Vig410p Motherboard Manual

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COMPUTERS ◆ NETWORKS ◆ SOLUTIONS

Viglen EMC and the 'CE' mark

CE Marking

As we begin the 21st century, European standards are being harmonised across borders. If products comply with the same standards in all European countries, product exporting and importing is made simple - paving our way to a common market. If you buy a product with a 'CE' mark on it (shown below), on the box, in the manual, or on the guarantee - it complies with the currently enforced directive(s).

CE

Introduction to EMC

EMC (Electromagnetic Compatibility) is the term used to describe certain issues with RF (Radio Frequency) energy. Electrical items should be designed so they do not interfere with each other through RF emissions. E.g. If you turn on your microwave, your television shouldn't display interference if both items are CE marked to the EMC directive.

If emitted RF energy is not kept low, it can interfere with other electrical circuitry - E.g. Cars Automatic Braking Systems have been known to activate by themselves while in a strong RF field. As this has obvious repercussions ALL electrical products likely to cause RF related problems have to be 'CE' marked from 1st January 1996 onwards.

If a product conforms to the EMC directive, not only should its RF emissions be very low, but its immunity to RF energy (and other types) should be high. The apparatus has to resist many 'real world' phenomena such as static shocks and mains voltage transients.

Viglen's Environment laboratory

To gain a 'CE' mark, the Viglen computer range has had to undergo many difficult tests to ensure it is Electromagnetically Compatible. These are carried out in the in-house 'Environment lab' at Viglen Headquarters. We have made every effort to guarantee that each computer leaving our factory complies fully with the correct standards. To ensure the computer system maintains compliance throughout its functional life, it is essential you follow these guidelines.

- Install the system according to Viglen's instructions
- If you open up your Viglen:
    - Keep internal cabling in place as supplied.
    - Ensure the lid is tightly secured afterwards
    - Do not remove drive bay shields unless installing a 'CE' marked peripheral in its place
    - The clips or 'bumps' around the lips of the case increase conductivity - do not remove or damage.
    - Do not remove the ferrite ring from the L.E.D cables.
    - Only use your Viglen computer with 'CE' marked peripherals

This system has been tested in accordance with European standards for use in residential and light industrial areas-this specifies a 10 meter testing radius for emissions and immunity. If you do experience any adverse affects that you think might be related to your computer, try moving it at least 10 meters away from the affected item. If you still experience problems, contact Viglen's Technical Support department who will put you straight through to an EMC engineer - s/he will do everything possible to help. If modifications are made to your Viglen computer system, it might breach EMC regulations. Viglen take no responsibility (with regards to EMC characteristics) of equipment that has been tampered with or modified.

This symbol on the product or on its packaging indicates that the product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to conserve natural resources. For more detailed information about recycling of this product, please contact your local city office, your household waste disposal service or Viglen Ltd.

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Contents

Chapter 1: Motherboard Overview

Introduction

This manual describes the Viglen Vig410P Motherboard inside your computer. The Motherboard is the most important part of your computer. It contains all of the CPU, memory and graphics circuitry that make the computer work.

The Vig410P is built upon the functionality and the capability of the Intel 5500 chipset platform. The Vig410P Motherboard provides the performance required for dual processor-based CAD workstations or graphic-intensive systems. The 5500 chipset consists of the 5500 (LGA 1366) processor, the 5500 (North Bridge), and the South Bridge (ICH10R). With the Intel QuickPath interconnect (QPI) controller built in, the 5500 Series Processor platform is the first dual-processing platform that offers the next generation point-to-point system interconnect interface, replacing the current Front Side Bus Technology that substantially enhances system performance with increased bandwidth and scalability.

This manual contains technical information about the Viglen Vig410P Motherboard and other hardware components inside your computer. If you are new to computers we recommend that you read the user guide first. If you are an experienced computer user this manual should provide all the information you will need to perform simple upgrades and maintenance.

We hope that this manual is both readable and informative. If you have any comments for suggestions about how we could improve the format then please fill out the form at the back of the manual and send it to us.

Above all we hope that you enjoy using your Viglen computer.

Motherboard Features

Form factor:

- ATX form factor: 12 in x 10 in (254 mm x 304.8 mm)

CPU Support:

- Two Intel® 5500 Series (LGA 1366) processors, each processor supporting two full-width Intel QuickPath Interconnect (QPI) @6.4 GT/s with a total of up to 51.2 GB/s Data Transfer Rate (6.4 GB/s per direction)

Chipset Support:

- Intel 5500 chipset, including: the 5500 North Bridge and the ICH10R South Bridge.

Memory Support:

- Six 240-pin DIMM sockets support up to 24 GB of DDR3 Buffered ECC or Unbuffered ECC/Non-ECC Memory (See Section 2-4 in Chapter 2 for DIMM Slot Population.)

Expansion Support:

- One PCI-E 2.0 x16 slot (Slot 6)
- One PCI-E 2.0 x4 slot in x16 slot (Slot 3)
- One PCI-E x4 (in x8) slots (Slot 2)
- Two 32-bit PCI 33 slots (Slot 4 and Slot 5)

Storage Support:

- Intel ICH10R supports six SATA2 ports (with RAID0, RAID1, RAID10, RAID5 supported in the Windows OS Environment, and RAID0, RAID1, RAID10 supported in the Linux platforms)

HD Audio Support:

- HD ALC883 Audio Controller supports High Definition 7.1 Audio with Line-in, Line-out and Microphone

LAN Support:

- Dual 82574LGigabit Ethernet controllers support two Giga-bit LAN ports

USB Support:

- Up to Eight USB 2.0 connections (4 Backpanel USB Ports, and 2 Headers w/4 connections supported)

BIOS Features:

- 4 MB AMI SPI Flash ROM
- PCI 2.2, DMI 2.3, ACPI 1.0/2.0/3.0, Plug and Play (PnP), DMI 2.3, USB Keyboard support, and SMBIOS 2.3

PC Health Monitoring:

- Onboard voltage monitors for Vcore1, Vcore2, 1.5V, 5VDD, 5VSB, 12V, -12V,
- 3.3Vcc, 3.3VSB, VBAT and Vtt.
- Fan status monitor with firmware control
- Tachometer Monitoring
- Pulse Width Modulation (PWM) fan control.
- Low-noise fan speed control
- CPU/chassis temperature monitoring
- Platform Environment Control Interface (PECI) ready
- Thermal Monitor 2 (TM2) support
- CPU fan auto-off in sleep mode
- CPU slow-down on temperature overheat
- CPU thermal trip support for processor protection, power LED
- Power-up mode control for recovery from AC power loss
- Auto-switching voltage regulator for CPU cores
- System overheat/Fan Fail • LED Indicator and control
- Chassis intrusion detection/header
- System resource alert via Super Doctor III

Rear Panel Port Support:

- 1 x PS/2 keyboard port
- 1 x PS/2 mouse port
- 4 x USB 2.0 ports
- 1 x Serial Port
- 2 x LAN (RJ-45) port
- 1 x Side Surround
- 1 x Back Surround
- 1 x CEN/LFE
- Microphone
- Front
- Line-In

Internal Connectors:

- 6 x Serial ATA 2 connectors
- 2 x CPU fan connector
- 4 x Chassis fan connector
- 2 x USB 2.0 connectors (total 4 USB ports)
- 1 x 24-pin ATX power connector
- 2 x 8-pin 12V processor connector
- 1 x Front panel AC'97 Audio connector
- 1 x Chassis intrusion connector
- 1 x Overheat LED/Fan fail connector
- 1 x Power LED/External Speaker connector
- 1 x CD-In connector
- 1 x Power SMB (System Management Bus) connector
- 2 x SGPIO (Serial-Link General Purpose Input/Output) connectors
- 1 x Front control panel connectors

ACPI Features:

- Slow blinking LED for suspend state indicator
- Main switch override mechanism
- ACPI/ACPM Power Management (S1, S3, S4, S5)

Other:

- Console redirection
- Onboard Fan Speed Control by Thermal Management via BIOS

Power Requirements:

- ATX power supply with SSI power connectors (24-pin, 8-pin, 8-pin)
- These connectors need to meet the SSI EPS 12V specification

Dimensions:

ATX 12.00" (L) x 10.00" (W) (304.80mm x 254.20mm)

Motherboard Features

Special Features:

- **Recovery from AC Power Loss**

BIOS provides a setting for you to determine how the system will respond when AC power is lost and then restored to the system. You can choose for the system to remain powered off (in which case you must hit the power switch to turn it back on) or for it to automatically return to a power- on state. See the Power Lost Control setting in the Advanced BIOS Setup section (Boot Features) to change this setting. The default setting is **Last State**.

PC Health Monitoring:

This section describes the PC health monitoring features of the Vig410P. All have an onboard System Hardware Monitor chip that supports PC health monitoring via Super Doctor II or III. An onboard voltage monitor will scan these onboard voltages continuously: Vcore1, Vcore2, 1.5V, 5VDD, 5VSB, 12V, -12V, 3.3Vcc, 3.3VSB, VBAT and Vtt. Once a voltage becomes unstable, a warning is given or an error message is sent to the screen. Users can adjust the voltage thresholds to define the sensitivity of the voltage monitor.

- **Fan Status Monitor with Firmware Control**

The PC health monitor can check the RPM status of the cooling fans. The onboard CPU and chassis fans are controlled by Thermal Management via BIOS (under Hardware Monitoring in the Advanced Setting).

- **Environment Temperature Control**

The thermal control sensor monitors the CPU temperature in real time and will turn on the thermal control fan whenever the CPU temperature exceeds a user-defined threshold. The overheat circuitry runs independently from the CPU. Once it detects that the CPU temperature is too high, it will automatically turn on the thermal fan control to prevent any overheat damage to the CPU. The onboard chassis thermal circuitry can monitor the overall system temperature and alert users when the chassis temperature is too high.

- **System Resource Alert**

This feature is available when used with Super Doctor III in the Windows OS environment or used with Super Doctor II in Linux. Super Doctor is used to notify the user of certain system events. For example, you can also configure Super Doctor to provide you with warnings when the system temperature, CPU temperatures, voltages and fan speeds go beyond a pre-defined range.

ACPI Features:

ACPI stands for Advanced Configuration and Power Interface. The ACPI specification defines a flexible and abstract hardware interface that provides a standard way to integrate power management features throughout a PC system, including its hardware, operating system and application software. This enables the system to automatically turn on and off peripherals such as CD-ROMs, network cards, hard disk drives and printers.

In addition to enabling operating system-directed power management, ACPI provides a generic system event mechanism for Plug and Play and an operating system-independent interface for configuration control. ACPI leverages the Plug and Play BIOS data structures while providing a processor architecture-independent implementation that is compatible with both Windows 2000 and Windows 2003 Operating Systems.

- **Slow Blinking LED for Suspend-State Indicator**

When the CPU goes into a suspend state, the chassis power LED and LE1 will start blinking to indicate that the CPU is in suspend mode. When the user presses any key, the CPU will wake-up and the LED will automatically stop blinking and remain on.

- **Main Switch Override Mechanism**

When an ATX power supply is used, the power button may function as a system suspend button, allowing the system to enter a Soft Off state. The monitor will be suspended and the hard drive will spin down. Pressing the power button again to "wake-up" the whole system. During the Soft Off state, the ATX power supply provides power to keep the required circuitry in the system "alive." In case the system malfunctions and you want to turn off the power, just press and hold the power button for 4 seconds. This option can be set in the BIOS Setup utility.

Power Supply:

Wake-up events can be triggered by a device such as the external modem ringing when the system is in the Standby or Off state. Note that external modem ring-on can only be used with an ATX 2.01 (or above) compliant power supply.

The Vig410P can accommodate 24-pin ATX power supplies. Although most power supplies generally meet the specifications required by the CPU, some are inadequate. In addition, the two 12V 8-pin power connections are also required to ensure adequate power supply to the system. Also your power supply must supply 1.5A for the Ethernet ports.

It is strongly recommended that you use a high quality power supply that meets ATX power supply Specification 2.02 or above. It must also be SSI compliant. (For more information, please refer to the web site at http://www.ssiforum.org/). Additionally, in

areas where noisy power transmission is present, you may choose to install a line filter to shield the computer from noise. It is recommended that you also install a power surge protector to help avoid problems caused by power surges.

WARNING!

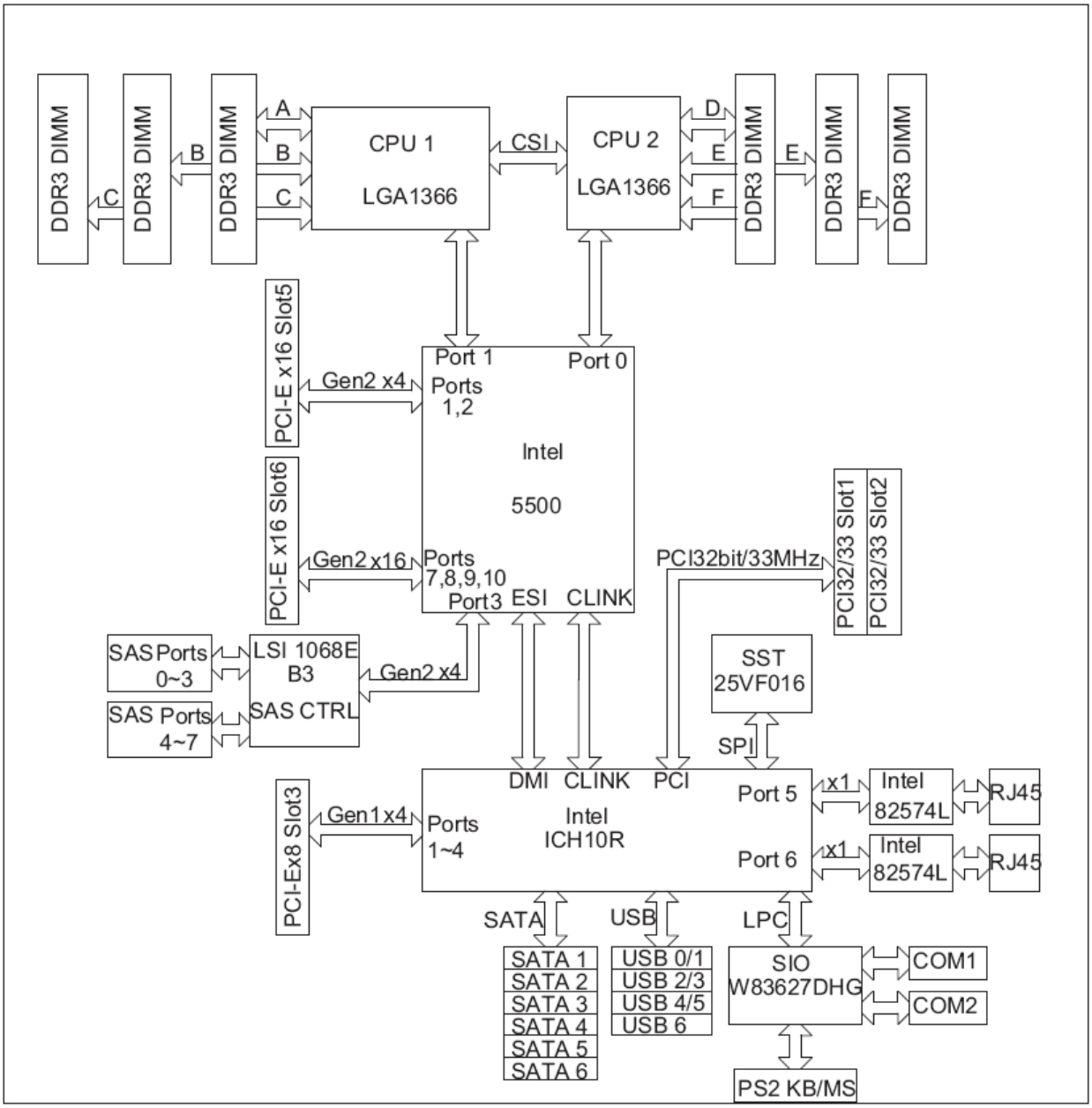
To prevent damage to the power supply or Motherboard, please use a power supply that contains a 24-pin and two 8-pin power connectors. Be sure to connect these connectors to the 24-pin (JPW1) and the two 8-pin (JPW2, JPW3) power connectors on the Motherboard for adequate power supply to your system. Failure in doing so will void the manufacturer warranty on your power supply and Motherboard.

Super I/O:

The wide range of functions integrated onto the Super I/O greatly reduces the number of components required for interfacing with floppy disk drives. It also provides two high-speed, 16550 compatible serial communication ports (UARTs). Each UART includes a 16-byte send/receive FIFO, a programmable baud rate generator, complete modem control capability and a processor interrupt system. Both UARTs provide legacy speed with baud rate of up to 115.2 Kbps as well as an advanced speed with baud rates of 250 K, 500 K, or 1 Mb/s, which support higher speed modems.

The Super I/O provides functions that comply with ACPI (Advanced Configuration and Power Interface), which includes support of legacy and ACPI power management through an SMI or SCI function pin. It also features auto power management to reduce power consumption.

Block Diagram of the Intel 5500 Chipset Platform



Note: This is a general block diagram. Please see the previous Motherboard features pages for details on the features.

Chipset Overview

Built upon the functionality and the capability of the Intel 5500 chipset platform, the Vig410P Motherboard provides the performance required for dual processor- based CAD workstations or graphic-intensive systems. The 5500 chipset consists of the 5500 (LGA 1366) processor, the 5500 (North Bridge), and the South Bridge (ICH10R). With the Intel QuickPath interconnect (QPI) controller built in, the 5500 Series Processor platform is the first dual-processing platform that offers the next generation point-to-point system interconnect interface, replacing the current Front Side Bus Technology that substantially enhances system performance with increased bandwidth and scalability.

The 5500 North Bridge connects to each processor through an independent QPI link. Each link consists of 20 pairs of unidirectional differential lanes for transmission and receiving in addition to a differential forwarded clock. A full-width QPI link pair provides 84 signals. Each processor supports two QPI links, one going to the other processor and the other to the North Bridge.

The 5500 Chipset supports up to 24 PCI Express Gen2 lanes, peer-to-peer read and writes transactions. The ICH10R provides up to six PCI-Express ports, six SATA ports and eight USB connections.

In addition, the 5500 platform also supports a wide range of RAS (Reliability, Availability and Serviceability) features. These features include memory interface ECC, x4/x8 Single Device Data Correction (SDDC), Cyclic Redundancy Check (CRC), parity protection, out-of-band register access via SMBus, memory mirroring, memory sparing, and Hot-plug support on the PCI-Express Interface.

Main Features of the 5500 Series Processor and 5500 Chipset

- Four processor cores in each processor with 8MB shared cache among cores
- Two full-width Intel QuickPath interconnect links, up to 6.4 GT/s of data transfer rate in each direction
- Virtualization Technology, Integrated Management Engine supported
- Point-to-point cache coherent interconnect, Fast/narrow unidirectional links, and Concurrent bi-directional traffic
- Error detection via CRC and Error correction via Link level retry

System Board Components

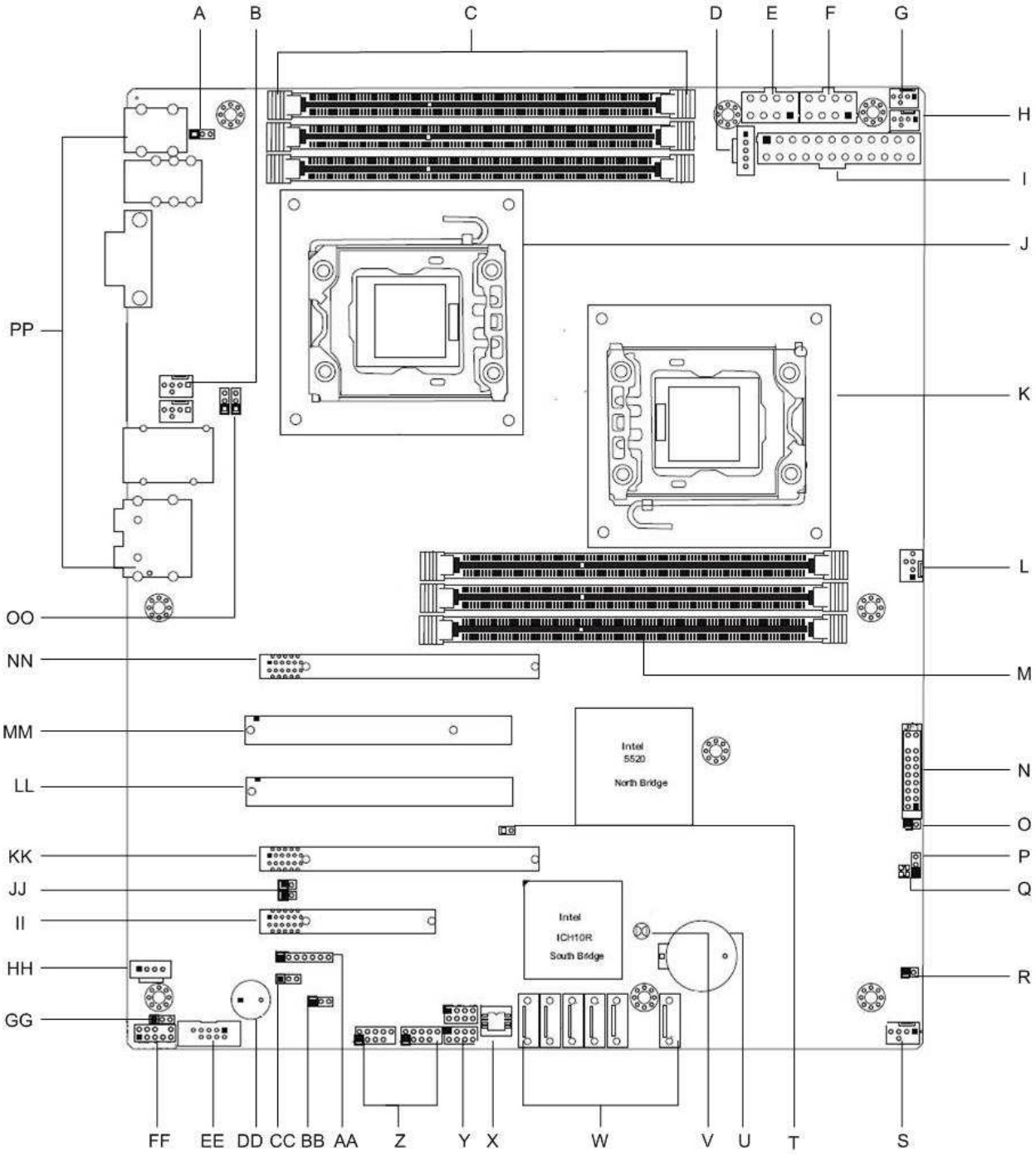


Figure 1: Motherboard Layout & Components

Table 1: Motherboard Connections

Label	Description	Label	Description
A	Back Panel USB Wake-Up	V	Clear CMOS
B	System Fan Connector 5	W	SATA Connectors 0~5
C	CPU 2 DDR3 Memory Sockets	X	BIOS ROM Chip
D	Power Supply SMBbus I^2C Header	Y	Serial General Purpose I/O headers for SATA
E	8pin Processor Power Connector	Z	USB headers
F	8pin Processor Power Connector	AA	PWR LED/Speaker Header
G	CPU2 Fan	BB	Front Access USB Wake-Up
H	CPU1 Fan	CC	Watch Dog
I	Primary 24-pin ATX PWR Connector	DD	Speaker/Internal Buzzer
J	CPU 2 1366 Socket	EE	Serial Port Header
K	CPU 1 1366 Socket	FF	Front Panel Audio Connector
L	System Fan Connector 3	GG	Audio Enable Header
M	CPU 1 DDR3 Memory Sockets	HH	CD-In Connector
N	Front Control Panel Connector	II	PCI-E x4 in x8 Slot
O	Overheat LED Header	JJ	SMB to PCI/PCI-E Slots
P	SAS Enable Header	KK	PCI-E 2.0 x4 in x16 Slot
Q	SAS Heartbeat LED	LL	PCI 33MHz
R	Chassis Intrusion Header	MM	PCI 33MHz
S	System Fan Connector 4	NN	PCI-E x16 Slot
T	Power Force On Jumper	OO	LAN1/2 Enable Header
U	Battery	PP	Rear I/O Connections

Back Panel Connectors

The Motherboard external IO connectors are attached to a metallic I/O shield. This shield serves several purposes:

- It protects the sensitive Motherboard from any external EMC interference.
- It stops the computer from interfering with other electrical devices.
- It allows the Motherboard to be easily upgraded in the future without having to resort to buying a whole new case. Simply change the I/O shield to match the Motherboard.

The I/O shield provides external access to PS/2 keyboard and mouse connectors as well as one serial port, four USB ports, two LAN Port and the audio connectors.

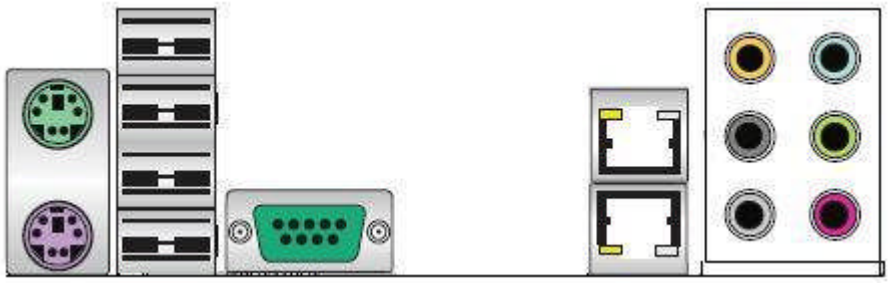


Figure 2: I/O shield

Note: *Power to the computer should be turned off before a keyboard or mouse is connected or disconnected.*

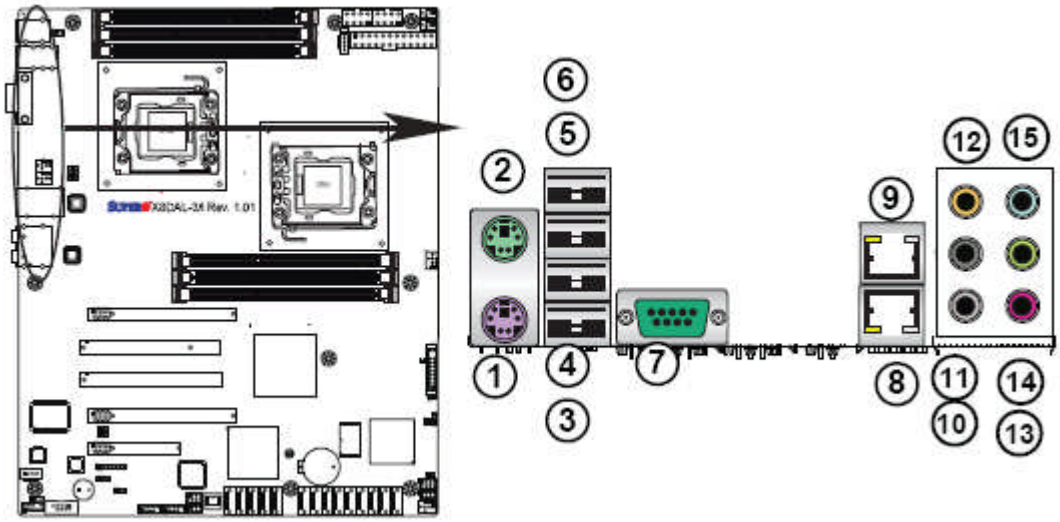


Figure 3: Back Panel Connections

Table 2: Back Panel Connectors

Item	Description	Item	Description
1	PS/2 Keyboard Port (Purple)	9	Gigabit LAN RJ45 1
2	PS/2* Mouse Port (Green)	10	Side Surround (Grey)
3	Back Panel USB 2.0 Port 0	11	Back Surround (Black)
4	Back Panel USB 2.0 Port 1	12	CEN/LFE (Orange)
5	Back Panel USB 2.0 Port 2	13	Microphone-In (Pink)
6	Back Panel USB 2.0 Port 3	14	Front (Green)
7	COM Port 1 (Turquoise)	15	Line-In (Blue)
8	Gigabit LAN RJ45 2		

Note: *The back panel audio out connectors are designed to power headphones or amplified speakers only. Poor audio quality occurs if passive (non-amplified) speakers are connected to these outputs.*

This Motherboard features a 7.1+2 Channel High Definition Audio (HDA) codec that provides 10 DAC channels. The HD Audio connections simultaneously supports multiple- streaming 7.1 sound playback with 2 channels of independent stereo output through the front panel stereo out for front L&R, rear L&R, center and subwoofer speakers. Use the Advanced software included in the CD-ROM with your Motherboard to enable this function.

System Memory

Main Memory

The Motherboard has six DDR3 Dual Inline Memory Module (DIMM) sockets. Support for up to a maximum memory size of 24GB. The BIOS automatically detects memory type, size, and speed.

The Motherboard supports the following memory features:

- Registered ECC or Unbuffered ECC/Non-ECC DDR3 1333 MHz/1066 MHz/800 MHz Memory
- 24 GB maximum total system memory total amount of addressable memory.
- Minimum total system memory: 1GB
- 72bit registered ECC DIMMs

Table 5: DIMM Population Configurations

Memory Population for Optimal Performance -For a motherboard with One CPU (CPU1) installed			
	Branch 0	Branch 1	Branch 2
3 DIMMs	P1 DIMM1A	P1 DIMM2A	P1 DIMM3A

Memory Population for Optimal Performance -For a motherboard with One CPU (CPU2) installed			
	Branch 0	Branch 1	Branch 2
3 DIMMs	P2 DIMM1A	P2 DIMM2A	P2 DIMM3A

Memory Population for Optimal Performance -For a motherboard with Two CPUs installed						
	CPU1			CPU2		
	Branch 0	Branch 1	Branch 2	Branch 0	Branch 1	Branch 2
6 DIMMs	P1-DIMM1A	P1-DIMM2A	P1-DIMM3A	P2-DIMM1A	P2-DIMM2A	P2-DIMM3A

Memory Population Table				
DIMM Slots per Channel	DIMMs Populated per Channel	DIMM Type (Reg.= Registered)	Speeds (in MHz)	Ranks per DIMM (any combination; SR=Single Rank, DR=Dual Rank, QR=Quad Rank)
3	1	Reg. DDR3 ECC	800,1066,1333	SR, DR
3	1	Reg. DDR3 ECC	800,1066,	QR

Notes:

1. *Due to OS limitations, some operating systems may not show more than 4 GB of memory.*
2. *Due to memory allocation to system devices, the amount of memory that remains available for operational use will be reduced when 4 GB of RAM is used. The reduction in memory availability is disproportional. (See the following Table.)*

Table 6: Memory Allocation & Availability

Possible System Memory Allocation & Availability		
System Device	Size	Physical Memory Remaining (-Available) (4 GB Total System Memory)
Firmware Hub flash memory (System BIOS)	1 MB	3.99 GB
Local APIC	4 KB	3.99 GB
Area Reserved for the chipset	2 MB	3.99 GB
I/O APIC (4 Kbytes)	4 KB	3.99 GB
PCI Enumeration Area 1	256 MB	3.76 GB
PCI Express (256 MB)	256 MB	3.51 GB
PCI Enumeration Area 2 (if needed) -Aligned on 256-MB boundary-	512 MB	3.01 GB
VGA Memory	16 MB	2.85 GB
TSEG	1 MB	2.84 GB
Memory available for the OS & other applications		2.84 GB

Chapter 2: System Board Options

- The Vig410P Motherboard is capable of accepting Duo Xeon 5500 (Nehalem) processors. RAM can be upgraded to a maximum of 24GB using DDR3 Registered ECC or Unbuffered ECC/Non-ECC 1333 MHz/1066 MHz/800 MHz Memory

WARNING!

Unplug the system before carrying out the procedures described in this chapter. Failure to disconnect power before you open the system can result in personal injury or equipment damage. Hazardous voltage, current, and energy levels are present in this product. Power switch terminals can have hazardous Voltages present even when the power switch is off.

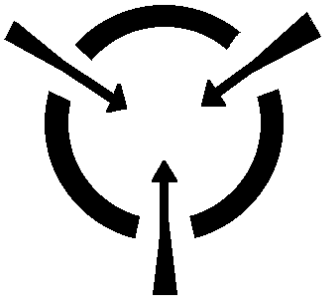
The procedures assume familiarity with the general terminology associated with personal computers and with the safety practices and regulatory compliance required for using and modifying electronic equipment.
Do not operate the system with the cover removed. Always replace the cover before turning on the system.

