



RL830-C602/C604

EATX Industrial Motherboard

User's Manual

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Changes after the publication's first release will be based on the product's revision. The website will always provide the most updated information.

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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.

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About this Manual

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

Warranty

1. Warranty does not cover damages or failures that arised from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.
2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.
3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.
4. We will not be liable for any indirect, special, incidental or 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 RL830 motherboard
- One Serial ATA data cable
- One I/O shield
- 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
- COM port cable
- I/O shield
- Serial ATA data cable
- Serial ATA power cable

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.

- A CPU
- 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"> • 2 LGA 2011 sockets • Dual Intel® Xeon® E5-2600 v2 processors <ul style="list-style-type: none"> - 3rd Generation processors (22nm process technology) <ul style="list-style-type: none"> : Intel® Xeon® E5-4624L v2 (25M Cache, up to 2.5 GHz); 70W : Intel® Xeon® E5-2680 v2 (25M Cache, up to 3.6 GHz); 115W : Intel® Xeon® E5-2658 v2 (25M Cache, up to 3.0 GHz); 95W : Intel® Xeon® E5-2648L v2 (25M Cache, up to 2.5 GHz); 70W : Intel® Xeon® E5-2640 v2 (20M Cache, up to 2.5 GHz); 95W : Intel® Xeon® E5-2630 v2 (15M Cache, up to 3.1 GHz); 80W : Intel® Xeon® E5-2628L v2 (20M Cache, up to 2.4 GHz); 70W : Intel® Xeon® E5-2618L v2 (15M Cache, up to 2.0 GHz); 50W • 8 GT/s Intel® QPI
Chipset	<ul style="list-style-type: none"> • Intel® C602J/C604 Express Chipset
System Memory	<ul style="list-style-type: none"> • 16 240-pin DDR3 sockets support: <ul style="list-style-type: none"> - Registered memory (RDIMM) - LV-RDIMM - Unbuffered memory (UDIMM) with ECC/non-ECC - Load Reduced memory (LR-DIMM) • Supports DDR3 800/1066/1333/1600MHz • Each processor supports 4 channel memory interface • Supports up to 512GB system memory • 1Gb, 2Gb, 4Gb and 8Gb DDR3 DRAM technologies supported for the following devices: <ul style="list-style-type: none"> - UDIMMs x8, x16 - RDIMMs x4, x8 - LRDIMMs x4, x8 (2Gb and 4Gb only)
Expansion Slots	<ul style="list-style-type: none"> • 4 PCIe x16 Gen 3 slots (PCIe 3.0) • 2 PCIe x8 Gen 3 slots (PCIe 3.0)
Graphics	<ul style="list-style-type: none"> • Aspeed AST 1400 • Display port: 1 VGA
LAN	<ul style="list-style-type: none"> • 1 Intel® 82580 PCI Express Gigabit Ethernet controller supports 4 LAN ports • 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"> • 6 Serial ATA ports (Intel® C602J) <ul style="list-style-type: none"> - 2 SATA 3.0 ports with data transfer rate up to 6Gb/s - 4 SATA 2.0 ports with data transfer rate up to 3Gb/s • 10 Serial ATA ports (Intel® C604) <ul style="list-style-type: none"> - 2 SATA 3.0 ports with data transfer rate up to 6Gb/s - 8 SATA 2.0 ports with data transfer rate up to 3Gb/s • Integrated Advanced Host Controller Interface (AHCI) controller • Supports RAID 0/1/5/10
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
External I/O	<ul style="list-style-type: none"> • 1 DB-9 RS232 serial port • 1 VGA port • 4 USB 2.0/1.1 ports • 4 RJ45 LAN ports

Internal I/O	<ul style="list-style-type: none"> • 1 connector for 2 external USB 2.0/1.1 ports • 1 Embedded USB connector for eUSB SSD • 1 vertical Type A USB 2.0 port • 1 connector for an external RS232 serial port (2.0mm pitch) • 6 Serial ATA ports (Intel® C602J) • 10 Serial ATA ports (Intel® C604) • 1 24-pin ATX power connector • 2 8-pin 12V power connector • 1 front panel connector • 1 chassis intrusion connector • 2 CPU fan connectors • 6 system fan connectors • 1 rear system fan connector
BIOS	<ul style="list-style-type: none"> • AMI BIOS <ul style="list-style-type: none"> - 128Mbit SPI BIOS
WatchDog Timer	<ul style="list-style-type: none"> • Software programmable from 1 to 255 seconds
Energy Efficient Design	<ul style="list-style-type: none"> • Supports ACPI • 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 15 voltages and failure alarm • Monitors CPU/system fan speed and failure alarm • Read back capability that displays temperature, voltage and fan speed
Power Consumption	<ul style="list-style-type: none"> • EPS12V
Temperature	<ul style="list-style-type: none"> • Operating: 0°C to 50°C • Storage: -20°C to 85°C
Humidity	<ul style="list-style-type: none"> • 10% to 90%
OS Support	<ul style="list-style-type: none"> • Windows 7 Ultimate x86 & SP1 (32-bit) • Windows 7 Ultimate x64 & SP1 (64-bit) • Windows 8 Enterprise x86 (32-bit) • Windows 8 Enterprise x64 (64-bit) • Windows 8.1 Enterprise x86 (32-bit) • Windows 8.1 Enterprise x64 (64-bit) • Windows Server 2008 x86 (32-bit) • Windows Server 2008 x64 (64-bit) • Windows Server 2008 R2 x64 (64-bit) • Windows Server 2012 x64 (64-bit)
Dimensions	<ul style="list-style-type: none"> • EATX form factor • 305mm (12") x 330mm (13")
Certification	<ul style="list-style-type: none"> • UL

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 AST1400 graphics engine delivering an excellent blend of graphics performance and features to meet business needs provides excellent video and 2D graphics with outstanding graphics responsiveness. These enhancements deliver the performance and compatibility needed for today's and tomorrow's business applications. Supports 1 VGA interface for display output.

- **PCI Express**

PCI Express is a high bandwidth I/O infrastructure that possesses the ability to scale speeds by forming multiple lanes. The PCI Express architecture also supports high performance graphics infrastructure by enhancing the capability of 4 PCIe x16 Gen 3 and 2 PCIe x8 Gen 3.

- **Serial ATA**

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

- **Gigabit LAN**

The Intel® 82580 PCI Express Gigabit Ethernet controller supports up to 1Gbps data transmission.

- **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 $\geq 790\text{mA}$.

- **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**

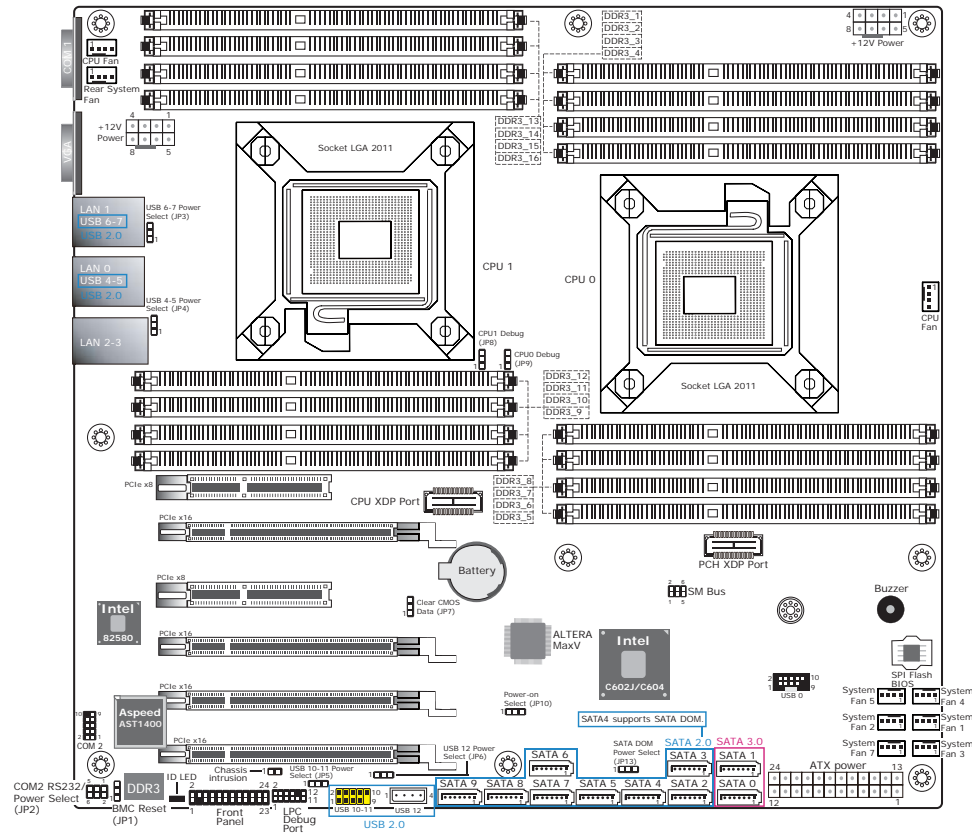
When power returns after an AC power failure, you may choose to either power-on the system manually or let the system power-on automatically.

- **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.

Chapter 2 - Hardware Installation

Board Layout



Important:

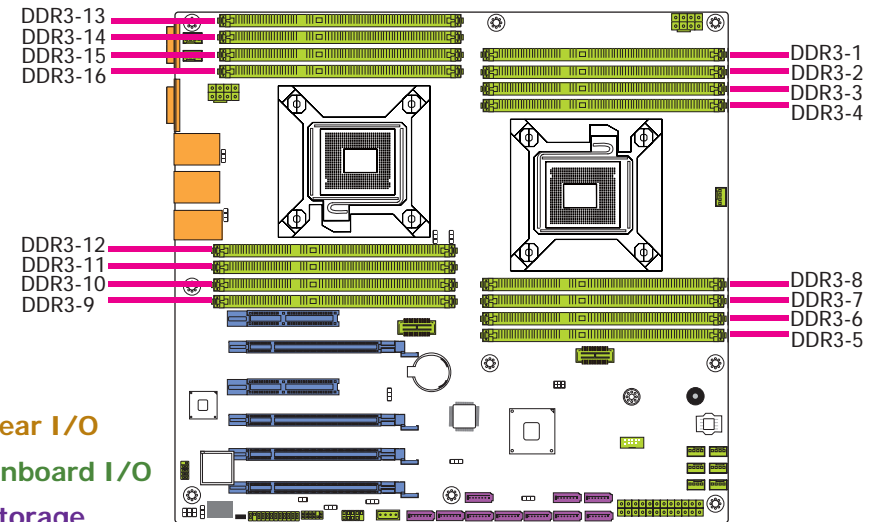
Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to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



- Rear I/O
- Onboard I/O
- Storage
- Expansion

Features

- 16 240-pin DDR3 DIMM sockets
- Supports DDR3 800/1066/1333/1600MHz
- Each processor supports 4 channel memory interface
- Supports up to 512GB 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.

Quad Channel (QC)

Data will be expanded to 256 bits from the memory channels because it quadruples the available memory bandwidth to provide better performance.

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.
Quad Channel	DIMMs in the same channel are identical.



Important:

When you are installing the memory modules on the system board, you must populate them in the DDR3_1, DDR3_3, DDR3_5, DDR3_7, DDR3_9, DDR3_11, DDR3_13 or DDR3_15 sockets first.

Installing the DIMM Module



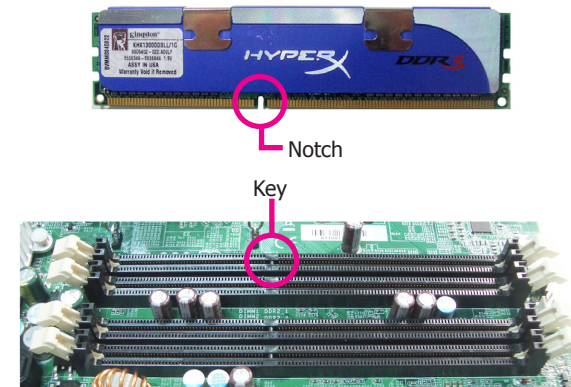
Note:

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

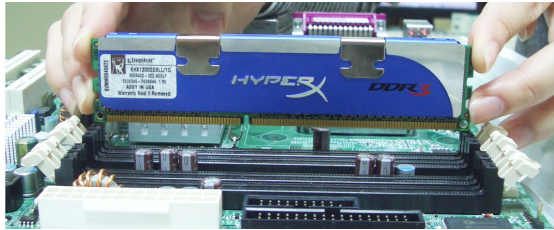
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the DIMM socket on the system board.
4. Push the "ejector tabs" which are at the ends of the socket to the side.



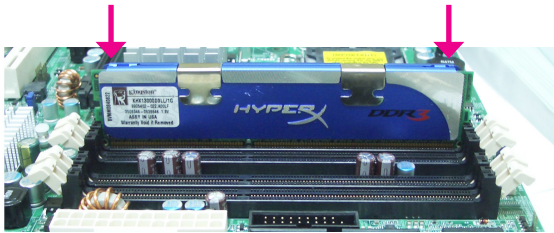
5. Note how the module is keyed to the socket.



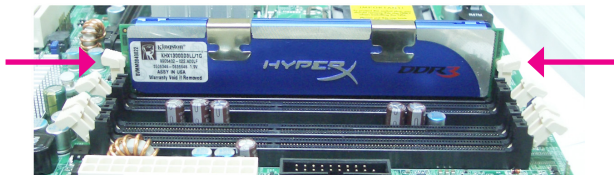
6. Grasping the module by its edges, position the module above the socket with the “notch” in the module aligned with the “key” on the socket. The keying mechanism ensures the module can be plugged into the socket in only one way.



7. Seat the module vertically, pressing it down firmly until it is completely seated in the socket.



8. The ejector tabs at the ends of the socket will automatically snap into the locked position to hold the module in place.



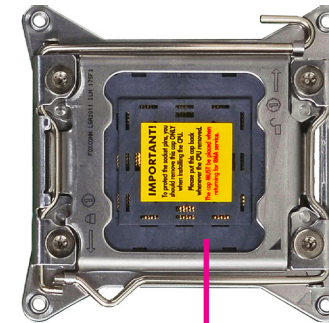
CPU

The system board is equipped with two surface mount LGA 2011 sockets. This socket is exclusively designed for installing a LGA 2011 packaged Intel CPU.



Important:

1. Before you proceed, make sure (1) the LGA 2011 socket comes with a protective cap, (2) the cap is not damaged and (3) the socket's contact pins are not bent. If the cap is missing or the cap and/or contact pins are damaged, contact your dealer immediately.
2. Make sure to keep the protective cap. RMA requests will be accepted and processed only if the LGA 2011 socket comes with the protective cap.



Protective cap

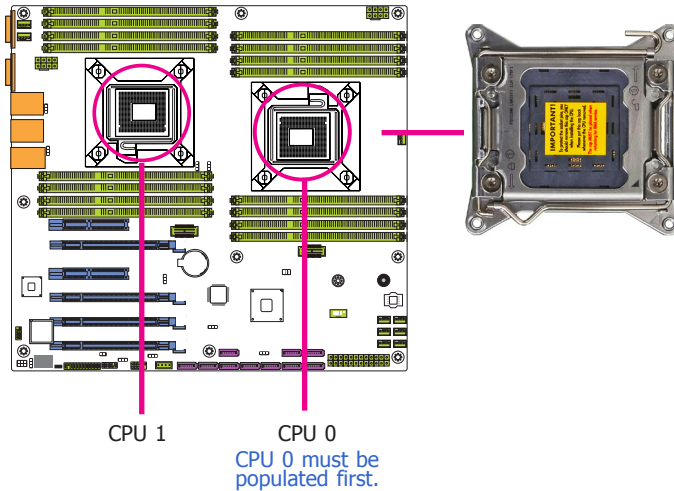


Note:

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

Installing the CPU

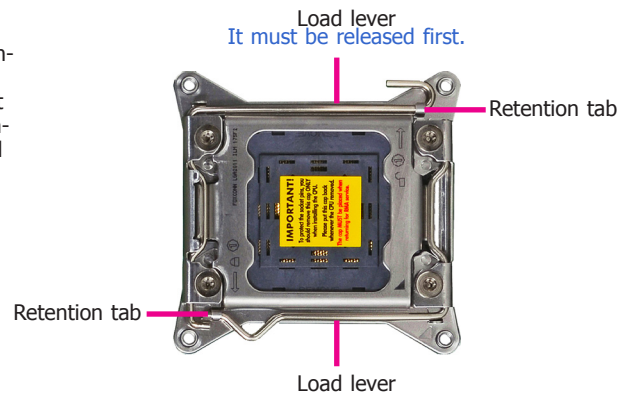
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the LGA 2011 CPU socket on the system board.



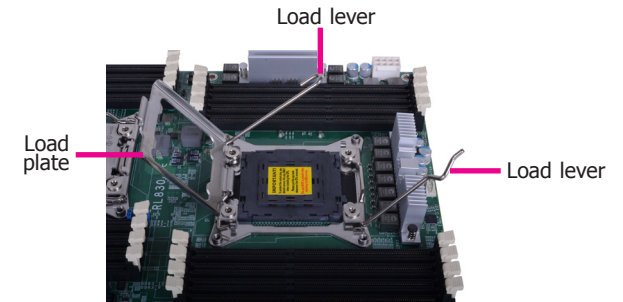
Important:

1. The CPU 0 socket must be populated first.
2. The CPU socket must not come in contact with anything other than the CPU. Avoid unnecessary exposure. Remove the protective cap only when you are about to install the CPU.

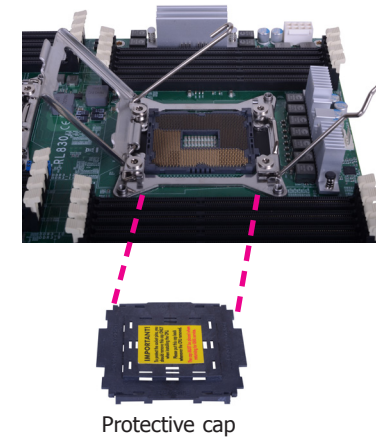
4. Unlock the socket by pushing the load lever down, moving it sideways until it is released from the retention tab; then lift the load lever up.



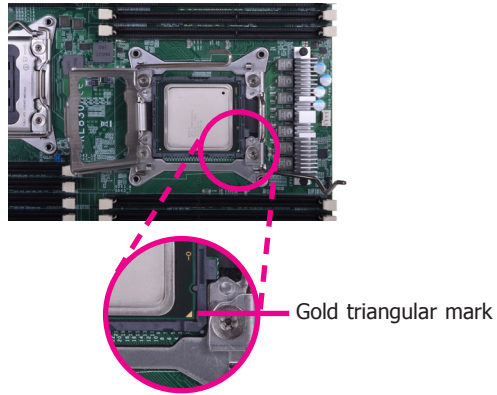
5. Lift the load levers up to the angle shown on the photo and then lift the load plate.



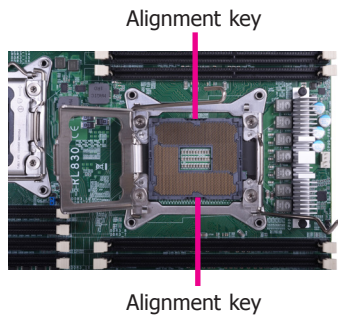
6. Remove the protective cap from the CPU socket. The cap is used to protect the CPU socket against dust and harmful particles. Remove the protective cap only when you are about to install the CPU.



7. Insert the CPU into the socket. The gold triangular mark on the CPU must align with the corner of the CPU socket shown on the photo.

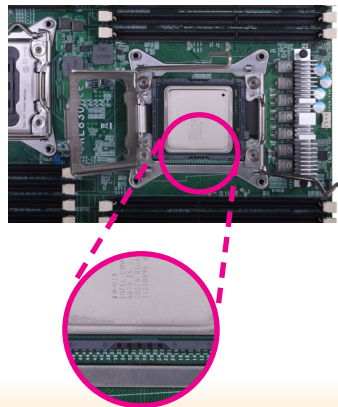


The CPU's notch will at the same time fit into the socket's alignment key.

