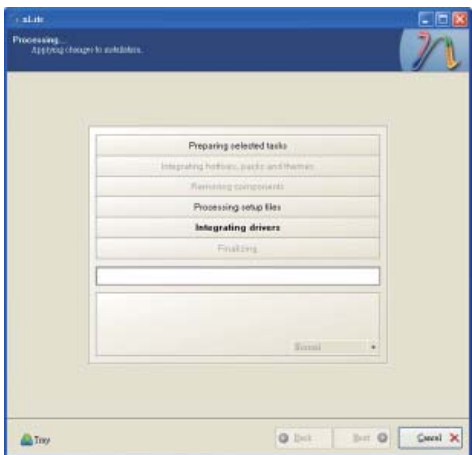
11. If you are uncertain of the southbridge chip used on your motherboard, select all RAID/AHCI controllers and then click **OK**.



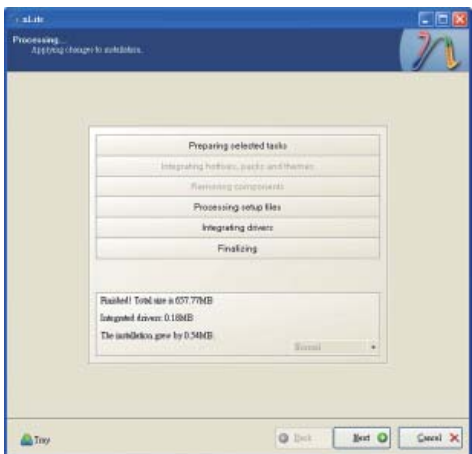
12. Click **Next**.



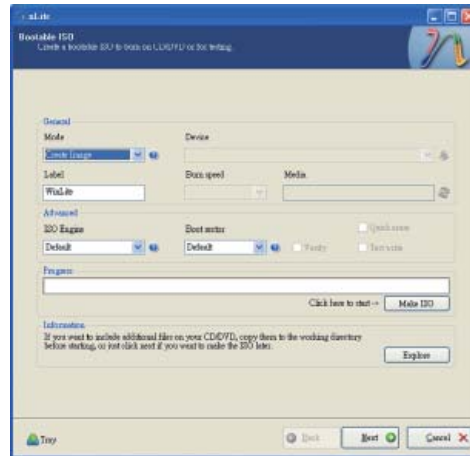
13. The program is currently integrating the drivers and applying changes to the installation.



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

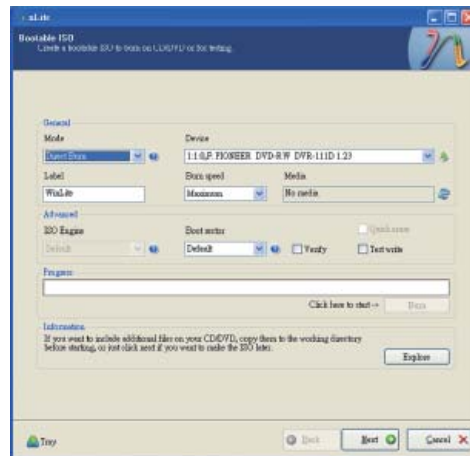


15. To create an image, select the **Create Image** mode under the General section and then click **Next**.



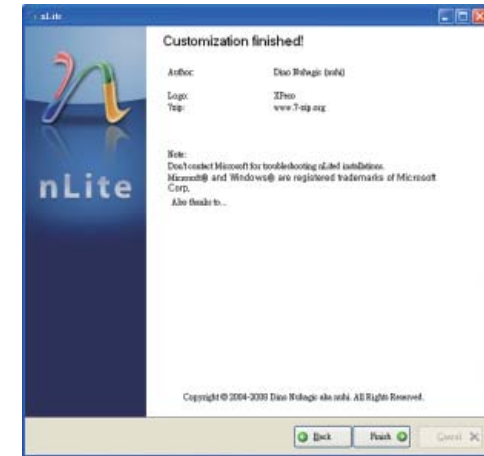
16. Or you can choose to burn it directly to a disc by selecting the **Direct Burn** mode under the General section.

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.