As the colours of the wires in the mains lead of this computer may not correspond with the coloured markings identifying the terminals in your plug precede as follows:

The wire which is coloured green-and-yellow must be connected to the terminal in the plug which is marked by the letter **E** or by the safety Earth symbol ⏚ or coloured green or green-and-yellow.

The wire which is coloured blue must be connected to the terminal which is marked with the letter **N** or coloured black.

The wire which is coloured brown must be connected to the terminal which is marked with the letter **L** or coloured red.



CAUTION!
The Viglen Vig410P Motherboard and associated components are sensitive electronic devices. A small static shock from your body can cause expensive damage to your equipment.

Make sure you are earthed and free of static charge before you open the computer case. If you are unsure about upgrading your computer, return it to Viglen so a qualified engineer can perform the upgrade.

STEPS TO TAKE TO PREVENT STATIC DISCHARGE:

1. The best way to prevent static discharge is to buy an anti-static strap from your local electrical shop. While you are wearing the strap and it is earthed, static charge will be harmlessly bled to ground.

2. Do not remove the component from its anti-static protective packaging until you are about to install it.

3. Hold boards by the edges – try not to touch components / interface strips etc.

Note: *We recommend that you return your computer to the service department for upgrading. Any work carried out is fully guaranteed. Upgrades should only be carried out by persons who are familiar with handling IC's, as incorrect installation will invalidate the guarantee.*

Overview of Jumper Settings

The Vig410P Motherboard contains the latest technology to offer an almost jumper less configuration. All Xeon CPU's are automatically detected and the Speed is automatically set from the information provided by the CPU.

CAUTION!!

1. ***Never remove jumpers using large pliers as this can damage the pins. The best way to remove a jumper is to use a small pair of tweezers or fine needle-nosed pliers.***

2. ***Do not move the jumper with the power on. Always turn off the power and unplug the power cord from the computer before changing a jumper, taking all necessary anti static precautions***

System Board Jumper Settings

The following figure shows the jumper locations of the Motherboard. Please refer to the following tables describing each jumper's configuration.

Explanation of Jumpers

To modify the operation of the Motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board.

***Note**: On two pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.*

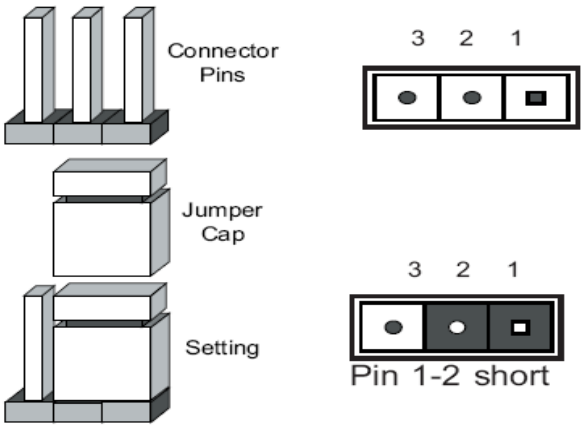


Figure 4: Explanation of jumpers

Motherboard Jumper Settings

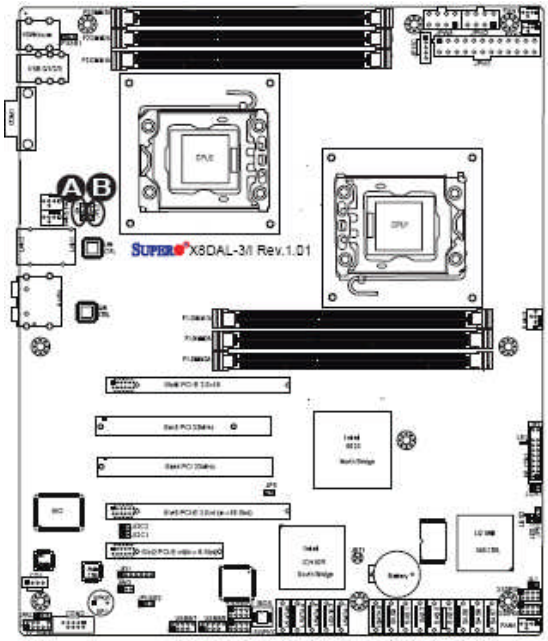
Clear CMOS (JBT1)

JBT1 is used to clear CMOS. Instead of pins this “jumper” consists of contact pads to prevent the accidental clearing of CMOS. To clear CMOS, use a metal object such as a small screwdriver to touch both pads at the same time to short the connection. Always remove the AC power cord from the system before clearing CMOS.

Note: *For an ATX power supply, you must completely shut down the system, remove the AC power cord and then short JBT1 to clear CMOS.*

GLAN Enable/Disable Jumper (JPL1/JPL2)

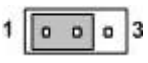
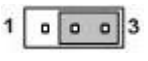
JPL1/JPL2 enables or disables the GLAN Port1/GLAN Port2 on the Motherboard. The default setting is **Enabled.**



A. GLAN Port 1 Enable
B. GLAN Port 2 Enable

Figure 5: GLAN Jumper Location

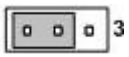
Table 7: GLAN Jumper

Function/Mode	Jumper Setting		Configuration
(Default) Enable	1-2		Enables onboard LAN controller, this may also be controlled via additional BIOS setting.
Disable	2-3		Disables onboard LAN controller. If set to disabled this may not be enabled via additional BIOS setting.

Watch Dog Enable/Disable Jumper (JWD)

JWD controls the Watch Dog function. Watch Dog is a system monitor that can reboot the system when a software application is “hung up”. The table below describes the jumper settings.

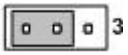
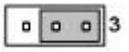
Table 8: Watch Dog Jumper

Function/Mode	Jumper Setting		Configuration
(Default) Reset	1-2		This will cause WD to reset the system if an application is hung up.
NMI	2-3		This will generate a non-maskable interrupt signal for the application that is hung up
Disable	Open		This disables the Watch Dog feature

Audio Enable/Disable Jumper (JPAC)

JPAC enables or disables Audio Controller on the Motherboard. The table below describes the jumper settings.

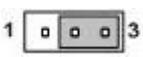
Table 9: Audio Jumper

Function/Mode	Jumper Setting		Configuration
(Default) Enable	1-2		Enables the onboard audio controller
Disable	2-3		Disables the onboard audio controller

I^2C Bus to PCI Slots Jumper (JI^2C1/JI^2C2)

Jumpers JI^2C1/JI^2C2 allows you to connect the System Management Bus (I^2C) to PCI slots. The table below describes the jumper settings.

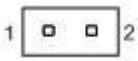
Table 10: I^2C Bus to PCI slots Jumper

Function/Mode	Jumper Setting		Configuration
Enables	Closed		This enables the System Management Bus (I^2C) to PCI slots connection.
(Default) Disable	Open		This disables the System Management Bus (I^2C) to PCI slots connection.

Power Force On Enable/Disable Jumper (JPF)

Jumper JPF allows you to enable or disable the Power Force-On function. The table below describes the jumper settings.

Table 11: Power Force On Enable/Disable Jumper

Function/Mode	Jumper Setting		Configuration
(Default) Disable	Open		This disables the Power Force On function to the systems normal state, the user needs to press the power button to power on the system.
Enable	Closed		This enables the power to always stay on automatically

Front Panel Audio Control Jumper (Front panel audio) (JC1)

When front panel headphones are plugged in, the back panel audio output is disabled. This is done through the FP Audio header (JC1). If the front panel interface card is not connected to the front panel audio header, jumpers should be installed on the header (JC1) pin pairs: 1-2, 5-6, and 9-10. If these jumpers are not installed, the back panel line out connector will be disabled and microphone input Pin 1 will be left floating, which can lead to excessive back panel microphone noise and cross talk. The table below describes the jumper settings.

Table 12: Front Panel Audio Jumpers (Front panel audio)

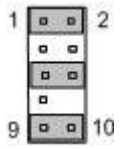
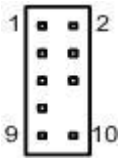
Function/Mode	Jumper Setting		Configuration
(Default)	1-2, 5-6 and 9-10		Allows audio to pass to rear I/O with no front audio cable. The audio line signals are routed back to the line connector.
Front panel audio	Open		Jumpers removed for front panel audio cable. Audio line out and mic in signals are available for front panel audio connectors on this connector when no jumpers are installed.

Table 13: Front panel Audio Connector

Pin	Signal name	Pin	Signal name
1	MIC_IN	2	Ground
3	MIC_BIAS	4	+5V
5	RIGHT_OUT	6	RIGHT_IN
7	Ground	8	Key
9	LEFT_OUT	10	LEFT_IN

Motherboard Connectors

There are connectors on the Motherboard for FAN, Power supply, CD audio, & Front Panel Connectors. The location and/or details of these connections are shown below.

- **Front panel connections**

The following are all connectors situated along the right edge of the Motherboard. They are often connected to buttons and LED's situated on the front panel.

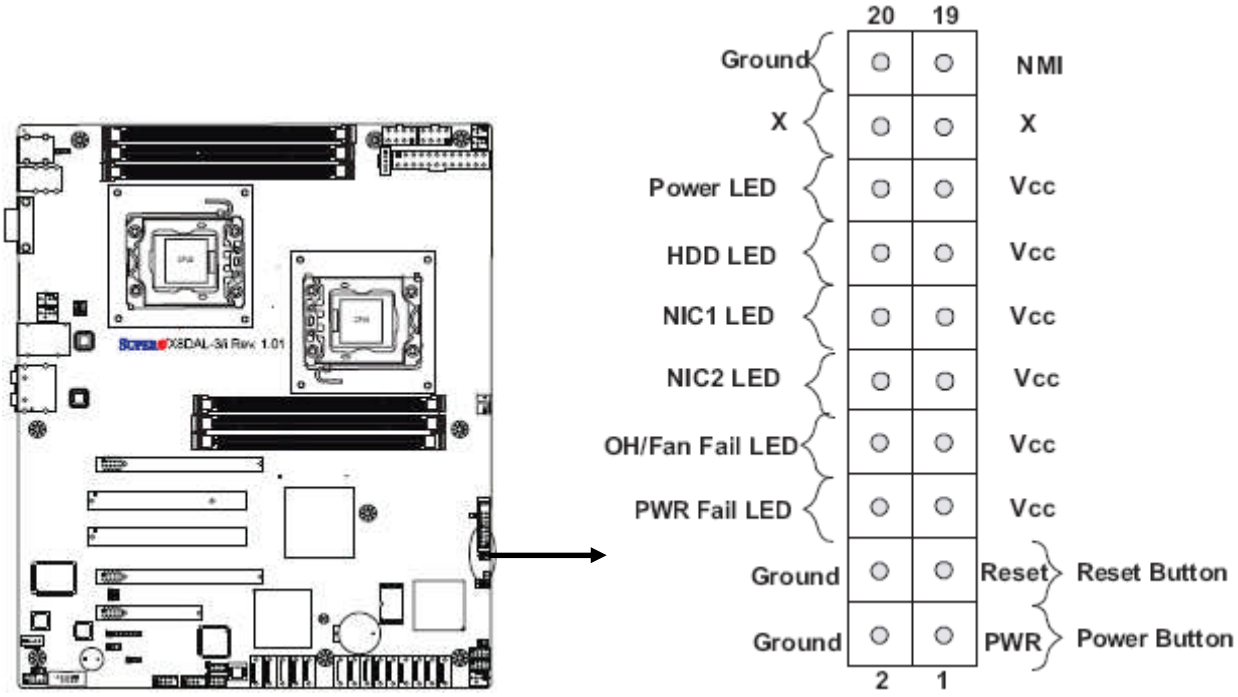


Figure 6: Front panel connections

A- NMI

This non-maskable interrupt

B- Power LED

This 2-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

C- HDD (Hard disk drive) LED

This 2-pin connector is for the HDD activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.

D- NIC1/NIC2 LED Indicators

These connectors are for the network activity LED. Connect the NIC LED cables to this connector. Anytime a network cable is connected to a NIC the LED will light up.

E- Overheat/Fan Fail LED (OH)

This 2-pin connector is for the advanced warning of chassis overheating or fan failure. If the system is overheating the LED will stay on, if a fan fails the LED will flash constantly.

F- Power Fail LED

This 2-pin connector is for the power stability for the system. If systems does not have the required amount of power the LED will light up.

G- Reset Button

This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

H- Power Button

This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

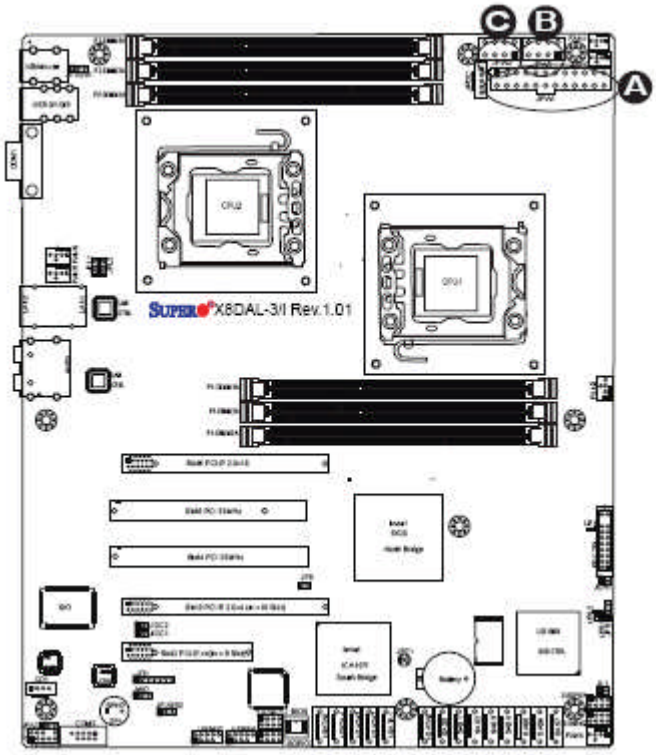
- **Power Connectors**

ATX Power Connector

There is a 24-pin main power supply connector and a 8-pin CPU PWR connector on the Motherboard. These power connectors meet the SSI EPS 12V specification. The 4-pin 12V PWR supply is required to provide adequate power to PCI-Express slots.

Processor Power Connector

In addition to the primary ATX power connector, the 12V 8-pin CPU Power connector must also be connected to the Motherboard.



A- 24-pin ATX power connector
B- 8-pin processor power connector
C- 8-pin processor power connector

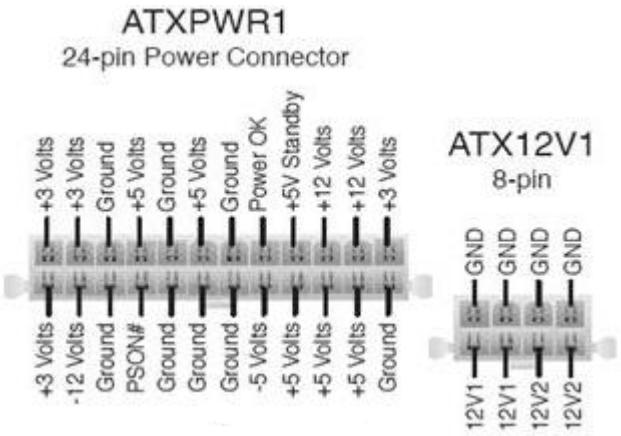


Figure 7: Power Connectors

CAUTION!!

Do not forget to connect the 24+8+8-pin power plugs; otherwise, the system will not boot up.

- **Serial ATA connectors**

These connectors are for the Serial ATA signal cables for Serial ATA hard disk drives.

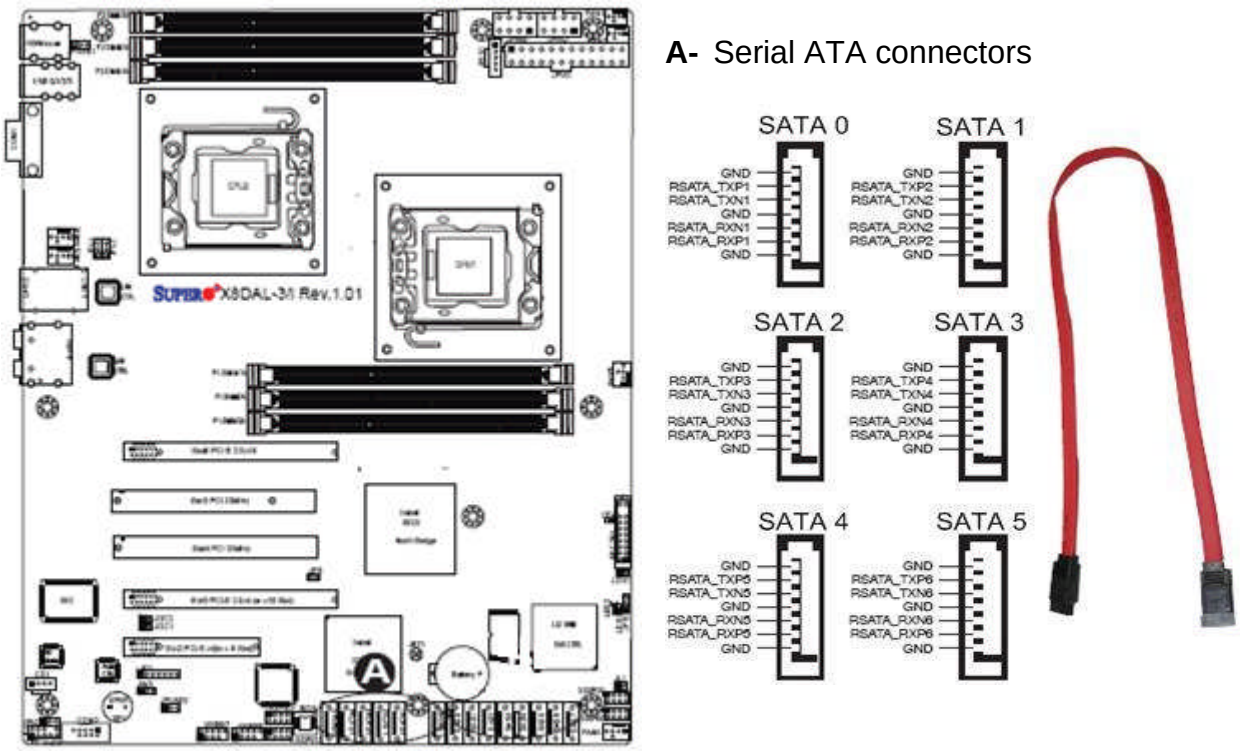


Figure 8: Serial ATA connectors

- **Universal Serial Bus (USB)**

There are two USB 2.0 (Universal Serial Bus) headers on the Motherboard.

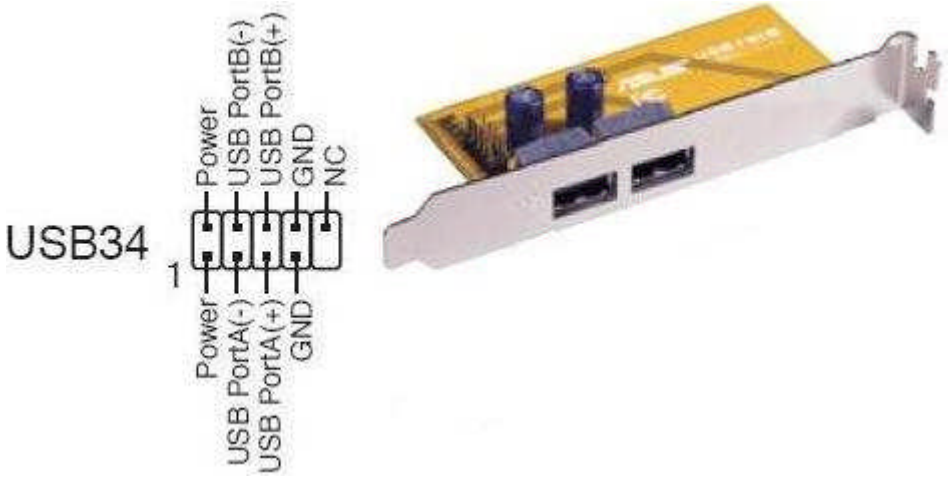


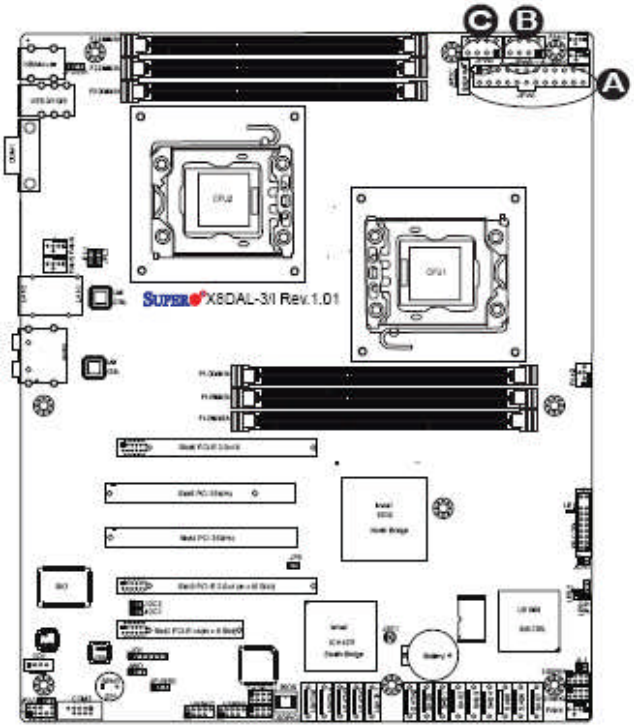
Figure 9: Universal Serial Bus (USB) header

- **Chassis Intrusion**

A Chassis Intrusion header is located at JL1 on the Motherboard. Attach an appropriate cable from the chassis to inform you of a chassis intrusion when the chassis is opened.

- **Fan Connectors**

This Motherboard has four chassis/system fan headers (Fan 3 to Fan6) and two CPU fans (Fan1/Fan2) on the Motherboard. All these 4-pin fans headers are backward compatible with the traditional 3-pin fans. However, fan speed control is available for 4-pin fans only. The fan speeds are controlled by Thermal Management via Hardware Monitoring in the Advanced Setting in the BIOS. (The Default setting is Disabled.) See the table for pin definitions.



A- Fan 1 (CPU2 Fan)
B- Fan 2 (CPU1 Fan)
C- Fan 3
D- Fan 4
E- Fan 5
F- Fan 6
G- Chassis Intrusion

Fan Header Pin Definitions	
Pin#	Definition
1	Ground
2	+12V
3	Tachometer
4	PWR Modulation

Chassis Intrusion Pin Definitions (JL1)	
Pin#	Definition
1	Intrusion Input
2	Ground

Figure 10: Fan connectors

CAUTION!!

Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the Motherboard components. These are not jumpers!! Do not place jumper caps on the fan connectors!!

Note: *All these fan connectors are 4-pin.*

- **Internal Speaker**

The Internal Speaker, located at SP1, can be used to provide audible indications for various beep codes. See the table on the right for pin definitions. Refer to the layout below for the locations of the Internal Buzzer (SP1).

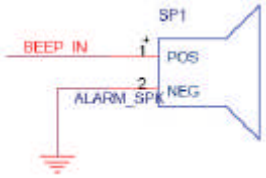
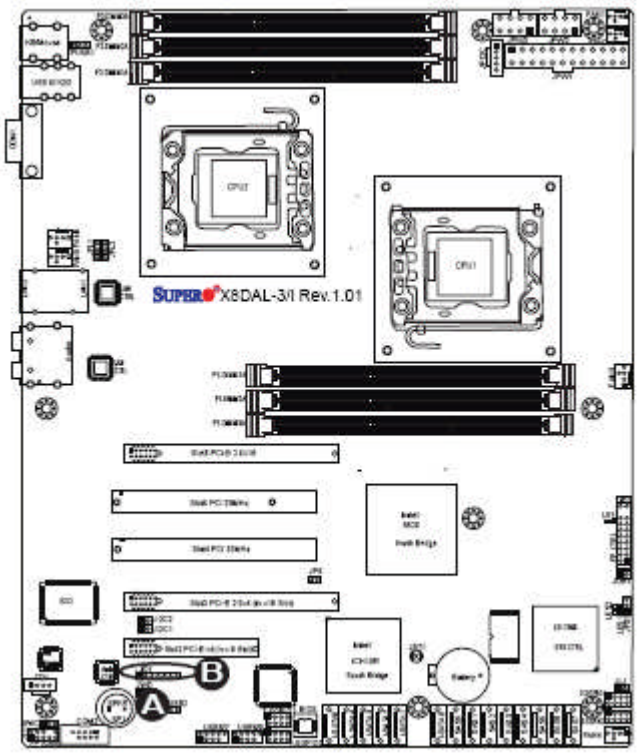


Figure 11: Internal Speaker

- **Power LED/Speaker**

On the JD1 header, pins 1~3 are used for power LED indication, and pins 4-7 are for the speaker. See the tables on the right for pin definitions. If you wish to use the onboard speaker, you should close pins 6~7 with a jumper. Connect a cable to pins 4~7 of JD1 to use an external speaker.



A- Internal Speaker (Buzzer)
B- Power LED/Speaker

Internal Buzzer (SP1) Pin Definition		
Pin#		Definitions
Pin 1	Pos. (+)	Beep In
Pin 2	Neg. (-)	Alarm Speaker

PWR LED Connector Pin Definitions	
Pin Setting	Definition
Pin 1	Anode (+)
Pin2	Cathode (-)
Pin3	NA

Speaker Connector Pin Definitions	
Pin Setting	Definition
Pins 4~7	External Speaker
Pins 6~7	Internal Speaker

Figure 12: Power LED/Speaker connection

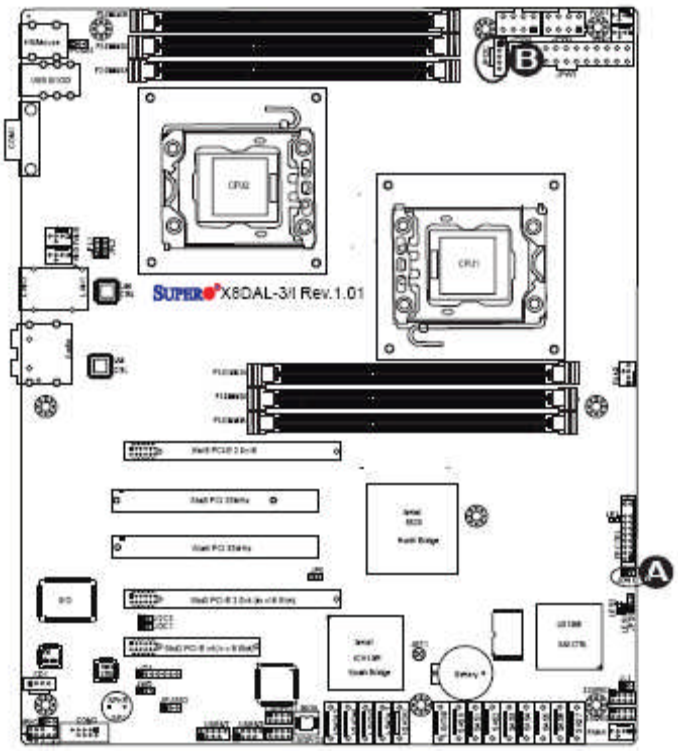
Note: *The speaker connector pins are for use with an external speaker. If you wish to use the onboard speaker, you should close pins 6.7 with a jumper.*

- **Overheat LED/Fan Fail (JOH1)**

The JOH1 header is used to connect an LED indicator to provide warnings of chassis overheating or fan failure. This LED will blink when a fan failure occurs. Refer to the table on right for pin definitions.

- **Power SMB (I^2c) Connector**

Power System Management Bus (I2C) Connector (JPI2C) monitors power supply, fan and system temperatures. See the table on the right for pin definitions.



A- OH LED
B- PWR SMB

Overheat LED Pin Definitions	
Pin#	Definition
1	5vDC
2	OH Active

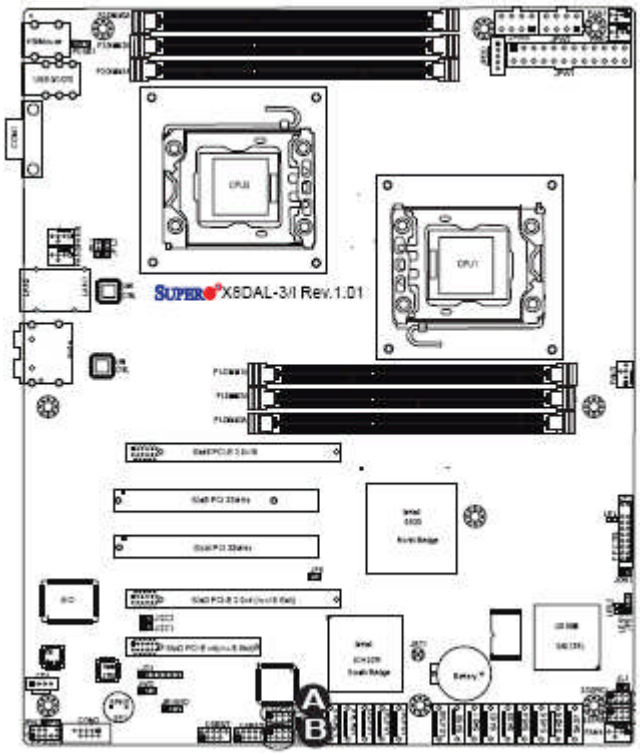
OH/Fan Fail LED Pin Definitions	
State	Message
Solid	Overheat
Blinking	Fan Fail

PWR SMB Pin Definitions	
Pin#	Definition
1	Clock
2	Data
3	PWR Fail
4	Ground
5	+3.3V

Figure 13: Overheat LED/Fan Fail and SMB connectors

- **T-SGPIO Headers**

Two SGPIO (Serial General Purpose Input/Output) headers are located on the Motherboard. These headers are used for SATA monitoring on the backplane. Refer to the board layout below for the locations of the headers.



A- T-SGPIO-1
B- T-SGPIO-2

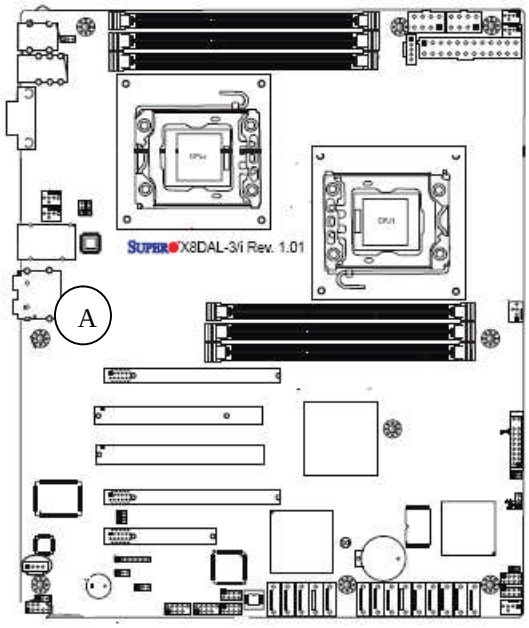
T-SGPIO Pin Definitions			
Pin#	Definition	Pin	Definition
1	NC	2	NC
3	Ground	4	Data
5	Load	6	Ground
7	NC	8	NC

Note: NC= No Connections

Figure 14: Power SMB and SGPIO connectors

- **CD-In Connector**

There is a 4-pin CD header (CD1) on the Motherboard. This header allows you to use the onboard sound for audio CD playback. Connect an audio cable from your CD drive to the CD header that fits your cable's connector.