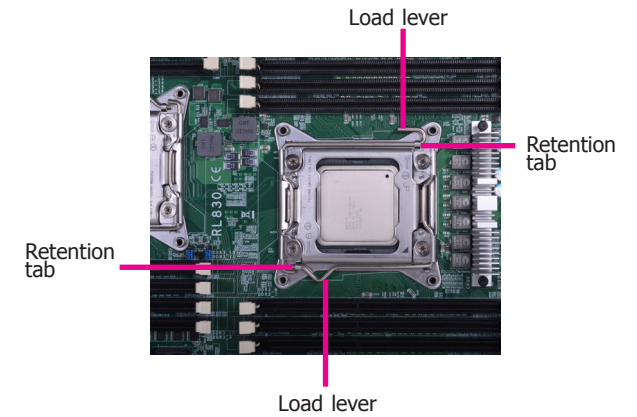


Important:

The CPU will fit in only one orientation and can easily be inserted without exerting any force.



8. Close the load plate then push the load lever down.
9. Hook the load lever under the retention tab.



Installing the Fan and Heat Sink

The CPU must be kept cool by using a CPU fan with heat sink. Without sufficient air circulation across the CPU and heat sink, the CPU will overheat damaging both the CPU and system board.



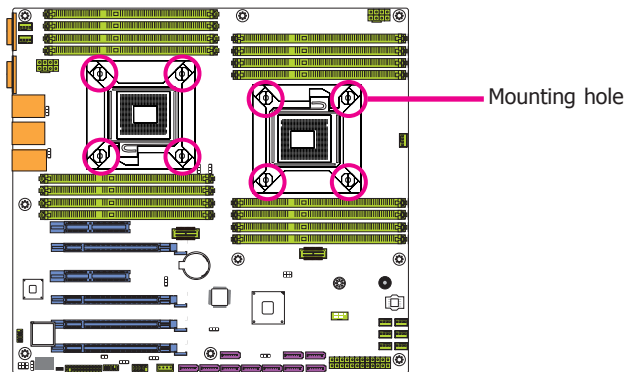
Note:

A boxed Intel® processor already includes the CPU fan and heat sink assembly. If your CPU was purchased separately, make sure to only use Intel®-certified fan and heat sink.

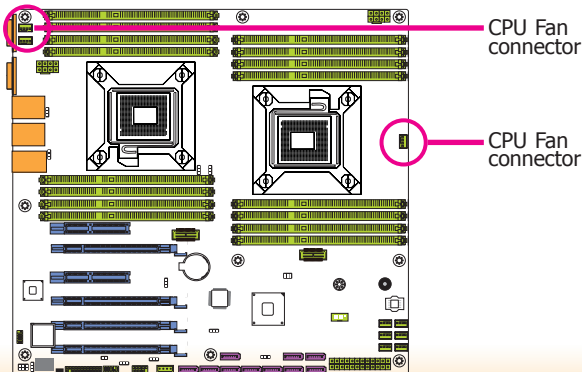
1. Before you install the fan / heat sink, you must apply a thermal paste onto the top of the CPU. The thermal paste is usually supplied when you purchase the fan / heat sink assembly. Do not spread the paste all over the surface. When you later place the heat sink on top of the CPU, the compound will disperse evenly.

Some heat sinks come with a patch of pre-applied thermal paste. Do not apply thermal paste if the fan / heat sink already has a patch of thermal paste on its underside. Peel the strip that covers the paste before you place the fan / heat sink on top of the CPU.

2. Place the heat sink on top of the CPU. The 4 push-pins, which are used to secure the heat sink onto the system board, must match the 4 mounting holes around the socket.

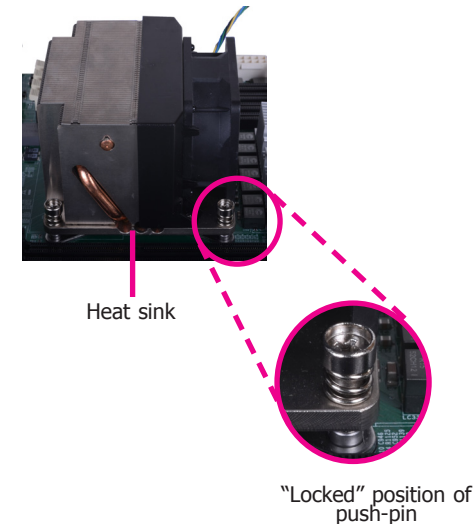


3. Orient the heat sink such that the CPU fan's cable is nearest the CPU fan connector.

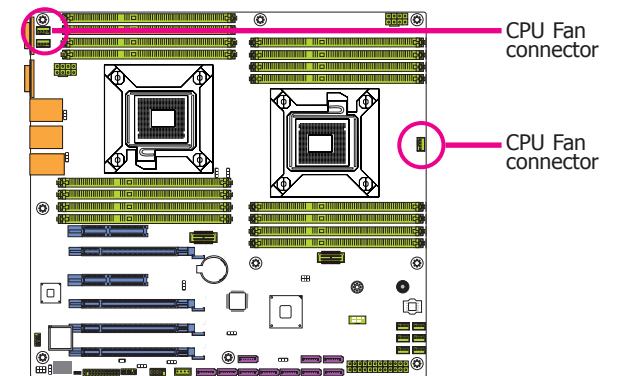


4. Rotate each push-pin according to the direction of the arrow shown on top of the pin.

Push down two pushpins that are diagonally across the heat sink. Perform the same procedure for the other two push-pins.

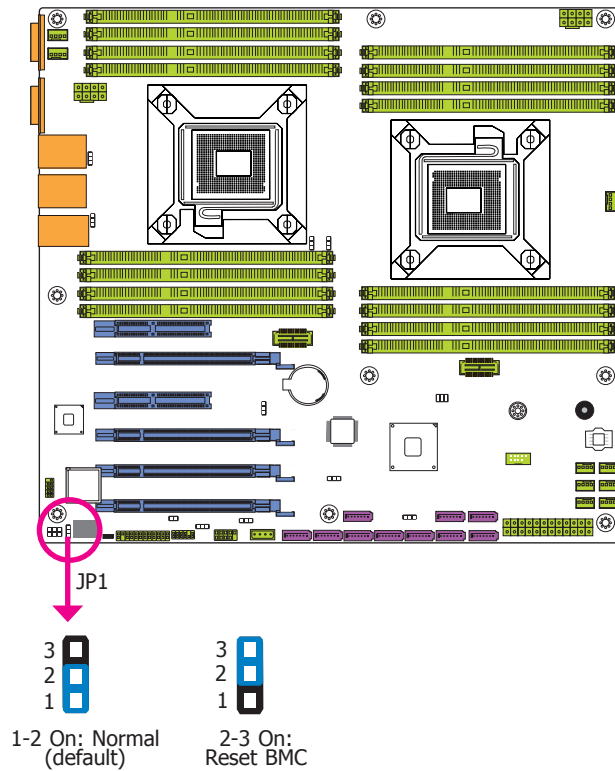


5. Connect the CPU fan's cable to the CPU fan connector on the system board.



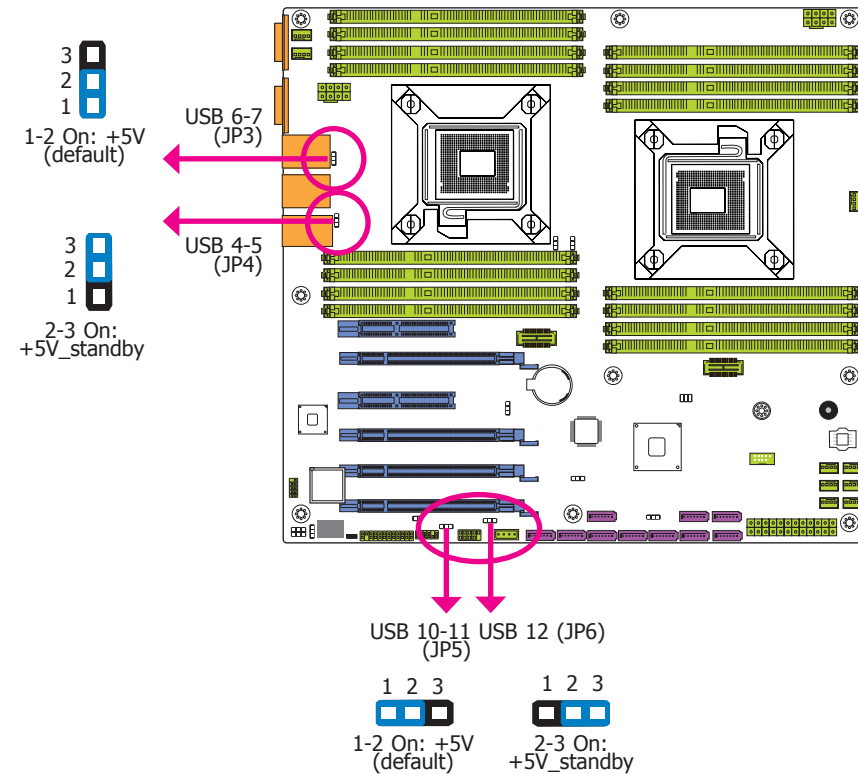
Jumper Settings

BMC Reset



BMC stands for Board Management Controller. This controller is usually used on server-grade boards. The BMC on the RL830 motherboard is the Aspeed AST1400 chip. JP1 allows you to reset the BMC controller whenever problem occurs.

USB Power Select



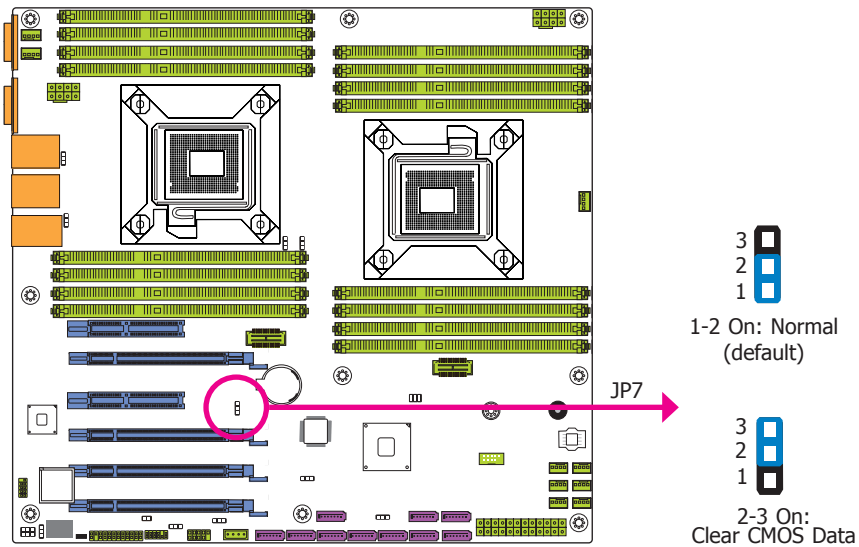
JP3, JP4, JP5 and JP6 are used to select the power of the USB devices. Selecting +5V_standby will allow you to use a USB device to wake up the system.



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 $\geq 2A$.

Clear CMOS Data



If you encounter the followings,

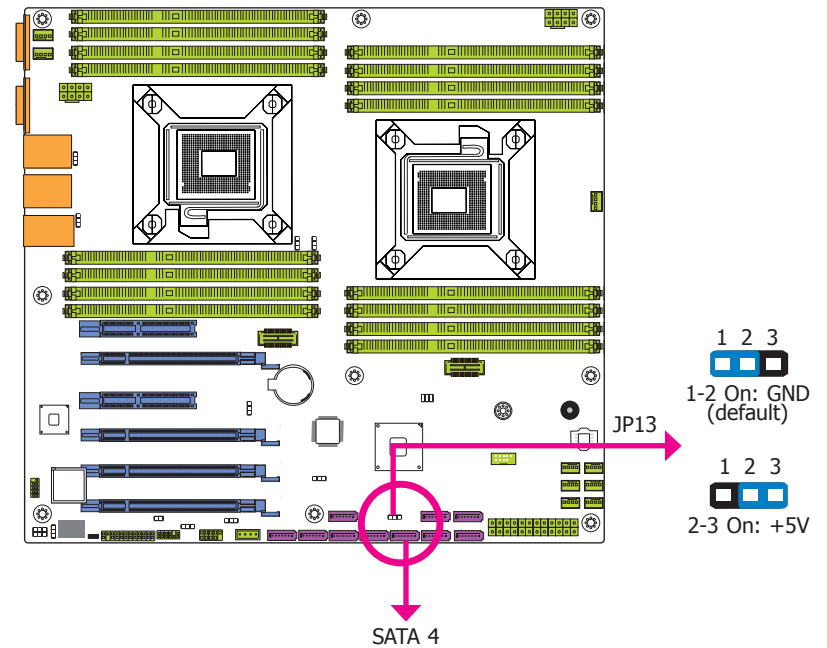
- CMOS data becomes corrupted.
- You forgot the supervisor or user password.

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 JP7 pins 2 and 3 to On. Wait for a few seconds and set JP7 back to its default setting, pins 1 and 2 On.
- Now plug the power cord and power-on the system.

SATA DOM Power Select

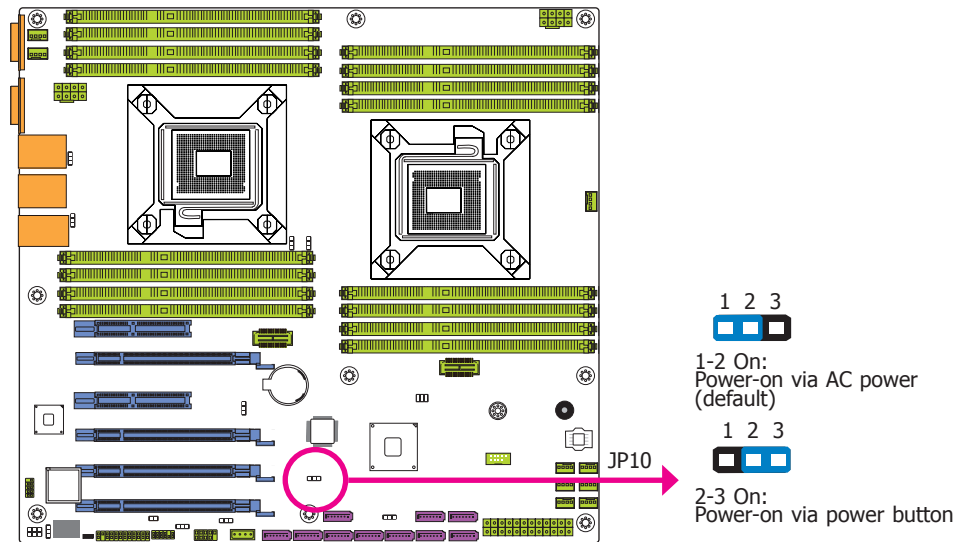


The JP13 is used to select the power of SATA DOM.

**Note:**

SATA port 4 provides adequate space for SATA DOM.

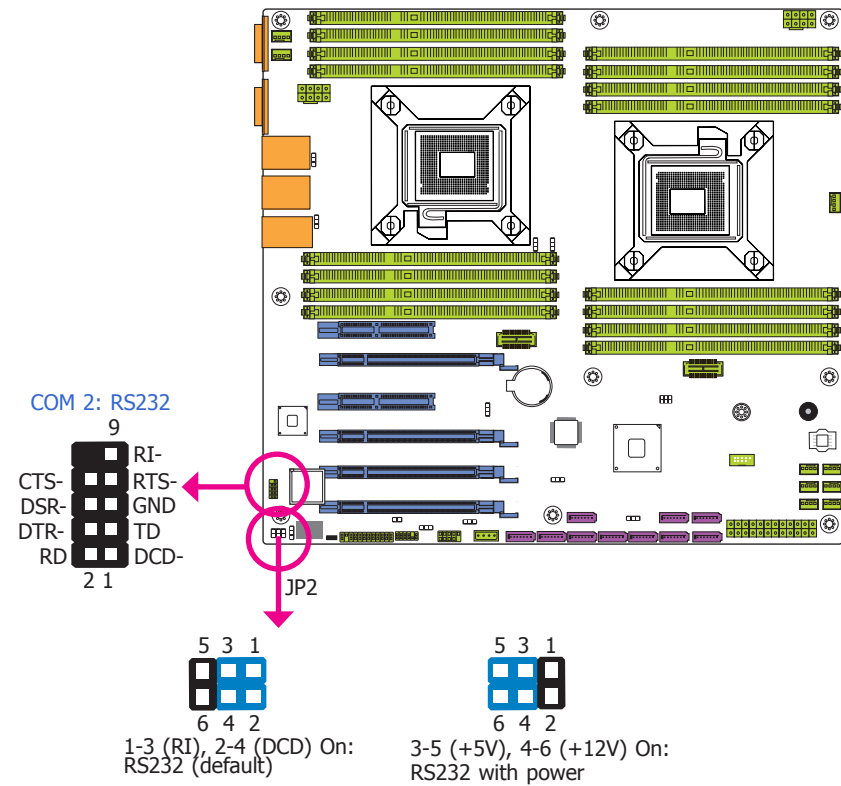
Power-on Select



The JP10 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 JP10 pins 1 and 2 to On. If you want to use the power button, set pins 2 and 3 to On.

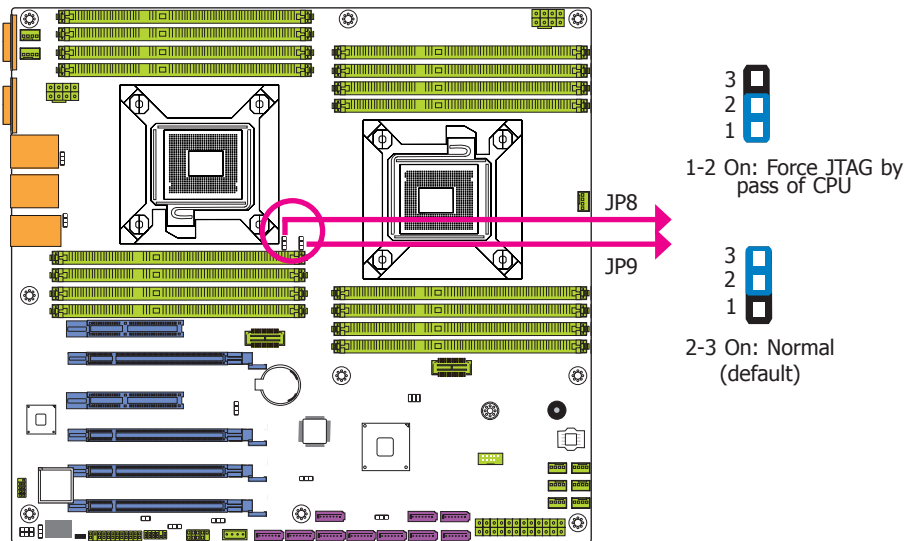
When using the JP10 "Power On" feature to power the system back on after a power failure occurs, the system may not power on if the power lost is resumed within 5 seconds (power flicker).

COM2 RS232/Power Select



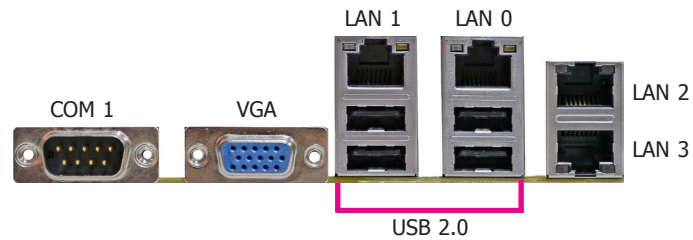
JP2 (for COM 2) is used to configure the Serial COM port to pure RS232 or RS232 with power. The pin functions of COM 2 will vary according to JP2's setting.

CPU0/CPU1 Debug



JP8 (for CPU1) and JP9 (for CPU0) allow you to debug the CPU processor whenever encountering problems.