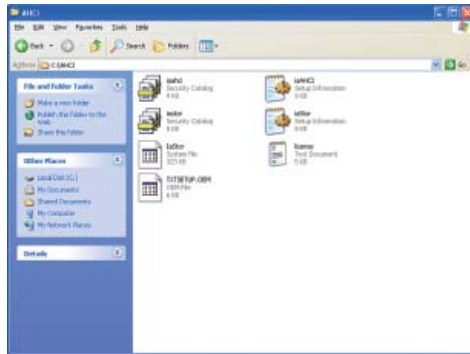


AHCI

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

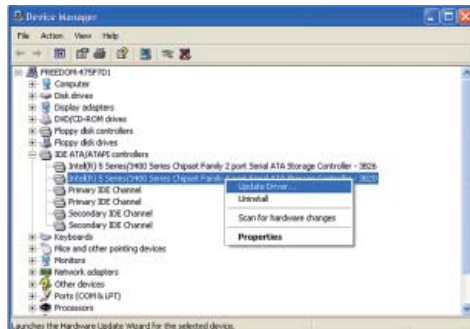
1. Enter the BIOS utility and configure the SATA controller to IDE mode.
2. Install Windows XP but do not press F6.
3. Download relevant RAID/AHCI driver files supported by the motherboard chipset from Intel's website.

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**.

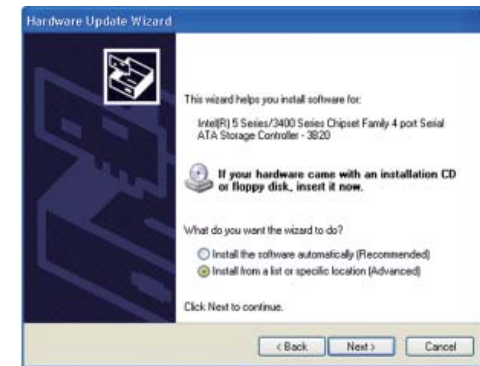
If the controller you selected did not work, try selecting another one.



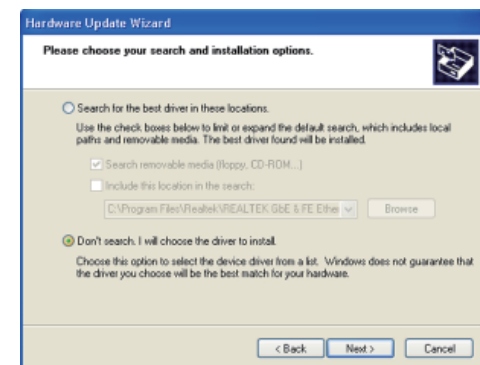
5. In the Hardware Update Wizard dialog box, select **"No, not this time"** then click **Next**.



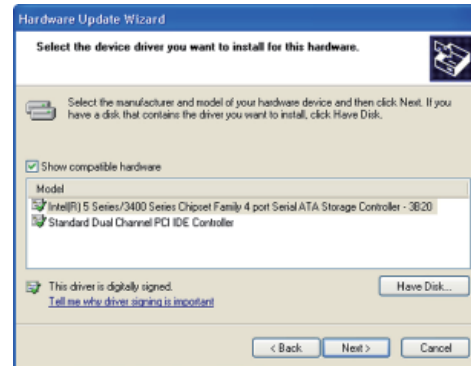
6. Select **"Install from a list or specific location (Advanced)"** and then click **Next**.



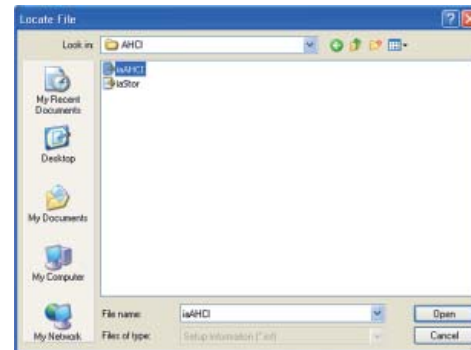
7. Select **"Don't search. I will choose the driver to install"** and then click **Next**.