A- CD-In

CD1 Pin Definition	
Pin#	Definition
1	Left
2	Ground
3	Ground
4	Right

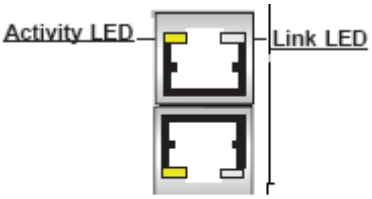
AUX1 Pin Definition	
Pin#	Definition
1	Right
2	Ground
3	Left
4	Ground

Figure 15: CD-In connector

Onboard Indicators

- **GLAN LEDs**

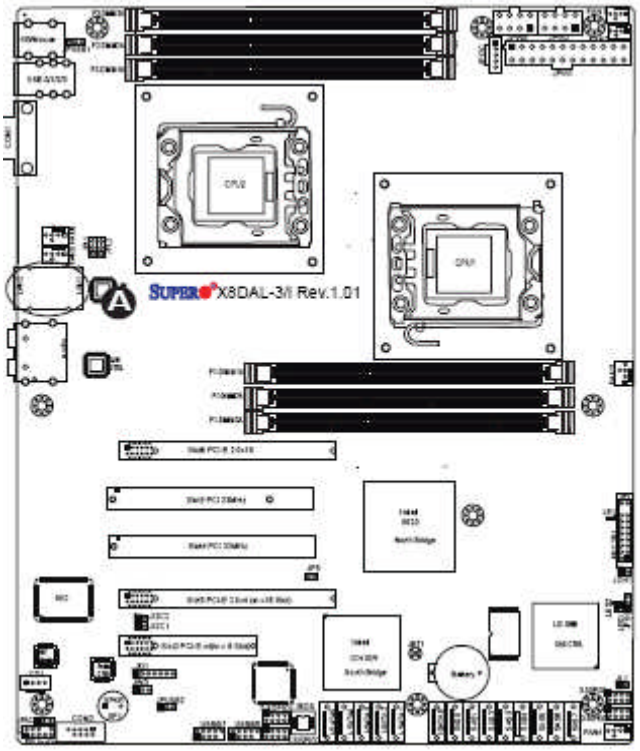
Two LAN ports (LAN 1/LAN 2) are located on the IO Backplane of the Motherboard. Each Ethernet LAN port has two LEDs. The Yellow LED on the right indicates activity, while the Link LED may be green, amber or off to indicate the speed of the connections. See the tables at below for more information.



Rear View (when facing the rear side of the chassis)

LAN 1/LAN 2 Activity LED (Left) LED State		
Color	Status	Definition
Yellow	Flashing	Active

LAN 1/LAN 2 Link LED (Right) LED State	
LED Color	Definition
Off	No Connection or 10 Mbps
Green	100 Mbps
Amber	1 Gbps

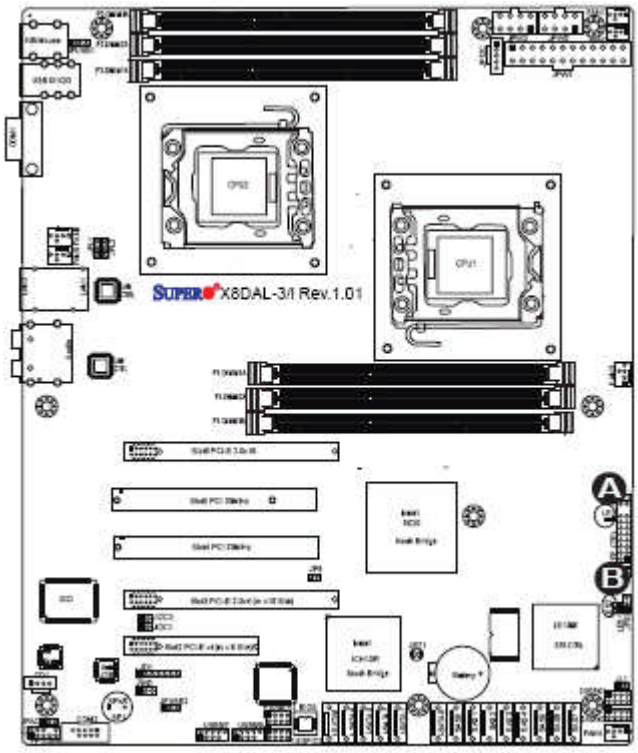


1. LAN1/2 LEDs

Figure 16: GLAN LEDs indicators

- **Onboard Power LED (LE1)**

There is an Onboard Power LED located on the Motherboard. When this LED is lit, the system is on.



A- Onboard Power LED

Onboard PWR LED (LE1) Settings	
LED Color	Definition
Off	System Off (PWR cable not connected)
Green	System Power On

Figure 17: Onboard Power LED indicators

Upgrading the Central Processing Unit (CPU)

The Motherboard comes with a surface mount LGA1366 socket designed for the Intel® Xeon 5500 Dual Core processor

CAUTION!!

When handling the processor package, avoid placing direct pressure on the label area of the fan.

Notes:

1. *Always connect the power cord last and always remove it before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the CPU heatsink.*

2. *Make sure you install the Motherboard into the chassis before you install the CPU heatsink and fan.*

All Intel® Processors together with Level 2 cache chips are housed in a protective package.

The design of the Vig410P computer makes it a simple job to replace or upgrade the processor. To do so please refer to the follow instructions below:

Un-install the Heatsink

1. Remove the lid from the system by lifting the securing latch at the rear of the case

CPU heatsink (Top View) **CPU heatsink (Bottom View)**

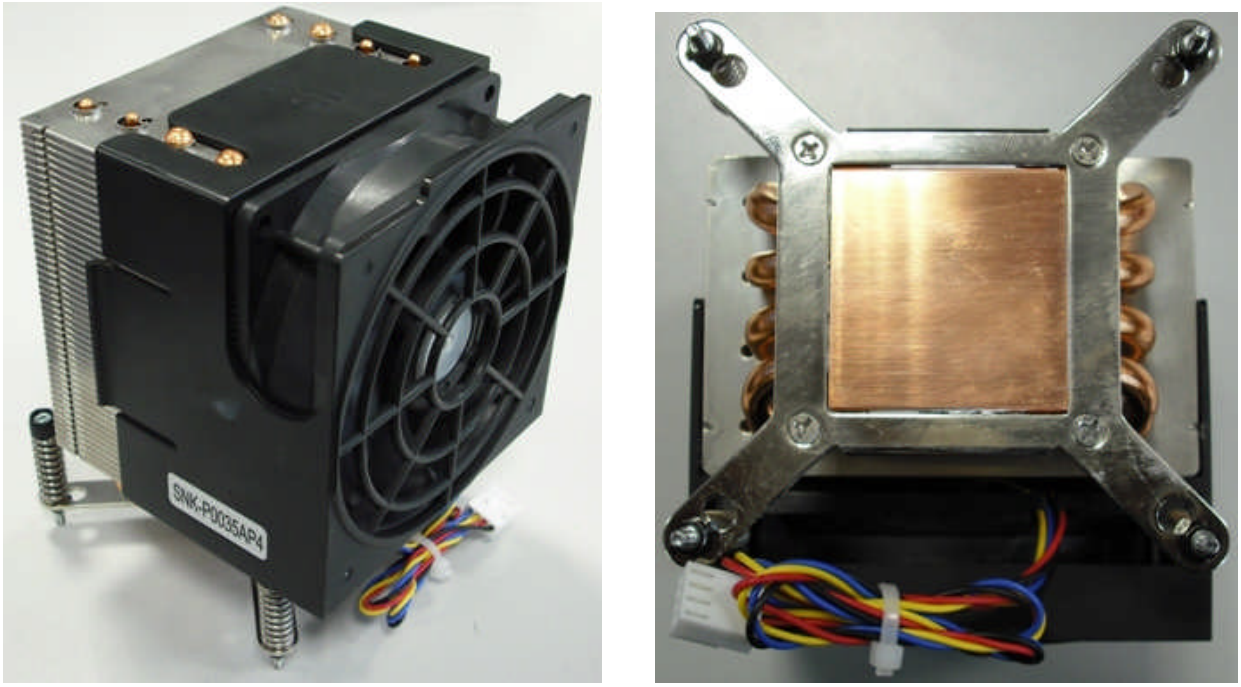


Figure 18: Xeon Active CPU heatsink

2. Unplug the heatsink fan from Motherboard fan connector. Remove the fan from the heatsink by lifting it out of cage.

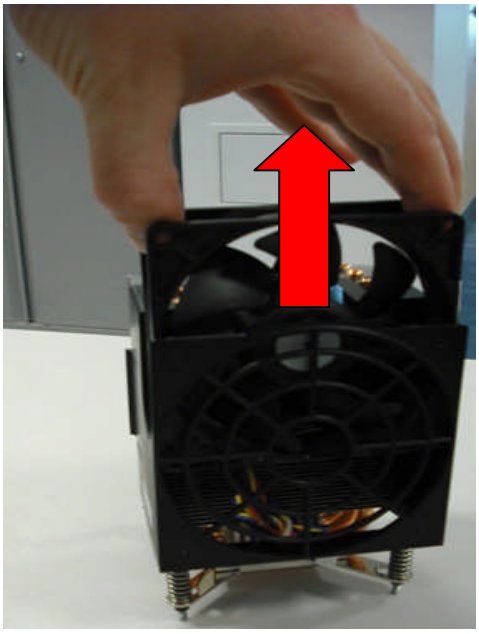


Figure 19: Heatsink Fan Removal

3. Remove the heatsink screws from the Motherboard in the sequence as shown in the picture below.

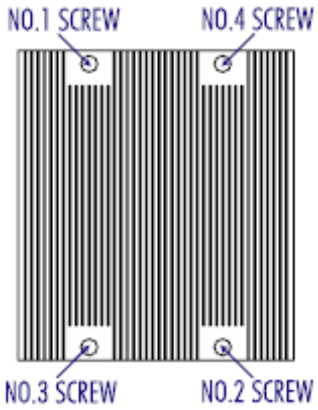


Figure 20: Heatsink screws

4. **Gently** wriggle the heatsink to loosen it from the CPU. (Do not use excessive force when wriggling the heatsink!!).

5. Once the heatsink is loosened, remove the heatsink from the CPU socket.

6. Clean the surface of the CPU and the heatsink to get rid of the old thermal grease. Reapply the proper amount of thermal grease on the surface before you re-install the CPU and the heatsink.

Installing the CPU:

1. Press the socket clip to release the load plate that covers the CPU socket from its locking position.

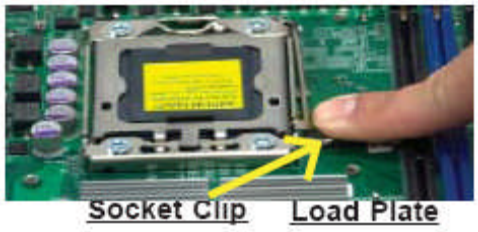


Figure 21: Release load plate

2. Gently lift the socket clip to open the load plate.

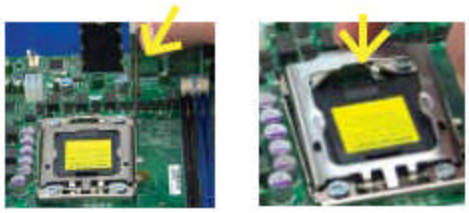


Figure 22: Lift Load Plate

3. Hold the CPU at the north and south edges.

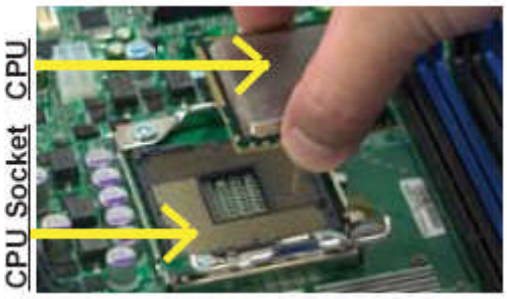


Figure 23: Holding the CPU

4. Align the CPU key, which is the semi-circle cut-out against the socket key, which is the notch below the gold colour dot, on the side of the socket.

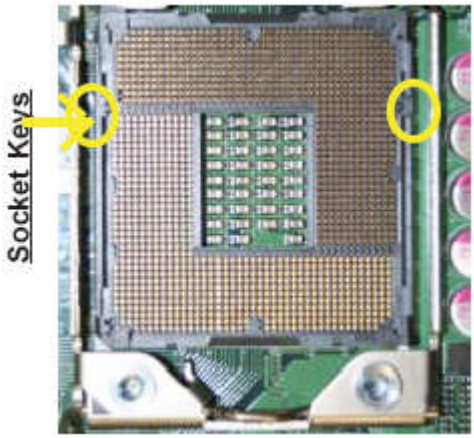


Figure 24: Aligning the CPU

5. When both CPU and the sockets are aligned, carefully lower the CPU straight down into the socket (Do not rub the CPU against the surface of the socket or its pins to avoid damaging the CPU or the socket.)

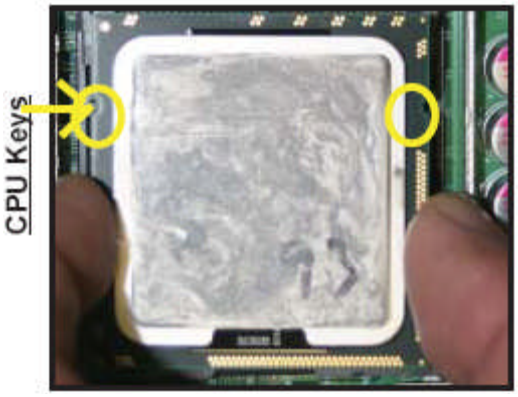


Figure 25: Aligning the CPU

6. With the CPU inside the socket, inspect the four corners of the CPU to make sure that the CPU is properly installed.

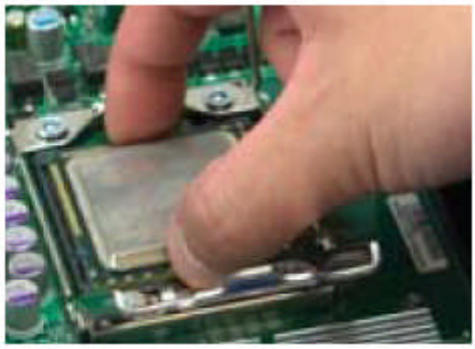


Figure 26: Ensure CPU is Properly Secured

7. Once the CPU is securely seated on the socket, lower the CPU load plate to the socket. Use your thumb to gently push the socket clip down to the clip lock.

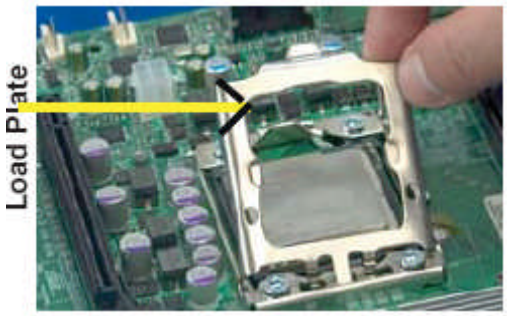


Figure 27: Secure CPU Load Plate

Note: *If one CPU is to be installed it should be installed in socket for CPU1.*

Installing Heatsink

1. Do not apply any thermal grease to the heatsink or the CPU die; if it has already been applied. If Heatsink thermal paste is not already applied to heatsinks this must be done now.

2. Place the heatsink on top of the CPU so that the four mounting holes are aligned with those on the retention mechanism.

3. Screw in two diagonal screws (i.e. the #1 and the #2 screws) until just snug (Do not fully tighten the screws to avoid possible damage to the CPU.)

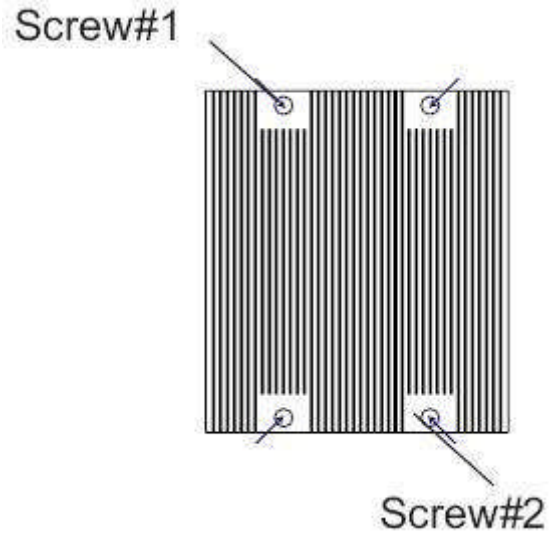


Figure 28: Heatsink diagonal screw locations

4. Finish the installation by fully tightening all four screws.

5. Repeat the steps for the second heatsink if required.

Upgrading the Memory Modules

CAUTION!!

Exercise extreme care when installing or removing DIMM modules to prevent any possible damage. Also note that the memory is interleaved to improve performance!!

To install DIMM:

1. Insert the desired number of DIMMs into the memory slots, starting with P1-DIMM 1A. For best memory performance, please install memory modules of the same type and same speed on the memory slots as indicated on the tables below. (See the Memory Installation Table on page 17.)

2. Insert each DIMM module vertically into its slot. Pay attention to the notch along the bottom of the module to prevent inserting the DIMM module incorrectly.

3. Gently press down on the DIMM module until it snaps into place in the slot. Repeat for all modules.

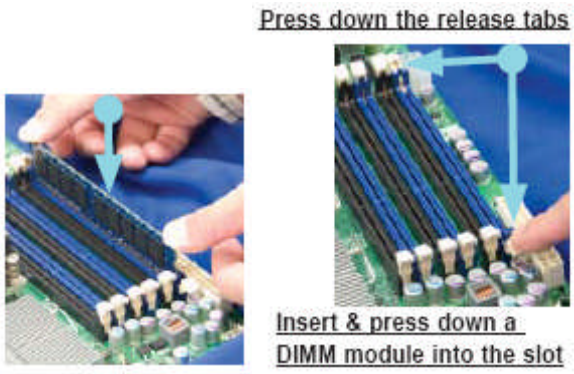


Figure 29: Installing Memory Modules

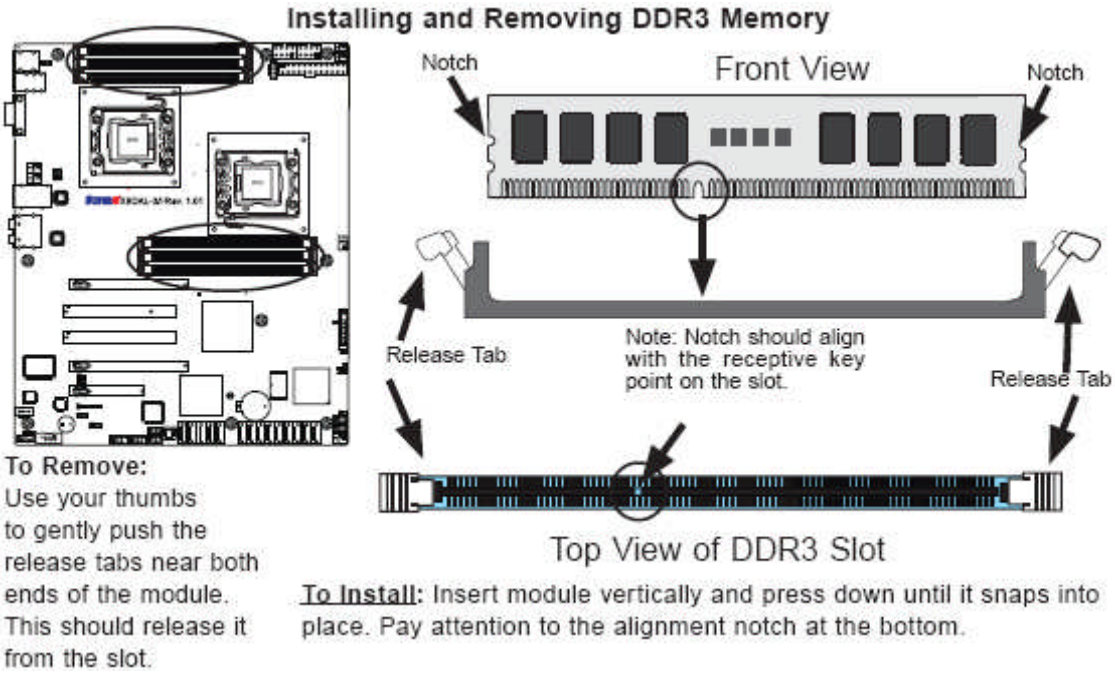


Figure 30: Installing and Removing Memory Modules

To Remove DIMM:

1. Simultaneously press the retaining clips outward to unlock the DIMM

Note: *Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.*

2. Remove the DIMM from the socket

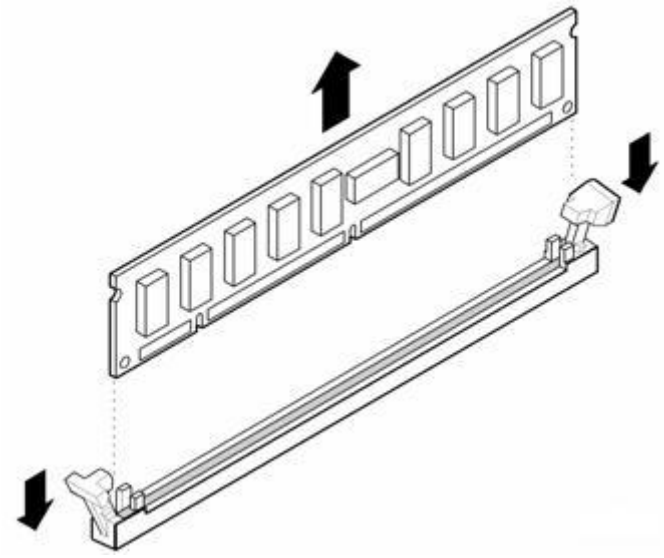


Figure 31: Removing DIMM

Installing an expansion card

To install an expansion card:

1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.

2. Remove the lid from the system by un-screwing the two screws at the rear of the case

2. Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.

3. Align the card connector with the slot and press firmly until the card is completely seated on the slot.

4. Secure the card to the chassis with the screw you removed earlier.

5. Replace the system lid.

Configuring an expansion card

After installing the expansion card, configure the card by adjusting the software settings.

1. Turn on the system and change the necessary BIOS settings, if any.

2. Install the software drivers for the expansion card.

PCI Slots

There are two 64-bit PCI slots on this Motherboard. The slots support PCI cards such as a LAN card, SCSI card, USB card, and other cards that comply with PCI specifications.

Figure 32: Installing a PCI card

PCI Express x16 Slot

This Motherboard supports PCI Express x16 graphic cards that comply with the PCI Express specifications.

Figure 44 shows a graphics card installed on the PCI Express x16 slot.

Figure 33: Install a PCI Express x16 card

Replacing the Clock/CMOS RAM Battery

A lithium battery is installed in a socket on the system board.

The battery has an estimated life expectancy of seven years. When the battery starts to weaken, it loses voltage; when the voltage drops below a certain level, the system settings stored in CMOS RAM (for example, the date and time) may be wrong.

If the battery fails, you will need to replace it with a **CR2032** battery or an equivalent. As long as local ordinance permits, you may dispose of individual batteries as normal rubbish. Do not expose batteries to excessive heat or any naked flame. Keep all batteries away from children.

CAUTION!!

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

The battery is listed as board component 'K' on the diagram on Figure 1.

To replace the battery, carry out the following:

1. Observe the precautions in "Before You Begin."
2. Turn off all peripheral devices connected to the system.
3. Turn off the system.
4. Remove any components that are blocking access to the battery.
5. Figure 1 shows the battery location. Gently pry the battery free from its socket, taking care to note the "+" and "-" orientation of the battery (Figure 45).
6. Install the new battery in the socket.

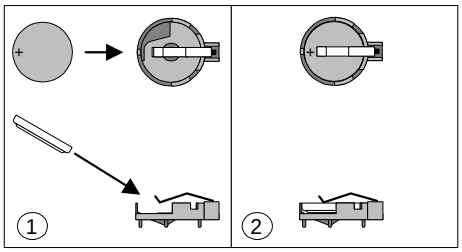


Figure 34: Removing the Battery

Chapter 3: Solving Problems

The first part of this chapter helps you identify and solve problems that might occur when the system is in use. The second part lists error code messages that might be displayed.

Please remember that if you cannot solve the problem by yourself then you should contact Viglen's Technical Support team for further assistance.

Viglen Technical Support can be reached in the following ways:

Telephone: 01727 201 850
Fax: 01727 201 858
Email: techsupport@viglen.co.uk

You can also look for support information on our web site:

http://www.viglen.co.uk

Device drivers and various useful utilities can be downloaded from our ftp site:

ftp://ftp.viglen.co.uk

Resetting the System

Before checking your system for hardware problems, it is always a good idea to try resetting your computer and see if a re-boot can solve the problem. Most software related problems can be solved simply by re-booting your PC.

Table 14: Resetting the System

To do the following	**Press**
Soft boot: Clear the system memory and reload the operating system (also called warm reset).	<Ctrl + Alt + Del>
Cold boot: Clear the system memory, halt power to all peripherals, restart POST, and reload the operating system.	Power off/on or reset button (at front of the system)

Troubleshooting Procedures

This section provides a step-by-step troubleshooting procedure to identify a problem and locate its source.

CAUTION!!

1. ***Turn off the system and any peripheral devices before you disconnect any peripheral cables from the system. Otherwise, you can permanently damage the system or the peripheral devices.***

2. ***Make sure the system is plugged into a properly grounded power outlet.***

3. ***Make sure your keyboard and video display are correctly connected to the system. Turn on the video display, and turn up its brightness and contrast controls to at least two-thirds of the maximum (refer to the documentation supplied with the video display).***

4. ***If the operating system normally loads from the hard disk drive, make sure there is no diskette in the diskette drive. If the operating system normally loads from a diskette, insert the operating system diskette into the drive.***

5. ***Turn on the system. If the power indicator does not light, but the system seems to be operating normally, the indicator is probably defective. Monitor the power-on self test (POST) execution. Each time you turn on the system, the POST checks the system board, memory, keyboard, and certain peripheral devices.***

Note: *If the POST does not detect any errors, the system beeps once and boots up.*

Errors that do not prevent the boot process (non-fatal errors) display a message that looks similar to the following:

Error Message Line 1
Error Message Line 2
Press <F1> for Set-up, <F2> to Boot
You can note the error and press <F2> to resume the boot- up process, or <F1> to enter Set-up.

Errors that prevent the boot process from continuing (fatal errors), are communicated by a series of audible beeps. If this type of error occurs, refer to the error codes and messages listed at the end of this chapter.

6. ***Confirm that the operating system has loaded.***

Problems Operating Add-in Boards

Problems related to add-in boards are usually related to improper board installation or interrupt and address conflicts. Go through the checklist below to see if you can correct the problem. If the problem persists after you have checked and corrected all of these items, contact the board vendor's customer service representative.

Did you install the add-in board according to the manufacturer's instructions?
Check the documentation that came with the board. Are all cables installed properly?

The following items are suggestions for troubleshooting problems related to PCI/ISA legacy (non-Plug and Play) add-in boards.

- If the PCI/ISA board uses an interrupt, run Set-up and set the interrupt that is being used by the PCI/ISA board to Used by PCI/ISA Card. Please refer to the BIOS manual for details of how to do this.

- If the PCI/ISA legacy board uses memory space between 80000H - 9FFFFH, run Set-up and set conventional memory to 256 K.

- If the PCI/ISA legacy board uses shared memory between C8000H - DFFFH, run Set-up and enable shared memory for the appropriate memory space.

No Power

1. Make sure that there are no short circuits between the Motherboard and the chassis.
2. Make sure that all jumpers are set to their default positions.
3. Check that the 115V/230V switch on the power supply is properly set.
4. Turn the power switch on and off to test the system.
5. The battery on your Motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.

No Video

1. If the power is on but you have no video, remove all the add-on cards and cables.
2. Use the speaker to determine if any beep codes exist. Refer to the page 56 for details on beep codes.

Losing the System's Setup Configuration

1. Make sure that you are using a high quality power supply. A poor quality power supply may cause the system to lose the CMOS setup information.
2. The battery on your Motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.
3. If the above steps do not fix the Setup Configuration problem, contact technical support

Memory Errors

When a No_Memory_Beep_Code is issued by the system, check the following:

1. Make sure that the DIMM modules are properly and fully installed.
2. Check if different speeds of DIMMs have been installed and check if the BIOS setup is configured for the fastest speed of RAM used. (It is recommended to use the same RAM speed for all DIMMs in the system.)
3. Make sure you are using the correct type of DDR3 Registered ECC or Unbuffered ECC/Non-ECC 1333 MHz/1066 MHz SDRAM (recommended by the manufacturer.)
4. Check for bad DIMM modules or slots by swapping a single module between all memory slots and check the results.
5. Make sure that all memory modules are fully seated in their slots. Make sure to follow the instructions given on DIMM population on page 17 Check the position of the 115V/230V switch on the power supply.
6. Please follow the instructions given in the DIMM Population Tables listed on page 17to install your memory modules.

Problems and Suggestions

Table 15: Problems and Suggestions

What happens	What to do
Application software problems	Try resetting the system. Make sure all cables are installed correctly. Verify that the system board jumpers are set properly. Verify that your system hardware configuration is set correctly. In Setup, check the values against the system settings you recorded previously. If an error is evident (wrong type of drive specified, for example), make the change in Setup and reboot the system. Record your change. Make sure the software is properly configured for the system. Refer to the software documentation for information. Try a different copy of the software to see if the problem is with the copy you are using. If other software runs correctly on the system, contact the vendor of the software that fails. If you check all of the above with no success, try clearing CMOS RAM and reconfiguring the system. Make sure you have your list of system settings available to re-enter, because clearing CMOS RAM sets the options to their default values.
Characters on-screen are distorted or incorrect	Make sure the brightness and contrast controls are properly adjusted on the monitor. Make sure the video signal cable and power cables are properly installed. Make sure your monitor is compatible with the video mode you have selected.
Characters do not appear on screen	Make sure the video display is plugged in and turned on. Check that the brightness and contrast controls are properly adjusted. Check that the video signal cable is properly installed. Make sure a video board is installed, enabled, and the jumpers are positioned correctly. Reboot the system.
CMOS RAM settings are wrong	If system settings stored in CMOS RAM change for no apparent reason (for example, the time of day develops an error), the backup battery may no longer have enough power to maintain the settings. Replace the battery (Chapter 2).
Diskette drive light does not go on when drive is in use or is tested by POST	Make sure the power and signal cables for the drive are properly installed. Check that the drive is properly configured and enabled in Setup.

Table 16: Problems and Suggestions **(Continued)**

What happens	What to do
Hard drive light does not go on when drive is in use or is tested by POST	Make sure the power and signal cables for the drive are properly installed. Make sure the front panel connector is securely attached to the system board headers. Check that the drive is properly configured and enabled in Setup. Check the drive manufacturer's manual for proper configuration for remote hard disk drive activity.
Power-on light does not go on	If the system is operating normally, check the connector between the system board and the front panel. If OK, the light may be defective.
Prompt doesn't appear after system boots	It's probably switched off. A serious fault may have occurred consult your dealer service department / Technical Support.
Setup, can't enter	If you can't enter Setup to make changes, check the switch that disables entry into Setup (Chapter 2). If the switch is set to allow entry into Setup, you might need to clear CMOS RAM to the default values and reconfigure the system in Setup.
System halts before completing POST	This indicates a fatal system error that requires immediate service attention. Note the screen display and write down any beep code emitted. Provide this information to your dealer service department / Technical Support.

Error and Information Messages

BIOS POST Messages

During the Power-On Self-Test (POST), the BIOS will check for problems. If a problem is found, the BIOS will activate an alarm or display a message. The following is a list of such BIOS messages.

Failure Fixed Disk
Fixed disk is not working or not configured properly. Check to see if fixed disk is attached properly. Run Setup. Find out if the fixed-disk type is correctly identified.

Stuck key
Stuck key on keyboard.

Keyboard error
Keyboard not working.

Keyboard Controller Failed
Keyboard controller failed test. May require replacing keyboard controller.

Keyboard locked - Unlock key switch
Unlock the system to proceed.

Monitor type does not match CMOS - Run SETUP
Monitor type not correctly identified in Setup

Shadow Ram Failed at offset: nnnn
Shadow RAM failed at offset **nnnn** of the 64k block at which the error was detected.

System RAM Failed at offset: nnnn
System RAM failed at offset **nnnn** of in the 64k block at which the error was detected.

Extended RAM Failed at offset: nnnn
Extended memory not working or not configured properly at offset **nnnn.**

System battery is dead - Replace and run SETUP
The CMOS clock battery indicator shows the battery is dead. Replace the battery and run Setup to reconfigure the system.

System CMOS checksum bad - Default configuration used
System CMOS has been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. The BIOS installed Default Setup Values. If you do not want these values, enter Setup and enter your own values. If the error persists, check the system battery or contact your dealer.

System timer error
The timer test failed. Requires repair of system board.

Real time clock error
Real-Time Clock fails BIOS hardware test. May require board repair.

Check date and time settings
BIOS found date or time out of range and reset the Real-Time Clock. May require setting legal date (1991-2099).

Previous boot incomplete - Default configuration used
Previous POST did not complete successfully. POST loads default values and offers to run Setup. If the failure was caused by incorrect values and they are not corrected, the next boot will likely fail. On systems with control of **wait states**, improper Setup settings can also terminate POST and cause this error on the next boot. Run Setup and verify that the wait state configuration is correct. This error is cleared the next time the system is booted.