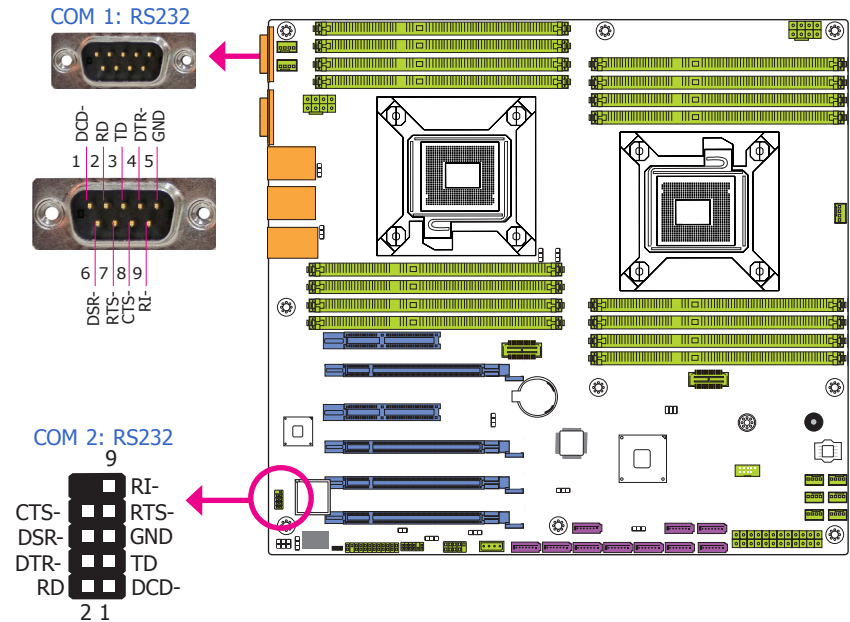
Rear Panel I/O Ports



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

- 1 Serial COM port
- 1 VGA port
- 4 USB 2.0 ports
- 4 RJ45 LAN ports

COM (Serial) Ports



COM 1 and COM 2 ports are fixed at RS232. JP2 (for COM 2) is used to configure the Serial COM port to pure RS232 or RS232 with power. Refer to "COM2 RS232/Power Select" in this chapter for more information.

The serial ports are RS232 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.

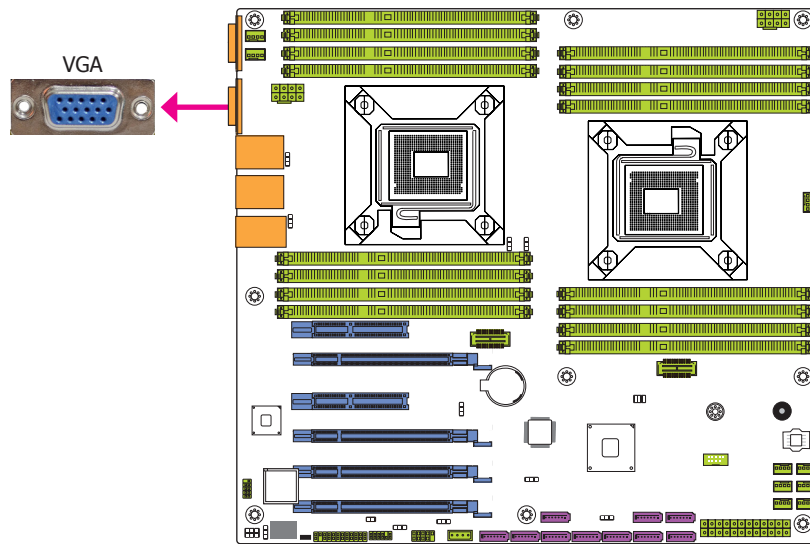
BIOS Setting

Configure the serial COM ports in the Advanced menu ("AST1400 Super IO Configuration" submenu) of the BIOS. Refer to the chapter 3 for more information.

Graphics Interface

The display port consists of the following:

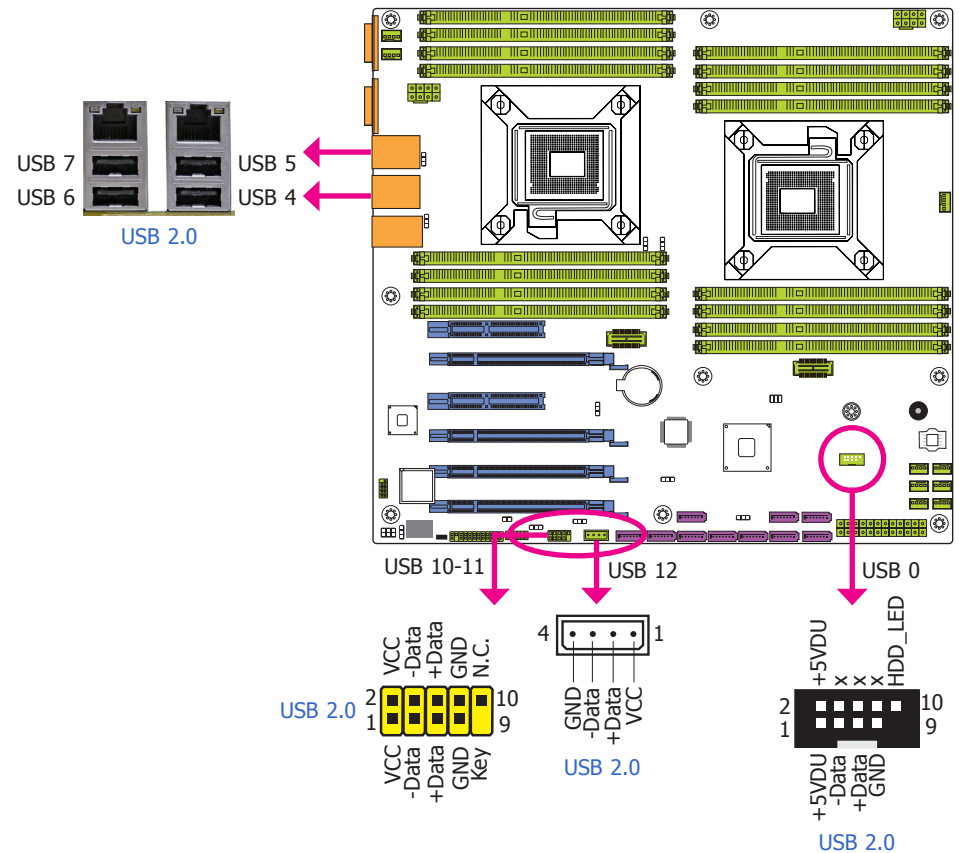
- 1 VGA port



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.

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 eight onboard USB 2.0/1.1 ports (USB 0/4-5/6-7/10-12). The 10-pin connector allows you to connect 2 additional USB 2.0/1.1 ports (USB 10-11). The embedded USB connector (USB 0) is used for the eUSB SSD and the vertical USB port (USB 12) is the USB Drive Security for securing USB flash drive. The additional USB 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 and then insert the USB port cables to a connector.

BIOS Setting

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

Driver Installation

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

Wake-On-USB Keyboard/Mouse

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

- **Jumper Setting**

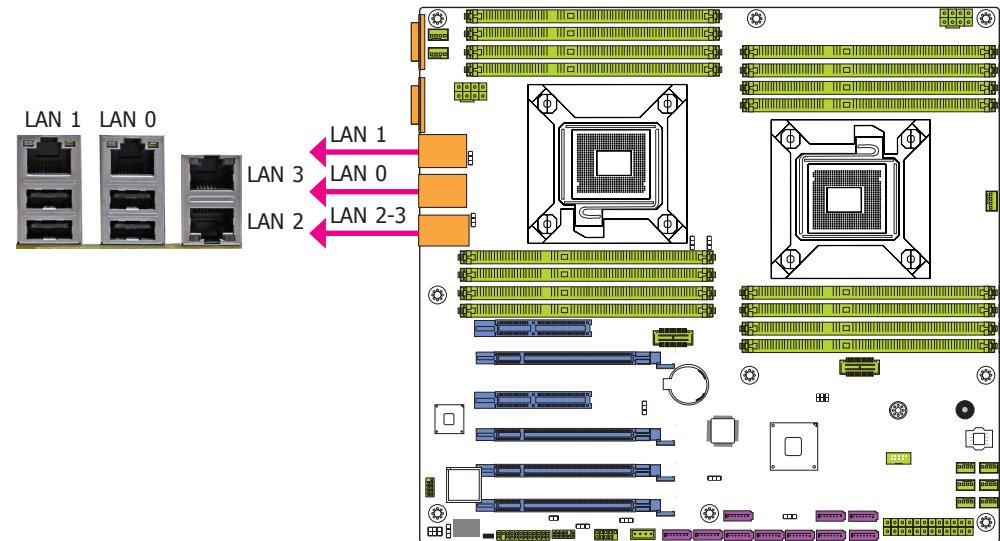
JP3, JP4, JP5 and JP6 must be set to "2-3 On: +5V_standby". Refer to "USB Power Select" in this chapter for more information.



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 $\geq 2A$.

RJ45 LAN Ports



Features

- Intel® 82580 PCI Express Gigabit Ethernet controller

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

BIOS Setting

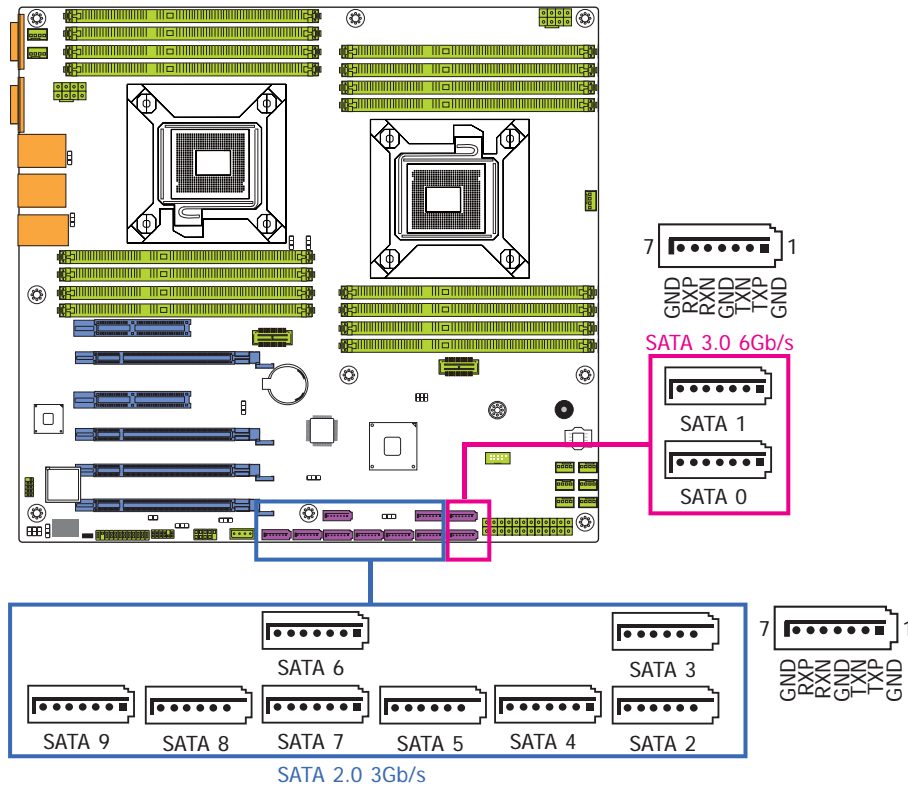
Configure the onboard LAN ports in the Advanced menu of the BIOS. Refer to the chapter 3 for more information.

Driver Installation

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

I/O Connectors

SATA (Serial ATA) Connectors



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.

BIOS Setting

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



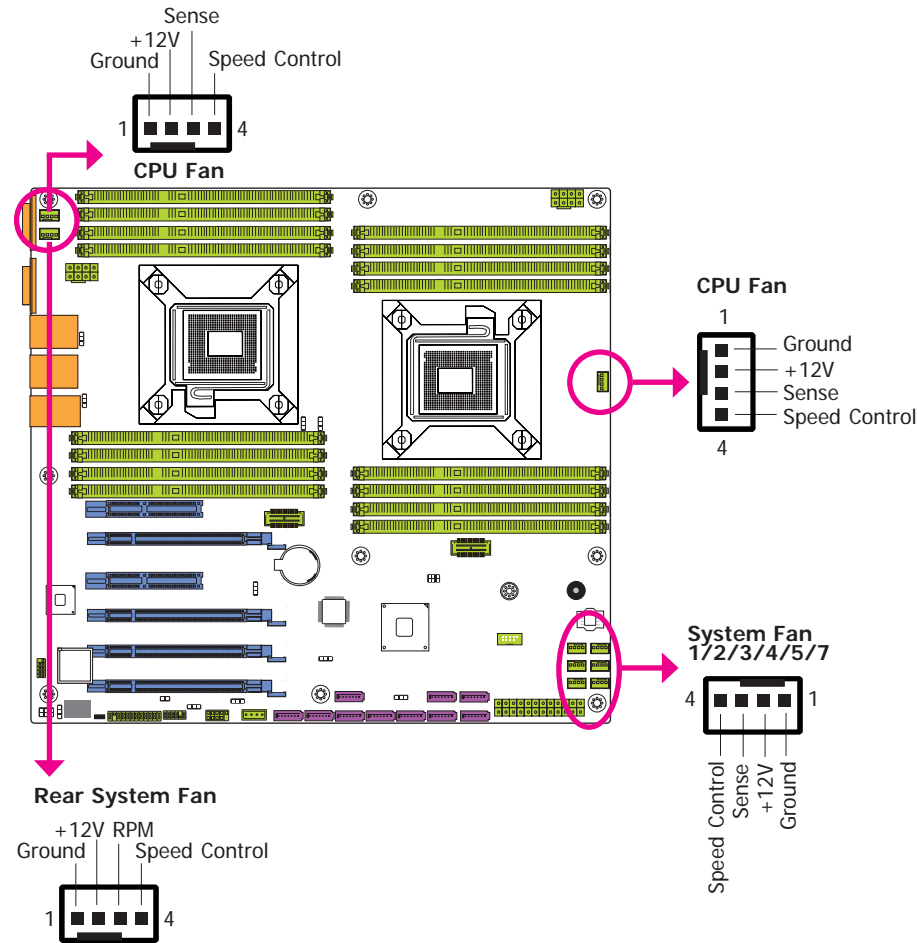
Note:

1. SATA port 4 provides adequate space for SATA DOM.
2. SATA 6 to SATA 9 on the RL830-C604 system board do not support the DVD boot function.

Features

- 6 Serial ATA ports (Intel® C602J)
 - 2 SATA 3.0 ports with data transfer rate up to 6Gb/s
 - 4 SATA 2.0 ports with data transfer rate up to 3Gb/s
- 10 Serial ATA ports (Intel® C604)
 - 2 SATA 3.0 ports with data transfer rate up to 6Gb/s
 - 8 SATA 2.0 ports with data transfer rate up to 3Gb/s
- Integrated Advanced Host Controller Interface (AHCI) controller
- Supports RAID 0/1/5/10

Cooling Fan Connectors

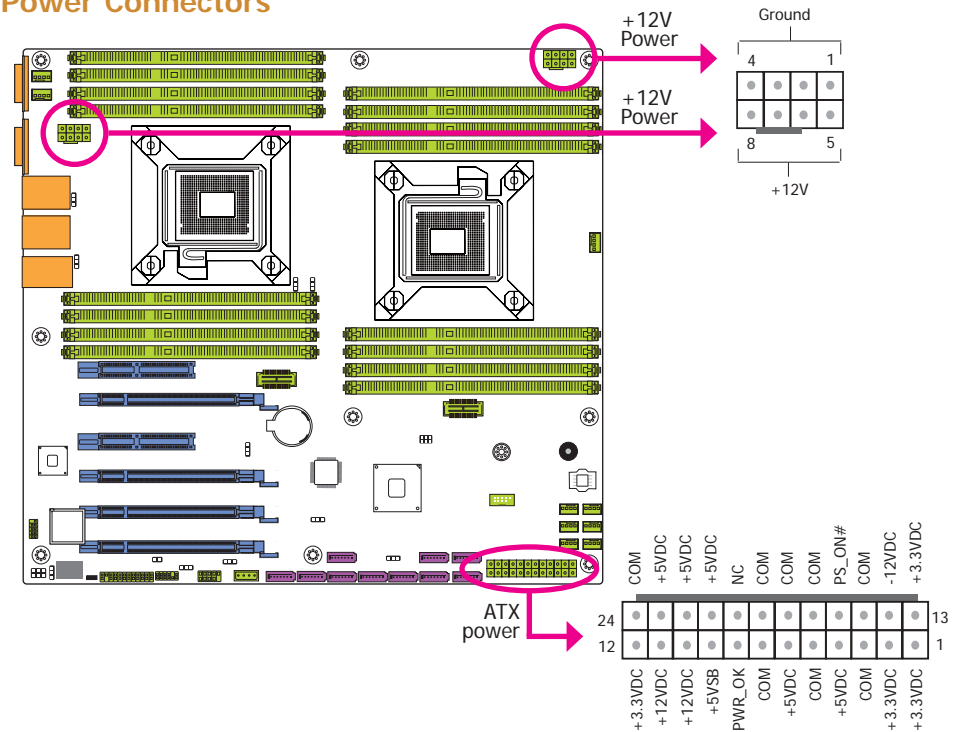


These fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

BIOS Setting

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

Power Connectors



Use a power supply that complies with the ATX12V Power Supply Design Guide Version 1.1. An ATX12V power supply unit has a standard 24-pin ATX main power connector that must be inserted into the 24-pin connector. The 8-pin +12VDC power connector enables the delivery of more +12VDC current to the processor's Voltage Regulator Module (VRM).

The power connectors from the power supply unit are designed to fit the 24-pin and 8-pin connectors in only one orientation. Make sure to find the proper orientation before plugging the connectors.

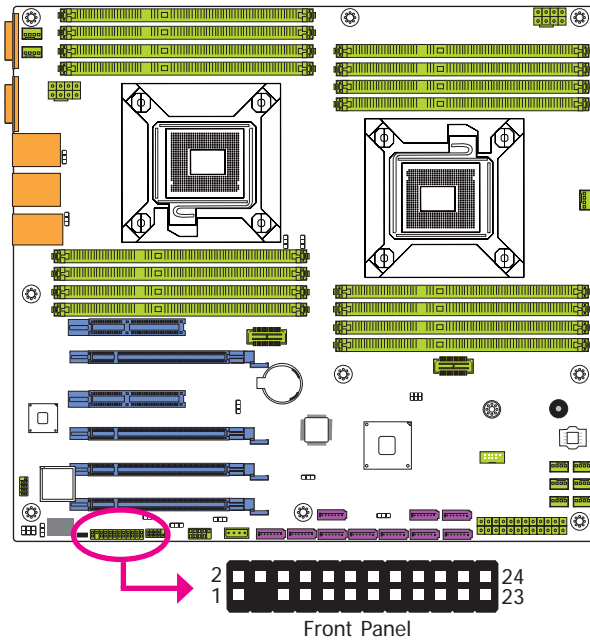
The system board requires a minimum of 300 Watt power supply to operate. Your system configuration (CPU power, amount of memory, add-in cards, peripherals, etc.) may exceed the minimum power requirement. To ensure that adequate power is provided, we strongly recommend that you use a minimum of 400 Watt (or greater) power supply.



Important:

1. Insufficient power supplied to the system may result in instability or the add-in boards and peripherals not functioning properly. Calculating the system's approximate power usage is important to ensure that the power supply meets the system's consumption requirements.
2. No matter how many CPUs are populated, the two 8-pin +12V power connectors must be supplied with power.

Front Panel Connector



The pin functions of the front panel connector are listed below.

Pins	Pin Assignment	Pins	Pin Assignment
1	+3VDU	2	+3VDU
3	N.C	4	+5VDU
5	PWR-LED	6	x
7	+3.3V	8	x
9	HDD-LED	10	x
11	PWR-BTN	12	LED_NIC_LINK1_0_LINKUP
13	GND	14	LED_NIC_LINK1_0_ACT
15	RST-SW	16	SMB_SENSOR_3V3STBY_DATA
17	GND	18	SMB_SENSOR_3V3STBY_CLK
19	x	20	Case Open
21	+3VDU	22	LED_NIC_LINK3_2_LINKUP
23	x	24	LED_NIC_LINK3_2_ACT

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.