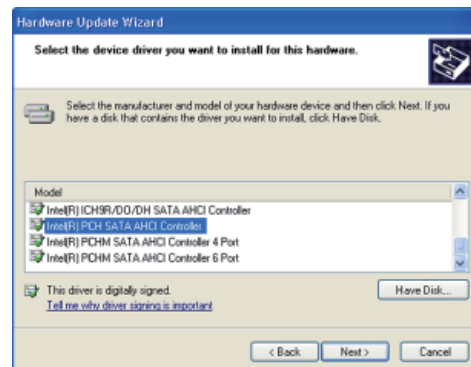
8. Click **“Have Disk”**.



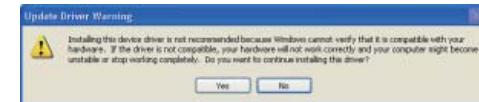
9. Select C:\AHCI\iaAHCI.inf and then click **Open**.



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

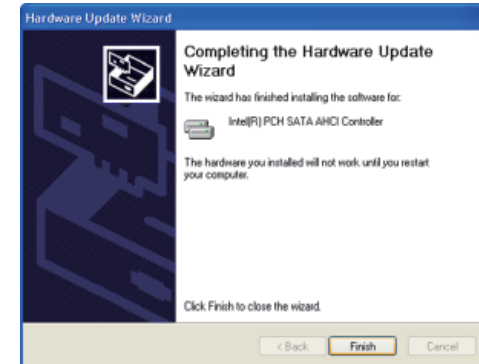


11. A warning message appeared because the selected SATA controller did not match your hardware device.



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

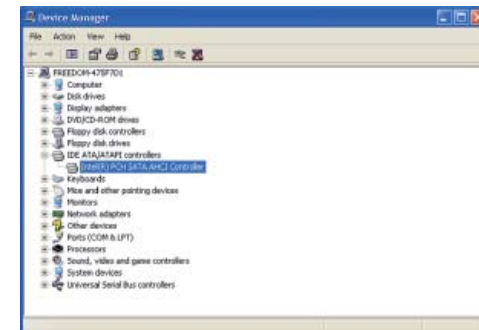
12. Click **Finish**.



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.

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-FFFFFFH is bad.

Memory test fail

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

Appendix D - Troubleshooting Checklist

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.

Appendix E - BIOS Status Code

Status Code Ranges

Status Code Range	Description
0x01 – 0x0F	SEC Status Codes & Errors
0x10 – 0x2F	PEI execution up to and including memory detection
0x30 – 0x4F	PEI execution after memory detection
0x50 – 0x5F	PEI errors
0x60 – 0xCF	DXE execution up to BDS
0xD0 – 0xDF	DXE errors
0xE0 – 0xE8	S3 Resume (PEI)
0xE9 – 0xEF	S3 Resume errors (PEI)
0xF0 – 0xF8	Recovery (PEI)
0xF9 – 0xFF	Recovery errors (PEI)

Standard Status Codes

SEC Status Codes

Status Code	Description
0x0	Not used
Progress Codes	
0x1	Power on. Reset type detection (soft/hard).
0x2	AP initialization before microcode loading
0x3	North Bridge initialization before microcode loading
0x4	South Bridge initialization before microcode loading
0x5	OEM initialization before microcode loading
0x6	Microcode loading
0x7	AP initialization after microcode loading
0x8	North Bridge initialization after microcode loading
0x9	South Bridge initialization after microcode loading
0xA	OEM initialization after microcode loading
0xB	Cache initialization
SEC Error Codes	
0xC – 0xD	Reserved for future AMI SEC error codes
0xE	Microcode not found
0xF	Microcode not loaded