Memory Size found by POST differed from CMOS
Memory size found by POST differed from CMOS.

Diskette drive A error
Drive A: is present but fails the BIOS POST diskette tests. Check to see that the drive is defined with the proper diskette type in Setup and that the diskette drive is attached correctly.

Incorrect Drive A type - run SETUP
Type of floppy drive A: not correctly identified in Setup.

System cache error - Cache disabled
RAM cache failed and BIOS disabled the cache. On older boards, check the cache jumpers. You may have to replace the cache. See your dealer. A disabled cache slows system performance considerably.

CPU ID:
CPU socket number for Multi-Processor error.

EISA CMOS not writeable
ServerBIOS2 test error: Cannot write to EISA CMOS.

DMA Test Failed
ServerBIOS2 test error: Cannot write to extended **DMA** (Direct Memory Access) registers.

Software NMI Failed
ServerBIOS2 test error: Cannot generate software NMI (Non-Maskable Interrupt).

Fail-Safe Timer NMI Failed
Server BIOS2 test error: Fail-Safe Timer takes too long.

Device Address Conflict
Address conflict for specified **device.**

Allocation Error for: device
Run ISA or EISA Configuration Utility to resolve resource conflict for the specified **device**.

CD ROM Drive
CD ROM Drive identified.

Entering SETUP ...
Starting Setup program

Failing Bits: nnnn
The hex number **nnnn** is a map of the bits at the RAM address which failed the memory test. Each 1 (one) in the map indicates a failed bit. See errors 230, 231, or 232 above for offset address of the failure in System, Extended, or Shadow memory.

Fixed Disk n
Fixed disk **n** (0-3) identified.

Invalid System Configuration Data
Problem with NVRAM (CMOS) data.

I/O device IRQ conflict
I/O device IRQ conflict error.

PS/2 Mouse Boot Summary Screen:
PS/2 Mouse installed.

nnnn kB Extended RAM Passed
Where **nnnn** is the amount of RAM in kilobytes successfully tested.

nnnn Cache SRAM Passed
Where **nnnn** is the amount of system cache in kilobytes successfully tested.

nnnn kB Shadow RAM Passed
Where **nnnn** is the amount of shadow RAM in kilobytes successfully tested.

nnnn kB System RAM Passed
Where **nnnn** is the amount of system RAM in kilobytes successfully tested.

One or more I2O Block Storage Devices were excluded from the Setup Boot Menu
There was not enough room in the IPL table to display all installed I2O block-storage devices.

Operating system not found
Operating system cannot be located on either drive A: or drive C: Enter Setup and see if fixed disk and drive A: are properly identified.

Parity Check 1 nnnn
Parity error found in the system bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays **????.** Parity is a method for checking errors in binary data. A parity error indicates that some data has been corrupted.

Parity Check 2 nnnn
Parity error found in the I/O bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays **????.**

Press <F1> to resume, <F2> to Setup, <F3> for previous
Displayed after any recoverable error message. Press <F1> to start the boot process or <F2> to enter Setup and change the settings. Press <F3> to display the previous screen (usually an initialization error of an **Option ROM**, i.e., an add-on card). Write down and follow the information shown on the screen.

Press <F2> to enter Setup
Optional message displayed during POST. Can be turned off in Setup.

PS/2 Mouse:
PS/2 mouse identified.

Run the I2O Configuration Utility
One or more unclaimed block storage devices have the Configuration Request bit set in the LCT. Run an I2O Configuration Utility (e.g. the SAC utility).

System BIOS shadowed
System BIOS copied to shadow RAM.

UMB upper limit segment address: *nnnn*
Displays the address ***nnnn*** of the upper limit of **Upper Memory Blocks**, indicating released segments of the BIOS which can be reclaimed by a virtual memory manager.

Video BIOS shadowed
Video BIOS successfully copied to shadow RAM.

BIOS POST Codes

This section lists the POST (Power On Self Test) codes for the Phoenix BIOS. POST codes are divided into two categories: recoverable and terminal.

Non-fatal errors are those which, in most cases, allow the system to continue the boot-up process. The error messages normally appear on the screen.

Fatal errors are those which will not allow the system to continue the boot-up procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps. The numbers on the fatal error list correspond to the number of beeps for the corresponding error.

BIOS Error Beep Codes

BIOS Error Beep Codes		
Beep Code	**Error Message**	**Description**
1 beep	Refresh	Circuits have been reset. (Ready to power up)
5 short beeps + 1 long beep	Memory error	No memory detected in the system
8 beeps	Display memory read/write error	Video adapter missing or with faulty memory
1 continuous beep w/ Front Panel OH LED on	System Overheat	1 continuous beep with the front panel OH LED on

Table 35: BIOS Error Beep Codes

Terminal POST Errors

If a terminal type of error occurs, BIOS will shut down the system. Before doing so, BIOS will write the error to port 80h, attempt to initialize video and write the error in the top left corner of the screen. The following is a list of codes that may be written to port 80h.

Table 17: POST code description

POST Code	Description
01h	IPMI Initialization
02h	Verify Real Mode
03h	Disable Non-Maskable Interrupt (NMI)
04h	Get CPU type
06h	Initialize system hardware
07h	Disable shadow and execute code from the ROM.
08h	Initialize chipset with initial POST values
09h	Set IN POST flag
0Ah	Initialize CPU registers
0Bh	Enable CPU cache
0Ch	Initialize caches to initial POST values
0Eh	Initialize I/O component
0Fh	Initialize the local bus IDE
10h	Initialize Power Management
11h	Load alternate registers with initial POST values
12h	Restore CPU control word during warm boot
13h	Reset PCI Bus Mastering devices
14h	Initialize keyboard controller
16h	1-2-2-3 BIOS ROM checksum
17h	Initialize cache before memory Auto size
18h	8254 timer initialization
1Ah	8237 DMA controller initialization
1Ch	Reset Programmable Interrupt Controller
20h	1-3-1-1 Test DRAM refresh

Table 18: POST code description **(Continued)**

POST Code	Description
18h	8254 timer initialization
1Ah	8237 DMA controller initialization
1Ch	Reset Programmable Interrupt Controller
20h	1-3-1-1 Test DRAM refresh
22h	1-3-1-3 Test 8742 Keyboard Controller
24h	Set ES segment register to 4 GB
28h	Auto size DRAM
29h	Initialize POST Memory Manager
2Ah	Clear 512 kB base RAM
2Ch	1-3-4-1 RAM failure on address line xxxx*
2Eh	1-3-4-3 RAM failure on data bits xxxx* of low byte of memory bus
2Fh	Enable cache before system BIOS shadow
32h	Test CPU bus-clock frequency
33h	Initialize Phoenix Dispatch Manager
36h	Warm start shut down
38h	Shadow system BIOS ROM
3Ah	Auto size cache
3Ch	Advanced configuration of chipset registers
3Dh	Load alternate registers with CMOS values
41h	Initialize extended memory for RomPilot (optional)
42h	Initialize interrupt vectors
45h	POST device initialization
46h	2-1-2-3 Check ROM copyright notice
48h	Check video configuration against CMOS
49h	Initialize PCI bus and devices
4Ah	Initialize all video adapters in system
4Bh	QuietBoot start (optional)
4Ch	Shadow video BIOS ROM
4Eh	Display BIOS copyright notice
4Fh	Initialize MultiBoot
50h	Display CPU type and speed
51h	Initialize EISA board (optional)
52h	Test keyboard
54h	Set key click if enabled
55h	Enable USB devices
58h	2-2-3-1 Test for unexpected interrupts
59h	Initialize POST display service
5Ah	Display prompt “Press <ESC> to enter SETUP”
5Bh	Disable CPU cache

Table 19: POST code description **(Continued)**

POST Code	Description
5Ch	Test RAM between 512 and 640 kB
60h	Test extended memory
62h	Test extended memory address lines
64h	Jump to UserPatch1
66h	Configure advanced cache registers
67h	Initialize Multi Processor APIC
68h	Enable external and CPU caches
69h	Setup System Management Mode (SMM) area
6Ah	Display external L2 cache size
6Bh	Load custom defaults (optional)
6Ch	Display shadow-area message
70h	Display error messages
72h	Check for configuration errors
76h	Check for keyboard errors
7Ch	Set up hardware interrupt vectors
7Dh	Initialize Intelligent System Monitoring (optional)
7Eh	Initialize coprocessor if present
80h	Disable onboard Super I/O ports and IRQs (optional)
81h	Late POST device initialization
82h	Detect and install external RS232 ports
83h	Configure non-MCD IDE controllers
84h	Detect and install external parallel ports
85h	Initialize PC-compatible PnP ISA devices
86h	Re-initialize onboard I/O ports.
87h	Configure Motherboard Configurable Devices (optional)
88h	Initialize BIOS Data Area
89h	Enable Non-Maskable Interrupts (NMIs)
8Ah	Initialize Extended BIOS Data Area
8Bh	Test and initialize PS/2 mouse
8Ch	Initialize floppy controller
8Fh	Determine number of ATA drives (optional)
90h	Initialize hard-disk controllers
91h	Initialize local-bus hard-disk controllers
92h	Jump to UserPatch2
93h	Build MPTABLE for multi-processor boards
95h	Install CD ROM for boot
96h	Clear huge ES segment register
97h	Fix up Multi Processor table

Table 20: POST code description **(Continued)**

POST Code	Description
98h	1-2 Search for option ROMs and shadow if successful. One long, two short beeps on checksum failure
99h	Check for SMART Drive (optional)
9Ch	Set up Power Management
9Dh	Initialize security engine (optional)
9Eh	Enable hardware interrupts
9Fh	Determine number of ATA and SCSI drives
A0h	Set time of day
A2h	Check key lock
A4h	Initialize typematic rate
A8h	Erase <ESC> prompt
AAh	Scan for <ESC> key stroke
ACh	Enter SETUP
AEh	Clear Boot flag
B0h	Check for errors
B1h	Inform RomPilot about the end of POST (optional)
B2h	POST done - prepare to boot operating system
B4h	1 One short beep before boot
B5h	Terminate QuietBoot (optional)
B6h	Check password (optional)
B7h	Initialize ACPI BIOS and PPM Structures
B9h	Prepare Boot
BAh	Initialize SMBIOS
BCh	Clear parity checkers
BDh	Display MultiBoot menu
BEh	Clear screen (optional)
BFh	Check virus and backup reminders
C0h	Try to boot with INT 19
C1h	Initialize POST Error Manager (PEM)
C2h	Initialize error logging
C3h	Initialize error display function
C4h	Initialize system error flags
C6h	Console redirection init.
C7h	Unhook INT 10h if console redirection enabled
C8h	Force check (optional)
C9h	Extended ROM checksum (optional)
CDh	Reclaim console redirection vector
D2h	Unknown interrupt
D4h	Check Intel Branding string

Table 21: POST code description **(Continued)**

POST Code	Description
D8h	Alert Standard Format initialization
D9h	Late init for IPMI
DEh	Log error if micro-code not updated properly

The following are for boot block in Flash ROM

Table 22: POST code description

POST Code	Description
E0h	Initialize the chipset
E1h	Initialize the bridge
E2h	Initialize the CPU
E3h	Initialize system timer
E4h	Initialize system I/O
E5h	Check force recovery boot
E6h	Checksum BIOS ROM
E7h	Go to BIOS
E8h	Set Huge Segment
E9h	Initialize Multi Processor
EAh	Initialize OEM special code
EBh	Initialize PIC and DMA
ECh	Initialize Memory type
EDh	Initialize Memory size
EEh	Shadow Boot Block
EFh	System memory test
F0h	Initialize interrupt vectors
F1h	Initialize Run Time Clock
F2h	Initialize video
F3h	Initialize System Management Manager
F4h	Output one beep
F5h	Clear Huge Segment
F6h	Boot to Mini DOS
F7h	Boot to Full DOS

Note:

*If the BIOS detects error 2C, 2E, or 30 (base 512K RAM error), it displays an additional word-bitmap (**xxxx**) indicating the address line or bits that failed. For example, "2C 0002" means address line 1 (bit one set) has failed. "2E 1020" means data bits 12 and 5 (bits 12 and 5 set) have failed in the lower 16 bits. The BIOS also sends the bitmap to the port-80 LED display. It first displays the checkpoint code, followed by a delay, the high-order byte, another delay, and then the loworder byte of the error. It repeats this sequence continuously.*

Chapter 4: System RAID Options

Intel ICH10R HostRAID Setup Guidelines

After all the hardware has been installed, you must first configure Intel's SATA RAID before you install the Windows Operating System and other software drivers.

Notes:

1. *If you do not wish to configure onboard SATA RAID functions, please go directly to page and page for Operating System & Other Software Installation.*

2. *This chapter describes RAID Configuration Instructions for the Intel ICH10R Host RAID Controller designed for the Windows OS. To configure the Adaptec HostRAID for your Motherboard, please refer to page 72.*

Introduction to Serial ATA and Parallel ATA

To configure the SATA RAID functions, you must first use the Intel ICH10R SATA RAID Utility program to configure the RAID Level that you desire before installing the Windows XP/2003/2008/Vista operating system and other software drivers. The necessary drivers are all included on the Viglen Driver CD supplied with the system.

Serial ATA (SATA)

Serial ATA (SATA) is a physical storage interface that uses a single cable with a minimum of four wires to create a point-to-point connection between devices. It is a serial link, which supports transfer rates up to 3.0 Gbps. Because the serial cables used in SATA are thinner than the traditional cables used in Parallel ATA (PATA), SATA systems have better airflow and can be installed in smaller chassis. In addition, the cables used in PATA are limited to a length of 40cm, while Serial ATA cables can be up to one meter in length. Overall, SATA provides better functionality than PATA.

Introduction to the Intel ICH10R Serial RAID

Located in the South Bridge of the 5000X chipset, the I/O Controller Hub (ICH10R) provides the I/O subsystem with access to the rest of the system. It supports 1- channel UltraATA/100 Bus Master IDE controller (PATA) and six Serial ATA (SATA) ports. The ICH10R supports the following PATA and SATA device configurations: Legacy mode and Native mode.

The Intel HostRAID Configurations

The following types of Intel's HostRAID configurations are supported:

RAID 0 (Data Striping): this writes data in parallel, interleaved ("striped") sections of two hard drives. Data transfer rate is doubled over using a single disk.

RAID1 (Data Mirroring): an identical data image from one drive is copied to another drive. The second drive must be the same size or larger than the first drive.

RAID 10 (Striping & Mirroring): RAID 0 and 1 schemes are combined (without parity information) to get the benefits of both.

RAID 5: both data and parity information are striped and mirrored across three or more hard drives.

The Intel Matrix Storage

The Intel Matrix Storage, supported by the ICH10R, allows the user to create RAID 0, RAID 1, RAID 10 and RAID 5 sets by using only six identical hard disk drives. The Intel Matrix Storage Technology creates two partitions on each hard disk drive and generates a virtual RAID 0, RAID 1, RAID 10 and RAID 5 sets. It also allows you the change the HDD partition size without any data.

Configuring BIOS settings for SATA RAID Functions (Native Mode)

1. Press the <Del> key during system bootup to enter the BIOS Setup Utility.

Note: *If it is the first time powering on the system, we recommend you load the Optimized Default Settings. If you have already done so, please skip to Step 3.*

2. Use the arrow keys to select the "Exit" Settings. Once in the "Exit" settings, Scroll down to select "Load Optimized Default Settings" and press the <Enter> key. Select "OK" to confirm the selection. Press the <Enter> key to load the default settings for the BIOS.

3. Use the arrow keys to select the "IDE/Floppy Configuration" section in BIOS.

4. Scroll down to "SATA#1 Configuration" and press the <Enter> key to select "Enhanced".

5. Scroll down to "Configure SATA#1 as" and press <Enter>. Then, select "RAID"

6. Scroll down to “ICH RAID CodeBase” and press <Enter>. Then, select “Intel”

7. Go to "Exit." Select "Exit Saving Changes" from the "Exit" menu. Press the <Enter> key to save the changes and exit the BIOS.

8. Once you've exited the BIOS Utility, the system will re-boot.

9. During the system boot-up, press the <Ctrl> and <I> keys simultaneously to run the Intel RAID Configuration Utility when prompted by the following message: *Press <Ctrl> <I> for the* Intel *RAID Configuration Utility*.

Note: *The Intel RAID Configuration Utility is only available for systems with two or more drives installed. The Intel RAID Utility screen will not display in systems with one drive installed.*

Using the Intel ICH10R SATA RAID Utility Program

Creating, Deleting and Resetting RAID Volumes:

1) After the system exits from the BIOS Setup Utility, the system will automatically reboot. The following screen appears after Power-On Self Test.

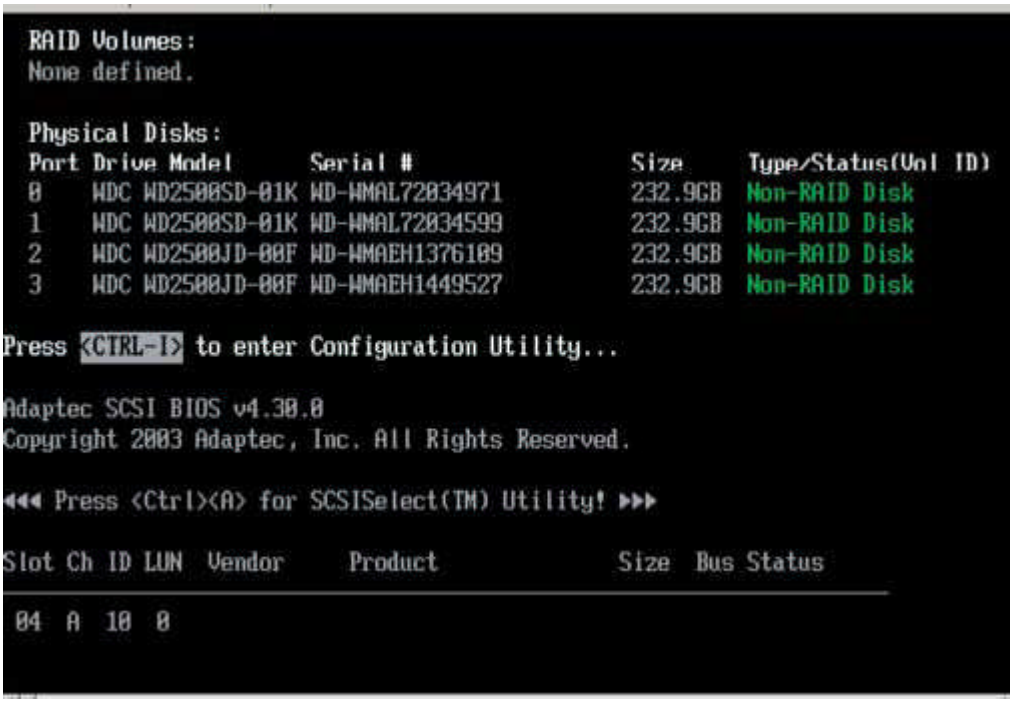


Figure 36: Entering the Intel ICH10R SATA Utility

Note: *All graphics and screen shots shown in the manual are for reference only. Your screens may or many won't look exactly the same as the graphics shown in this manual.*

2. When you see the above screen, press the <Ctrl> and the <I> keys simultaneously to have the main menu of the SATA RAID Utility appear:

Creating a RAID 0 Volume

1. Select "Create RAID Volume" from the main menu and press the <Enter> key.

The following screen will appear:

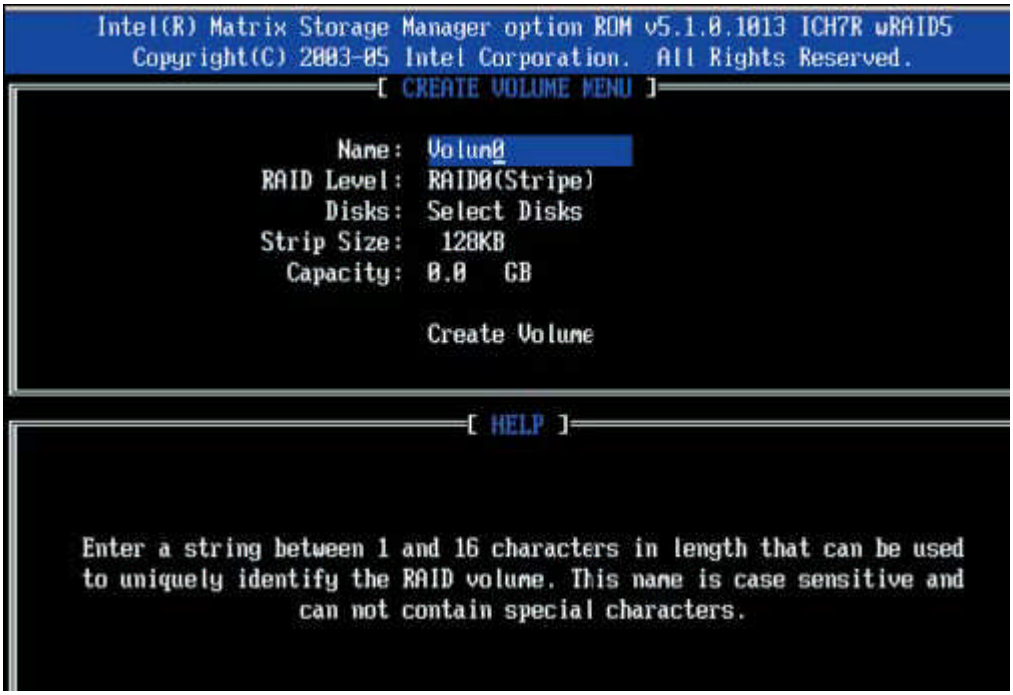


Figure 437: Creating a RAID 0 Volume

2. Specify a name for the **RAID 0** set and press the <Tab> key or the <Enter> key to go to the next field. (You can use the <Esc> key to select the previous menu.)

3. When RAID Level item is highlighted, press the <Up Arrow>, <Down Arrow> keys to select **RAID 0 (Stripe)** and hit <Enter>.

4. When the Disks item is highlighted, press <Enter> to select the HDD to configure as RAID. The following pop-up screen displays:

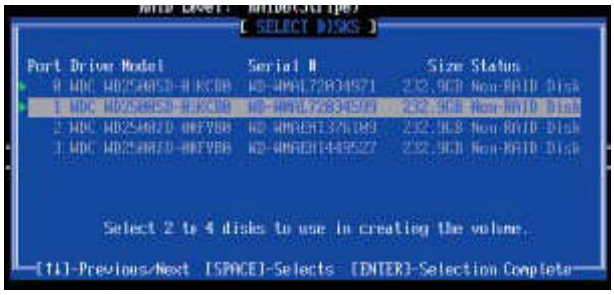


Figure 38: Selecting Drives for RAID 0 Volume

5. Use the <Up Arrow>, <Down Arrow> keys to highlight a drive and press <Space> to select it. A triangle appears to confirm the selection of the drive.

6. Use the <Up Arrow>, <Down Arrow> keys to select the stripe size, ranged from 4 KB to 128 KB for the RAID 0 array, and hit <Enter>.

Note: *For a server, please use a lower stripe size, and for a multimedia system, use a higher stripe size. The default stripe size is 128 KB.*

7. Press <Enter> when the Create Volume item is highlighted. A warning message displays.

8. When asked "Are you sure you want to create this volume (Y/N), press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Creating a RAID 1 Volume

1. Select "Create RAID Volume" from the main menu and press the <Enter> key.

The following screen will appear:

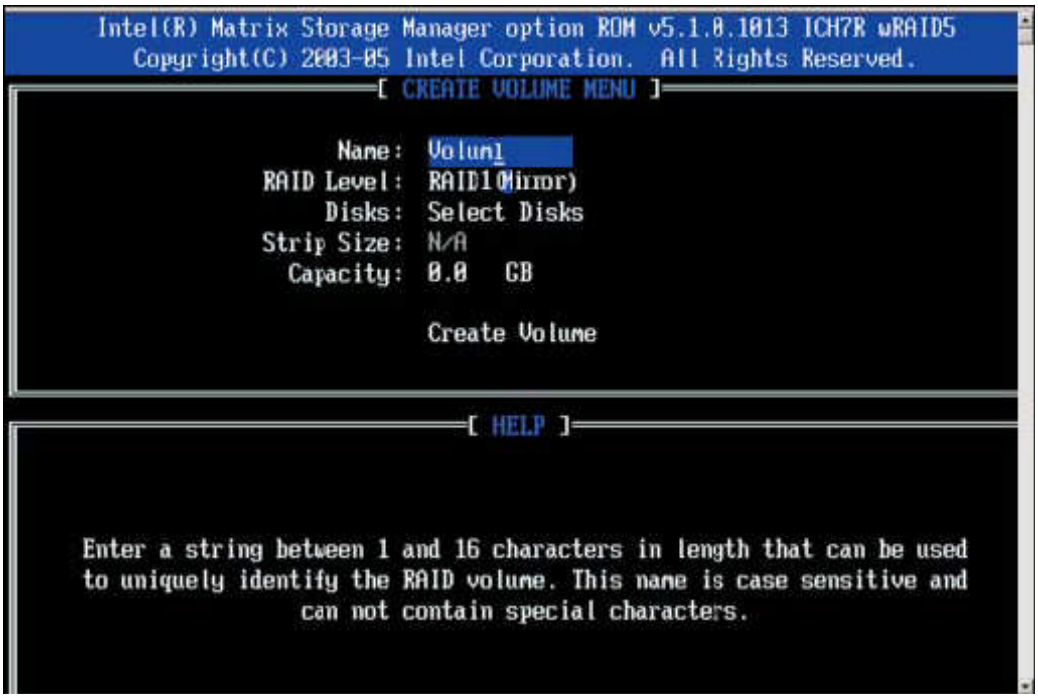


Figure 39: Creating a RAID 1 Volume

2. Specify a name for the **RAID 1** set and press the <Tab> key or the <Enter> key to go to the next field. (You can use the <Esc> key to select the previous menu.)

3. When RAID Level item is highlighted, press the <Up Arrow>, <Down Arrow> keys to select **RAID 1 (Mirror)** and hit <Enter>.

4. When the Capacity item is highlighted, enter your RAID volume capacity and hit <Enter>. The default setting is the maximum capacity allowed.

5. Press <Enter> when the Create Volume item is highlighted. A warning message displays.

6. When asked "Are you sure you want to create this volume (Y/N), press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Creating a RAID 10 (RAID 1+RAID 0)

1. Select "Create RAID Volume" from the main menu and press the <Enter> key.

The following screen will appear:

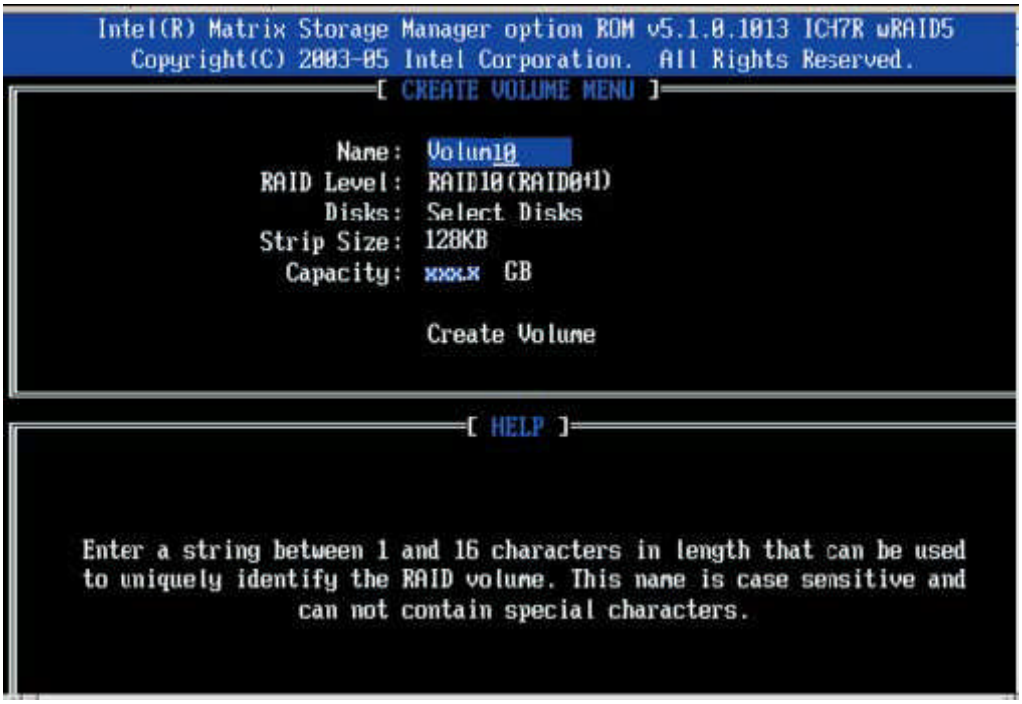


Figure 40: Creating a RAID 10 (RAID 1 + RAID 0) Volume

2. Specify a name for the **RAID 10** set and press <Enter>.

3. When RAID Level item is highlighted, use the <Up Arrow>, <Down Arrow> keys to select **RAID 10 (RAID1 + RAID0)** and hit <Enter>.

4. When the Stripe Size is highlighted, use the <Up Arrow>, <Down Arrow> keys to select the stripe size from 4 KB to 128 KB for your RAID 10 and hit <Enter>. The default setting is 64 KB.

Note: *For a server, please use a lower stripe size, and for a multimedia system, use a higher stripe size.*

5. When the RAID Volume Capacity item is highlighted, enter your RAID volume capacity and hit <Enter>. The default setting is the maximum capacity allowed.

6. Press <Enter> when the Create Volume item is highlighted. A warning message displays.

7. When asked "Are you sure you want to create this volume (Y/N), press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Creating a RAID 5 (Parity)

1. Select "Create RAID Volume" from the main menu and press the <Enter> key.

The following screen will appear:

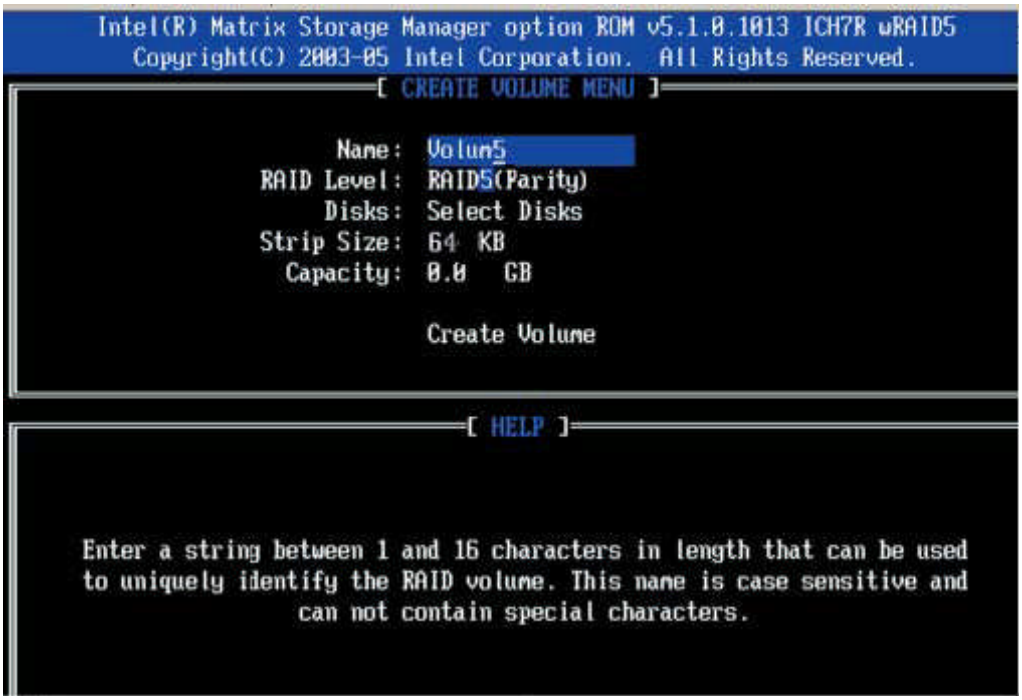


Figure 41: Creating a RAID 5 (Parity) Volume

2. Specify a name for the **RAID 5** set and press <Enter>.

3. When the Raid Level is highlighted, use the <Up Arrow>, <Down Arrow> keys to select **RAID 5 (Parity)** and hit <Enter>.