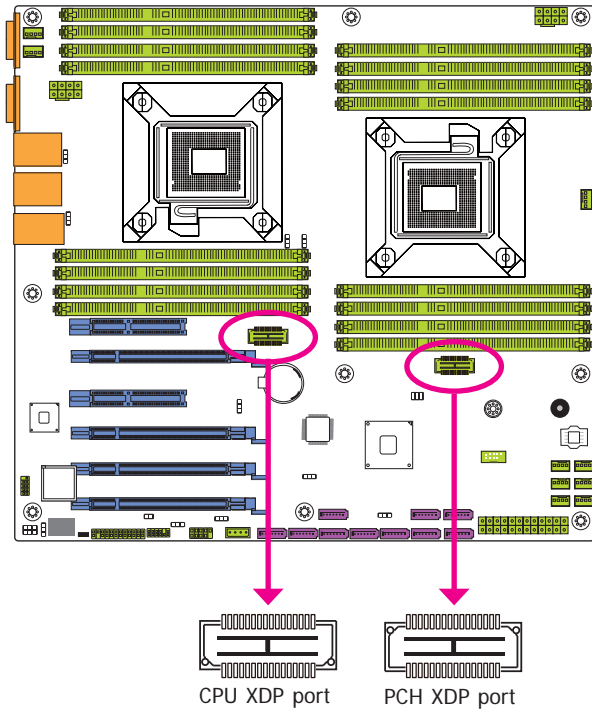
PWR-BTN - Power Switch

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

PWR-LED - Power/Standby LED

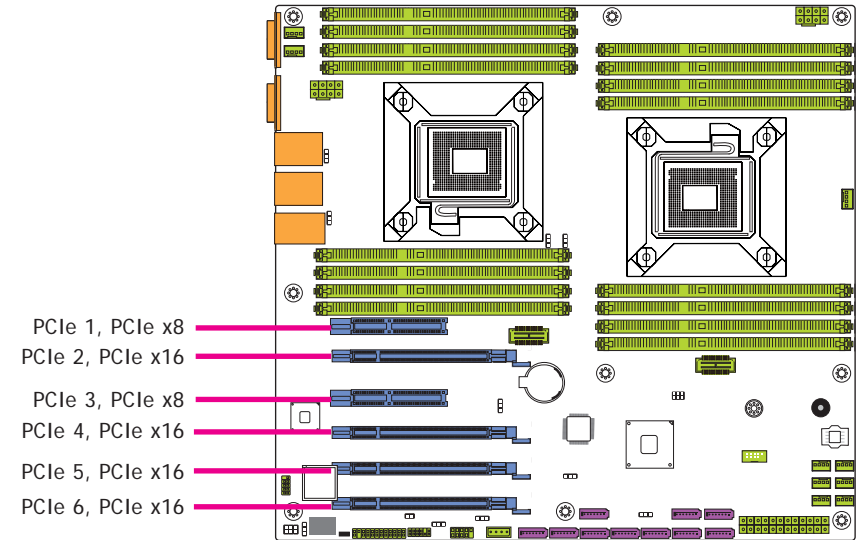
When the system's power is on, this LED will light.

XDP Ports



The two XDP ports are used for the processor and PCH debug support on the system board respectively. The CPU XDP port is for the function of debugging the processor issues and the PCH XDP port allows you to debug the PCH silicon issues whenever problem occurs.

Expansion Slots



PCI Express x16 Slot

Install PCI Express x16 graphics card, that comply to the PCI Express specifications, into the PCI Express x16 slot. To install a graphics card into the x16 slot, align the graphics card above the slot then press it down firmly until it is completely seated in the slot. The retaining clip of the slot will automatically hold the graphics card in place.

PCI Express x8 Slot

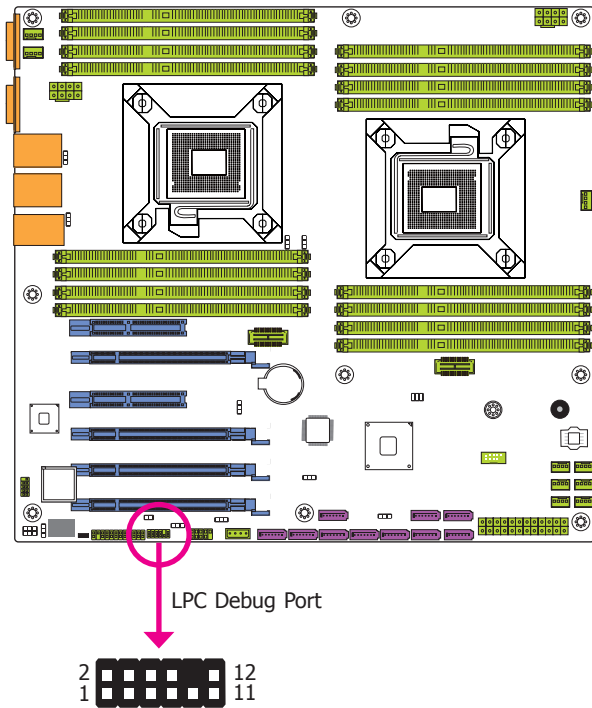
Install PCI Express cards such as network cards or other cards that comply to the PCI Express specifications into the PCI Express x8 slot.



Note:

CPU 0 supports PCIe 2, PCIe 3 and PCIe 4.
CPU 1 supports PCIe 1, PCIe 5 and PCIe 6.

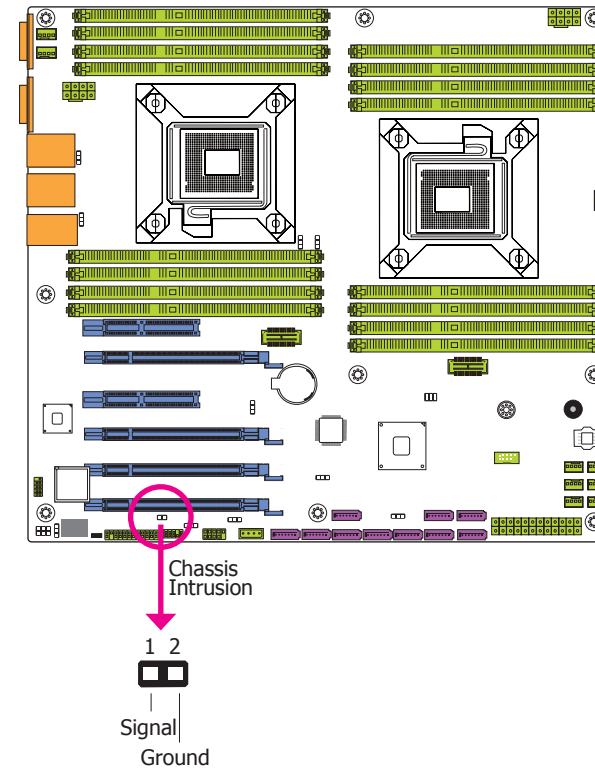
LPC Debug Port



The LPC connector is used for the debug function and its pin functions are listed below.

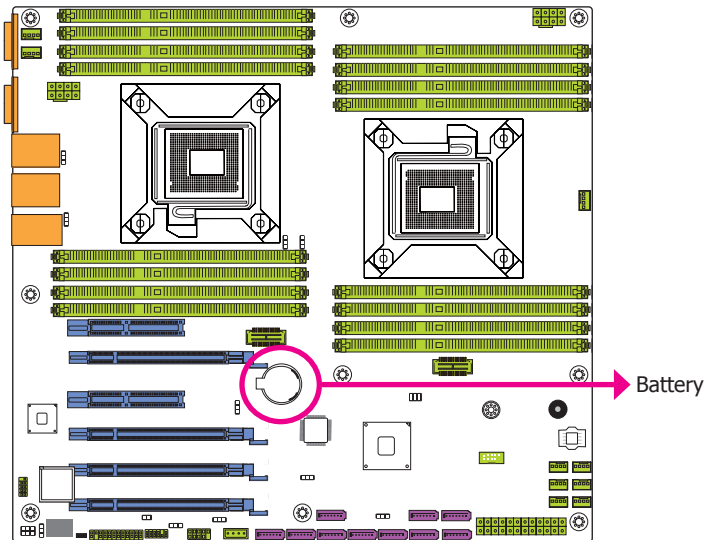
Pins	Pin Assignment	Pins	Pin Assignment
1	CLK	2	LAD1
3	RST#	4	LAD0
5	FRAME#	6	VCC_+3V
7	LAD3	8	GND
9	LAD2	10	x
11	SERIRQ	12	48MHz

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.

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>	Previous 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.

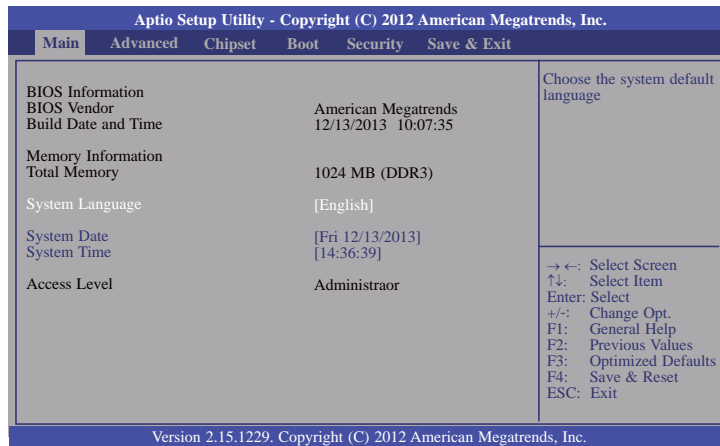
Submenu

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 Date

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

System Time

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

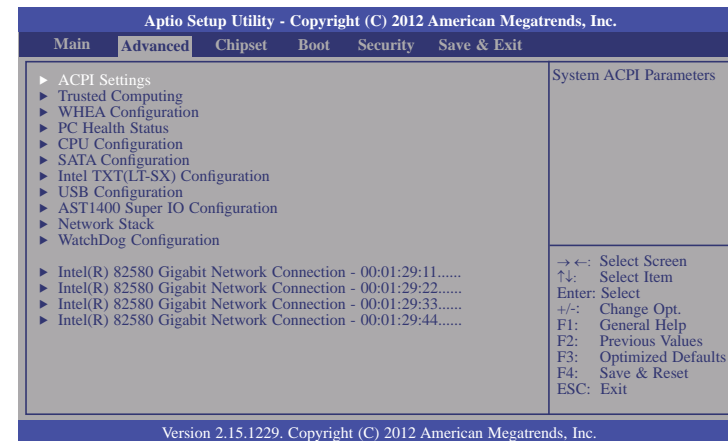
Advanced

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



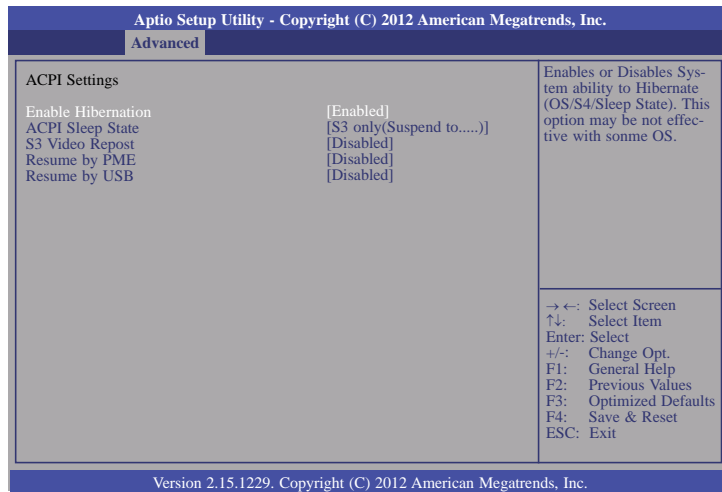
Important:

Setting incorrect field values may cause the system to malfunction.



ACPI Settings

This section is used to configure the System ACPI settings.



Enable Hibernation

When this function is enabled, the system will enter the hibernate mode (OS/S4 sleep state). This function is not applicable to some OS.

ACPI Sleep State

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

S3(STR) Enables the Suspend to RAM function.

S3 Video Repost

When this field is set to Auto, the system will initialize the VGA BIOS when it wakes up from the S3 state. This can be configured only if the "ACPI Suspend Type" field is set to "S3(STR)". When this feature is disabled, the system resume time is shortened but system will need an AGP driver to initialize the VGA card. Therefore, if the AGP driver of the card does not support the initialization feature, the display may work abnormally or not function after resuming from S3.

Resume by PME

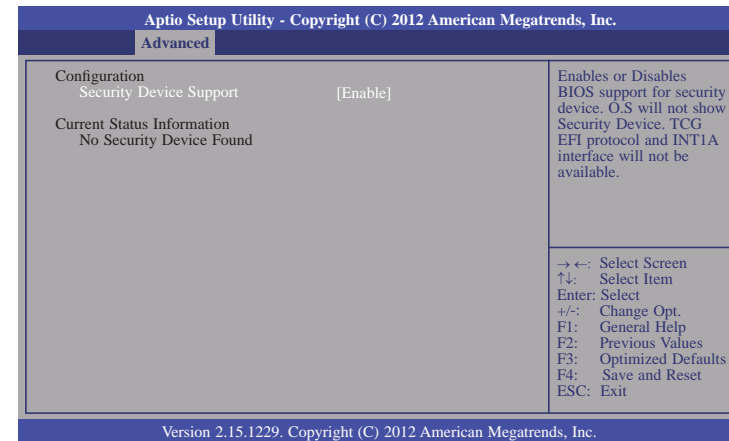
Enables this field to use the PME signal to wake up the system.

Resume by USB

When Enabled, this system uses the USB signal to carry out a wakeup event.

Trusted Computing

This section configures settings relevant to Trusted Computing innovations.

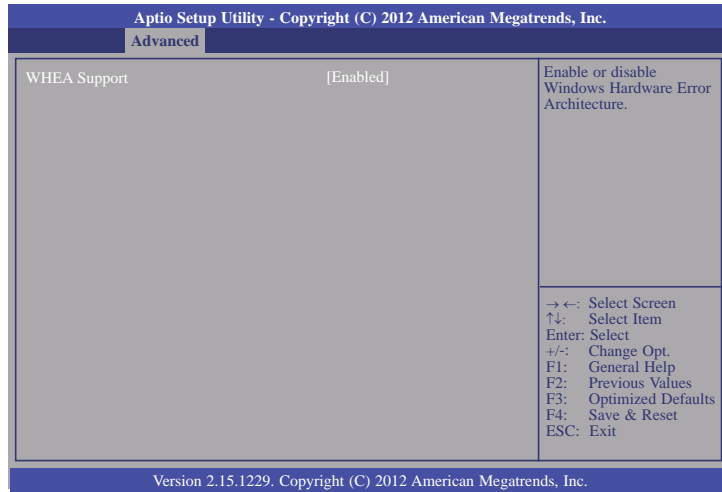


Security Device Support

This field is used to enable or disable BIOS supporting for the security device. OS will not show the security device. TCG EFI protocol and INT1A interface will not be available.

WHEA Configuration

This section is used to configure the general WHEA settings.

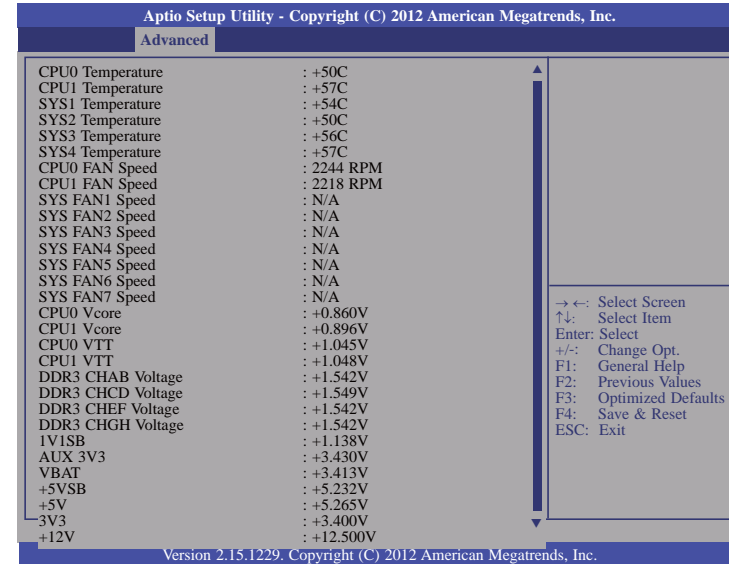


WHEA Support

Enables or disables the Windows hardware error architecture.

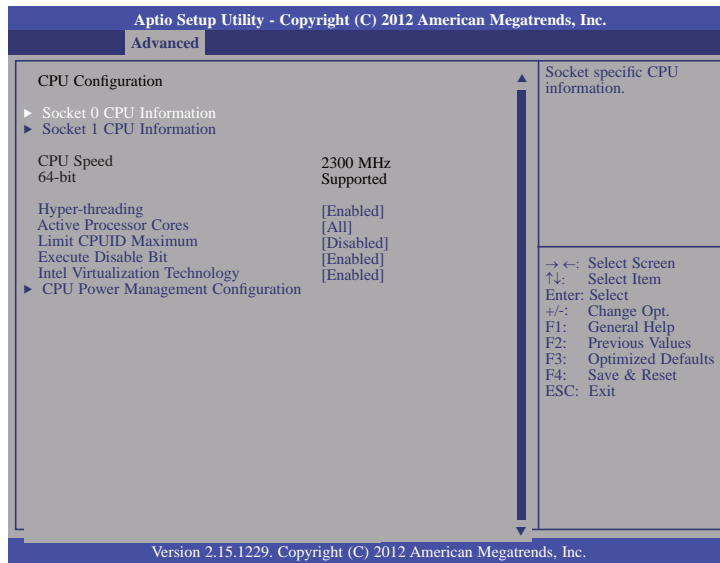
PC Health Status

This section displays the hardware health monitor.



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. Select disabled for other OSes not optimized for Hyper-Threading technology. When disabled, only one thread per enabled core is enabled.

Active Processor Cores

Number of cores to enable in each processor package.

Limit CPUID Maximum

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

Execute Disable Bit

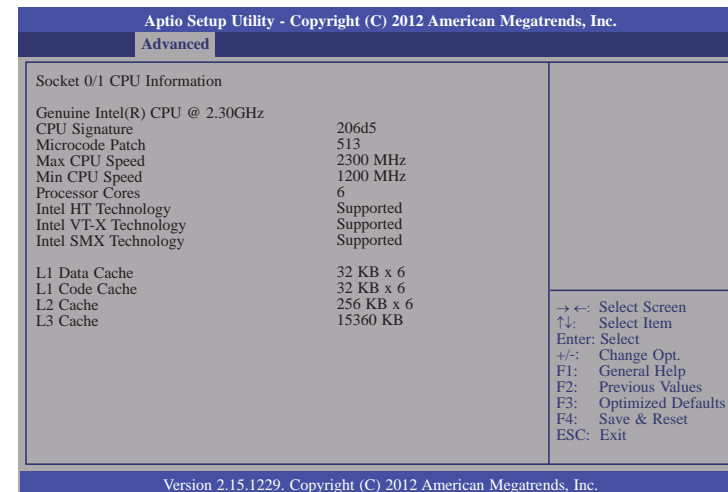
When this field is set to Disabled, it will force the XD feature flag to always return to 0.