PEI Status Codes

Status Code	Description
Progress Codes	
0x10	PEI Core is started
0x11	Pre-memory CPU initialization is started
0x12	Pre-memory CPU initialization (CPU module specific)
0x13	Pre-memory CPU initialization (CPU module specific)
0x14	Pre-memory CPU initialization (CPU module specific)
0x15	Pre-memory North Bridge initialization is started
0x16	Pre-Memory North Bridge initialization (North Bridge module specific)
0x17	Pre-Memory North Bridge initialization (North Bridge module specific)
0x18	Pre-Memory North Bridge initialization (North Bridge module specific)
0x19	Pre-memory South Bridge initialization is started
0x1A	Pre-memory South Bridge initialization (South Bridge module specific)
0x1B	Pre-memory South Bridge initialization (South Bridge module specific)
0x1C	Pre-memory South Bridge initialization (South Bridge module specific)
0x1D – 0x2A	OEM pre-memory initialization codes
0x2B	Memory initialization. Serial Presence Detect (SPD) data reading
0x2C	Memory initialization. Memory presence detection
0x2D	Memory initialization. Programming memory timing information
0x2E	Memory initialization. Configuring memory
0x2F	Memory initialization (other).
0x30	Reserved for ASL (see ASL Status Codes section below)
0x31	Memory Installed
0x32	CPU post-memory initialization is started
0x33	CPU post-memory initialization. Cache initialization
0x34	CPU post-memory initialization. Application Processor(s) (AP) initialization
0x35	CPU post-memory initialization. Boot Strap Processor (BSP) selection
0x36	CPU post-memory initialization. System Management Mode (SMM) initialization
0x37	Post-Memory North Bridge initialization is started
0x38	Post-Memory North Bridge initialization (North Bridge module specific)
0x39	Post-Memory North Bridge initialization (North Bridge module specific)

0x3A	Post-Memory North Bridge initialization (North Bridge module specific)
0x3B	Post-Memory South Bridge initialization is started
0x3C	Post-Memory South Bridge initialization (South Bridge module specific)
0x3D	Post-Memory South Bridge initialization (South Bridge module specific)
0x3E	Post-Memory South Bridge initialization (South Bridge module specific)
0x3F-0x4E	OEM post memory initialization codes
0x4F	DXE IPL is started
PEI Error Codes	
0x50	Memory initialization error. Invalid memory type or incompatible memory speed
0x51	Memory initialization error. SPD reading has failed
0x52	Memory initialization error. Invalid memory size or memory modules do not match.
0x53	Memory initialization error. No usable memory detected
0x54	Unspecified memory initialization error.
0x55	Memory not installed
0x56	Invalid CPU type or Speed
0x57	CPU mismatch
0x58	CPU self test failed or possible CPU cache error
0x59	CPU micro-code is not found or micro-code update is failed
0x5A	Internal CPU error
0x5B	reset PPI is not available
0x5C-0x5F	Reserved for future AMI error codes
S3 Resume Progress Codes	
0xE0	S3 Resume is started (S3 Resume PPI is called by the DXE IPL)
0xE1	S3 Boot Script execution
0xE2	Video repost
0xE3	OS S3 wake vector call
0xE4-0xE7	Reserved for future AMI progress codes
0xE0	S3 Resume is started (S3 Resume PPI is called by the DXE IPL)
S3 Resume Error Codes	
0xE8	S3 Resume Failed in PEI
0xE9	S3 Resume PPI not Found
0xEA	S3 Resume Boot Script Error
0xEB	S3 OS Wake Error
0xEC-0xEF	Reserved for future AMI error codes
Recovery Progress Codes	
0xF0	Recovery condition triggered by firmware (Auto recovery)
0xF1	Recovery condition triggered by user (Forced recovery)
0xF2	Recovery process started

0xF3	Recovery firmware image is found
0xF4	Recovery firmware image is loaded
0xF5-0xF7	Reserved for future AMI progress codes
Recovery Error Codes	
0xF8	Recovery PPI is not available
0xF9	Recovery capsule is not found
0xFA	Invalid recovery capsule
0xFB – 0xFF	Reserved for future AMI error codes

PEI Beep Codes

# of Beeps	Description
1	Memory not Installed
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started
3	DXE IPL was not found
3	DXE Core Firmware Volume was not found
7	Reset PPI is not available
4	Recovery failed
4	S3 Resume failed

DXE Status Codes

Status Code	Description
0x60	DXE Core is started
0x61	NVRAM initialization
0x62	Installation of the South Bridge Runtime Services
0x63	CPU DXE initialization is started
0x64	CPU DXE initialization (CPU module specific)
0x65	CPU DXE initialization (CPU module specific)
0x66	CPU DXE initialization (CPU module specific)
0x67	CPU DXE initialization (CPU module specific)
0x68	PCI host bridge initialization
0x69	North Bridge DXE initialization is started
0x6A	North Bridge DXE SMM initialization is started
0x6B	North Bridge DXE initialization (North Bridge module specific)
0x6C	North Bridge DXE initialization (North Bridge module specific)
0x6D	North Bridge DXE initialization (North Bridge module specific)
0x6E	North Bridge DXE initialization (North Bridge module specific)
0x6F	North Bridge DXE initialization (North Bridge module specific)