4. When the Disk item is highlighted, press <Enter> to select the HDD to configure as RAID. The following pop-up screen (See Note on Page 70) displays:

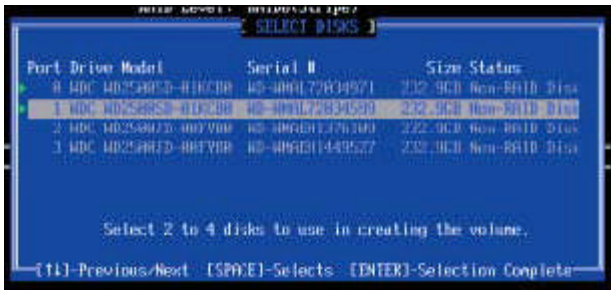


Figure 42: Selecting Drives for RAID 5 (Parity) Volume

5. Use the <Up Arrow>, <Down Arrow> keys to highlight a drive and press <Space> to select it. A triangle appears to confirm the selection of the drive.

6. Use the <Up Arrow>, <Down Arrow> keys to select the stripe size, ranged from 4 KB to 128 KB for the RAID 5 array, and hit <Enter>.

Note: *For a server, please use a lower stripe size, and for a multimedia system, use a higher stripe size. The default stripe size is 128 KB.*

7. Enter your desired RAID volume capacity and press <Enter> when the capacity item is highlighted. The default setting is the maximum capacity allowed.

8. Press Enter when the Create Volume item is highlighted. A warning message displays.

9. When asked "Are you sure you want to create this volume (Y/N), press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Deleting RAID Volume

CAUTION!!

Be sure to back up your data before deleting a RAID set. You will lose all data on the disk drives when deleting a RAID set.

1. From the main menu, select item2-Delete RAID Volume, and press <Enter>.

2. Use the <Up Arrow>, <Down Arrow> keys to select the RAID set you want to delete and press <Del>. A Warning message displays.

3. When asked "Are you sure you want to delete this volume (Y/N), press "Y" to delete the RAID volume, or type "N" to go back to the Delete Volume menu.

Resetting to Non-RAID and Resetting a RAID HDD

CAUTION!!

Be cautious when you reset a RAID volume HDD to non-RAID or Resetting a RAID HDD. Resetting a RAID volume HDD or Resetting a RAID HDD will reformat the HDD and delete the internal RAID structure on the drive.

1. From the main menu, select item3-Reset Disks to Non- RAID, and press <Enter>.

   The following screen will appear:

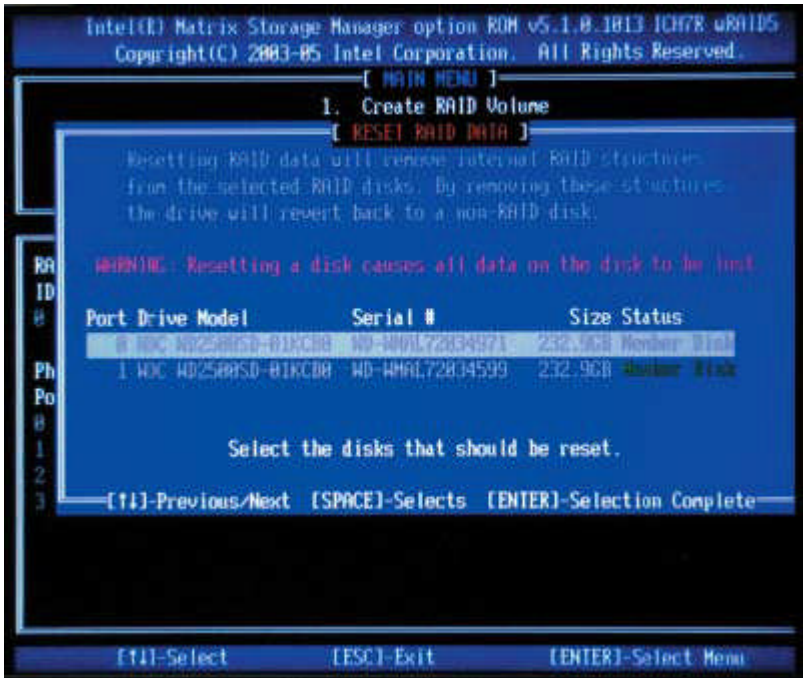


Figure 43: Resetting to Non-RAID and Resetting a RAID HDD

2. Use the <Up Arrow>, <Down Arrow> keys to highlight the RAID set drive to reset and press <Space> to select.

3. Press <Enter> to reset the RAID set drive. A Warning message displays.

4. Press "Y" to reset the drive, or type "N" to go back to the main menu.

Exiting the Intel Matrix Storage Manager Utility:

1. From the main menu, select item4-Exit, and press <Enter>. A warning message will appear.

2. Press "Y" to reset the drive, or type "N" to go back to the main menu.

Installing the Windows XP/2003/2008/Vista for systems with RAID Functions

New Operating System-Windows XP/2003/2008/Vista Installation

1. Copy the Intel ICH10R SATA RAID Controller Drivers for the appropriate OS to a formatted diskette. These drivers can be found on the Viglen driver CD provided with the system.

2. Reboot system.

3. Insert Microsoft Windows XP/2003/2008/Vista Setup CD in the CD Driver, and the system will start booting up from CD.

4. Press the <F6> key when the message-" Press F6 if you need to install a third party SCSI or RAID driver" displays.

5. When the Windows XP/2003/2008/Vista Setup screen appears, press "S" to specify additional device(s).

6. Insert the driver diskette-"Intel AA RAID XP/2003/2008/Vista Driver for ICH10R into Drive A: and press the <Enter> key.

7. Choose the Intel ICH10R SATA RAID Controller from the list indicated in the XP/2003/2008/Vista Setup Screen, and press the <Enter> key.

8. Press the <Enter> key to continue the installation process. (If you need to specify any additional devices to be installed, do it at this time.) Once all devices are specified, press the <Enter> key to continue with the installation.

9. From the Windows XP/2003/2008/Vista Setup screen, press the <Enter> key. The XP/2003/2008/Vista Setup will automatically load all device files and then, continue the Windows XP/2003/2008/Vista installation.

10. After Windows XP/2003/2008/Vista installation is completed, the system will automatically reboot.

Adaptec HostRAID Setup Guidelines

After all the hardware has been installed, you must first configure the Adaptec Embedded Serial ATA RAID before you install the Windows operating system. The necessary drivers are all included on the Viglen driver CD that comes with your system.

Note: *The following section provides information on the Adaptec SATA RAID Driver based on the Intel ICH10R Controller.*

Introduction to the Adaptec Embedded Serial ATA RAID Controller Driver

Serial ATA (SATA)

Serial ATA (SATA) is a physical storage interface. It uses a single cable with a minimum of four wires to create a point-to-point connection between devices. It is a serial link which supports SATA Transfer rates up to 3.0 Gbps. Because the serial cables used in SATA are thinner than the traditional cables used in Parallel ATA (PATA), SATA systems have better airflow and can be installed in smaller chassis than Parallel ATA. In addition, the cables used in PATA can only extend to 40cm long, while Serial ATA cables can extend up to one meter. Overall, Serial ATA provides better functionality than Parallel ATA.

Introduction to the Intel ICH10R I/O Controller Hub

Located in the South Bridge of the Intel 5000X Chipset, the ICH10R I/O Controller Hub provides the I/O subsystem with access to the rest of the system. It supports 1-channel Ultra ATA/100 Bus Master IDE controller (PATA) and one Adaptec's Serial ATA (SATA) Host Controller, which support up to six Serial ATA drives, up to two RAID volumes and up to four drives in RAID Configurations. (See below for details.)

Adaptec's SATA HostRAID Controller Firmware supports:

- Drives supported- Six
- Number of RAID Volumes supported- Two
- Total Drives in RAID Configurations- Four

Examples of Valid RAID Configurations:

- Two drives of RAID 1 + two drives of RAID 0
- Two drives of RAID 1 + two drives of RAID 1
- Three drives of RAID 0
- Four drives of RAID 0

Examples of Invalid RAID Configurations:

- Three drives of RAID 0 + Two drives of RAID 1

Note: *The information above is applicable to Adaptec's HostRAID Controller Firmware only.*

Configuring the Adaptec SATA RAID for Operating Systems that support RAID

1. Press the <Del> key during system bootup to enter the BIOS Setup Utility.

Note: *If it is the first time powering on the system, we recommend you load the Optimized Default Settings. If you have already done so, please skip to Step 3.*

2. Use the arrow keys to select the "Exit" Settings. Once in the "Exit" settings, Scroll down to select "Load Optimized Default Settings" and press the <Enter> key. Select "OK" to confirm the selection. Press the <Enter> key to load the default settings for the BIOS.

3. Use the arrow keys to select the "IDE/Floppy Configuration" section in BIOS.

4. Scroll down to "SATA#1 Configuration" and press the <Enter> key to select "Enhanced".

5. Scroll down to "Configure SATA#1 as" and press <Enter>. Then, select "RAID"

6. Scroll down to “ICH RAID CodeBase” and press <Enter>. Then, select “Adaptec”

7. Go to "Exit." Select "Exit Saving Changes" from the "Exit" menu. Press the <Enter> key to save the changes and exit the BIOS.

8. Once you've exited the BIOS Utility, the system will re-boot.

9. During the system boot-up, press the <Ctrl> and <A> keys simultaneously to run the Adaptec RAID Configuration Utility when prompted by the following message: *Press <Ctrl> <A> for the* Adaptec *RAID Configuration Utility*.

Note: *The Adaptec RAID Configuration Utility is only available for systems with two or more drives installed. The Adaptec RAID Utility screen will not display in systems with one drive installed.*

The Adaptec Embedded Serial ATA with HostRAID Controller Driver

The Adaptec Embedded Serial ATA RAID Controller adds SATA/RAID functionality and performance enhancements to a Motherboard. RAID striping (RAID 0) allows data to be written across multiple drives, greatly improving hard disk I/O performance. RAID mirroring (RAID 1) allows data to be simultaneously written to two drives, improving data security even if a single hard disk fails. A Stripe of Mirrors (RAID 10) provides multiple RAID 1 mirrors and a RAID 0 stripe, maximizing data security and system efficiency. By incorporating the Adaptec Embedded Serial ATA into the Motherboard design, the Vig395 offers the user the benefits of SATARAID without the high costs associated with hardware RAID applications.

Using the Adaptec RAID Configuration Utility (ARC)

The Adaptec RAID Configuration Utility, an embedded BIOS Utility, includes the following:

- Array Configuration Utility: Use this utility to create, configure and manage arrays.
- Disk Utilities: Use this option to format or verify disks.

To run the Adaptec RAID Configuration Utility, you will need to do the following:

1. Enable RAID functions in the system BIOS (refer to page 91).

2. Press the <Ctrl> and <A> keys simultaneously when prompted to do so during system boot. (Refer to the previous page for detailed instructions.)

Using the Array Configuration Utility (ACU)

When you press <Ctrl> and <A> keys simultaneously at the prompt during system bootup, the main menu will appear.

Note: *To select an option, use the arrow keys to highlight the item and then press the <Enter> key to select it. To return to the previous menu, press the <ESC> key. Press the <Insert> key to select a drive. When a drive is highlighted (selected), press the <Delete> key to de-select it.*

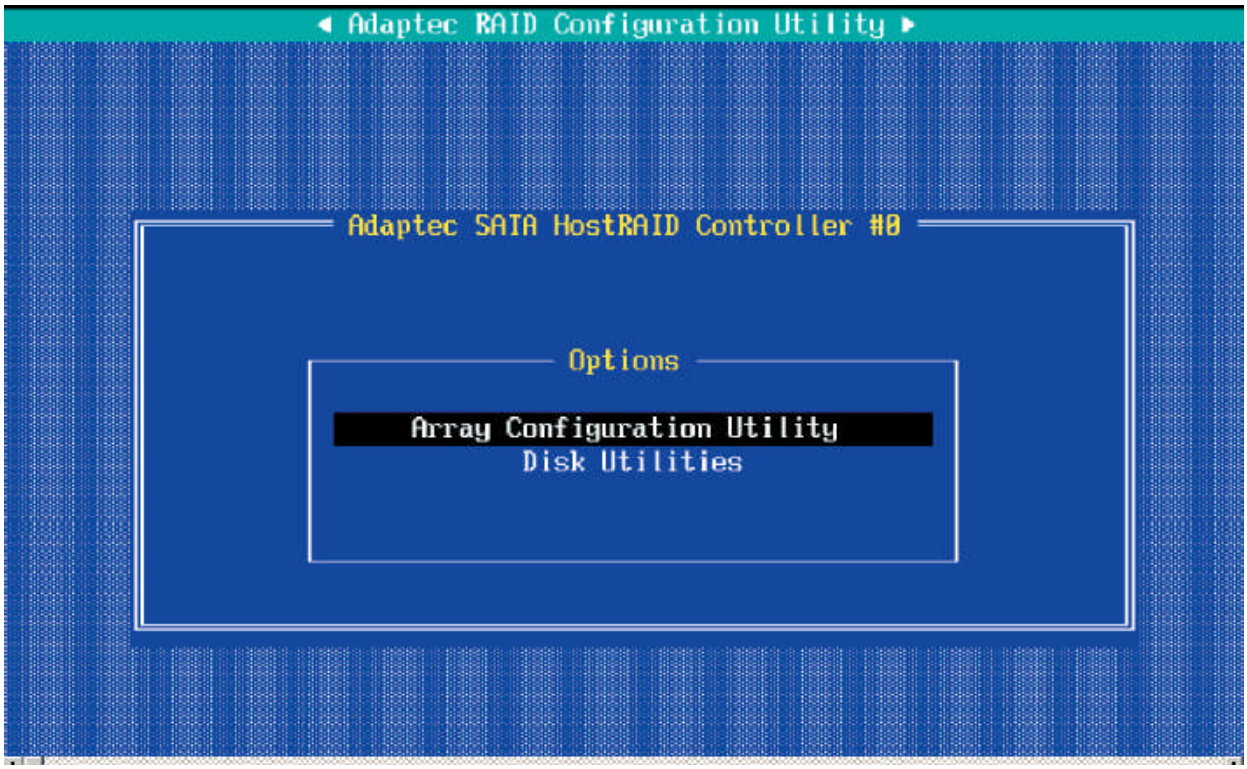


Figure 44: Selecting the Array Configuration Utility

Managing Arrays

Select this option to view array properties, and configure array settings.

To select this option, using the arrow keys and the <enter> key, select "Managing Arrays" from the main menu as shown above.

Figure 45: Managing Arrays

Configuring Disk Drives

You may need to configure a disk drive before you can use it.

CAUTION!!

Configuring a disk may overwrite the partition table on the disk and may make any data on the disk inaccessible. If the drive is used in an array, you may not be able to use the array again.

Do not configure a disk that is part of a boot array. To determine which disks are associated with a particular array, please refer to ***Viewing Array Properties***.

To configure a disk drive

1. From the main menu (shown on Page 82), select **Configure Drives** and hit <**Enter**> (as shown below.)

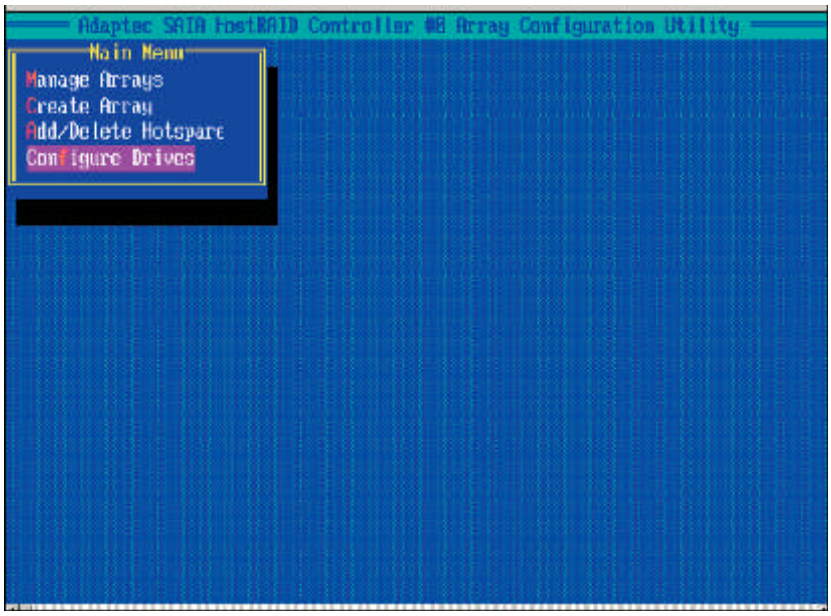


Figure 46: Configuring Drives

2. From the "Select Drives for Configuring" List (shown below,) select the drives you want to configure and press <**Insert>**.

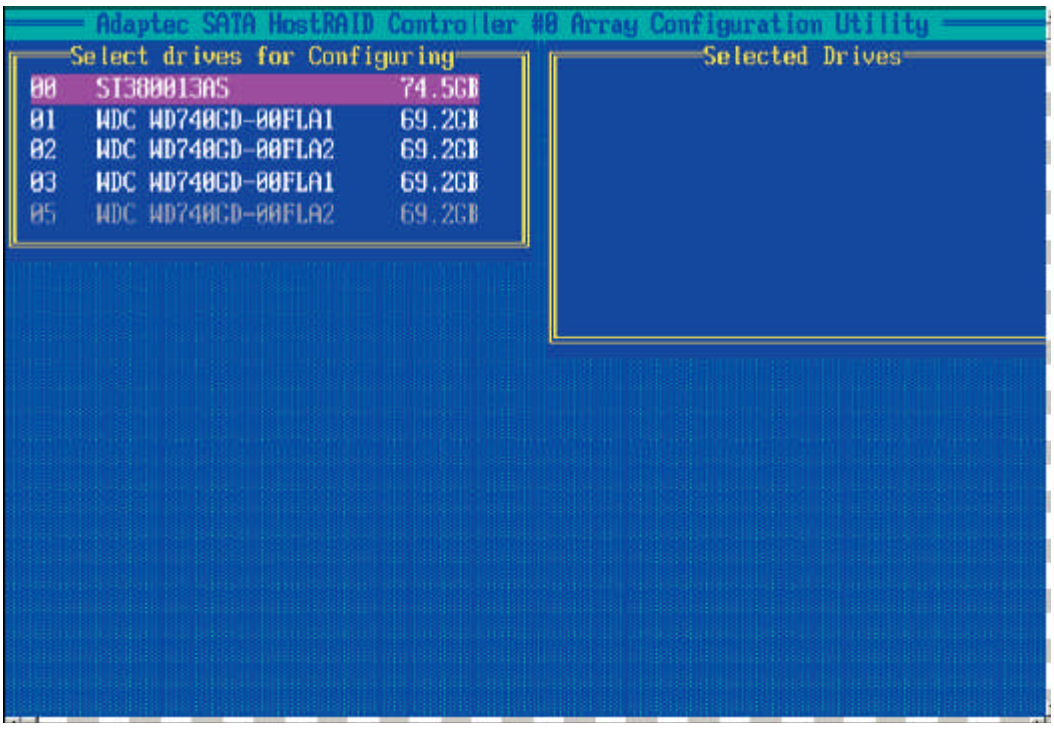


Figure 47: Selecting Drives To Be Configured

3. The drive you've selected will appear in the "Selected Drives Dialog Box" on the right (as shown below.) Repeat the same steps until all drives that you want to configure appear in the selected drives box.

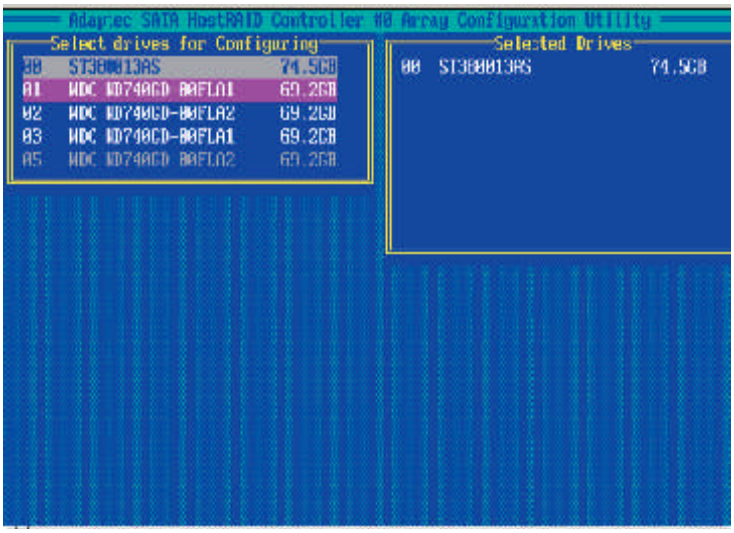


Figure 48: List of Selected Drives for Configuration

4. Once both drives display in the selected drive box, press <**Enter**.>

5. Read the warning message as shown in the screen below.

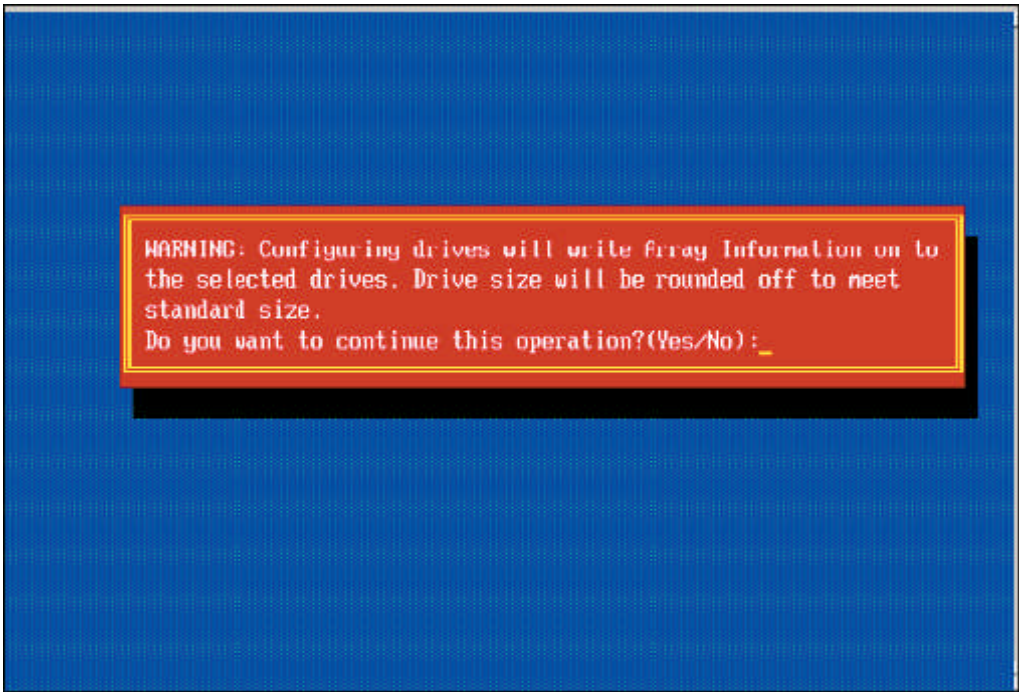


Figure 49: List of Selected Drives for Configuration

6. Make sure that you have selected the correct disk drives to configure. If correct, type **Y** to continue.

Creating Arrays

Before you create arrays, make sure that the disks for the array are connected and installed in your system. Note that disks with no usable space or disks that are un-initialized or not formatted are shown in gray and cannot be used.

***Note**: It is recommended that you configure devices before you create arrays.*

To create an array:

1. From the main menu (shown on page 82), select **Create Array**.

2. Select the disks for the new array and press Insert (as the screen shown below).

***Note:** To de-select any disk, highlight the disk and press **Delete**.*

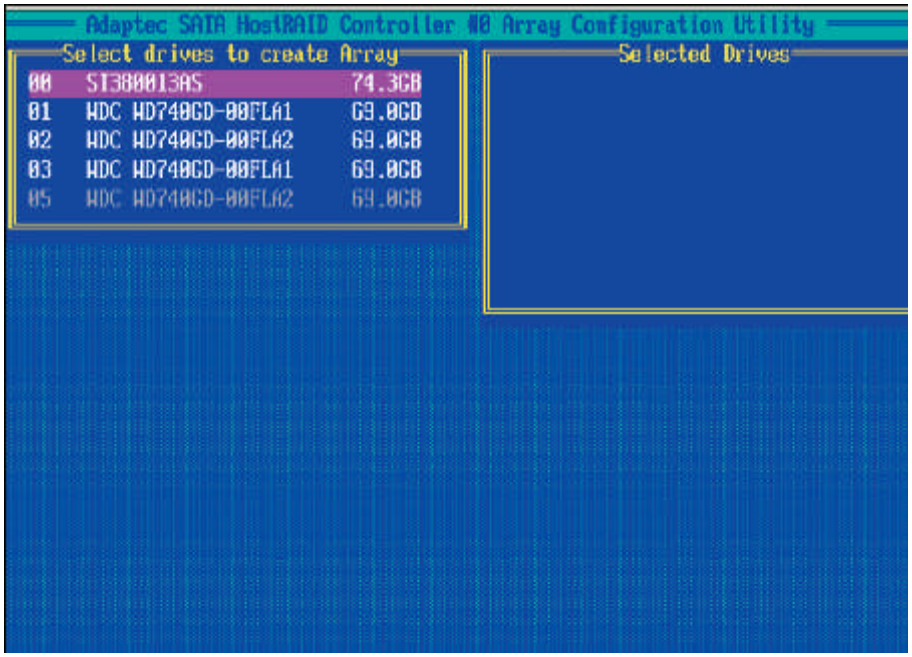


Figure 50: Creating Arrays

3. The arrays you have selected will appear on the Selected Drives dialog box on the right (as shown below.)

4. Press **Enter** when both disks for the new array are selected. The Array Properties menu displays.

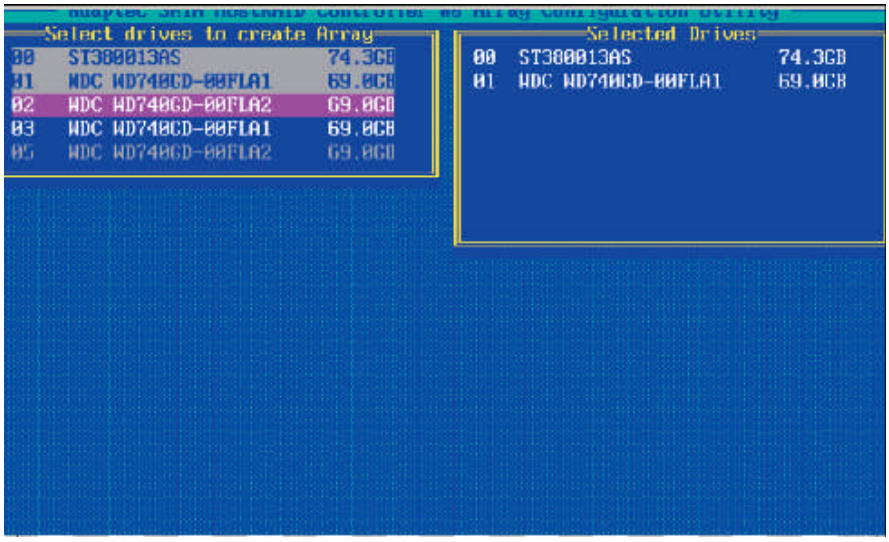


Figure 51: Selecting Drives to Create an Array

Assigning Array Properties

Once a new array is completed, you can assign properties to the array.

CAUTION!!

Once the array is created and its properties are assigned, and you cannot change the array properties using this utility.

To assign properties to the new array:

1. In the Array Properties menu (as shown in the screen below), select an array type and press **Enter**. Only the available array types will be displayed on the screen. (*RAID 0 or RAID 1 requires two drives.)

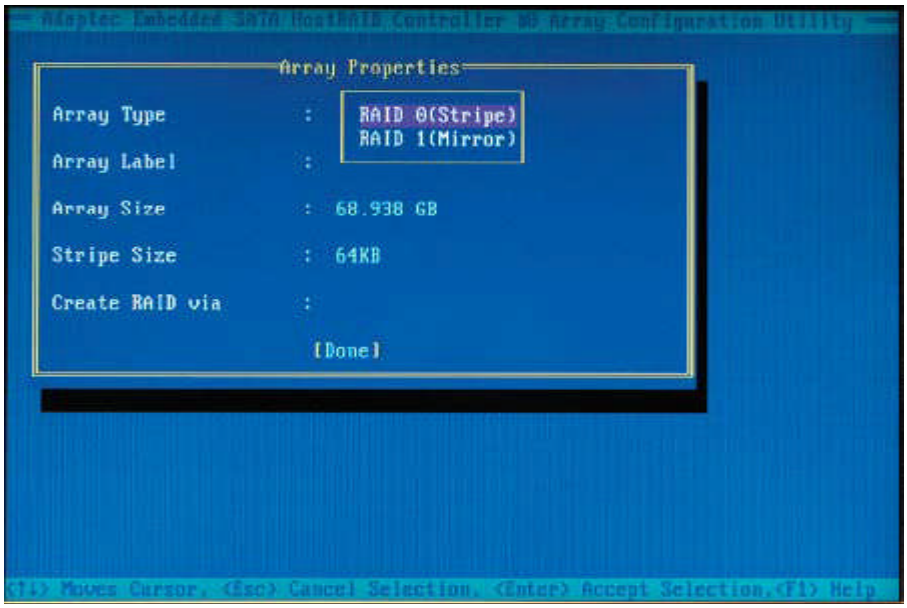


Figure 52: Assigning Array Properties

2. Under the item "**Arrays Label**", type in a label and press <**Enter>**.

Note: *The label shall not be more than 15 characters.*

3. For RAID 0, select the desired stripe size.

Note: *Available stripe sizes are 16, 32, and 64 KB. 64K is default. Please do not change the default setting.*

4. The item: **"Create RAID via"** allows you to select between the different ways of creating methods for RAID 0 and RAID 1.

The following table gives examples of when each is appropriate.

RAID Level	Create Via	When Appropriate.
RAID 0	Quick Init	Creating a RAID 0 on new drives
RAID 0	Migrate	Creating a RAID 0 from one new drive and one drive with data you wish to preserve
RAID 1	Build	Any time you wish to create a RAID 1, but especially if you have data on one drive that you wish to preserve
RAID 1, RAID 10	Clear	Creating a RAID 1 or RAID 10 on new drives, or when you want to ensure that the array contains no data after creation.
RAID 1, RAID 10	Quick Init	Fastest way to create a RAID 1 or RAID 10 Appropriate when using new drives

Note: *If you select Migrate for RAID 0, or Build for RAID 1, you will be asked to select the source drive. The contents of the source drive will be preserved. However, the data on the new drive will be lost.*

5. When you are finished, press <**Done>** (as the screen shown below).

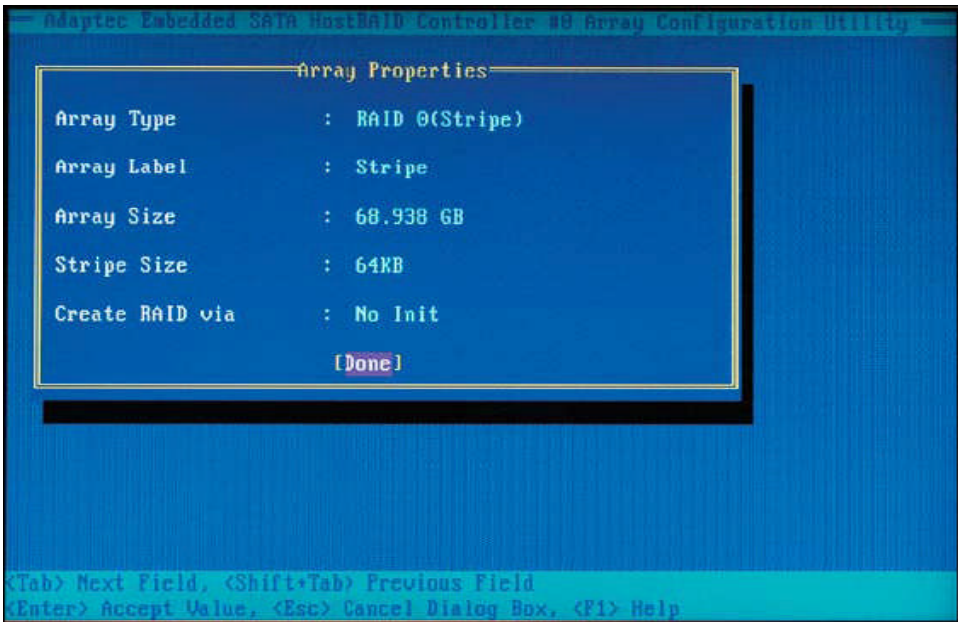


Figure 53: Assigning Array Properties

Notes:

1. *Before adding a new drive to an array, be sure to back up any data stored on the new drive; otherwise, all data will be lost.*

2. *If you stop the Build or Clear process on a RAID 1, you can restart it by pressing <Ctrl> and <R>.*

3. *If you've used the Quick Init option to create a RAID1, it may return some data mis-comparison when you run a consistency check at a later time. This is normal.*

4. *The Adaptec Host RAID allows you to use drives of different sizes in a RAID. However, you can only select a smaller drive as the source or first drive during a build operation.*

5. *When migrating from single volume to RAID 0, migrating from a larger drive to a smaller drive is allowed. However, the destination drive must be at least half the capacity of the source drive.*

6. *It is not recommended that you migrate or build an array on Windows dynamic disks (volumes) because it will result in data loss.*

CAUTION!!