Intel Virtualization Technology

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

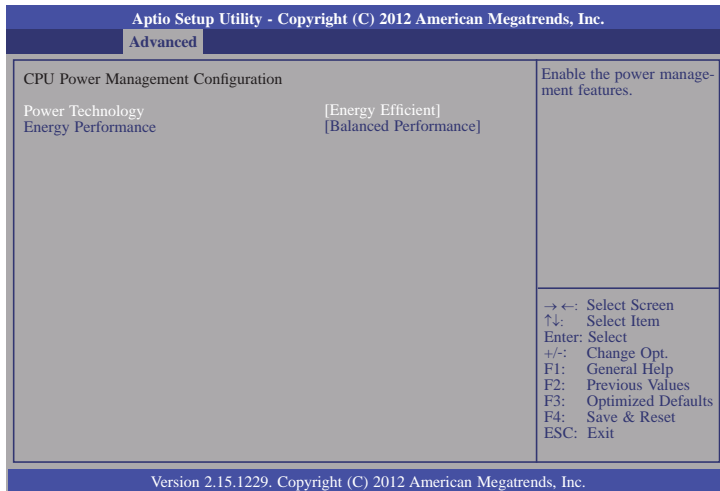
Socket 0/1 CPU Information

This field only displays the socket 0 and 1 specific CPU information.



CPU Power Management Configuration

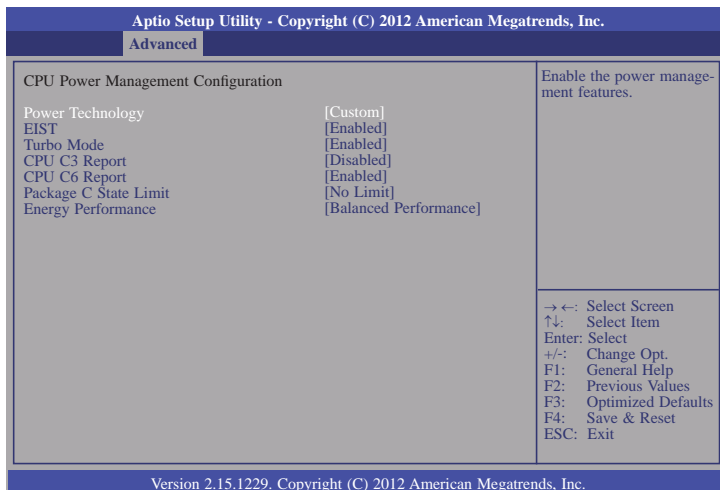
This field configures parameters of the CPU power management.



Power Technology

Enables or disables the power management function.

When the custom feature is selected, it will display the following information:



EIST

Enables or disables the Enhanced SpeedStep Technology.

Turbo Mode

Enables or disables the Turbo Mode.

CPU C3/C6 Report

Enables or disables the CPU Core C3/C6 report to OS.

Package C State Limit

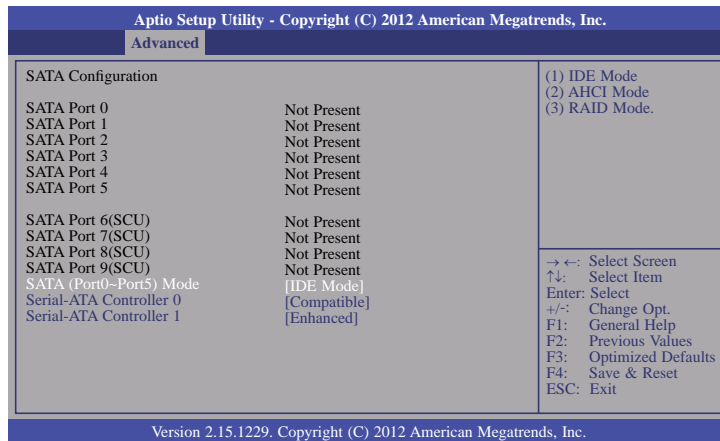
Selects the limitation of the packae C state.

Energy Performance

Optimizes between the performance and the power saving. Windows 2008 and later OSes override this values according to its power plan.

SATA Configuration

This section is used to configure the settings of SATA device.



SATA Mode

The mode selection determines how the SATA controller(s) operates.

IDE Mode

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

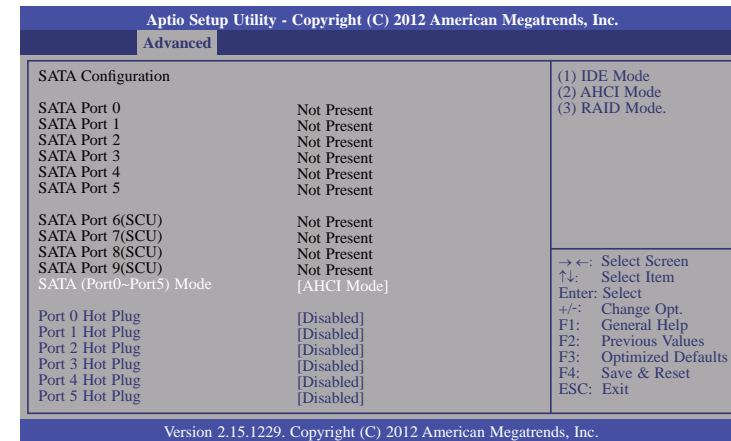
AHCI Mode

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

SATA Controller 0/1

This field is used to enable or disable the Serial ATA controller 0/1.

When AHCI or RAID mode is selected in the SATA Mode Selection, it will display the following information:

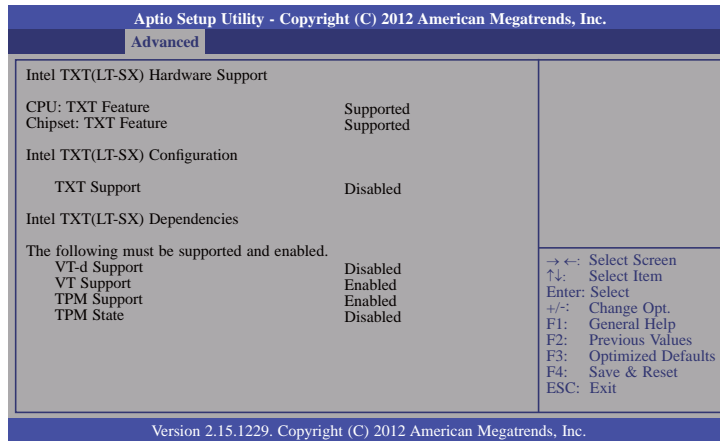


Port 0~5 Hot Plug

Enables or disables the support of the SATA port hot plug.

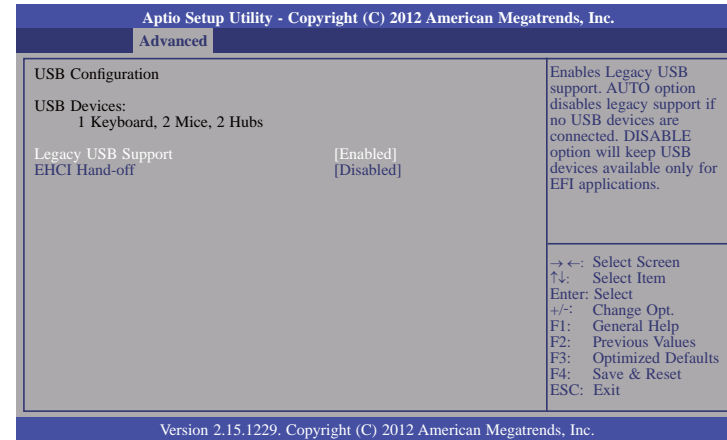
Intel TXT(LT-SX) Configuration

This field displays the configuration of the Intel Trusted Execution Technology.



USB Configuration

This section is used to configure the parameters of the USB device.



Legacy USB Support

Enabled

Enables legacy USB.

Auto

Disables support for legacy when no USB devices are connected.

Disabled

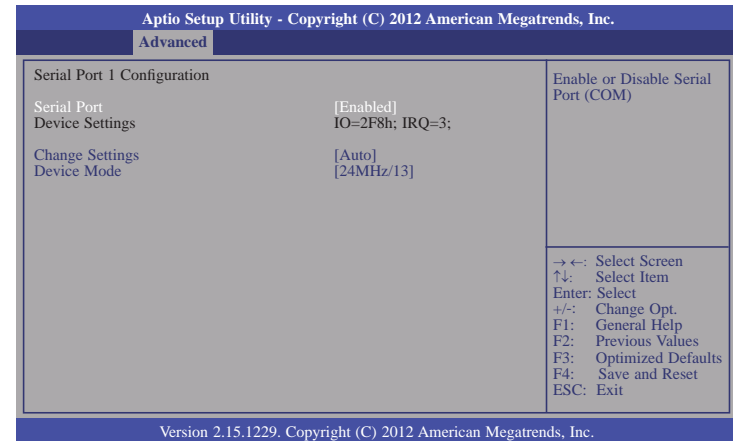
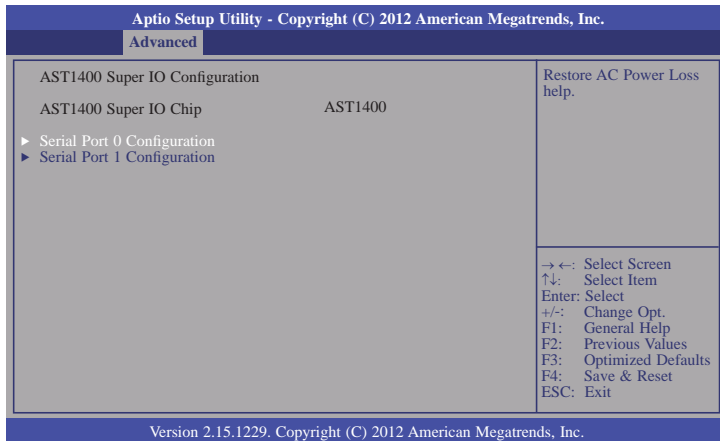
Keeps USB devices available only for EFI applications.

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.

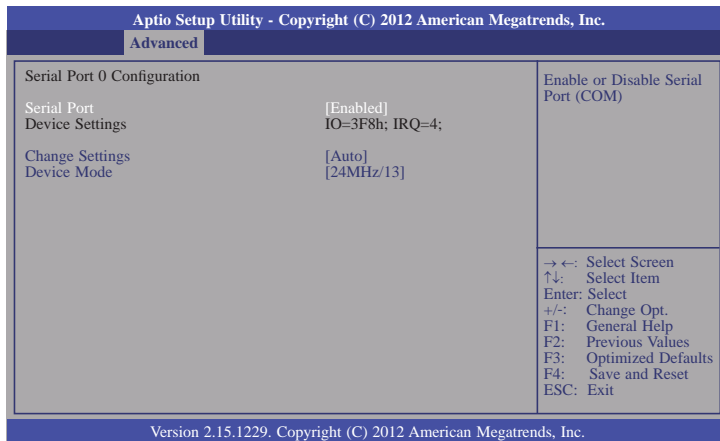
AST1400 Super IO Configuration

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 1 Configuration

Sets the parameters of serial port 0 (COM A) and serial port 1 (COM B).



Serial Port

Enables or disables the serial port (COM).

Change Settings

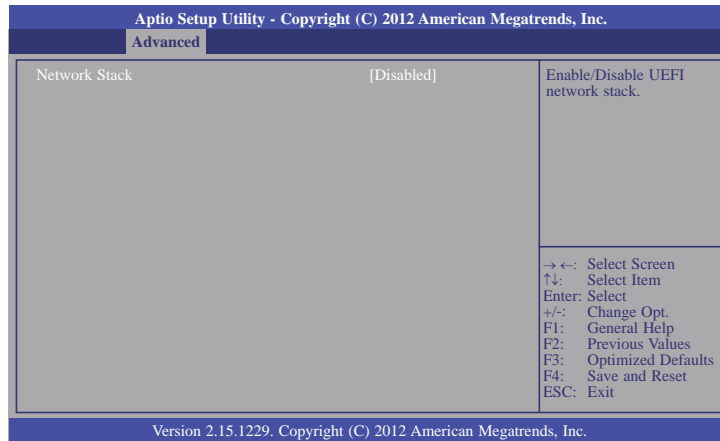
Selects the IO/IRQ settings for the super I/O device.

Device Mode

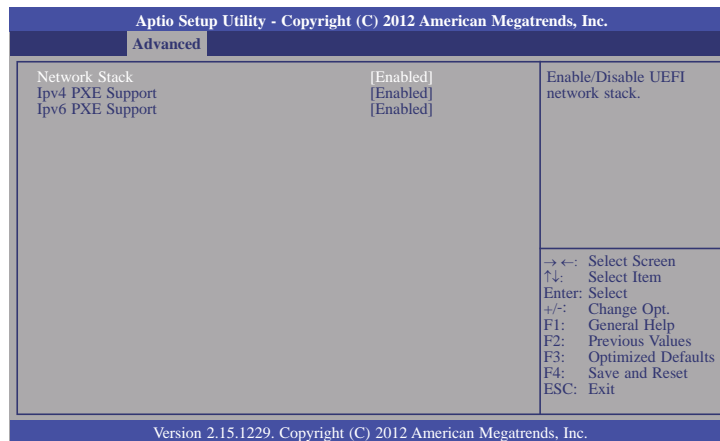
Selects SUART clock source.

Network Stack

This section is used to enable or disable UEFI network stack.



When Network Stack is enabled, it will display the following information:



Ipv4 PXE Support

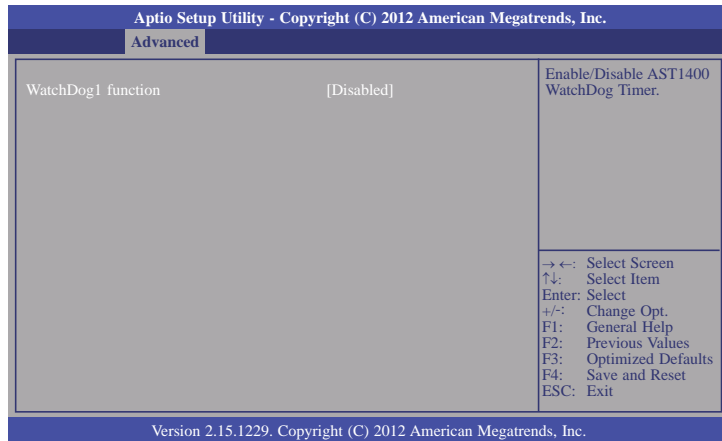
When enabled, Ipv4 PXE boot supports. When disabled, Ipv4 PXE boot option will not be created.

Ipv6 PXE Support

When enabled, Ipv6 PXE boot supports. When disabled, Ipv6 PXE boot option will not be created.

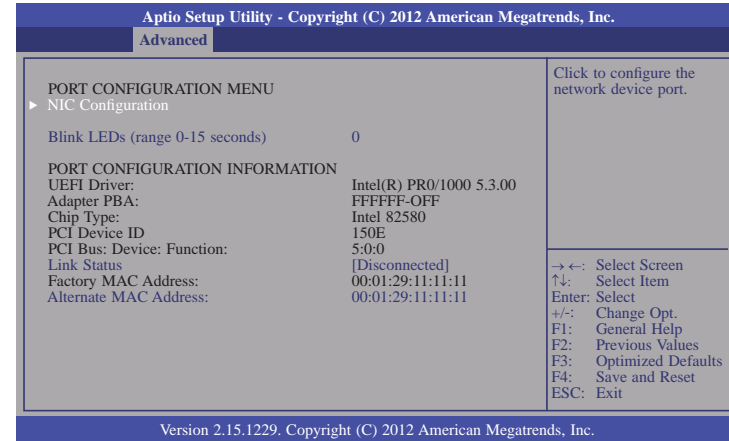
WatchDog Configuration

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



Intel(R) 82580 Gigabit Network Connection - 00:01:29:11...

This section is used to configure parameters of the Gigabit Ethernet device.



NIC Configuration

This field is used to configure the network device.

Blink LEDs

Blink LEDs for the specified duration (up to 15 seconds).

Link Status

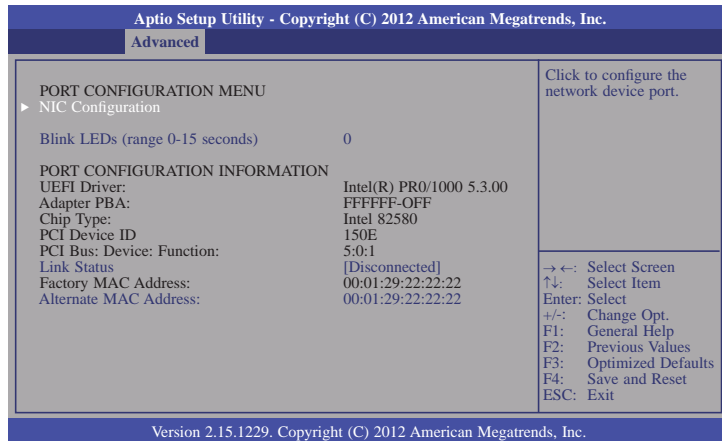
This field indicates the link status of the network device.

Alternate MAC Address

Alternates assigned MAC address of Ethernet port.

Intel(R) 82580 Gigabit Network Connection - 00:01:29:22...

This section is used to configure parameters of the Gigabit Ethernet device.

**NIC Configuration**

This field is used to configure the network device.

Blink LEDs

Blink LEDs for the specified duration (up to 15 seconds).

Link Status

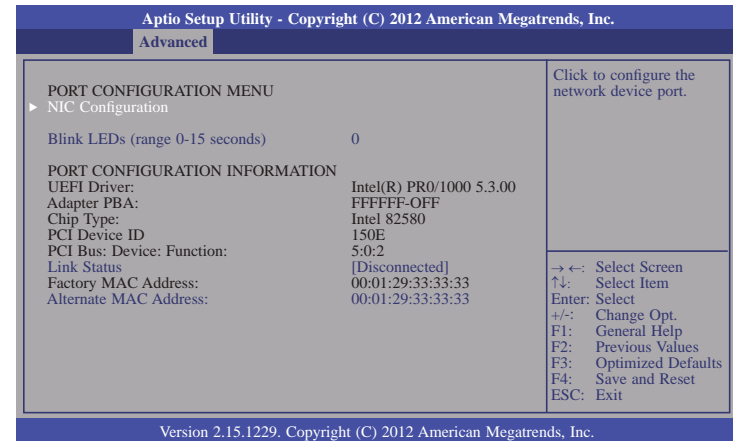
This field indicates the link status of the network device.

Alternate MAC Address

Alternates assigned MAC address of Ethernet port.

Intel(R) 82580 Gigabit Network Connection - 00:01:29:33...

This section is used to configure parameters of the Gigabit Ethernet device.

**NIC Configuration**

This field is used to configure the network device.

Blink LEDs

Blink LEDs for the specified duration (up to 15 seconds).

Link Status

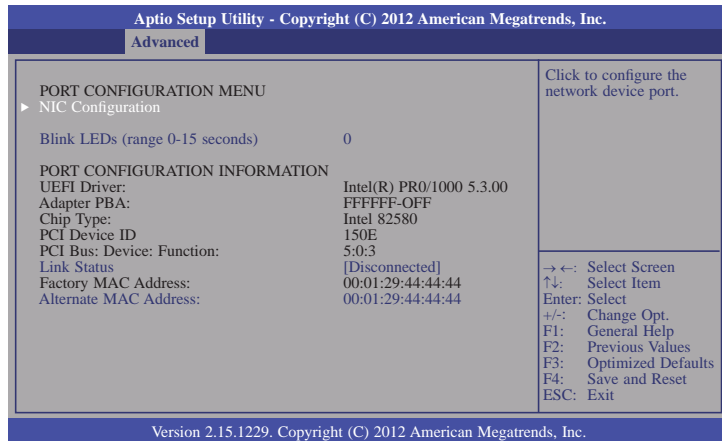
This field indicates the link status of the network device.

Alternate MAC Address

Alternates assigned MAC address of Ethernet port.

Intel(R) 82580 Gigabit Network Connection - 00:01:29:44...

This section is used to configure parameters of the Gigabit Ethernet device.



NIC Configuration

This field is used to configure the network device.

Blink LEDs

Blink LEDs for the specified duration (up to 15 seconds).