0x70	South Bridge DXE initialization is started
0x71	South Bridge DXE SMM initialization is started
0x72	South Bridge devices initialization
0x73	South Bridge DXE Initialization (South Bridge module specific)
0x74	South Bridge DXE Initialization (South Bridge module specific)
0x75	South Bridge DXE Initialization (South Bridge module specific)
0x76	South Bridge DXE Initialization (South Bridge module specific)
0x77	South Bridge DXE Initialization (South Bridge module specific)
0x78	ACPI module initialization
0x79	CSM initialization
0x7A – 0x7F	Reserved for future AMI DXE codes
0x80 – 0x8F	OEM DXE initialization codes
0x90	Boot Device Selection (BDS) phase is started
0x91	Driver connecting is started
0x92	PCI Bus initialization is started
0x93	PCI Bus Hot Plug Controller Initialization
0x94	PCI Bus Enumeration
0x95	PCI Bus Request Resources
0x96	PCI Bus Assign Resources
0x97	Console Output devices connect
0x98	Console input devices connect
0x99	Super IO Initialization
0x9A	USB initialization is started
0x9B	USB Reset
0x9C	USB Detect
0x9D	USB Enable
0x9E – 0x9F	Reserved for future AMI codes
0xA0	IDE initialization is started
0xA1	IDE Reset
0xA2	IDE Detect
0xA3	IDE Enable
0xA4	SCSI initialization is started
0xA5	SCSI Reset
0xA6	SCSI Detect
0xA7	SCSI Enable
0xA8	Setup Verifying Password
0xA9	Start of Setup
0xAA	Reserved for ASL (see ASL Status Codes section below)

0xAB	Setup Input Wait
0xAC	Reserved for ASL (see ASL Status Codes section below)
0xAD	Ready To Boot event
0xAE	Legacy Boot event
0xAF	Exit Boot Services event
0xB0	Runtime Set Virtual Address MAP Begin
0xB1	Runtime Set Virtual Address MAP End
0xB2	Legacy Option ROM Initialization
0xB3	System Reset
0xB4	USB hot plug
0xB5	PCI bus hot plug
0xB6	Clean-up of NVRAM
0xB7	Configuration Reset (reset of NVRAM settings)
0xB8 – 0xBF	Reserved for future AMI codes
0xC0 – 0xCF	OEM BDS initialization codes
DXE Error Codes	
0xD0	CPU initialization error
0xD1	North Bridge initialization error
0xD2	South Bridge initialization error
0xD3	Some of the Architectural Protocols are not available
0xD4	PCI resource allocation error. Out of Resources
0xD5	No Space for Legacy Option ROM
0xD6	No Console Output Devices are found
0xD7	No Console Input Devices are found
0xD8	Invalid password
0xD9	Error loading Boot Option (LoadImage returned error)
0xDA	Boot Option is failed (StartImage returned error)
0xDB	Flash update is failed
0xDC	Reset protocol is not available

DXE Beep Codes

# of Beeps	Description
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
1	Invalid password
6	Flash update is failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met

ACPI/ASL Status Codes

Status Code	Description
0x01	System is entering S1 sleep state
0x02	System is entering S2 sleep state
0x03	System is entering S3 sleep state
0x04	System is entering S4 sleep state
0x05	System is entering S5 sleep state
0x10	System is waking up from the S1 sleep state
0x20	System is waking up from the S2 sleep state
0x30	System is waking up from the S3 sleep state
0x40	System is waking up from the S4 sleep state
0xAC	System has transitioned into ACPI mode. Interrupt controller is in PIC mode.
0xAA	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.

OEM-Reserved Status Code Ranges

Status Code	Description
0x5	OEM SEC initialization before microcode loading
0xA	OEM SEC initialization after microcode loading
0x1D – 0x2A	OEM pre-memory initialization codes
0x3F – 0x4E	OEM PEI post memory initialization codes
0x80 – 0x8F	OEM DXE initialization codes
0xC0 – 0xCF	OEM BDS initialization codes