Do not interrupt the process when you create a RAID 0 using the Migrate option. If you do, you will not be able to restart the system, or to recover the data that was on the source drive.

Adding a Bootable Array

To make an array bootable:

1. From the Main menu, select **Manage Arrays.**

2. From the List of Arrays, select the array you want to make bootable, and press <**Ctrl>** and **<B>.**

3. Enter Y to create a bootable array when the following message is displayed: "This will make all other existing bootable array non-bootable. Do you want to make this array bootable? (Yes/No):" Then, a bootable array will be created. An asterisk (*) will appear next to the bootable array (as shown in the picture below)

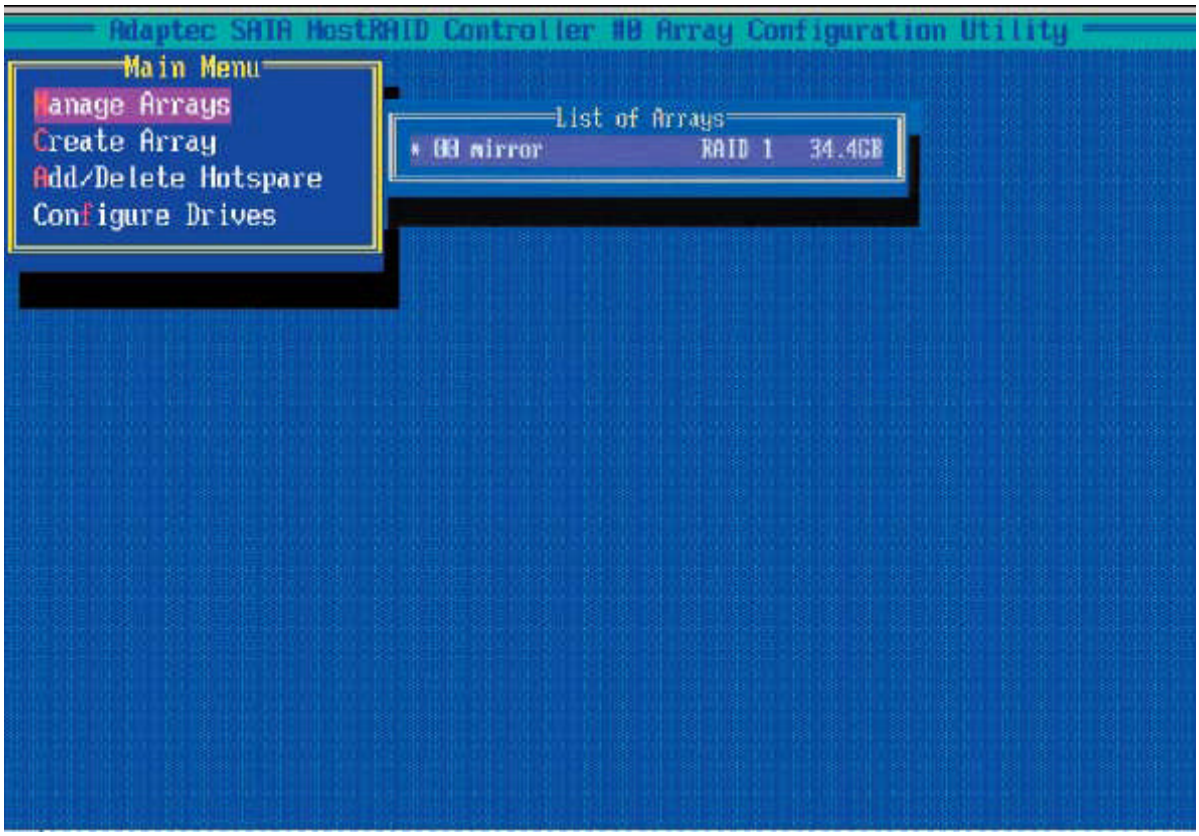


Figure 54: Adding a Bootable Array

Deleting a Bootable Array

To delete a bootable array:

1. From the Main menu, select **Manage Arrays.**

2. From the List of Arrays, select the bootable array you want to delete, and press <**Ctrl>** and **<B>**. Note: a bootable array is the array marked with an asterisk * (as shown in the picture above.)

3. When the following message is displayed: "The array is already marked bootable. Do you want to make this array as not bootable? (Yes/No), Enter Y to delete a bootable array. The bootable array will be deleted and the asterisk will disappear.

Note: *Do not use the delete key to delete the bootable array.*

Adding/Deleting Hotspares

To add a Hotspare:

Note: *In order to rebuild a RAID (RAID 0 or RAID 1), you would need to add anew HDD as a hotspare.*

1. From the main menu (shown on Page 82), select Add/Delete Hotspares.

2. Use the up and down arrow keys to highlight and select the disk you want to designate as a hotspare, and press <Insert>, and then, press <Enter>.

3. Press Yes when the following prompt is displayed: "Do you want to create spare?" (Yes/No?) The spare you have selected will appear in the Selected drives Menu.

To delete a Hotspare:

1. From the main menu (shown on Page 82), select Add/Delete Hotspares.

2. Use the up and down arrow keys to highlight and select the Hotspare you want to delete, and press <delete>, and then, press <Enter>.

3. When the following warning is displayed: "Do you want to delete the hot spare?" (Yes/No?), press Yes to delete the hotspare you have selected.

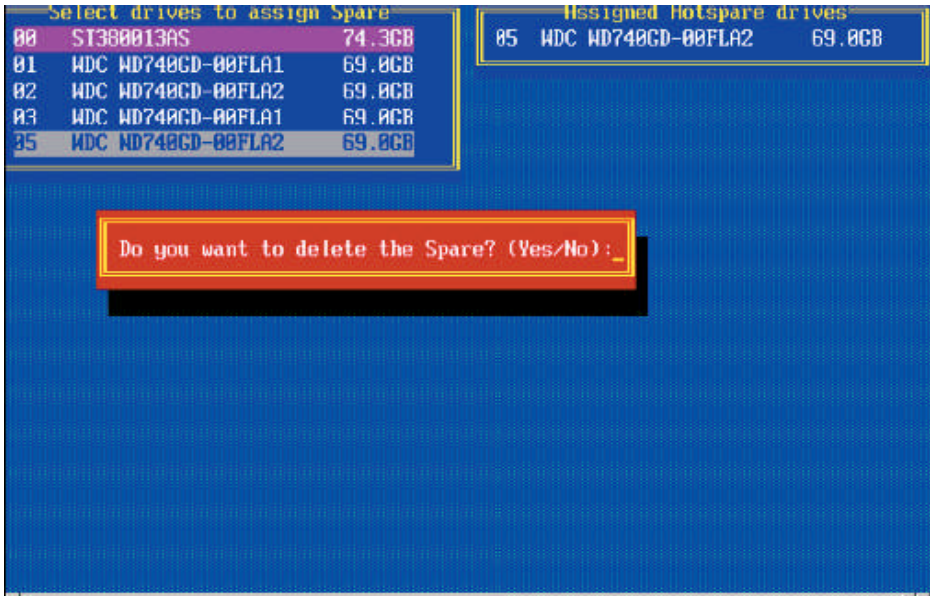


Figure 55: Deleting Hotspare

Viewing Array Properties

To view the properties of an existing array:

1. From the main menu, select **Manage Arrays** and hit <Enter> (as shown on the previous page.)

2. From the List of Arrays dialog box (shown below), select the array you want to view and press **Enter**.

The Array Properties dialog box appears (as shown below), showing detailed information on the array. The physical disks associated with the array are displayed here.

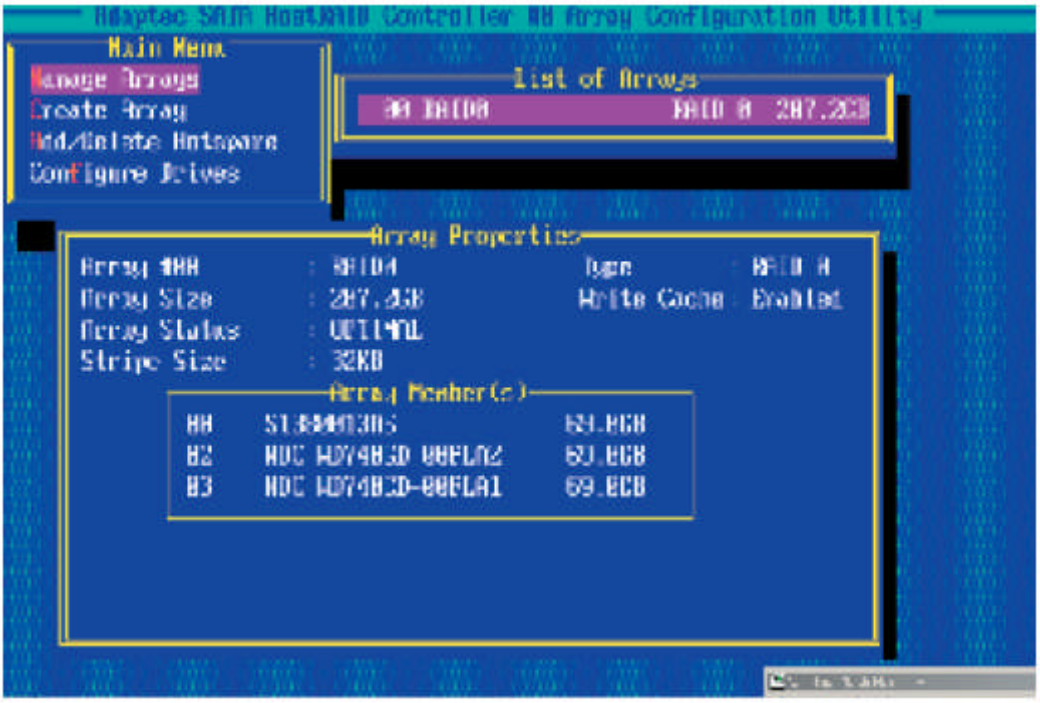


Figure 56: Deleting Hotspare

3. Press **Esc** to return to the previous menu.

Rebuilding Arrays

Notes:

1. *Rebuilding applies to Fault Tolerant array (RAID 1) only.*

   If an array Build process is interrupted or when one critical member is missing, you must perform a Rebuild to restore its functionality. For a critical array rebuild operation, the optimal drive is the source drive.

2. *If no spare array exists and a hard disk drive fails, you need to create a spare before you can rebuild an array.*

To Rebuild an array:

From the Main Menu, select **Manage Arrays** (as shown in the screen below). From the List of Arrays, select the array you want to Rebuild.

Press <**Ctrl>** and **<R>** to Rebuild.

Figure 57: Rebuilding Arrays

Deleting Arrays

CAUTION!!

Back up the data on an array before you delete it to prevent data loss
Deleted arrays cannot be restored.

To delete an existing array:

1. From the main menu (shown on Page 82), select **Manage Arrays**.

2. Select the array you wish to delete and press <**delete**>.

3. In the Array Properties dialog box, select **Delete** and press <**Enter>**. The following prompt is displayed:

CAUTION!!

Deleting the array will render array unusable. Do you want to delete the array? (Yes/No):

RAID 1 only—the following prompt is also displayed:

Deleting the partition will result in data loss! Do you also want to delete the partition? (Yes/No):

4. Press **Yes** to delete the array and partition or **No** to return to the previous menu.

5. Press **Esc** to return to the previous menu.

Using the Disk Utilities

The Disk Utilities enable you to format or verify the media of your Serial ATA hard disks.

To access the disk utilities:

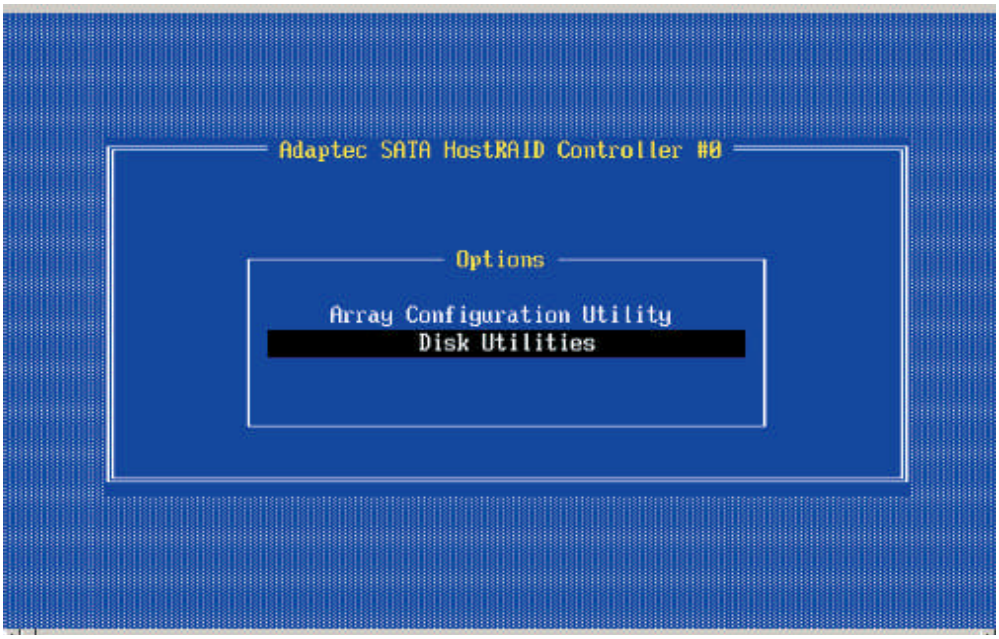


Figure 58: Accessing Disk Utilities

1. From the Adaptec RAID Configuration Utility Menu, select **Disk Utilities** (as shown above) and press **<Enter>.** The following screen appears.

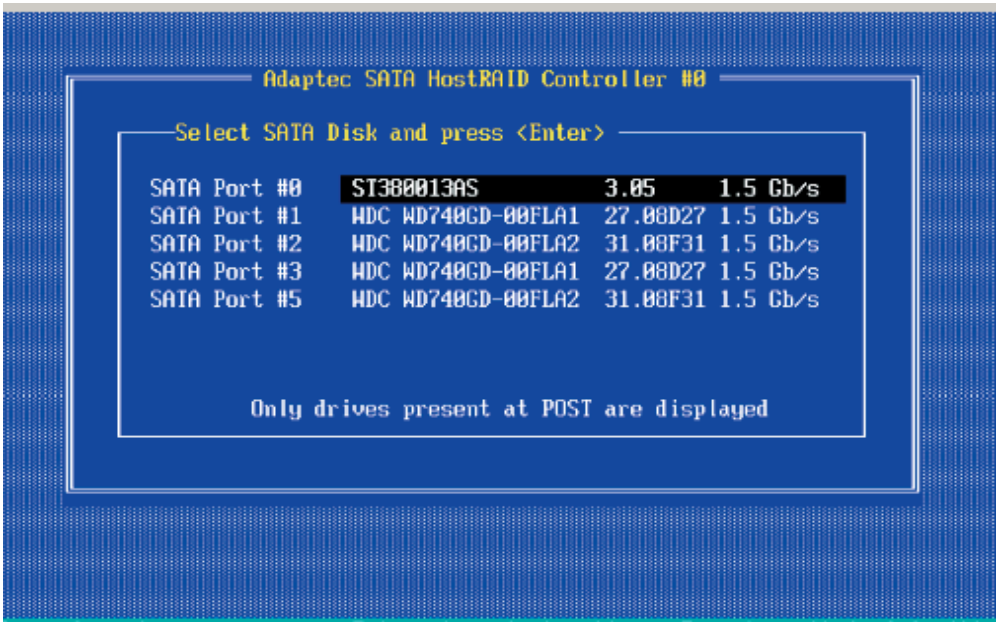


Figure 59: Disk Utilities Main Menu

2. Select the desired disk and press <**Enter>**. The following screen appears:

To format a disk:

Note: *The operation of* ***Formatting Disk*** *allows you to perform a low-level formatting of a hard drive by writing zeros to the entire disk. Serial ATA drives are low-level formatted at the factory and does not need to be low-level formatted again.*

1. When the screen shown below displays, select **Format Disk** and press **<Enter>**. The following screen appears:

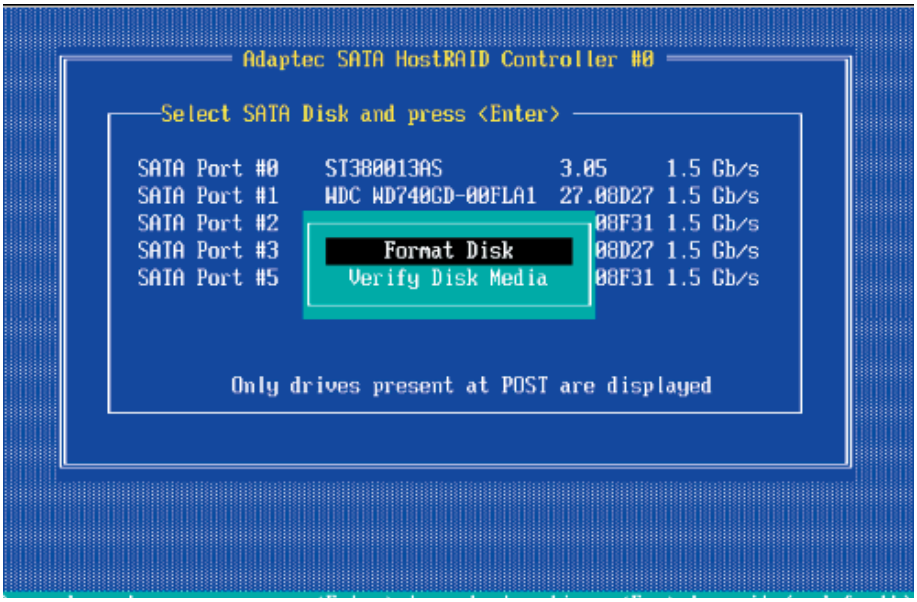


Figure 60: Formatting Disk

2. Read the warning message when it appears in the screen as shown below. To continue with disk formatting, select **Yes** and hit **<Enter>.** Otherwise, select **No** and press **<Enter>**.

CAUTION!!

Formatting a disk destroys all data on the drive. Be sure to back up your data before formatting a disk.

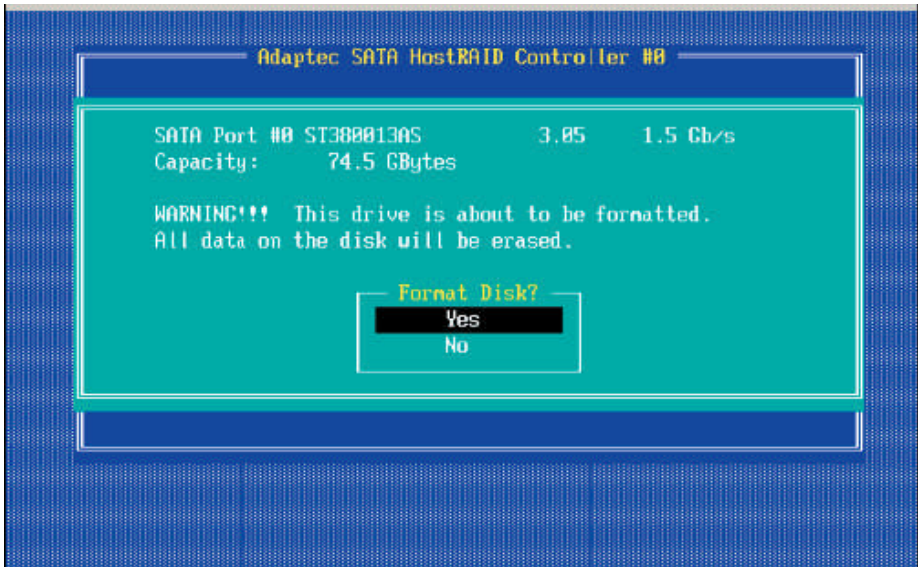


Figure 61: Formatting Disk

To verify disk media:

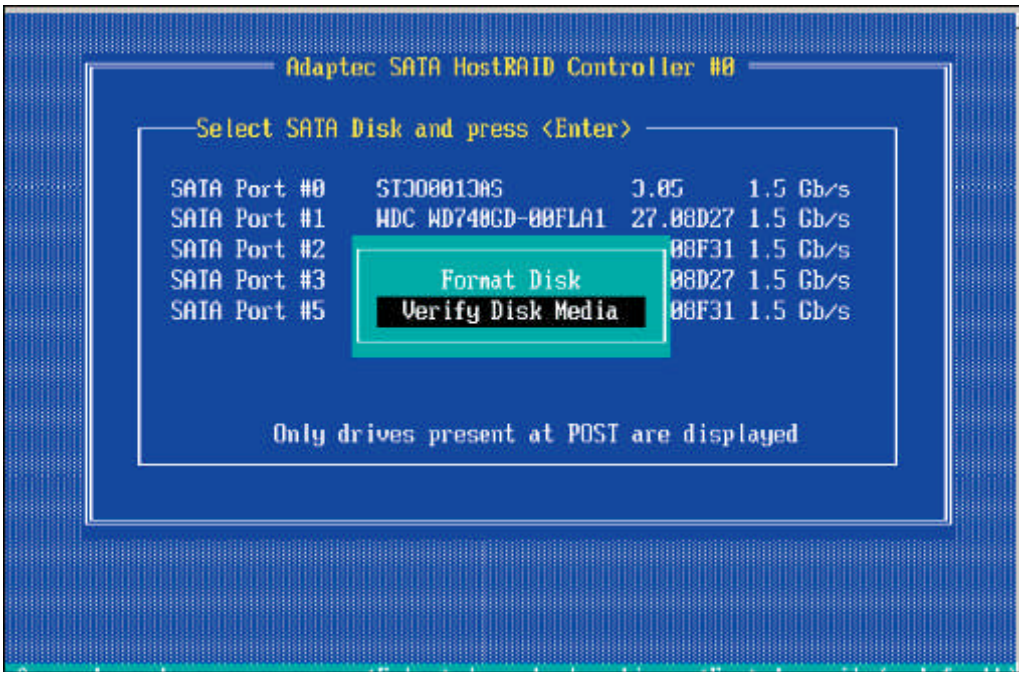


Figure 62: Verifying Disk Media

1. When the screen shown above displays, select **Verify Disk Media** and press **<Enter>**.

2. A message will display, indicating that the selected drive will be scanned for media defects. Select **Yes** and hit **<Enter>** to proceed with disk verifying; otherwise, select **No and** hit **<Enter>.**

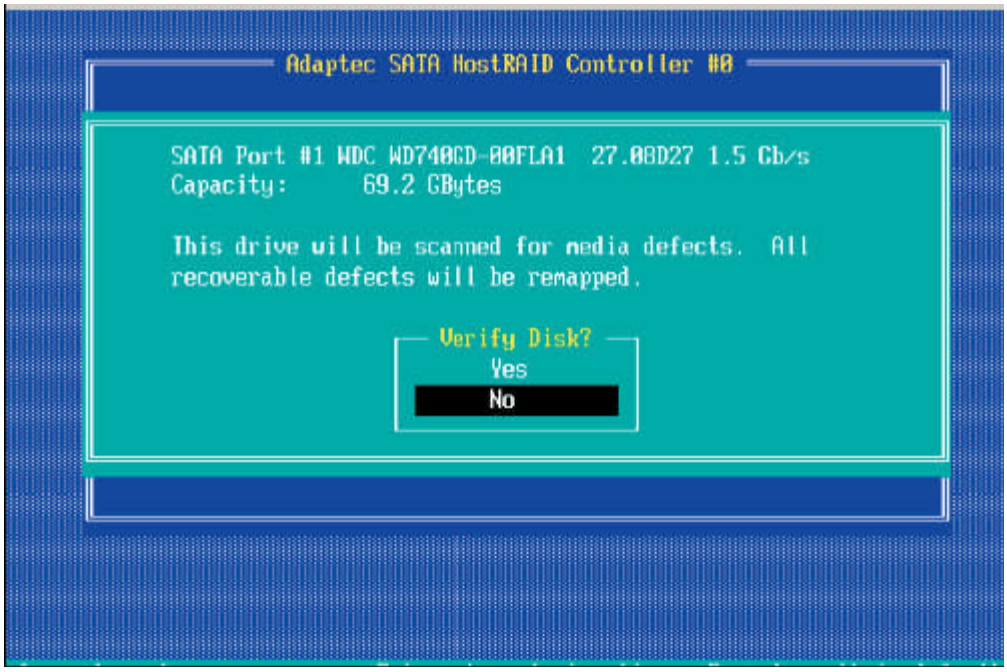


Figure 63: Verifying Disk Media

To Exit Adaptec RAID Configuration Utility

1. Once you have completed RAID array configurations, press **ESC** to exit. The following screen will appear.

2. Press **Yes** to exit the Utility.

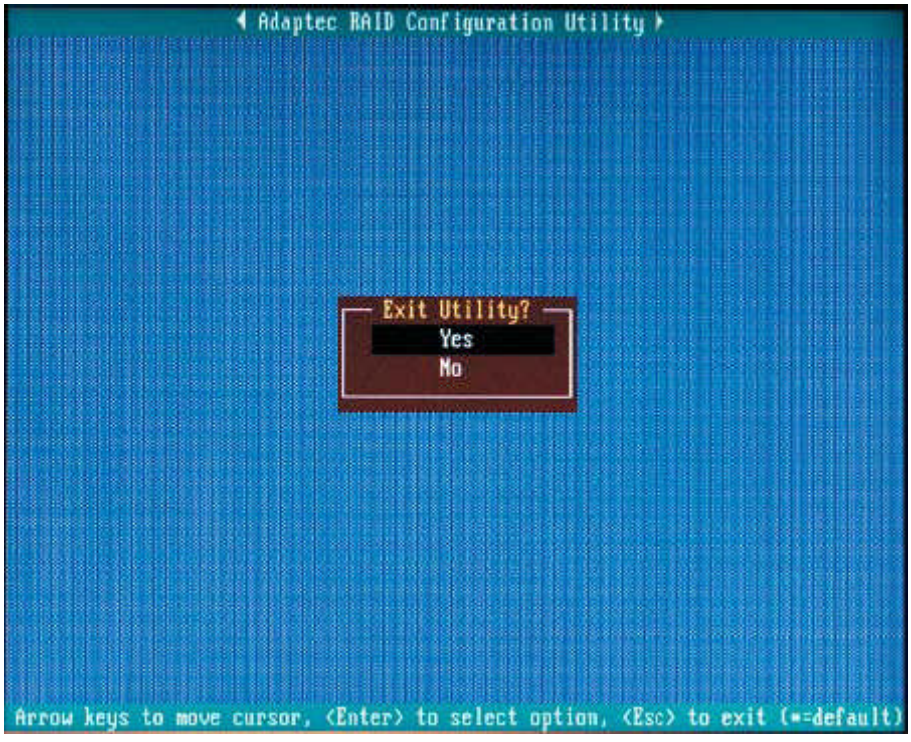


Figure 64: Exiting utility

Installing Intel's ICH10R Driver by Adaptec and Installing the OS

1. Copy the Adaptec Embedded Serial ATA Raid Controller Drivers for the appropriate OS to a formatted diskette. These drivers can be found on the Viglen driver CD provided with the system.

2. Reboot system.

3. Insert the Microsoft Windows OS Setup CD in the CD Driver, and the system will start to boot up from CD.

4. Press the <**F6**> key when the message-"Press F6 if you need to install a third party SCSI or RAID driver" displays.

5. When the Windows OS Setup screen appears, press "**S**" to specify additional device(s).

6. Insert the driver diskette-"Adaptec Embedded Serial ATA Raid Controller Driver" into Drive A: and press the <**Enter**> key.

7. Choose "ICH10R Driver by 3rd Party (Adaptec)" from the list indicated in the Windows OS Setup Screen, and press the <**Enter**> key.

8. Press the <**Enter**> key to continue the installation process. (If you need to specify any additional devices to be installed, do it at this time.) Once all devices are specified, press the <**Enter**> key to continue with the installation.

9. From the Windows OS Setup screen, press <**Enter**>. The OS Setup will automatically load all device files, and, then, continue with the Windows OS installation.

10. After Windows OS Installation is completed, the system will automatically reboot.

Chapter 5: System BIOS

Introduction

This chapter describes the Phoenix BIOS™ Setup utility for the Vig410P. The Phoenix ROM BIOS is stored in a flash chip and can be easily upgraded using a floppy disk-based program.

What is the BIOS?

The BIOS is the Basic Input Output System used in all IBM® PC, XT™, AT®, and PS/2® compatible computers. The Phoenix BIOS stores the system parameters, types of disk drives, video displays, etc. in the CMOS. The CMOS memory requires very little electrical power. When the computer is turned off, a backup battery provides power to the CMOS Logic, enabling it to retain system parameters. Each time the computer is powered on the computer is configured with the values stored in the CMOS Logic by the system BIOS, which gains control at boot up.

The Power-On sequence

When the computer is first switched on, certain instructions in the BIOS are executed to test various parts of the machine. This is known as the POST (Power-On Self Test) routine. When you switch the computer on (or when you press the Reset button or press <Ctrl> + <Alt>+ <Delete> keys, which has the same effect), you can see on the monitor that it counts through the memory, testing it. The floppy disk drives are then accessed and tested, and the various interfaces are checked. If there are any errors, a message is displayed on the screen.

Managing and Updating your BIOS

The following utility allows you to manage and update the Motherboard Basic Input/Output System (BIOS) setup.

- Phoenix Phlash16 BIOS Flash Utility (Updates the BIOS in DOS mode using a bootable floppy disk)

Note: *Save a copy of the original Motherboard BIOS file to a bootable floppy disk in case you need to restore the BIOS in the future. Copy the original Motherboard BIOS using the Phoenix Phlash16 BIOS utilities.*

Creating a Bootable Floppy Disk

1. Do either one of the following to create a bootable floppy disk.

DOS environment

a. Insert a 1.44MB floppy disk into the drive.
b. At the DOS prompt, type format **A:/S** then press <Enter>.

Windows ® XP environment

a. Insert a 1.44 MB floppy disk to the floppy disk drive.
b. Click **Start** from the Windows® desktop, and then select **My Computer**.
c. Select the 3½ Floppy Drive icon.
d. Click **File** from the menu, and then select **Format**. A **Format 3½ Floppy Disk** window appears.
e. Select **Create an MS-DOS start-up disk** from the format options field, and then click **Start**.

Windows ® 2000 environment

To create a set of boot disks for Windows® 2000:

a. Insert a formatted, high density 1.44 MB floppy disk into the drive.
b. Insert the Windows® 2000 CD to the optical drive.
c. Click **Start**, and then select **Run**.
d. From the Open field, type

D:\bootdisk\makeboot a: (Assuming that d: is your optical drive)

e. Press <Enter>, then follow screen instructions to continue

2. Copy the original or the latest Motherboard BIOS file to the bootable floppy disk.

Updating the BIOS using Phoenix Phlash16 Utility

The Phoenix Phlash16 utility allows you to update the BIOS file in DOS environment using a bootable floppy disk with the updated BIOS file. This utility also allows you to copy the current BIOS file that you can use as backup when the BIOS fails or gets corrupted during the updating process.

To update the BIOS file using the Phoenix Phlash16 utility:

1. Visit the Viglen FTP site (ftp://ftp.viglen.co.uk/files) and download the latest BIOS file for the Vig410P Motherboard. Save the BIOS file to a bootable floppy disk.

Note: *Write the BIOS filename on a piece of paper. You need to type the exact BIOS filename at the DOS prompt.*

2. Copy the following files to the bootable floppy disk you created earlier:

   - Latest BIOS file (R1_0A.ROM)
   - AMI.BAT
   - AFUDOS.SMC

3. Boot the system in DOS mode, then at the prompt type:

   AMI.BAT filename.rom

   Where [filename] is the latest or the original BIOS file on the bootable floppy disk.