Link Status

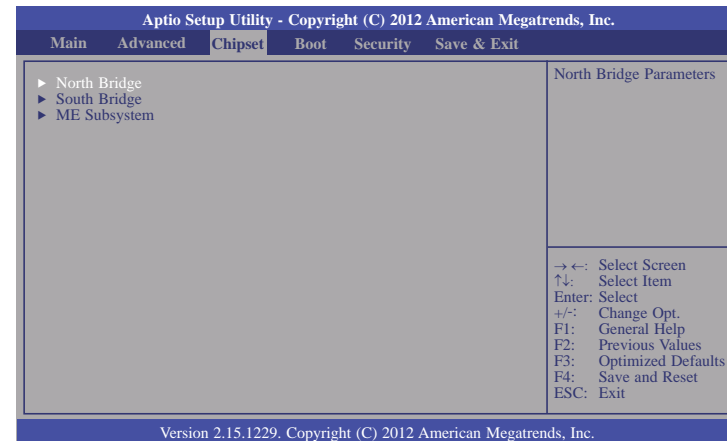
This field indicates the link status of the network device.

Alternate MAC Address

Alternates assigned MAC address of Ethernet port.

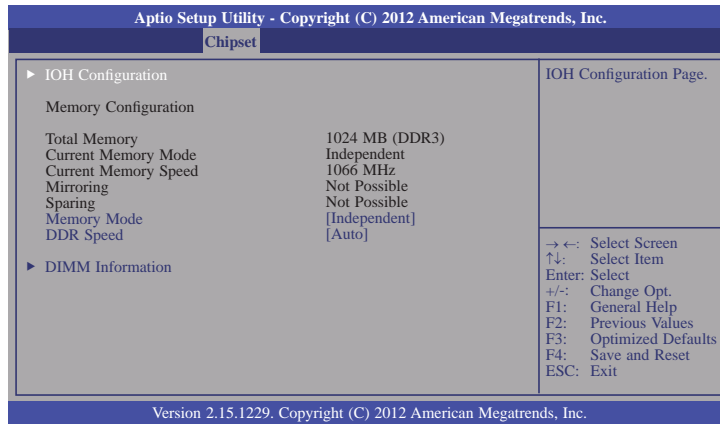
Chipset

This section configures relevant chipset functions.



North Bridge

This section is used to configure the parameters of North Bridge.



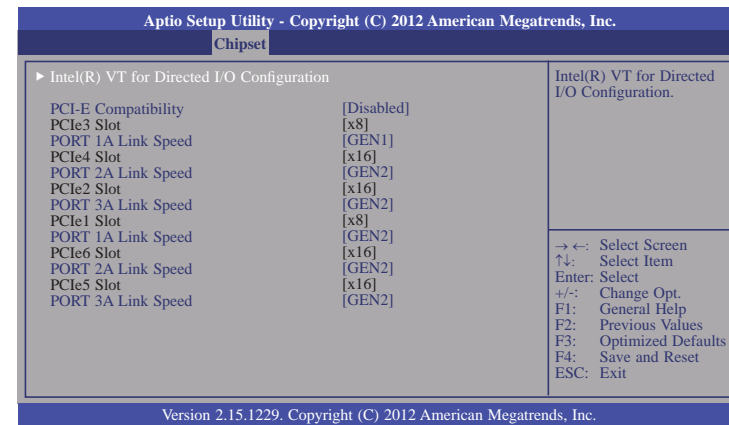
Memory Mode

Selects the mode for memory initialization: Independent, Mirroring, Lock Step or Sparing.

DDR Speed

Selects the DDR3 Speed.

IOH Configuration

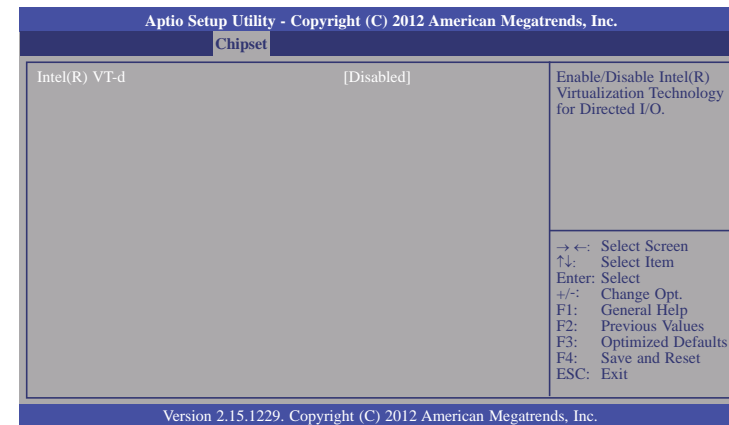


Port Link Speed

Select the target link speed: Gen1, Gen2 or Gen3.

Intel(R) VT for Directed I/O Configuration

Enables or disables Intel(R) Virtualization Technology for Directed I/O device.



DIMM Information

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Chipset		
CPU Socket 0 DIMM Information		
Node 0 Ch 0 Dimm 0	Not Present	
Node 0 Ch 0 Dimm 1	Not Present	
Node 0 Ch 1 Dimm 0	Not Present	
Node 0 Ch 1 Dimm 1	Not Present	
Node 0 Ch 2 Dimm 0	Not Present	
Node 0 Ch 2 Dimm 1	Not Present	
Node 0 Ch 3 Dimm 0	Present 1024MB Independent	
Node 0 Ch 3 Dimm 1	Not Present	
CPU Socket 1 DIMM Information		
Node 1 Ch 0 Dimm 0	Not Present	
Node 1 Ch 0 Dimm 1	Not Present	
Node 1 Ch 1 Dimm 0	Not Present	
Node 1 Ch 1 Dimm 1	Not Present	
Node 1 Ch 2 Dimm 0	Not Present	
Node 1 Ch 2 Dimm 1	Not Present	
Node 1 Ch 3 Dimm 0	Not Present	
Node 1 Ch 3 Dimm 1	Not Present	
→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save and Reset ESC: Exit		
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.		

South Bridge

This section is used to configure the parameters of South Bridge.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Chipset		
PCH Information		
Name	Patsburg	Specify what state to go to when power is re-applied after a power failure (G3 State).
Stepping	06 (C1 Stepping)	
SB Chipset Configuration		
After G3	[Power On]	→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save and Reset ESC: Exit
Disable SCU devices	[Disabled]	
Onboard SAS Oprom/Driver	[Enabled]	
Onboard SATA RAID Oprom/Driver	[Enabled]	
High Precision Event Timer Configuration		
High Precision Timer	[Enabled]	
▶ USB Configuration		
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.		

After G3

Specifies what state to go to when the power is reapplied after a power failure (3 State).

Power 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.

Power On

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

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.

Disable SCU devices

Enables or disables the patsburg SCU devices. SMBus 0/1/2 will be disabled while SCU devices are disabled.

Onboard SAS Oprom/Driver

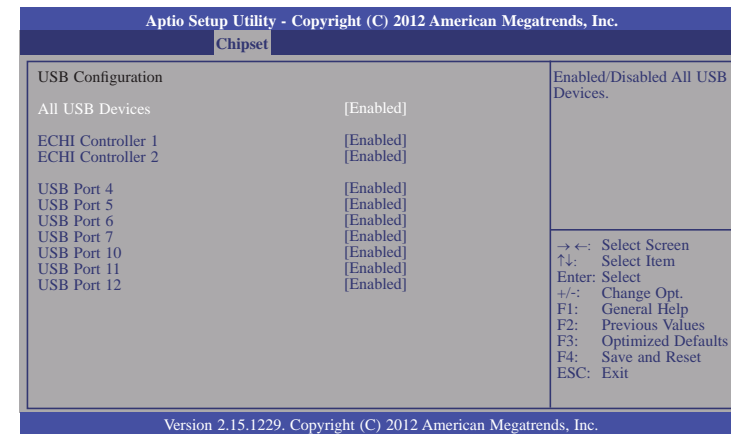
Controls whether to enable the onboard SAS option ROM or EFI driver.

Onboard SATA RAID Oprom/Driver

Controls whether to enable the onboard SATA option ROM or EFI driver.

High Precision Timer

Enables or disables the High Precision Event Timer.

USB Configuration**All USB Devices**

Enables or disables all USB devices.

ECHI Controller 1/2

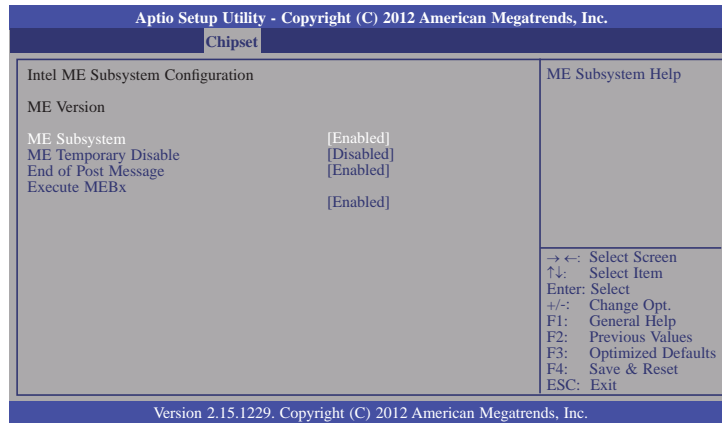
Enables or disables the USB 2.0 (EHCI) support.

USB Port

Enables or disables the USB port.

ME Subsystem

This section is used to configure the parameters of ME Subsystem.



ME Subsystem

The ME subsystem help.

ME Temporary Disable

The ME temporary disable help.

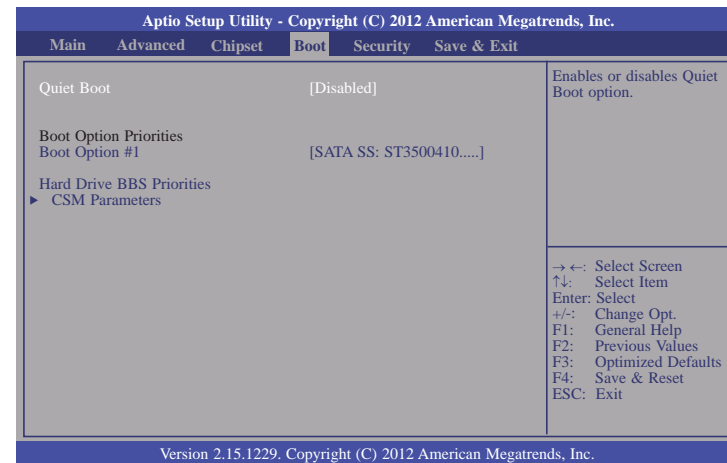
End of Post Message

The end of post message help.

Execute MEBx

Execute MEBx help.

Boot



Quiet Boot

Enables or disables the quiet boot function.

Boot Option #1

Sets the system boot order.

Hard Drive BBS Priorities

Sets the order of the legacy devices in this group.



Note:

SATA 6 to SATA 9 on the RL830-C604 system board do not support the DVD boot function.

CSM Parameters

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Launch CSM	[Enabled]				This option controls if CSM will be launched.
Boot option filter	[UEFI and Legacy]				
Launch PXE OpROM policy	[Do not launch]				
Launch Storage OpROM policy	[Legacy only]				
Launch Video OpROM policy	[Legacy only]				
Other PCI device ROM priority	[UEFI OpROM]				
					→ ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.					

Boot option filter

This option controls what devices system can be boot to.

Launch PXE OpROM policy

Controls the execution of UEFI and legacy PXE OpROM.

Launch Storage OpROM policy

Controls the execution of UEFI and legacy storage OpROM.

Launch Video OpROM policy

Controls the execution of UEFI and legacy Video OpROM.

Other PCI device ROM priority

For PCI devices other than Network, Mass Storage, or Video defines which OpROM to launch.

Security

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Password Description					Set Administrator Password.
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup. If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights. The password length must be in the following range: Minimum length 3 Maximum length 20					
Administrator Password					
User Password					
					→ ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.					

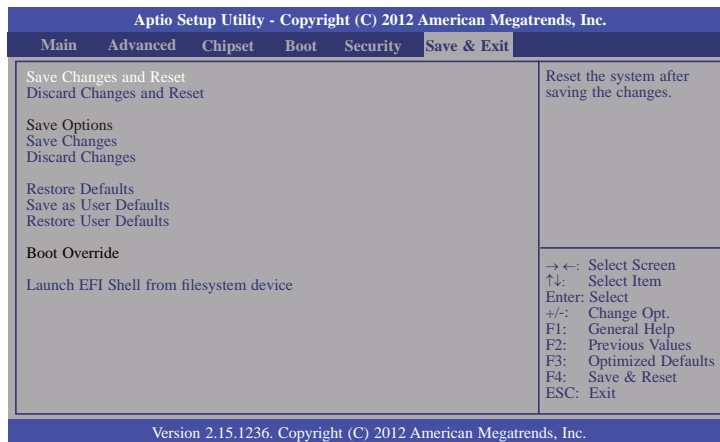
Administrator Password

Sets the administrator password.

User Password

Sets the user password.

Save & Exit



Save Changes and Reset

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

Discard Changes and Reset

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

Save Changes

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

Discard Changes

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

Restore Defaults

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

Save as User Defaults

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

Restore User Defaults

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

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:

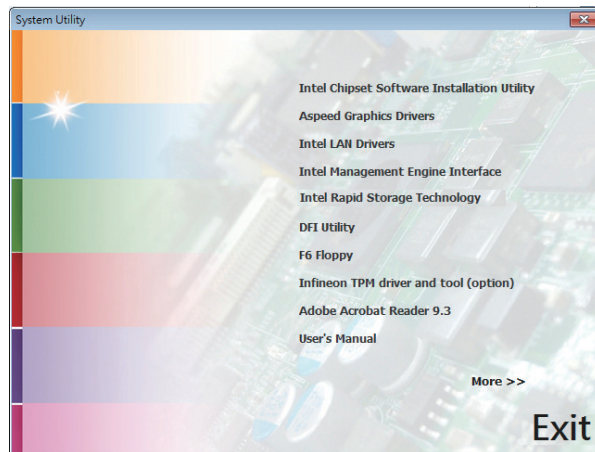
```
A:> AFUDOS BIOS_File_Name /b /p /n
```

then press <Enter>.

```
C:\AFU\AFUDOS>afudos filename /B /P /N
+-----+
|              AMI Firmware Update Utility(APTIO) v2.25              |
|              Copyright (C)2008 American Megatrends Inc. All Rights Reserved.              |
+-----+
Reading file ..... done
Erasing flash ..... done
Writing flash ..... done
Verifying flash ..... done
Erasing BootBlock ..... done
Writing BootBlock ..... done
Verifying BootBlock ..... done
C:\AFU\AFUDOS>
```

Chapter 4 - Supported Software

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



Note:

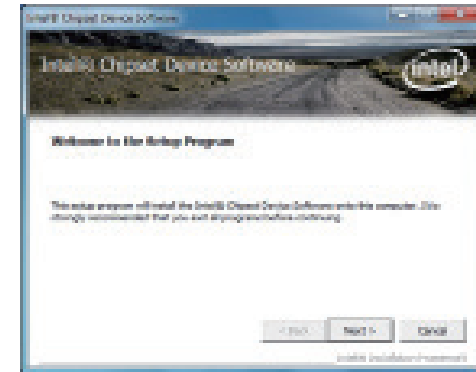
This step can be ignored if the applications are standalone files.

Intel Chipset Software Installation Utility

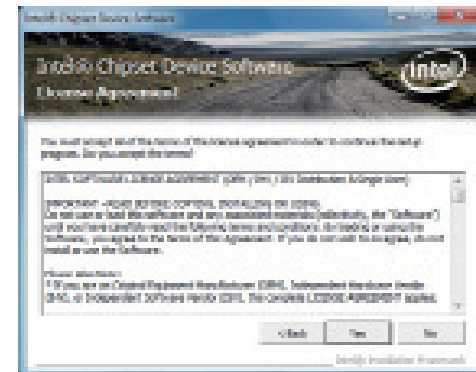
The Intel Chipset Software Installation Utility is used for updating Windows® INF files so that the Intel chipset can be recognized and configured properly in the system.

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

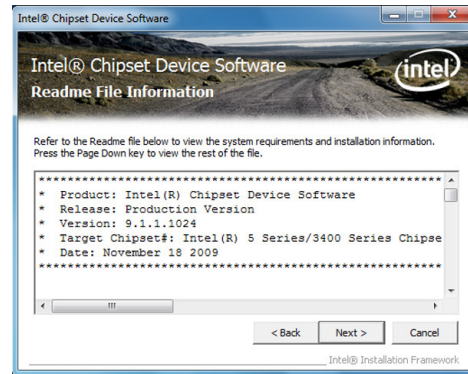
1. Setup is ready to install the utility. Click Next.



2. Read the license agreement then click Yes.



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



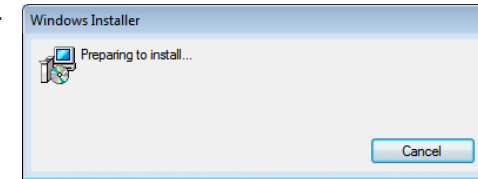
- Click Finish to exit setup.



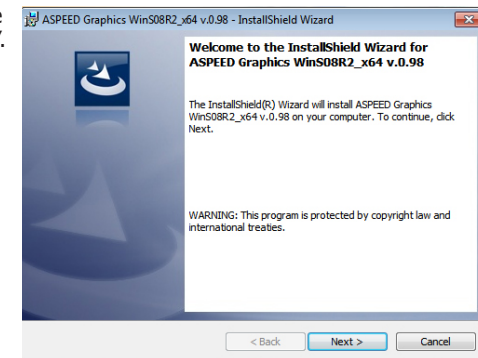
Aspeed Graphics Drivers

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

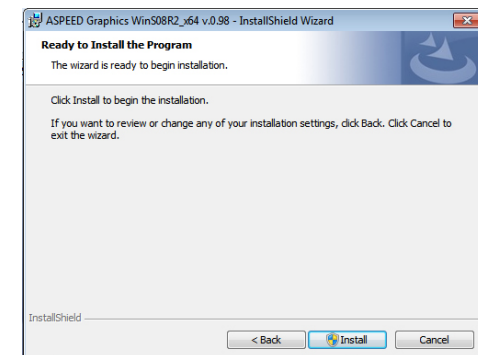
- Prepare to install the driver.



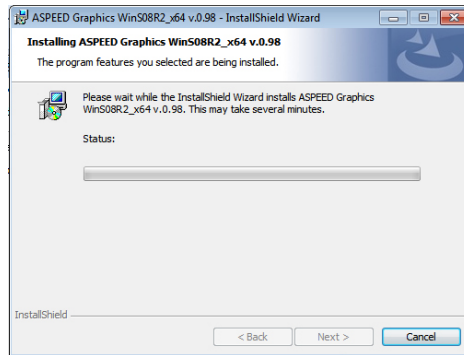
- Setup is ready to install the driver and then click "Next".



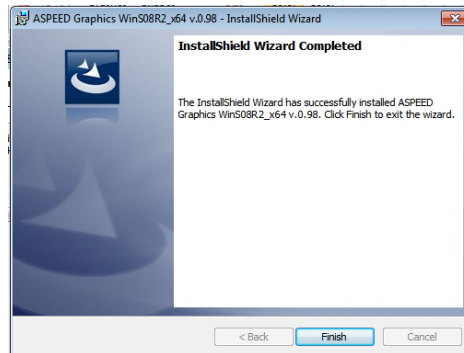
- Click "Install" to begin the installation.



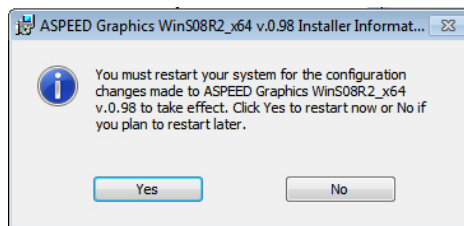
4. The installing status of the program feature you selected.