4. The utility verifies the file and starts updating the BIOS.

CAUTION!!

Do not shut down or reset the system while updating the BIOS to prevent system boot failure!

BIOS Setup Program

This Motherboard supports a programmable firmware chip that you can update using the provided utility described above.

Use the BIOS Setup program when you are installing a Motherboard, reconfiguring your system, or prompted to “Run Setup”. This section explains how to configure your system using this utility.

Even if you are not prompted to use the Setup program, you can change the configuration of your computer in the future. For example, you can enable the security password feature or change the power management settings. This requires you to reconfigure your system using the BIOS Setup program so that the computer can recognise these changes and record them in the CMOS RAM of the firmware hub.

The firmware hub on the Motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On-Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

The Setup program is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various sub-menus and make your selections from the available options using the navigation keys.

Note:

- *The default BIOS settings for this Motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the Load Default Settings item under the Exit Menu.*

- *The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.*

- *Visit the Viglen FTP site (ftp://ftp.viglen.co.uk/files) to download the latest BIOS file for this Motherboard.*

Note: *Default settings are in bold text unless otherwise noted.*

All main Setup options are described in this section. The main BIOS Setup screen is displayed below. Use the Up/Down arrow keys to move among the different settings in each menu. Use the Left/Right arrow keys to change the options for each setting. Press the <Esc> key to exit the CMOS Setup Menu. The next section describes in detail how to navigate through the menus. Items that use submenus are indicated with the _ icon. With the item highlighted, press the <Enter> key to access the submenu.

BIOS Menu Screen

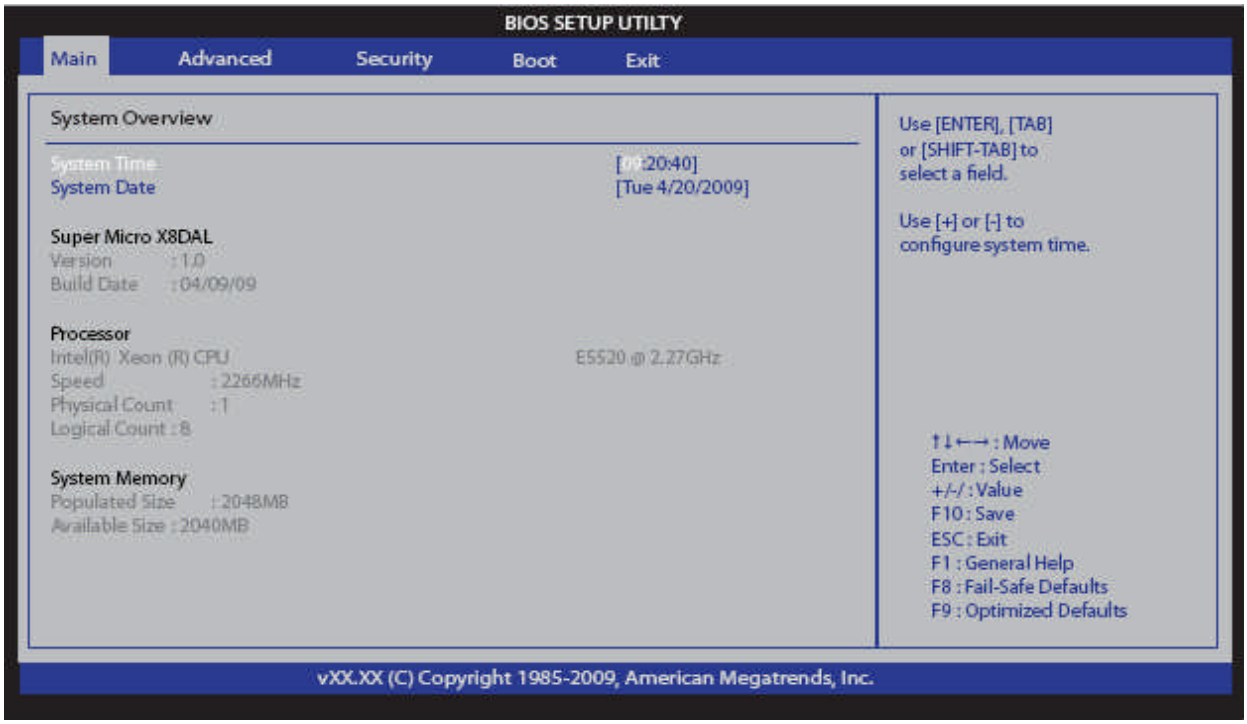


Figure 65 BIOS Screen Layout

- **Main Setup Features**

System Overview: The following BIOS information will be displayed:

System Time/System Date

Use this option to change the system time and date. Highlight *System Time* or *System Date* using the arrow keys. Key in new values through the keyboard and press <Enter>. Press the <Tab> key to move between fields. The date must be entered in Day MM/DD/YY format. The time is entered in HH:MM:SS format.

Note: The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00

Super Micro X8DAL BIOS

- **Version**: This item displays the BIOS revision used in your system.
- **Build Date**: This item displays the date when this BIOS was completed.

Processor

The AMI BIOS will automatically display the status of the processor used in your system:

- **CPU Type**: This item displays the type of CPU used in the Motherboard.
- **Speed**: This item displays the speed of the CPU detected by the BIOS.
- **Physical Count**: This item displays the number of processors installed in your system as detected by the BIOS.
- **Logical Count**: This item displays the number of CPU Cores installed in your system as detected by the BIOS.

System Memory

This displays the size of memory available in the system:

- **Populated Size**: This item displays the installed memory size detected by the BIOS.
- **Available Size**: This item displays the available memory detected by the BIOS.

- **Advanced Setup Configurations**

Choose Advanced from the BIOS Setup Utility main menu with the arrow keys. You should see the following display. The items with a triangle beside them have sub menus that can be accessed by highlighting the item and pressing <Enter>.

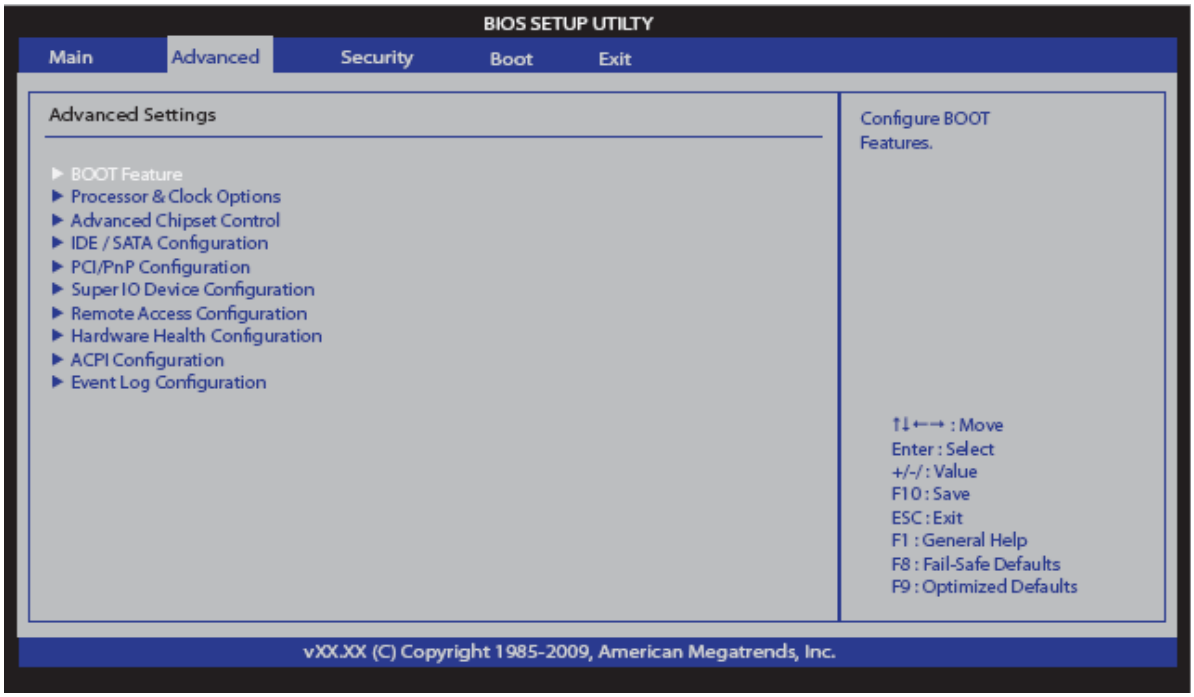


Figure 66: Advanced Settings

BOOT Features

Quick Boot

If Enabled, this option will skip certain tests during POST to reduce the time needed for system boot. The options are **Enabled** and Disabled.

Quiet Boot

This option allows the bootup screen options to be modified between POST messages or the OEM logo. Select Disabled to display the POST messages. Select Enabled to display the OEM logo instead of the normal POST messages. The options are **Enabled** and Disabled.

AddOn ROM Display Mode

This sets the display mode for Option ROM. The options are **Force BIOS** and Keep Current.

Bootup Num-Lock

This feature selects the Power-on state for Numlock key. The options are Off and **On**.

PS/2 Mouse Support
This feature enables support for the PS/2 mouse. The options are Disabled, Enabled and **Auto.**

Wait For 'F1' If Error
This forces the system to wait until the 'F1' key is pressed if an error occurs. The options are Disabled and **Enabled**.

Hit 'Del' Message Display
This feature displays "Press DEL to run Setup" during POST. The options are **Enabled** and Disabled.

Watch Dog Function
If enabled, the Watch Dog Timer will allow the system to reboot when it is inactive for more than 5 minutes. The options are Enabled and **Disabled.**

Power Button Function
If set to Instant_Off, the system will power off immediately as soon as the user hits the power button. If set to 4_Second_Override, the system will power off when the user presses the power button for 4 seconds or longer. The options are **Instant_Off** and 4_Second_Override.

Restore on AC Power Loss
Use this feature to set the power state after a power outage. Select Power-Off for the system power to remain off after a power loss. Select Power-On for the system power to be turned on after a power loss. Select Last State to allow the system to resume its last state before a power loss. The options are Power-On, Power-Off and **Last State**.

Interrupt 19 Capture
Interrupt 19 is the software interrupt that handles the boot disk function. When this item is set to Enabled, the ROM BIOS of the host adaptors will "capture" Interrupt 19 at boot and allow the drives that are attached to these host adaptors to function as bootable disks. If this item is set to Disabled, the ROM BIOS of the host adaptors will not capture Interrupt 19, and the drives attached to these adaptors will not function as bootable devices. The options are **Enabled** and Disabled.

Processor and Clock Options
This submenu allows the user to configure the Processor and Clock settings.

CPU Ratio
If set to Manual, this option allows the user to set the ratio between the CPU Core Clock and the System Bus Frequency. The options are **Auto** and Manual.

***Note**: if an invalid ratio is entered, the AMI BIOS will restore the setting to the previous state.*

Clock Spread Spectrum
Select Enable to use the feature of Clock Spectrum, which will allow the BIOS to monitor and attempt to reduce the level of Electromagnetic Interference caused by the components whenever needed. The options are **Disabled** and Enabled.

Hardware Prefetcher (Available when supported by the CPU)
If set to Enabled, the hardware pre fetcher will pre fetch streams of data and instructions from the main memory to the L2 cache in the forward or backward manner to improve CPU performance. The options are Disabled and **Enabled**.

Adjacent Cache Line Prefetch (Available when supported by the CPU)
The CPU fetches the cache line for 64 bytes if this option is set to Disabled. The CPU fetches both cache lines for 128 bytes as comprised if **Enabled**.

Intel® Virtualization Technology (Available when supported by the CPU)
Select Enabled to use the feature of Virtualization Technology to allow one platform to run multiple operating systems and applications in independent partitions, creating multiple "virtual" systems in one physical computer. The options are **Enabled** and Disabled.

Note: If there is any change to this setting, you will need to power off and restart the system for the change to take effect. Please refer to Intel's web site for detailed information.

Execute-Disable Bit Capability (Available when supported by the OS and the CPU)
Set to Enabled to enable the Execute Disable Bit which will allow the processor to designate areas in the system memory where an application code can execute and where it cannot, thus preventing a worm or a virus from flooding illegal codes to overwhelm the processor or damage the system during an attack. The default is **Enabled**. (Refer to Intel and Microsoft Web Sites for more information.)

Simultaneous Multi-Threading (Available when supported by the CPU)
Set to Enabled to use the Simultaneous Multi-Threading Technology, which will result in increased CPU performance. The options are Disabled and **Enabled.**

Active Processor Cores
Set to Enabled to use a processor's Second Core and beyond. (Please refer to Intel's web site for more information.) The options are **All,** 1 and 2.

Intel® EIST Technology
EIST (Enhanced Intel SpeedStep Technology) allows the system to automatically adjust processor voltage and core frequency in an effort to reduce power consumption and heat dissipation. Please refer to Intel's web site for detailed information.
The options are Disable (Disable GV3) and Enable (Enable GV3).

Intel® TurboMode Technology (Available when Intel® EIST Technology is enabled)
Select Enabled to use the Turbo Mode to boost system performance. The options are **Enabled** and Disabled.

C1E Support
Select Enabled to use the feature of Enhanced Halt State. C1E significantly reduces the CPU's power consumption by reducing the CPU's clock cycle and voltage during a "Halt State." The options are Disabled and **Enabled**.

Intel® C-STATE Tech
This feature allows the user to set Processor Idle state for power saving. The options are Disabled and **Enabled.**

C-State package limit setting (Available when Intel® C-State Tech is enabled)
If set to Auto, the AMI BIOS will automatically set the limit on the C-State package register. The options are **Auto**, C1, C3, C6 and C7.

C3 State
This feature allows the user to decide how the onboard 5500 Series processor will act at C3 State. The options are Disabled, **ACPI 2** and ACPI 3**.**

C6 State
This feature allows the user to decide how the onboard 5500 Series processor will act at C6 State. The options are Disabled and **Enabled.**

C3 Auto Demotion
When enabled, the CPU will conditionally demote C6 or C7 requests to C3 based on un-core auto-demote information. The options are Disabled and **Enabled.**

DCA Technology
This feature accelerates the performance of TOE devices.

Note: A TOE device is a specialized, dedicated processor that is installed on an add-on card or a network card to handle some or all packet processing of this add-on card.

For this Motherboard, the TOE device is built inside the ESB 2 South Bridge chip. This feature is supported only by some types of processors (i.e., Intel Nehalem-WS 1S). The options are **Enabled** and Disabled.

DCA Prefetch Delay
A DCA Prefetch is used with TOE components to prefetch data in order to shorten execution cycles and maximize data processing efficiency. Prefetching too frequently can saturate the cache directory and delay necessary cache accesses. This feature reduces or increases the frequency the system prefetches data. The options are [8], [16], **[32]**, [40], [48], [56], [64], [72], [80], [88], [96], [104], [112], [120]

Advanced Chipset Control

The items included in the Advanced Settings submenu are listed below:

QPI & IMC Configuration

QPI Links Speed
This feature selects QPI's data transfer speed. The options are Slow-mode, and **Full Speed**.

QPI Frequency
This selects the desired QPI frequency. The options are **Auto**, 4.800 GT, 5.866GT, 6.400 GT.

QPI L0s and L1
This enables the QPI power state to low power. L0s and L1 are automatically selected by the Motherboard. The options are **Disabled** and Enabled.

Memory Frequency
This feature forces a DDR3 frequency slower than what the system has detected. The available options are **Auto**, Force DDR-800, Force DDR-1066, and Force DDR-1333.

Memory Mode
The options are **Independent**, Channel Mirror, and Lockstep. Independent - All DIMMs are available to the operating system. Channel Mirror - The Motherboard maintains two identical copies of all data in memory for redundancy. Lockstep - The Motherboard uses two areas of memory to run the same set of operations in parallel.

Demand Scrubbing
A memory error-correction scheme where the Processor writes corrected data back into the memory block from where it was read by the Processor. The options are Enabled and **Disabled**.

Patrol Scrubbing
A memory error-correction scheme that works in the background looking for and correcting resident errors. The options are Enabled and **Disabled**.

Throttling - Closed Loop / Throttling - Open Loop
Throttling improves reliability and reduces power in the processor by automatic voltage control during processor idle states. Available options are **Disabled** and Enabled. If Enabled, the following items will appear:

> **Hysteresis Temperature (Closed Loop only)**
> Temperature Hysteresis is the temperature lag (in degrees Celsius) after the set DIMM temperature threshold is reached before Closed Loop Throttling begins. The options are **Disabled**, 1.5oC, 3.0oC, and 6.0oC.

Guardband Temperature (Closed Loop only)
This is the temperature which applies to the DIMM temperature threshold. Each step is in 0.5oC increment. The default is **[006]**. Press "+" or "-" on your keyboard to change this value.

Inlet Temperature
This is the temperature detected at the chassis inlet. Each step is in 0.5oC increment. The default is **[070]**. Press "+" or "-" on your keyboard to change this value.

Temperature Rise
This is the temperature rise to the DIMM thermal zone. Each step is in 0.5oC increment. The default is **[020]**. Press "+" or "-" on your keyboard to change this value.

Air Flow
This is the air fl ow speed to the DIMM modules. Each step is one mm/sec. The default is **[1500]**. Press "+" or "-" on your keyboard to change this value.

Altitude
This feature defi nes how many meters above or below sea level the system is located. The options are **Sea Level or Below,** 1~300, 301~600, 601~900, 901~1200, 1201~1500, 1501~1800, 1801~2100, 2101~2400, 2401~2700, 2701~3000.

DIMM Pitch
Use this feature to set the physical space between each DIMM module. Each step is in 1/1000 of an inch. The default is **[400]**. Press <+> or <-> to change the value.

Intel VT-d
Select Enabled to enable Intel's Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to VMM through the DMAR ACPI Tables. This feature offers fully-protected I/O resource-sharing across the Intel platforms, providing the user with greater reliability, security and availability in networking and data-sharing. The settings are Enabled and **Disabled**.

SR-IOV Support
Single Root I/O Virtualization is an industry-standard mechanism that allows devices to advertise their capability to be simultaneously shared among several virtual machines. SR-IOV is capable of partitioning a PCI function into several virtual interfaces for sharing the resources of a PCI Express device under a virtual environment. The options are Disabled and **Enabled.**

NUMA Support
Select Enabled to enable Non-Uniform Memory Access support to enhance software execution performance for NUMA-aware operating systems. Select Disabled for better memory accessibility for non-NUMA operating systems. The options are **Enabled** and Disabled.

Intel I/OAT
The Intel I/OAT (I/O Acceleration Technology) significantly reduces CPU overhead by leveraging CPU architectural improvements, freeing resources for more other tasks. The options are Disabled and Enabled.

Active State Power Management
Select Enabled to start Active-State Power Management for signal transactions between L0 and L1 Links on the PCI Express Bus. This maximizes power-saving and transaction speed. The options are Enabled and **Disabled**.

Route Port 80h Cycle to
Use this item to decide where to route Port 80h Cycle to. The Options are LPC and **PCI**.

USB Functions
This feature allows the user to decide the number of onboard USB ports to be enabled. The Options are: Disabled, 2 USB ports, 4 USB ports, 6 USB ports, 8 USB ports, 10 USB ports and **12 USB ports**.

USB 2.0 Controller
Select Enabled to activate the onboard USB2.0 controller. The options are **Enabled** and Disabled.

Legacy USB Support
Select Enabled to use Legacy USB devices. If this item is set to Auto, Legacy USB support will be automatically enabled if a legacy USB device is installed on the Motherboard, and vise versa. The settings are Disabled, Enabled and **Auto**.

IDE/SATA Configuration

When this submenu is selected, the AMI BIOS automatically detects the presence of the IDE devices and displays the following items:

SATA#1 Configuration
If Compatible is selected, it sets SATA#1 to legacy compatibility mode, while selecting Enhanced sets SATA#1 to native SATA mode. The options are Disabled, Compatible and **Enhanced**.

> **Configure SATA#1 as**
> This feature allows the user to select the drive type for SATA#1. The options are **IDE,** RAID and AHCI. (When the option-RAID is selected, the item-ICH RAID Code Base will appear.

ICH RAID Code Base (This feature is available when the option-RAID is selected)
Select Intel to enable Intel's SATA RAID firmware to configure Intel's SATA RAID settings. Select Adaptec to enable Adaptec's SATA RAID firmware to configure Adaptec's SATA RAID settings. The options are **Intel** and Adaptec.

SATA#2 Configuration (This feature is available when the option-IDE is selected)
Selecting Enhanced will set SATA#2 to native SATA mode. The options are Disabled, and **Enhanced**.

IDE Detect Timeout (sec)
Use this feature to set the time-out value for the BIOS to detect the ATA, ATAPI devices installed in the system. The options are 0 (sec), 5, 10, 15, 20, 25, 30, and **35**.

Primary IDE Master/Slave, Secondary IDE Master/Slave, Third IDE Master, and Fourth IDE Master
These settings allow the user to set the parameters of Primary IDE Master/Slave, Secondary IDE Master/Slave, Third and Fourth IDE Master slots. Hit <Enter> to activate the following submenu screen for detailed options of these items. Set the correct configurations accordingly. The items included in the submenu are:

Type
Select the type of device connected to the system. The options are Not Installed, **Auto**, CD/DVD and ARMD.

LBA/Large Mode
LBA (Logical Block Addressing) is a method of addressing data on a disk drive. In the LBA mode, the maximum drive capacity is 137 GB. For drive capacities over 137 GB, your system must be equipped with a 48-bit LBA mode addressing. If not, contact your manufacturer or install an ATA/133 IDE controller card that supports 48-bit LBA mode. The options are Disabled and **Auto**.

Block (Multi-Sector Transfer)
Block Mode boosts the IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if Block Mode is not used. Block Mode allows transfers of up to 64 KB per interrupt. Select Disabled to allow data to be transferred from and to the device one sector at a time. Select Auto to allow data transfer from and to the device occur multiple sectors at a time if the device supports it. The options are **Auto** and Disabled.

PIO Mode
The IDE PIO (Programmable I/O) Mode programs timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases. The options are **Auto**, 0, 1, 2, 3, and 4.

Select Auto to allow the AMI BIOS to automatically detect the PIO mode. Use this value if the IDE disk drive support cannot be determined.

- Select 0 to allow the AMI BIOS to use PIO mode 0. It has a data transfer rate of 3.3 MBs.
- Select 1 to allow the AMI BIOS to use PIO mode 1. It has a data transfer rate of 5.2 MBs.
- Select 2 to allow the AMI BIOS to use PIO mode 2. It has a data transfer rate of 8.3 MBs.
- Select 3 to allow the AMI BIOS to use PIO mode 3. It has a data transfer rate of 11.1 MBs.
- Select 4 to allow the AMI BIOS to use PIO mode 4. It has a data transfer bandwidth of 32-Bits. Select Enabled to enable 32-Bit data transfer.

DMA Mode
Select Auto to allow the BIOS to automatically detect IDE DMA mode when the IDE disk drive support cannot be determined.

- Select SWDMA0 to allow the BIOS to use Single Word DMA mode 0. It has a data transfer rate of 2.1 MBs.
- Select SWDMA1 to allow the BIOS to use Single Word DMA mode 1. It has a data transfer rate of 4.2 MBs.
- Select SWDMA2 to allow the BIOS to use Single Word DMA mode 2. It has a data transfer rate of 8.3 MBs.
- Select MWDMA0 to allow the BIOS to use Multi Word DMA mode 0. It has a data transfer rate of 4.2 MBs.
- Select MWDMA1 to allow the BIOS to use Multi Word DMA mode 1. It has a data transfer rate of 13.3 MBs.
- Select MWDMA2 to allow the BIOS to use Multi-Word DMA mode 2. It has a data transfer rate of 16.6 MBs.
- Select UDMA0 to allow the BIOS to use Ultra DMA mode 0. It has a data transfer rate of 16.6 MBs. It has the same transfer rate as PIO mode 4 and Multi Word DMA mode 2.
- Select UDMA1 to allow the BIOS to use Ultra DMA mode 1. It has a data transfer rate of 25 MBs.
- Select UDMA2 to allow the BIOS to use Ultra DMA mode 2. It has a data transfer rate of 33.3 MBs.
- Select UDMA3 to allow the BIOS to use Ultra DMA mode 3. It has a data transfer rate of 66.6 MBs.
- Select UDMA4 to allow the BIOS to use Ultra DMA mode 4. It has a data transfer rate of 100 MBs.

- Select UDMA5 to allow the BIOS to use Ultra DMA mode 5. It has a data transfer rate of 133 MBs.
- Select UDMA6 to allow the BIOS to use Ultra DMA mode 6. It has a data transfer rate of 133 MBs. The options are **Auto**, SWDMAn, MWDMAn, and UDMAn.

S.M.A.R.T. For Hard disk drives
Self-Monitoring Analysis and Reporting Technology (SMART) can help predict impending drive failures. Select Auto to allow the AMI BIOS to automatically detect hard disk drive support. Select Disabled to prevent the AMI BIOS from using the S.M.A.R.T. Select Enabled to allow the AMI BIOS to use the S.M.A.R.T. to support hard drive disk. The options are Disabled, Enabled, and **Auto**.

32Bit Data Transfer
Select Enable to enable the function of 32-bit IDE data transfer. The options are **Enabled** and Disabled.

Hot Plug (This feature is available when the option-AHCI Under "Configure SATA#1 as" is selected)
Select Enable to enable the hot plug function for the SATA devices. The options are **Enabled** and Disabled.

PCI/PnP Configuration

Clear NVRAM
This feature clears the NVRAM during system boot. The options are **No** and Yes.

Plug & Play OS
Selecting **Yes** allows the OS to configure Plug & Play devices. (This is not required for system boot if your system has an OS that supports Plug & Play.) Select No to allow the AMI BIOS to configure all devices in the system.

PCI Latency Timer
This feature sets the latency Timer of each PCI device installed on a PCI bus. Select 64 to set the PCI latency to 64 PCI clock cycles. The options are 32, **64**, 96, 128, 160, 192, 224 and 248.

PCI IDE BusMaster
When enabled, the BIOS uses PCI bus mastering for reading/writing to IDE drives. The options are Disabled and **Enabled.**

PCIe IO Performance
Some add-on cards perform faster with the coalesce feature, which limits the payload size to 128 MB; while others, with a payload size of 256 MB which inhibits the coalesce feature. Please refer to your add-on card user guide for the desired setting. The options are 256 MB and **128MB**.

Slot 2 PCIE X4 in X8 Slot, Slot 3 PCIE X4 in X16 Slot, Slot 4 PCI 33MHz, Slot 5 PCI 33MHz, Slot 6 PCIE X16
This feature allows you to Enable or Disable the Option ROM of a PCI slot specified. The options are **Enable** and Disable.

Load Onboard LAN1 Option ROM/Load Onboard LAN2 Option ROM
Select Enabled to enable the onboard LAN1 or LAN2 Option ROM. This is to boot computer using a network interface. The options are Enabled and **Disabled.**

Load Onboard SAS Option ROM
Select Enabled to enable the onboard SAS Option ROM. This is to boot computer using a network interface. The options are Enabled and **Disabled.**

Boot Graphics Adapter Priority
This feature allows the user to select the priority graphics adapter for system boot. The options are **Slot 6** and Other.

Super IO Device Configuration

Serial Port1 Address/ Serial Port2 Address
This option specifies the base I/O port address and the Interrupt Request address of Serial Port 1 and Serial Port 2. Select Disabled to prevent the serial port from accessing any system resources. When this option is set to Disabled, the serial port physically becomes unavailable. Select 3F8/IRQ4 to allow the serial port to use 3F8 as its I/O port address and IRQ 4 for the interrupt address. The options for Serial Port1 are Disabled, **3F8/IRQ4**, 3E8/IRQ4, 2E8/IRQ3. The options for Serial Port2 are Disabled, **2F8/IRQ3**, 3E8/IRQ4, and 2E8/IRQ3.

Remote Access Configuration

Remote Access
This allows the user to enable the Remote Access feature. The options are **Disabled** and Enabled.

If Remote Access is set to Enabled, the following items will display:

Serial Port Number
This feature allows the user decide which serial port to be used for Console Redirection. The options are **COM 1** and COM 2.

Base Address, IRQ
This item displays the based address and IRQ of the serial port specified above.

Serial Port Mode
This feature allows the user to set the serial port mode for Console Redirection. The options are **115200 8, n 1**; 57600 8, n, 1; 38400 8, n, 1; 19200 8, n, 1; and 9600 8, n, 1.

Flow Control
This feature allows the user to set the flow control for Console Redirection. The options are **None**, Hardware, and Software.

Redirection After BIOS POST
Select Disabled to turn off Console Redirection after Power-On Self-Test (POST). Select Always to keep Console Redirection active all the time after POST. (Note: This setting may not be supported by some operating systems.) Select Boot Loader to keep Console Redirection active during POST and Boot Loader. The options are Disabled, Boot Loader, and **Always**.

Terminal Type
This feature allows the user to select the target terminal type for Console Redirection. The options are ANSI, **VT100**, and VT-UTF8.

VT-UTF8 Combo Key Support
A terminal keyboard definition that provides a way to send commands from a remote console. Available options are **Enabled** and Disabled.

Sredir Memory Display Delay
This feature defines the length of time in seconds to display memory information. The options are **No Delay,** Delay 1 Sec, Delay 2 Sec, and Delay 4 Sec.

Hardware Health Monitor

This feature allows the user to monitor system health and review the status of each item as displayed.

CPU Overheat Alarm
This option allows the user to select the CPU Overheat Alarm setting which determines when the CPU OH alarm will be activated to provide warning of possible CPU overheat.

Warning!

1. Any temperature that exceeds the CPU threshold temperature predefined by the CPU manufacturer may result in CPU overheat or system instability. When the CPU temperature reaches this predefined threshold, the CPU and system cooling fans will run at full speed.
2. To avoid possible system overheating, please be sure to provide adequate airflow to your system.

The options are:

- **The Early Alarm:** Select this setting if you want the CPU overheat alarm (including the LED and the buzzer) to be triggered as soon as the CPU temperature reaches the CPU overheat threshold as predefined by the CPU manufacturer.

- **The Default Alarm**: Select this setting if you want the CPU overheat alarm (including the LED and the buzzer) to be triggered when the CPU temperature reaches about 5oC above the threshold temperature as predefined by the CPU manufacturer to give the CPU and system fans additional time needed for CPU and system cooling. In both the alarms above, please take immediate action as shown below.

CPU1 Temperature/CPU2 Temperature/System Temperature
This feature displays current temperature readings for the CPU and the System.
The following items will be displayed for your reference only:

CPU1 Temperature/CPU2 Temperature
The CPU Temperatures feature will display the CPU temperature status as detected by the BIOS:

Low – This level is considered as the 'normal' operating state. The CPU temperature is well below the CPU 'Temperature Tolerance'. The Motherboard fans and CPU will run normally as configured in the BIOS (Fan Speed Control).
User intervention: No action required.

Medium – The processor is running warmer. This is a 'precautionary' level and generally means that there may be factors contributing to this condition, but the CPU is still within its normal operating state and below the CPU 'Temperature Tolerance'. The Motherboard fans and CPU will run normally as configured in the BIOS. The fans may adjust to a faster speed depending on the Fan Speed Control settings. User intervention: No action is required. However, consider checking the CPU fans and the chassis ventilation for blockage.

High – The processor is running hot. This is a 'caution' level since the CPU's 'Temperature Tolerance' has been reached (or has been exceeded) and may activate an overheat alarm. The system may shut down if it continues for a long period to prevent damage to the CPU.

User intervention: If the system buzzer and Overheat LED has activated, take action immediately by checking the system fans, chassis ventilation and room temperature to correct any problems.

Notes:
The CPU thermal technology that reports absolute temperatures (Celsius/Fahrenheit) has been upgraded to a more advanced feature by Intel in its newer processors. The basic concept is each CPU is embedded by unique temperature information that the Motherboard can read. This 'Temperature Threshold' or 'Temperature Tolerance' has been assigned at the factory and is the baseline on which the Motherboard takes action during different CPU temperature conditions (i.e., by increasing CPU Fan speed, triggering the Overheat Alarm, etc). Since CPUs can have different 'Temperature Tolerances', the installed CPU can now send information to the Motherboard what its 'Temperature Tolerance' is, and not the other way around. This results in better CPU thermal management. Supermicro has leveraged this feature by assigning a temperature status to certain thermal conditions in the processor (Low, Medium and

High). This makes it easier for the user to understand the CPU's temperature status, rather than by just simply seeing a temperature reading (i.e., 25oC). The information provided above is for your reference only. For more information on thermal management, please refer to Intel's Web site at www.Intel.com.