5. After completing the installation, click "Finish."



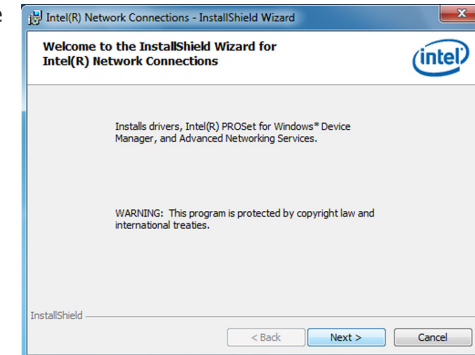
6. Click "Yes" to restart your system.



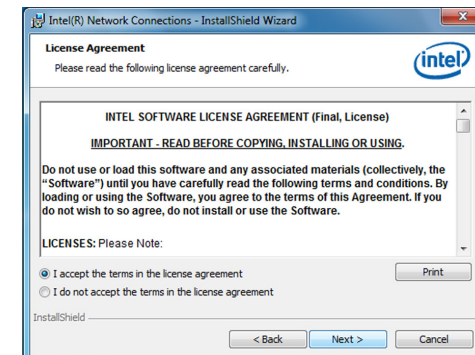
Intel LAN Drivers

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

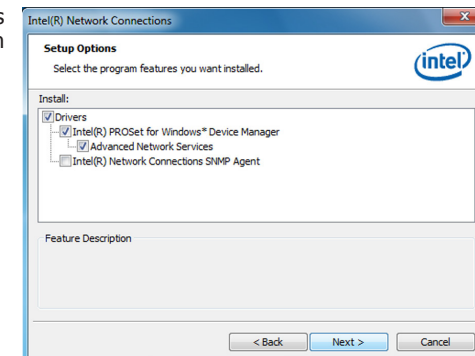
1. Setup is ready to install the driver. Click "Next."



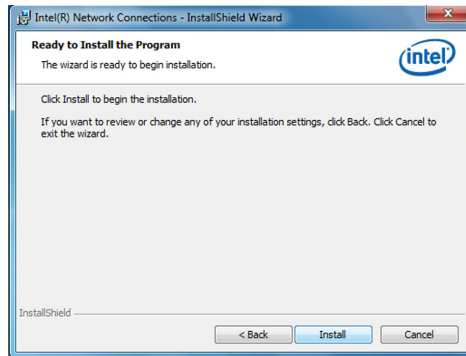
2. Click "I accept the terms in the license agreement" and then click "Next."



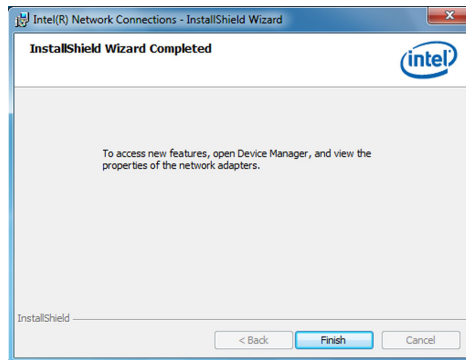
3. Select the program features you want installed and then click "Next."



- Click Install to begin the installation.



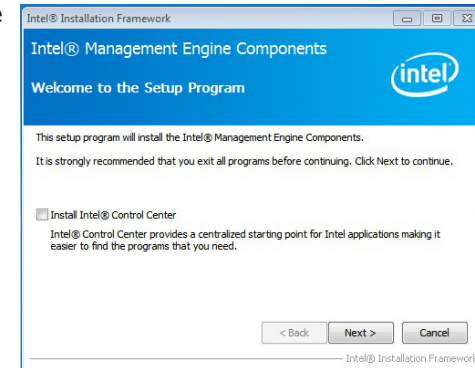
- After completing the installation, click "Finish."



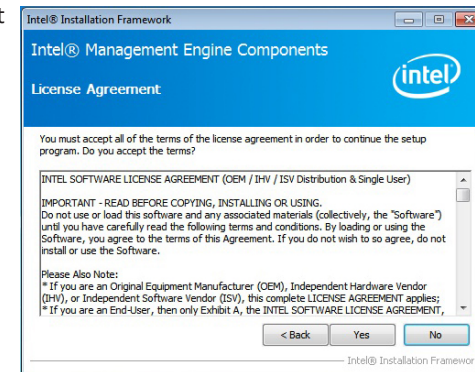
Intel Management Engine Interface

To install the driver, click "Intel Management Engine Interface" on the main menu.

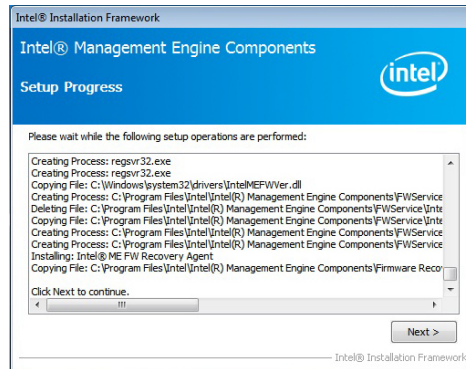
- Setup is ready to install the driver. Click "Next."



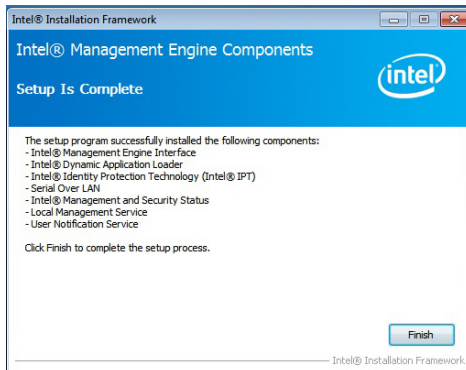
- Read the license agreement then click "Yes."



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



4. After completing the installation, click "Finish."



Intel Rapid Storage Technology

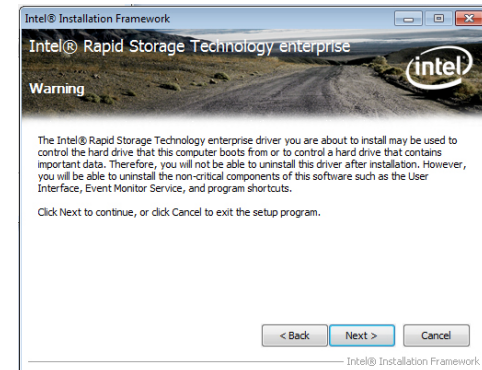
The Intel Rapid Storage Technology is a utility that allows you to monitor the current status of the SATA drives. It enables enhanced performance and power management for the storage subsystem.

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

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



2. Read the warning and then click "Yes."

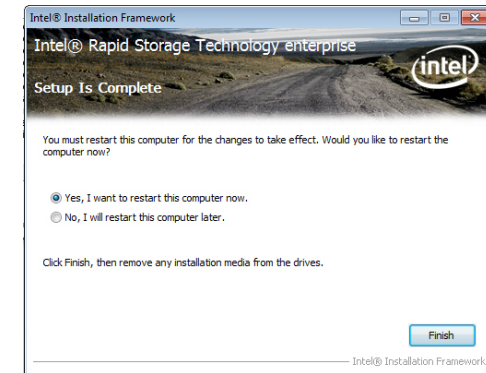


3. Read the license agreement and then click "Yes."

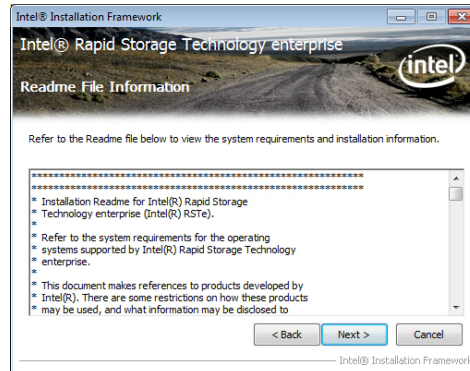


6. Click "Yes, I want to restart my computer now" and then click "Finish."

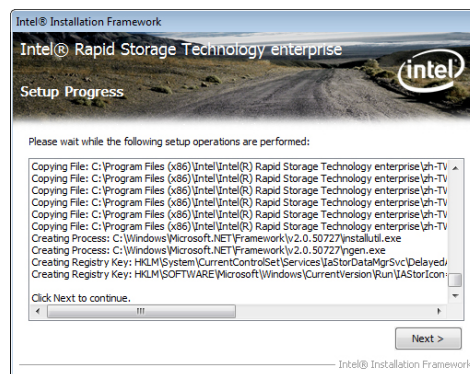
Restarting the system will allow the new software installation to take effect.



4. Go through the readme document for system requirements and installation tips. Then, click "Next."



5. Setup is now installing the utility. Click "Next" to continue.



DFI Utility

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



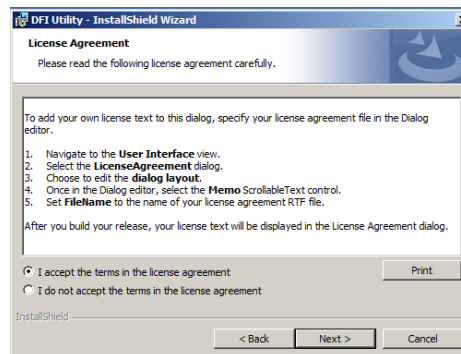
Note:

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

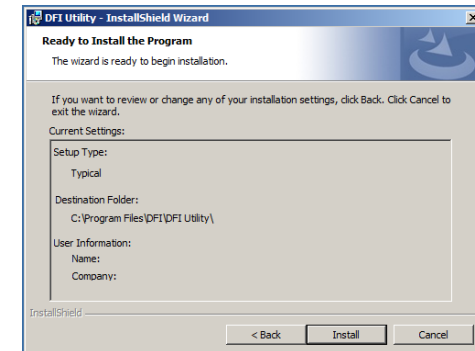
1. Setup is ready to install the DFI Utility driver. Click "Next".



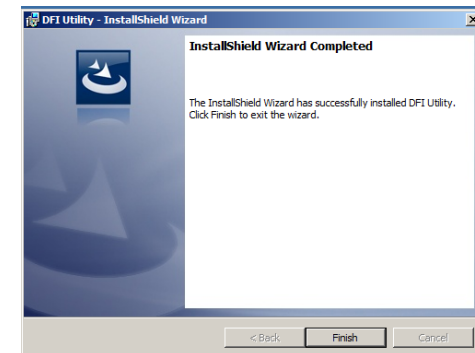
2. Click "I accept the terms in the license agreement" then click "Next".



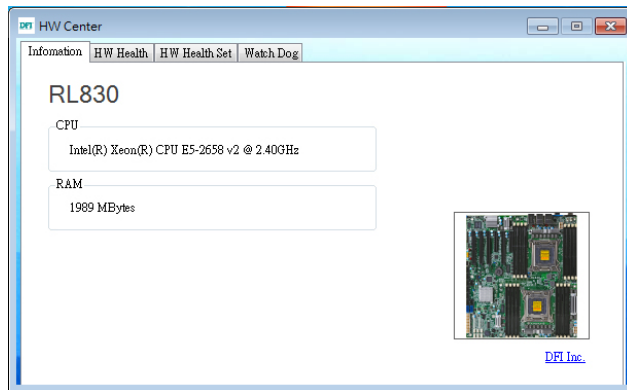
3. Click "Install" to begin the installation.



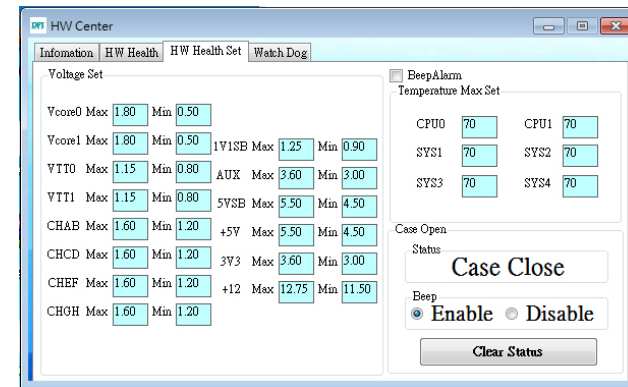
4. After completing the installation, click "Finish".



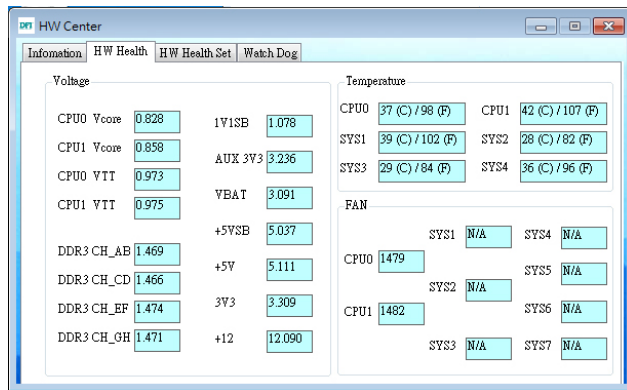
The DFI Utility icon will appear on the desktop. Double-click the icon to open the utility.



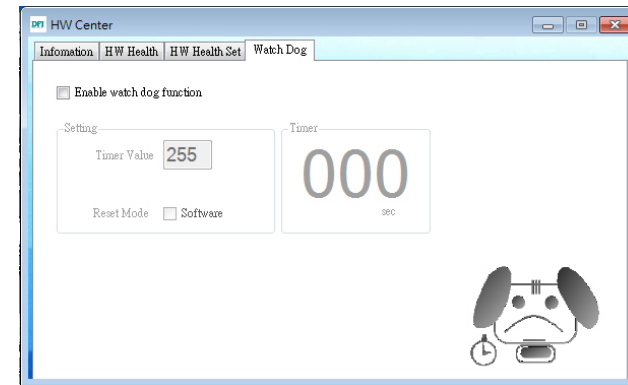
Information



HW Health Set



HW Health



WatchDog

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

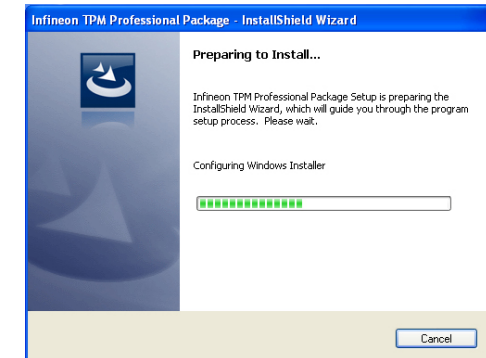
64-bit

CD Drive:\AHCI_RAID\F6FLOPPY\f6flpy64

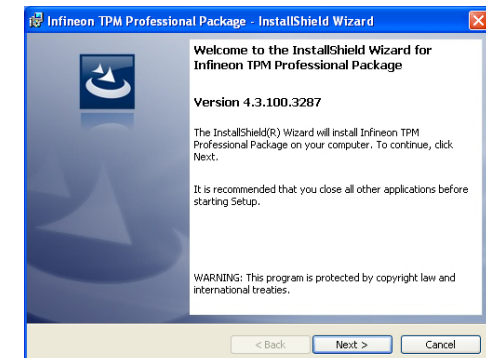
Infinion TPM Driver and Tool (option)

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

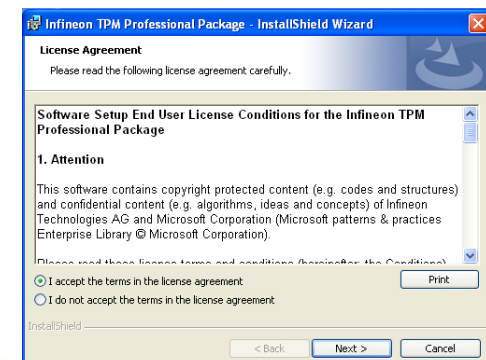
1. The setup program is preparing to install the driver.



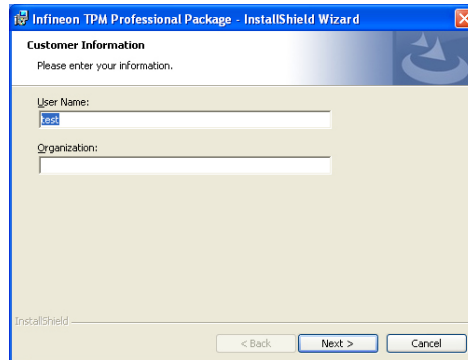
2. The setup program is now ready to install the utility. Click Next.



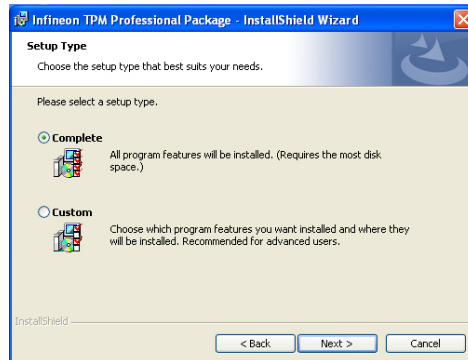
3. Click "I accept the terms in the license agreement" and then click "Next".



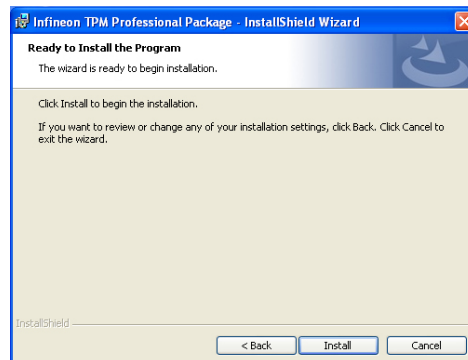
4. Enter the necessary information and then click Next.



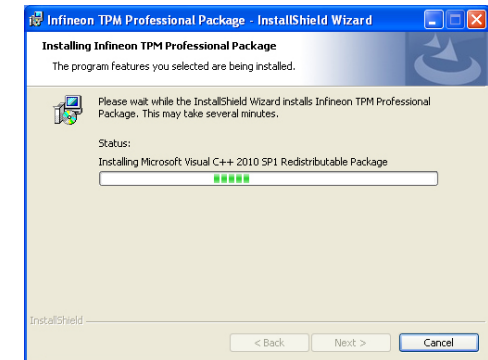
5. Select a setup type and then click Next.



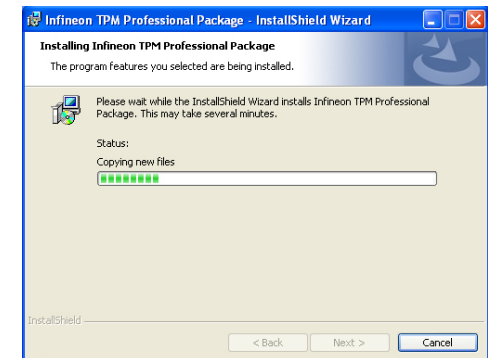
6. Click Install.



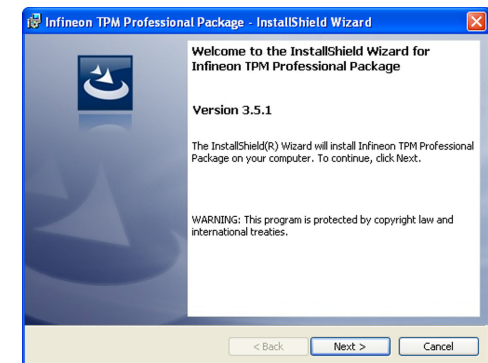
7. TPM requires installing the Microsoft Visual C++ package prior to installing the utility. Click Install.



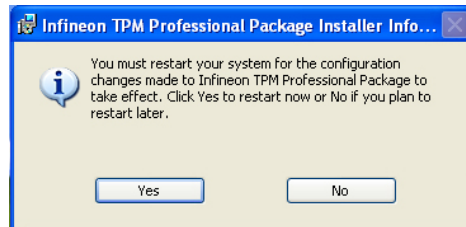
8. The setup program is currently installing the Microsoft Visual C++ package.



9. Click Finish.



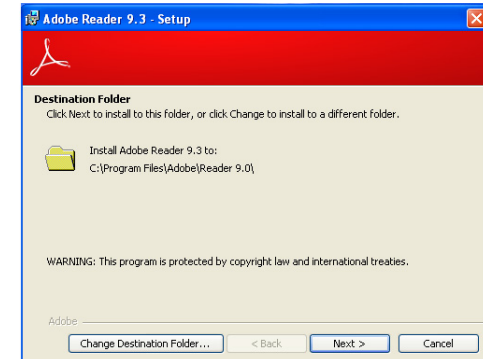
10. Click "Yes" to restart your system.



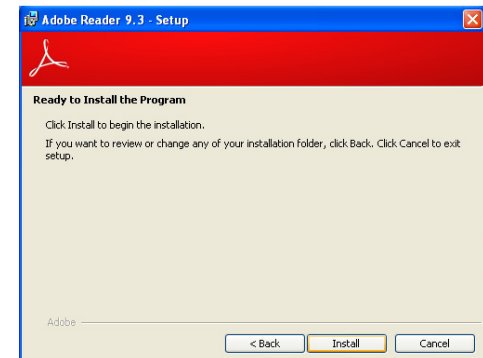
Adobe Acrobat Reader 9.3

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

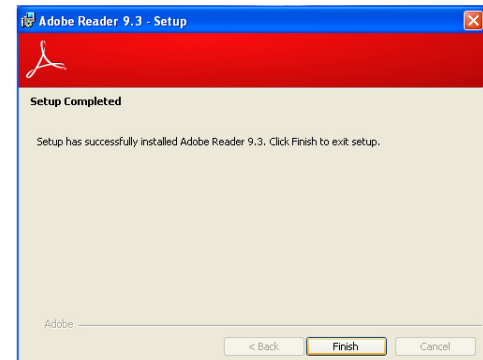
1. Click Next to install or click Change Destination Folder to select another folder.



2. Click Install to begin installation.



3. Click Finish to exit installation.



Appendix A - NLITE and AHCI Installation Guide

nLite

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



Note:

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

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

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

2. Install nLite.

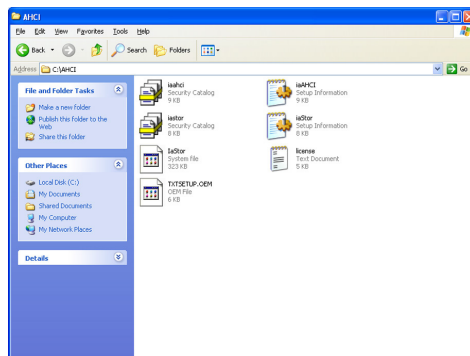


Important:

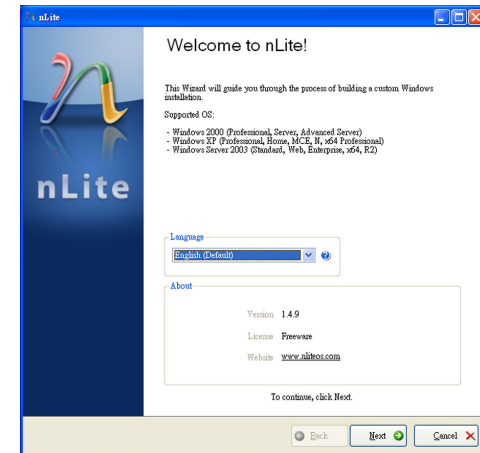
Due to its coding with Visual.Net, you may need to first install .NET Framework prior to installing nLite.

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.

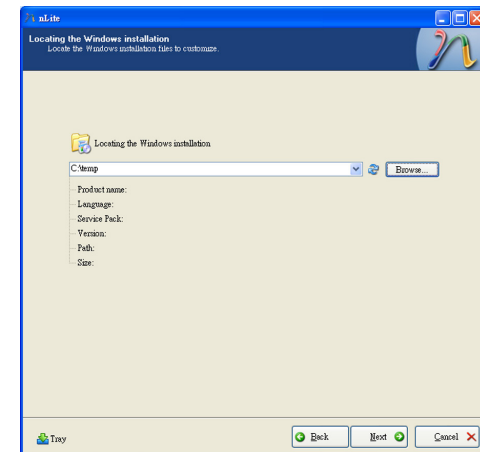


4. Insert the XP installation disc into an optical drive.
5. Launch nLite. The Welcome screen will appear. Click **Next**.

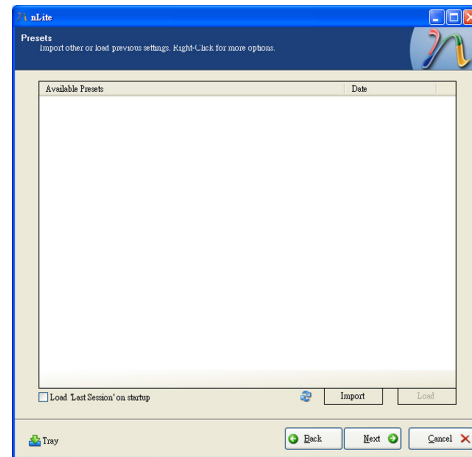


6. Click **Next** to temporarily save the Windows installation files to the designated default folder.

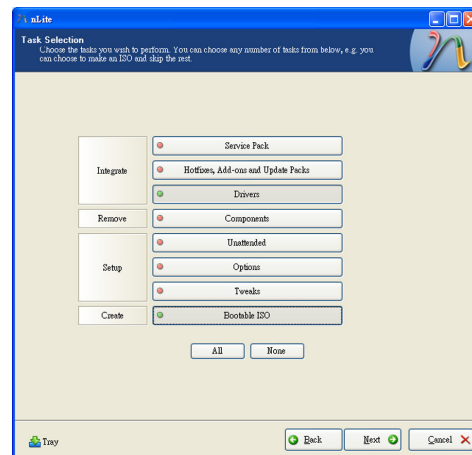
If you want to save them in another folder, click **Browse**, select the folder and then click **Next**.



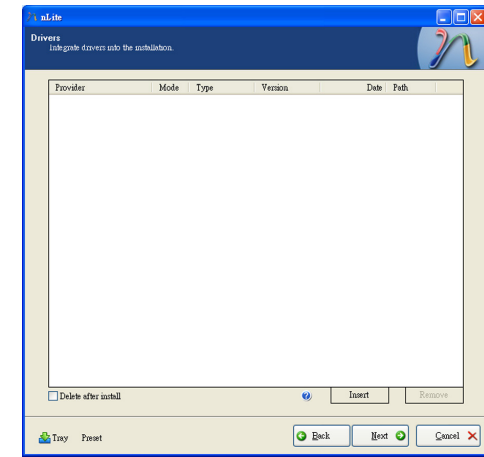
7. Click **Next**.



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

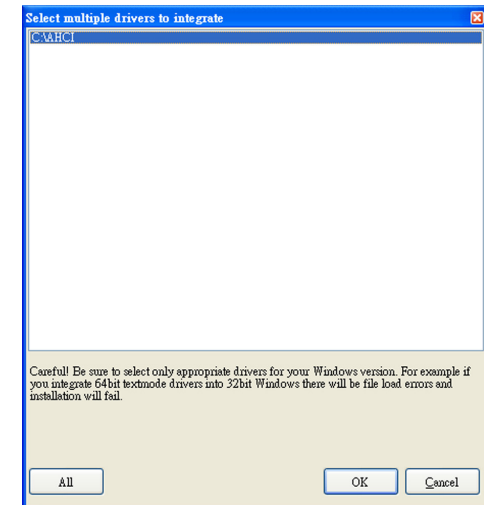


9. Click **Insert** and then select **Multiple driver folder** to select the drivers you will integrate. Click **Next**.

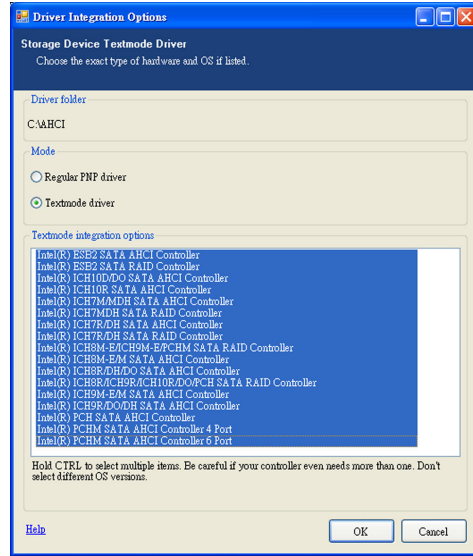


10. Select only the drivers appropriate for the Windows version that you are using and then click **OK**.

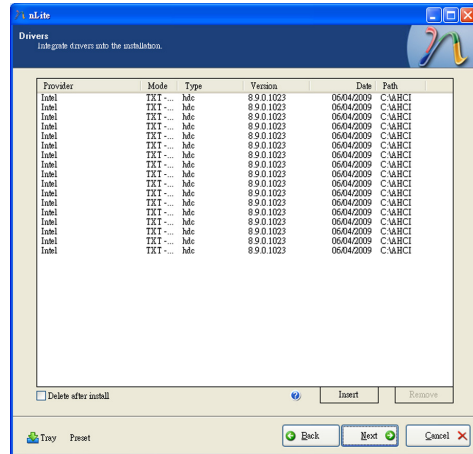
Integrating 64-bit drivers into 32-bit Windows or vice versa will cause file load errors and failed installation.



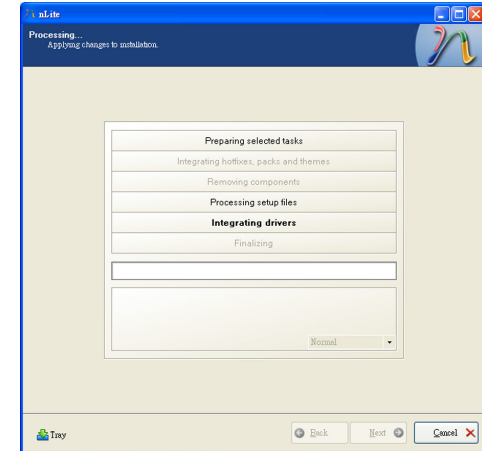
- 11. If you are uncertain of the southbridge chip used on your motherboard, select all RAID/AHCI controllers and then click **OK**.



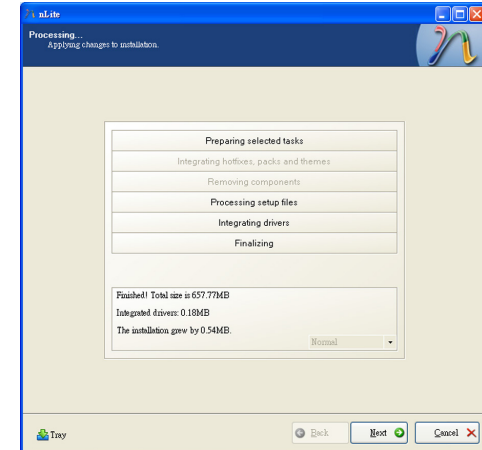
- 12. Click **Next**.



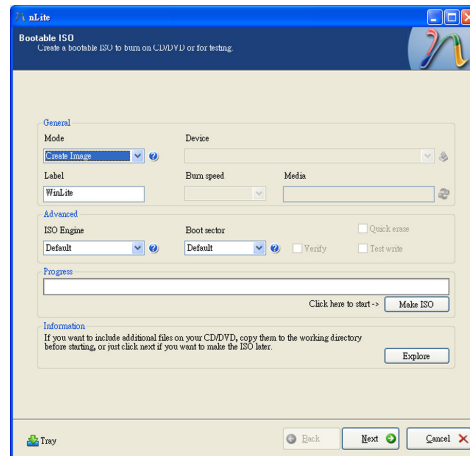
- 13. The program is currently integrating the drivers and applying changes to the installation.



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

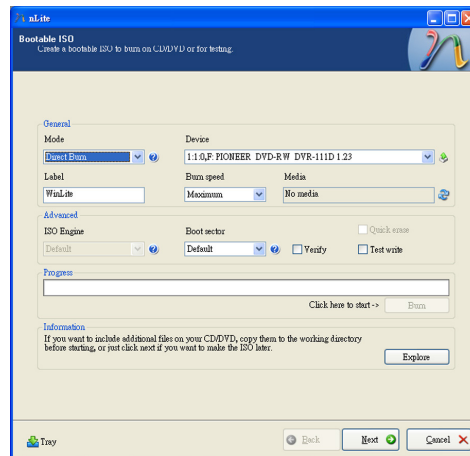


15. To create an image, select the **Create Image** mode under the General section and then click **Next**.



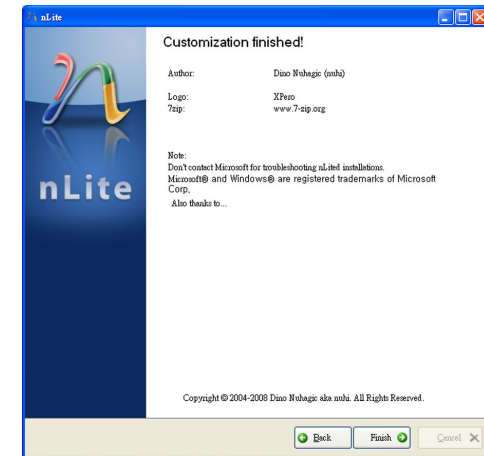
16. Or you can choose to burn it directly to a disc by selecting the **Direct Burn** mode under the General section.

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.

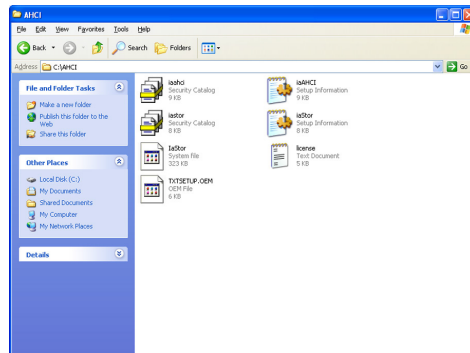


AHCI

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

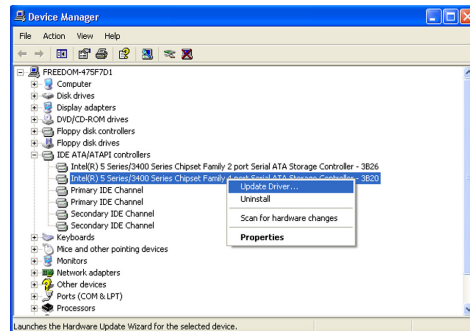
1. Enter the BIOS utility and configure the SATA controller to IDE mode.
2. Install Windows XP but do not press F6.
3. Download relevant RAID/AHCI driver files supported by the motherboard chipset from Intel's website.

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**.

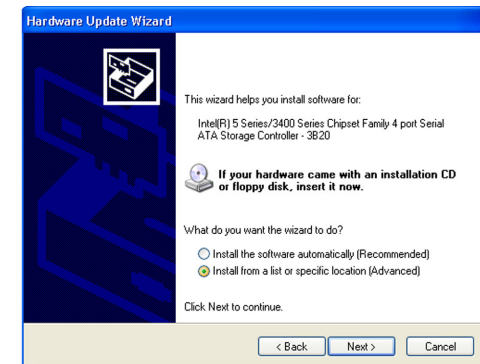
If the controller you selected did not work, try selecting another one.



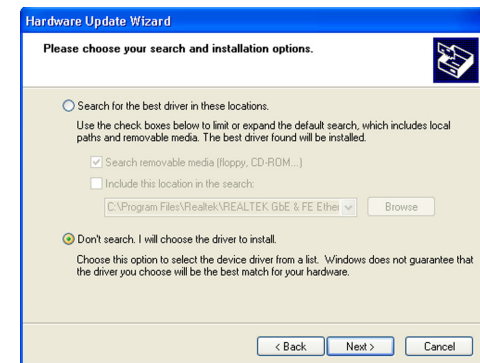
5. In the Hardware Update Wizard dialog box, select **"No, not this time"** then click **Next**.



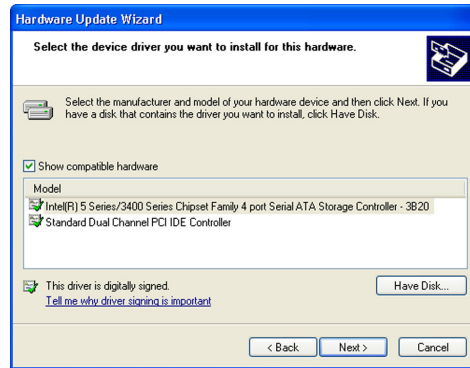
6. Select **"Install from a list or specific location (Advanced)"** and then click **Next**.



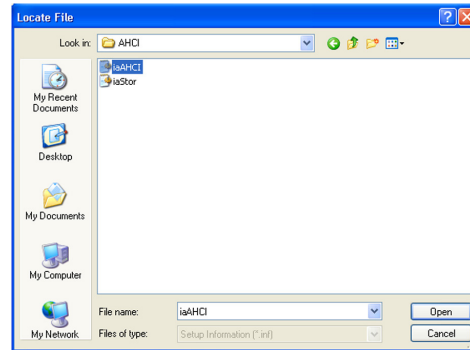
7. Select **"Don't search. I will choose the driver to install"** and then click **Next**.



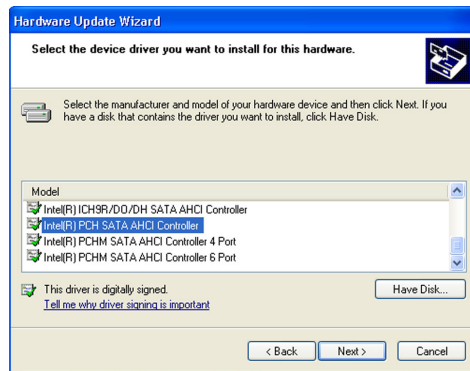
8. Click **"Have Disk"**.



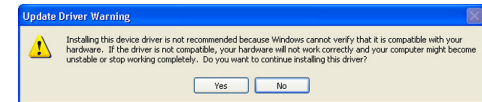
9. Select C:\AHCI\iaAHCI.inf and then click **Open**.



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

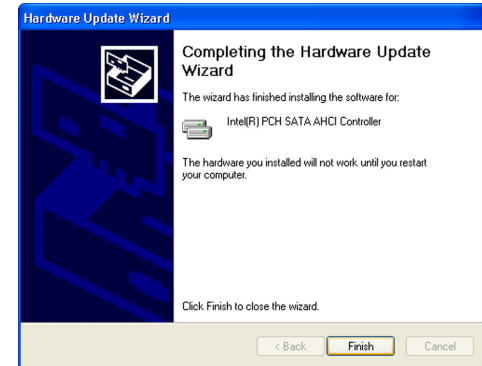


11. A warning message appeared because the selected SATA controller did not match your hardware device.

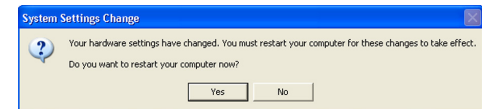


Ignore the warning and click **Yes** to proceed.

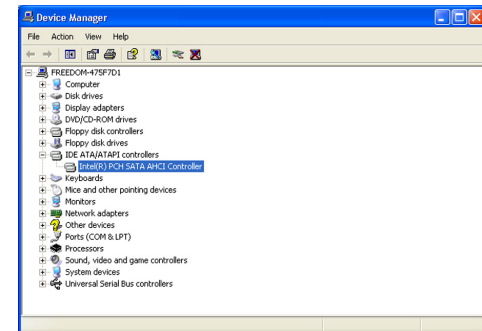
12. Click **Finish**.



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

Watch Dog ISI Programing Guide

; Using DFI Utility (ISIDll.dll) library function
WD_Init
WD_SerTimerValue
WD_GetTimerValue

WD_Init function

Initial the Watch Dog Timer Module

Syntax

Int WD_Init(void);

Return value

If the return value isn't NULL ,the initial procedure failed.

WD_SerTimerValue function

Setting the Watch Dog Timer counting Value

Syntax

Int WD_SerTimerValue(unsigned char ucData);

Input value

The ucData represent the counting value. If the value is 0x00,
Watch dog timer will stop counting.

Return value

If the return value isn't NULL , the setting procedure failed.

WD_GetTimerValue function

Getting the Watch Dog Timer runtime value.

Syntax

Unsigned char WD_GetTimerValue(void);

Return value

The return value represent the timer runtime value.

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.