System Temperature: The system temperature will be displayed (in degrees in Celsius and Fahrenheit) as it is detected by the BIOS.

Fan Speed Readings
This feature displays the fan speed readings from Fan1 through Fan8.

Fan Speed Control Monitor
This feature allows the user to decide how the system controls the speeds of the onboard fans. The CPU temperature and the fan speed are correlative. When the CPU on-die temperature increases, the fan speed will also increase, and vice versa. Select Workstation if your system is used as a Workstation. Select Server if your system is used as a Server. Select Disabled to disable the fan speed control function and allow the onboard fans to constantly run at full speed. The Options are: Full Speed, Server, Workstation/Desktop, and **Super Quiet**.

Voltage Readings
The following voltage readings will be displayed.
Vcore1, Vcore2, 1.5V, 5VDD, 5VSB, 12V, -12V, 3.3Vcc, 3.3VSB, VBAT and Vtt.

ACPI Configuration

Use this feature to configure Advanced Configuration and Power Interface (ACPI) power management settings for your system.

High Performance Event Timer
Select Enabled to activate the High Performance Event Timer (HPET) that produces periodic interrupts at a much higher frequency than a Real-time Clock (RTC) does in synchronizing multimedia streams, providing smooth playback and reducing the dependency on other timestamp calculation devices, such as an x86 RDTSC Instruction embedded in the CPU. The High Performance Event Timer is used to replace the 8254 Programmable Interval Timer. The options are **Enabled** and Disabled.

USB Device Wakeup
Select Enable to "wake-up" the system via a USB device when the system is in S3 or S4 State. The options are Enabled and **Disabled**.

PS2 KB/MS Wake Up
Select Enable to "wake-up" the system using either the PS2 keyboard or mouse (if equipped) when the system is in S3 (Sleep) or S4 (Hibernate) state. The options are Enabled and **Disabled**.

ACPI Aware O/S
Enable ACPI support if it is supported by the OS to control ACPI through the Operating System. Otherwise, disable this feature. The options are **Yes** and No.

Suspend Mode
This setting allows you to configure the ACPI (Advanced Configuration and Power Interface) state for your system when it is in the Suspend mode. The options are S1 (POS), **S3 (STR)** and Auto.

ACPI APIC Support
Select Enabled to include the ACPI APIC Table Pointer in the RSDT (Root System Description Table) pointer list. The options are **Enabled** and Disabled.

APIC ACPI SCI IRQ
When this item is set to Enabled, APIC ACPI SCI IRQ is supported by the system.
The options are Enabled and **Disabled**.

Headless Mode
This feature is used to enable system to function without a keyboard, monitor and/ or mouse attached The options are Enabled and **Disabled**.

ACPI Version Features
The options are ACPI v1.0, **ACPI v2.**0 and ACPI v3.0. Please refer to ACPI's website for further explanation: http://www.acpi.info/.

Event Log Configuration

View Event Log
Use this option to view the System Event Log.

Mark all events as read
This option marks all events as read. The options are OK and Cancel.

Clear event log
This option clears the Event Log memory of all messages. The options are OK and **Cancel.**

PCIe Error Log
Use this option to enable PCI-Exp. error (PERR) logging. The options are **Yes** and No.

Security Settings

The AMI BIOS provides a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first.

Supervisor Password
This item indicates if a Supervisor password has been entered for the system. "Not Installed" means a Supervisor password has not been used.

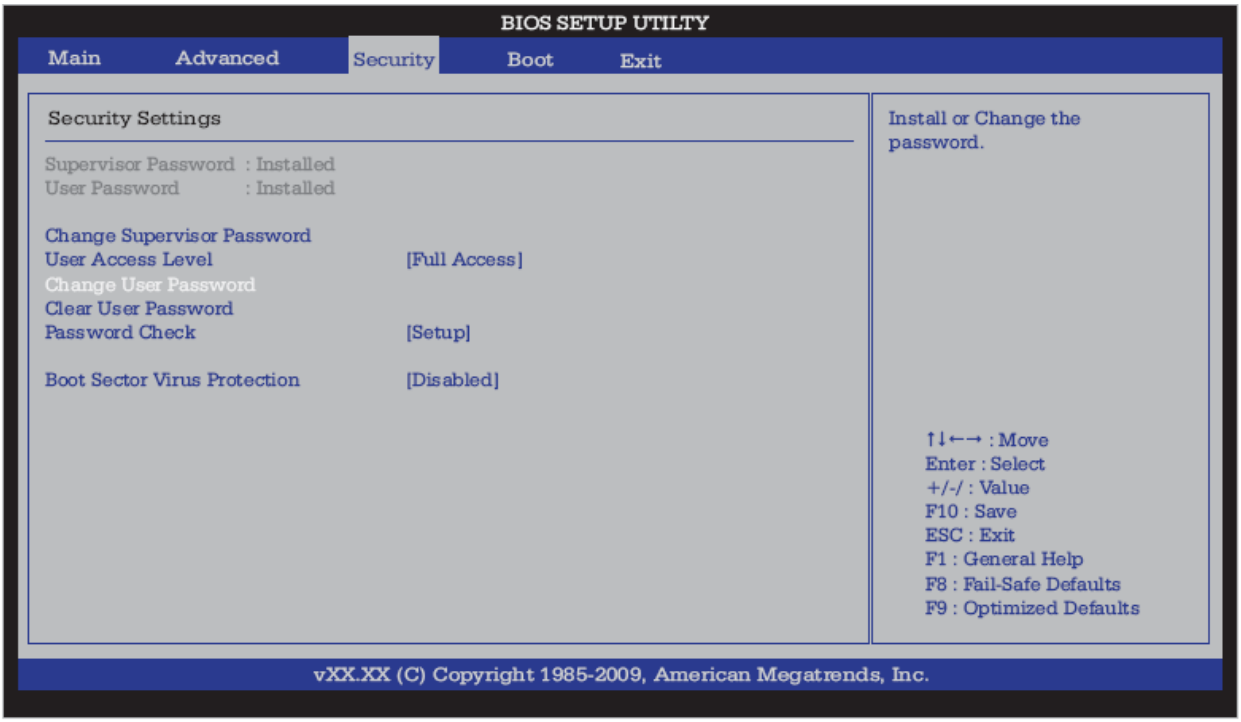


Figure 67: Security Settings

User Password
This item indicates if a user password has been entered for the system. "Not Installed" means that a user password has not been used.

Change Supervisor Password
Select this feature and press <Enter> to access the submenu, and then type in a new Supervisor Password.

User Access Level (Available when Supervisor Password is set as above) Available options are **Full Access**: grants full User read and write access to the Setup Utility, View Only: allows access to the Setup Utility but the fields cannot be changed, Limited: allows only limited fields to be changed such as Date and Time, No Access: prevents User access to the Setup Utility.

Change User Password
Select this feature and press <Enter> to access the submenu , and then type in a new User Password.

Clear User Password (Available only when User Password has been set)
This item allows you to clear a user password after it has been entered.

Password Check
This item allows you to check a password after it has been entered. The options are **Setup** and Always.

Boot Sector Virus Protection
When Enabled, the AMI BIOS displays a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive. The options are Enabled and **Disabled**.

Boot Configuration

Use this feature to configure boot settings.

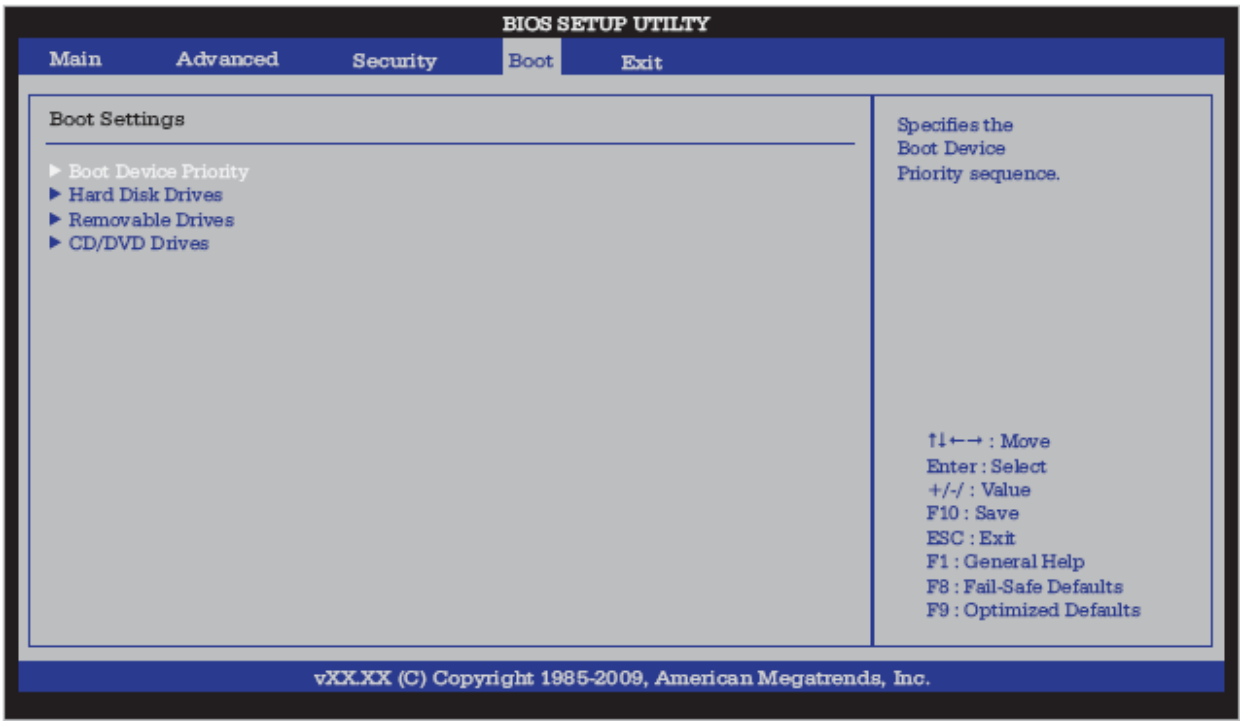


Figure 68: BIOS Setup Utility

Boot Device Priority
This feature allows the user to specify the sequence of priority for the Boot Device. The settings are 1st boot device, 2nd boot device, 3rd boot device, 4th boot device, 5th boot device and Disabled.

- 1st Boot Device - [USB: XXXXXXXXX]
- 2nd Boot Device - [CD/DVD: XXXXXXXXX]

Hard Disk Drives
This feature allows the user to specify the boot sequence from all available hard disk drives. The settings are Disabled and a list of all hard disk drives that have been detected (i.e., 1st Drive, 2nd Drive, 3rd Drive, etc).

- 1st Drive - [SATA: XXXXXXXXX]

Removable Drives
This feature allows the user to specify the boot sequence from available Removable Drives. The settings are 1st boot device, 2nd boot device, and Disabled.

- 1st Drive - [USB: XXXXXXXXX]
- 2nd Drive

CD/DVD Drives
This feature allows the user to specify the boot sequence from available CD/DVD Drives (i.e., 1st Drive, 2nd Drive, etc).

Exit Options

Select the Exit tab from the AMI BIOS Setup Utility screen to enter the Exit BIOS Setup screen.

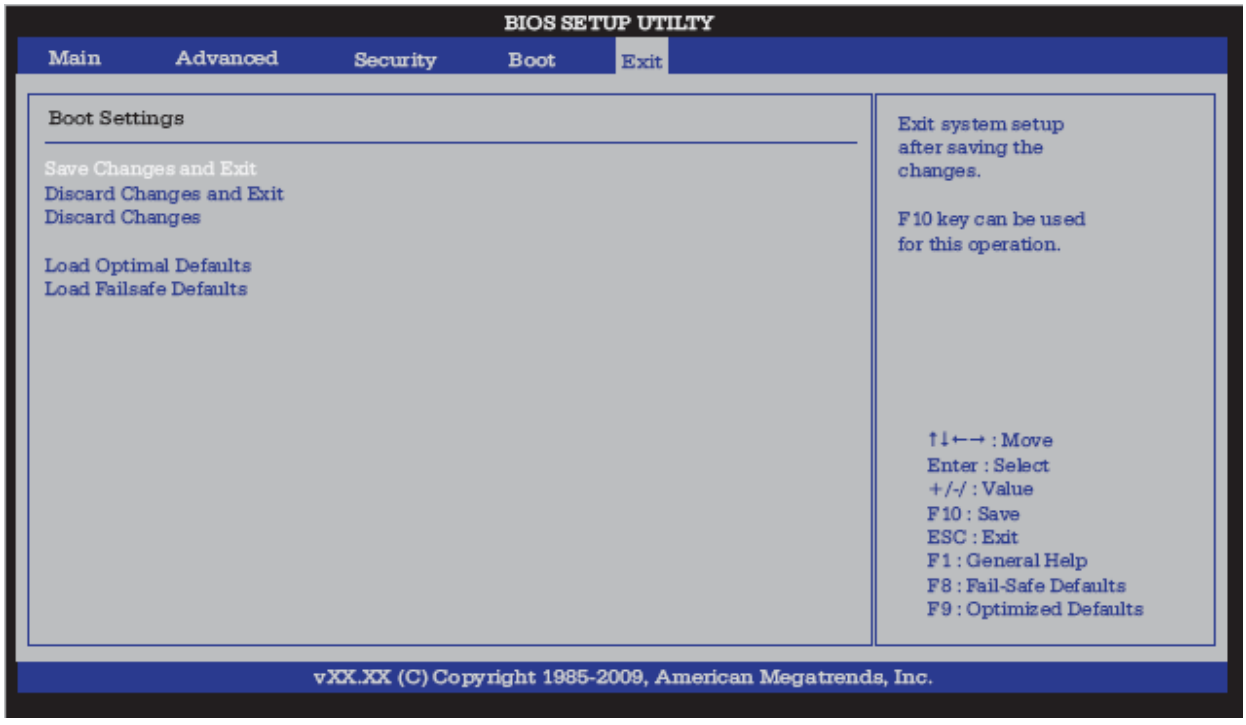


Figure 69: Exit Menu

Save Changes and Exit
When you have completed the system configuration changes, select this option to leave the BIOS Setup Utility and reboot the computer, so the new system configuration

parameters can take effect. Select Save Changes and Exit from the Exit menu and press <Enter>.

Discard Changes and Exit
Select this option to quit the BIOS Setup without making any permanent changes to the system configuration, and reboot the computer. Select Discard Changes and Exit from the Exit menu and press <Enter>.

Discard Changes
Select this option and press <Enter> to discard all the changes and return to the AMI BIOS Utility Program.

Load Optimal Defaults
To set this feature, select Load Optimal Defaults from the Exit menu and press <Enter>. Then, select OK to allow the AMI BIOS to automatically load Optimal Defaults to the BIOS Settings. The Optimal settings are designed for maximum system performance, but may not work best for all computer applications.

Load Fail-Safe Defaults
To set this feature, select Load Fail-Safe Defaults from the Exit menu and press <Enter>. The Fail-Safe settings are designed for maximum system stability, but not for maximum performance.

Chapter 6: BIOS Recovery

Warning!

Do not upgrade the BIOS unless your system has a BIOS-related issue. Flashing the wrong BIOS can cause irreparable damage to the system. In no event shall Viglen be liable for direct, indirect, special, incidental, or consequential damages arising from a BIOS update. If you need to update the BIOS, do not shut down or reset the system while the BIOS is updating. This is to avoid possible boot failure.

How to Recover the AMIBIOS Image (The Main BIOS Block)

An AMIBIOS fl ash chip consists of a boot sector block, and a main BIOS code block (a main BIOS image). The boot sector block contains critical BIOS code, including memory detection and recovery code to be used to fl ash a new BIOS image if the original BIOS Image is corrupted. When the system is powered on, the boot sector code executes first. Once it is completed, the main BIOS code will continue with system initialization and complete the bootup process.

Notes:

BIOS Recovery described below is used when the main BIOS block crashes. However, when the BIOS Boot sector crashes, you will need to send the Motherboard back to Viglen for RMA repairs.

Boot Sector Recovery from a USB Device

This feature allows the user to recover a BIOS image using a USB device without additional utilities needed. A user can download the BIOS image into a USB flash device, and name the file "SUPER.ROM" for the recovery process to load the file. A USB fl ash device such as a USB Flash Drive, a USB CDROM or a USB CDRW device can be used for this purpose,

1. Insert the USB device that contains the new BIOS image (the ROM files) saved in a root directory into your USB drive.

2. While turning the power on, press and hold <Ctrl> and <Home> at the same time until the USB Access LED Indicator comes on. This might take a few seconds.

3. Once the USB drive LED is on, release the <Ctrl> and <Home> keys. AMIBIOS will issue beep codes to indicate that the BIOS ROM file is being updated.

4. When BIOS flashing is completed, the computer will reboot. Do not interrupt the flashing process until it is completed.

Boot Sector Recovery from an IDE CD-ROM

This process is almost identical to the process of Boot Sector Recovery from a USB device, except that the BIOS image file is loaded from a CD-ROM. Use a CD-R or CD-RW drive to burn a CD with the BIOS image file in it, and name the file "SUPER.ROM" for the recovery process to load the file.

Boot Sector Recovery from a Serial Port (“Serial Flash”)

This process, also known as "Serial Flash," allows the user to use a serial port to load a BIOS image for Boot Sector recovery. This feature is usually used for embedded systems that rely on a serial port for remote access and debugging.

Requirements

In order to use Serial Flash for Boot Sector Recovery, you will need to meet the following requirements.

- The "Target system," the system that needs BIOS updates, must have a serial port and "Serial Flash" support embedded in the BIOS image file.
- The "Host system" should also have a serial port and a terminal program that supports XModem Transfer protocol (Hyper Terminal for the Windows operating systems, and minicom for Linux/FreeSBD, etc.).
- A Null_modem serial cable

How to use Serial Flash for Boot Sector Recovery

1. Connect a Null_modem serial cable between the target system and the host system that runs the terminal program.
2. Make sure that the new BIOS Image fi le is accessible for the host system.
3. Start the terminal program on the host system and create a new connection.

Use the following communication parameters for the new connection.

- Bits per second: 115200 bits/sec.
- Data Bits: 8
- Parity: None
- Stop Bit: 1
- Flow Control: None

4. Power on your system and click the <Connect> button in the Hyper Terminal. The terminal screen will display the following messages.

```
Press <SpaceBar> to update BIOS.
Confirm update BIOS? (y/n) y
Begin remote BIOS flash? (y/n) y
Starting remote flash.
Upload new BIOS file using Xmodem protocol.
```

Figure 70: Hyper Terminal Screen

5. Following the instructions given on the screen to update the BIOS. These instructions are also shown below.

   A. At the prompt, press the <SpaceBar> to update the BIOS.
   B. When asked to confi m BIOS updating, press <y> to confirm BIOS updates.
   C. Press <y> again to begin flashing BIOS remotely.

Note:

Be sure to complete Steps A~C above quickly because you have a second or less to do so.

6. Once you've completed the instructions given, a screen will display to indicate that remote flashing is starting and the new BIOS file is being uploaded.

7. To use Hyper Terminal to transfer the XModem protocol by using the "Send File" dialog under the "Transfer" menu, follow the instructions below to complete XModem transfers.

   A. Select the "Transfer" menu and enter <Send>.

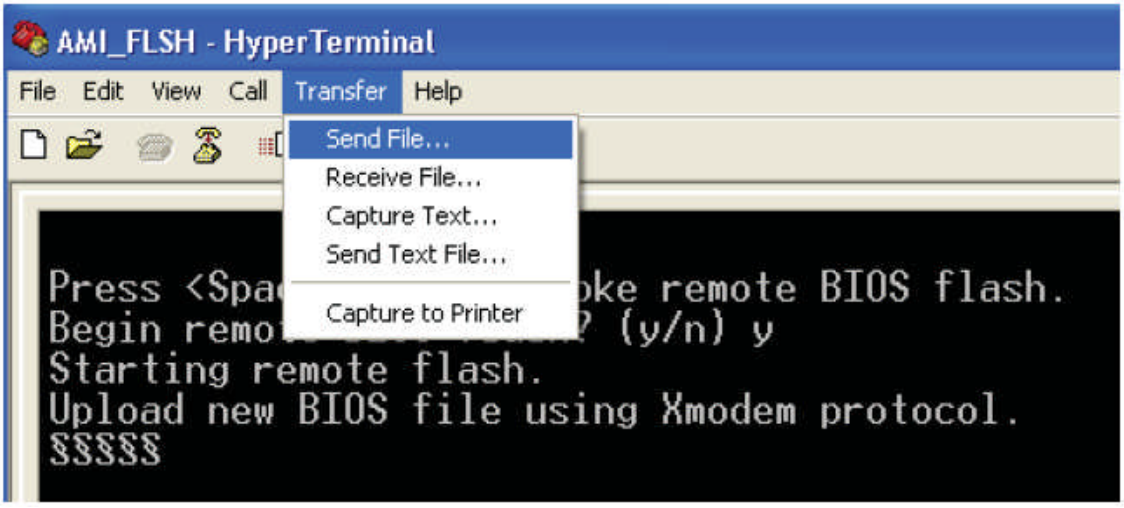


Figure 71: XModem transfers

B. Specify the location of the ROM fi le and select the proper protocol (XModem).

C. Press <Send> to start ROM File extraction. (See the picture below.)

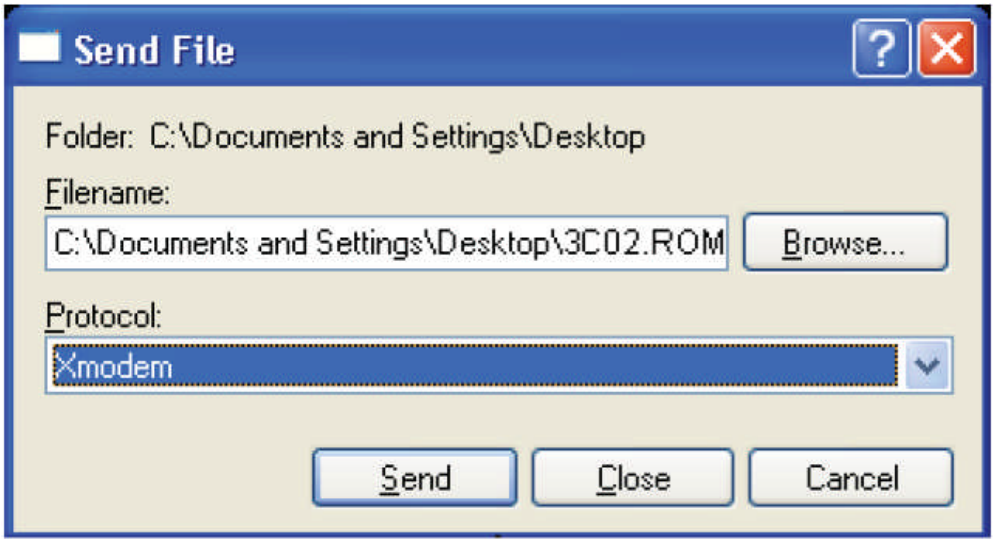


Figure 72: ROM File extraction

D. Once the ROM file extraction is completed, the message: "New BIOS received OK" will display.

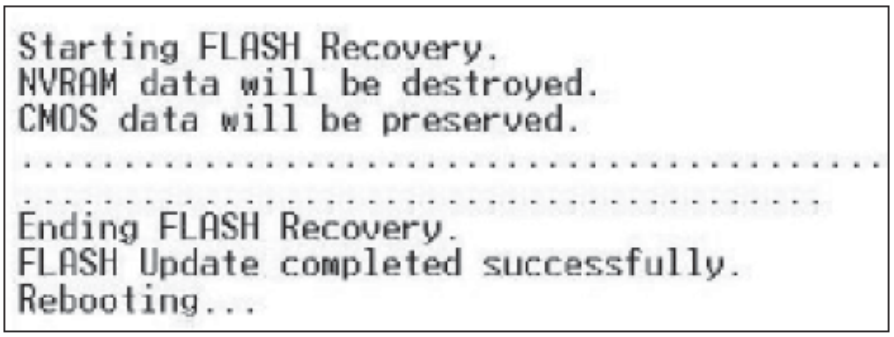


Figure 73: Flash Update Successful

8. Once remote BIOS fl ash is completed, the system will reboot.

Note:

AMIBIOS Serial Flash will work with any terminal communications program that supports VT-100 and XModem protocols, including protocols designed for GNU/LINUX & BSD operating systems such as minicom. It is recommended that the terminal program be configured to use the 'CR/LF' style of line termination.

Chapter 7: Glossary

Advanced Dynamic Execution
Part of the Xeon processor's Intel® NetBurst® micro-architecture. Improved branch prediction algorithm accelerates the flow of work to the processor and helps overcome the deeper pipeline. Very deep, out-of-order speculative execution allows the processor to view 126 instructions in flight and handle up to 48 loads and 24 stores in the pipeline. A 4 KB branch target buffer stores more detail on the history of past branches, reducing inaccurate branch predictions by roughly 33% (when compared to P6 micro-architecture).

Advance Transfer Cache (Level 2 Advance Transfer Cache)
The 256 KB Level 2 Advance Transfer Cache (ATC) delivers a much higher data throughput channel between the Level 2 cache and the processor core. 512 KB L2 Advance Transfer Cache is available on 0.13 micron technology Pentium® 4 processors, while 0.18 micron technology Pentium 4 processors utilise a 256 KB L2 Advance Transfer Cache. Features of the ATC include: Non-Blocking, full speed, on-die level 2 cache, 8-way set association, 512-bit or 256-bit data bus to the level 2 cache, data clocked into and out of the cache every clock cycle.

BIOS
(Basic Input Output System) This is software stored on a chip and consists of the instructions necessary for the computer to function. The System BIOS contains the instructions for the keyboard, disk drives etc., and the VGA BIOS controls the VGA graphics card.

CPU
Central Processing Unit. This is the main piece of equipment on the Motherboard. The CPU processes data, tells memory what to store and the video card what to display.

Default
The configuration of the system when it is switched on or the standard settings before any changes are made.

DIMM
Dual In-Line Memory Module, a type of memory module used for the systems main memory.

Driver
A piece of software which is used by application software to control some special features. Each graphics board and printer requires its own driver.

D-Type
A common type of connector used for connecting printers, serial ports, game port, and many other types of interface.

DRAM
Dynamic Ram used for main system memory, providing a moderately fast but cheap storage solution.

Enhanced Floating Point and Multimedia Unit
Part of the Pentium® 4 processor's Intel® NetBurst® micro-architecture. An expanded 128-bit floating point register and an additional register for data movement improves performance on floating-point and multimedia applications.

Execution Trace Cache (Level 1 Execution Trace Cache)
Part of the Pentium® 4 processor's Intel® NetBurst® micro-architecture. In addition to the 8 KB data cache, the Pentium 4 processor includes an Execution Trace Cache that stores up to 12 K decoded micro-ops in the order of program execution. This increases performance by removing the decoder from the main execution loop and makes more efficient usage of the cache storage space since instructions that are branched around are not stored. As a result, a high volume of instructions are delivered to the processor's execution units and the overall time required to recover from erroneous branch predictions is decreased.

FDC
Floppy Disk Controller - the interface for connecting floppy disk drives to the computer.

Hercules
A monochrome graphics video mode which first appeared in the Hercules graphics card. Provides a resolution of 720 by 348 pixels.

Hyper-Pipelined Technology
Part of the Pentium® 4 processor's Intel® NetBurst® micro-architecture. Hyper-pipelined technology doubles the pipeline depth of the Pentium® III processor's P6 micro-architecture, increasing the branch prediction and recovery pipeline to 20 stages. The deeper pipeline enables instructions to be queued and executed at the fastest-possible rate, increasing performance, frequency, and scalability.

IDE
Integrated Drive Electronics - currently the most popular type of interface for hard disk drives. Much of the circuitry previously required on hard disk controller cards is now integrated on the hard disk itself.

Interface
The electronics providing a connection between two pieces of equipment. For example, a printer interface connects a computer to a printer.

Interlace
The mode the graphics card uses to refresh a monitor screen. When the graphics is in interlace mode, the frequency of the display update is lower than in non-interlace mode. This causes a slight flicker, so generally non-interlaced mode is better if the monitor supports it.

Internet Streaming SIMD Extensions
Consists of 70 instructions and includes single instruction, multiple data for floating-point, additional SIMD-integer and cache ability control instructions. Benefits include higher resolution image viewing and manipulation, high quality audio, MPEG2 video, and simultaneous MPEG2 encoding and decoding, reduced CPU utilisation for speech recognition, and higher accuracy and faster response times

L.E.D.
Light Emitting Diode - a light which indicates activity - for example hard disk access.

PCI (Peripheral Component Interconnect)
Developed by Intel, PCI is a local bus standard. A bus is a channel used to transfer data to (input) and from (output) a computer and to or from a peripheral device. Most PCs have a PCI bus usually implemented at 32-bits providing a 33 MHz clock speed with a throughput rate of 133 MBps.

NetBurst® micro-architecture (Intel NetBurst® micro-architecture)
The NetBurst® micro-architecture delivers a number of new and innovative features including Hyper Pipelined Technology, 400 MHz System Bus, Execution Trace Cache, and Rapid Execution Engine. It also delivers a number of enhanced features, including Advanced Transfer Cache, Advanced Dynamic Execution, Enhanced Floating Point and Multimedia Unit, and Streaming SIMD Extensions 2. Intel NetBurst® Microarchitecture provides higher throughput within the processor and out to memory and I/O for improved headroom.

PCI
Peripheral Component Interface. It became apparent to manufacturers that the 8MHz AT ISA BUS on the standard PC was just not fast enough for today's applications, and so PCI was invented. It is a high speed data bus that carries information to and from components - known as 'Local Bus'.

PCI-X
The 64-bit PCI-X interface (PCI-X 1.0a) can be operated at 133 MHz, (or at 100 MHz and 66 MHz) which achieves a greater than two-fold boost in performance over PCI 2.2 bus technology. The 133 MHz PCI-X interface achieves up to 1 GB/s throughput, a two-fold increase over 66 MHz PCI 2.2.

PCI-Express
PCI Express is a 3rd generation I/O architecture where ISA and PCI were respectively the 1st and 2nd generations. A high-speed, general-purpose serial I/O interconnect, PCI Express will initially offers speeds of 2.5 Gigabits per second, support multiple widths ("lanes" of data that range from 1 to 32), and scale to the limits of copper. PCI Express will unify I/O architecture for desktop, mobile, server, communications platforms, workstations and embedded devices while also coexisting with PCI and USB connection types

RAM
Random Access Memory - the memory used by the computer for running programs and storing data.

ROM
Read Only Memory - a memory chip which doesn't lose its data when the system is switched off. It is used to store the System BIOS and VGA BIOS instructions. It is slower than RAM.

Rapid Execution Engine
Part of the Pentium® 4 processor's Intel® NetBurst® micro-architecture. Two Arithmetic Logic Units (ALUs) are clocked at twice the core processor frequency, allowing basic integer instructions such as Add, Subtract, Logical AND, and Logical OR to execute in half of a clock cycle. For example, the Rapid Execution Engine on a 1.50 GHz Pentium 4 processor runs at 3 GHz.

S-ATA (Serial ATA)
Serial ATA is the next-generation internal storage interconnect designed to replace Parallel ATA technology. Serial ATA is the proactive evolution of the ATA interface from a parallel bus to a serial bus architecture. This architecture overcomes many design and usage constraints that are increasing the difficulty of continued speed enhancements for the classic parallel ATA bus. Serial ATA will be introduced at 150Mbytes/sec, with a roadmap already planned through 600Mbytes/sec.

Shadow Memory
The BIOS is normally stored in ROM. On certain systems it can be copied to RAM on power up to make it go faster. This RAM is known as shadow memory. The System BIOS is responsible for this copying.

SSE (Streaming SIMD Extensions)
Internet Streaming SIMD (Single Instruction Multiple Data) Extensions are instructions that reduce the overall number of instructions required to execute a particular program task. As a result, they can boost performance by accelerating a broad range of applications, including video, speech, and image, photo processing, encryption, financial, engineering and scientific applications. NetBurst® micro-architecture adds 144 new SSE instructions, which are known as SSE2.

Streaming SIMD Extensions 3
Better multimedia and encryption/decryption processing than previous generations, along with support for more computationally intensive graphics.

Super VGA
Additional screen modes and capabilities provided over and above the standard VGA defined by IBM.

VGA
Video Graphics Array - the graphics standard defined by IBM and provided on IBM's PS/2 machines.

Notes

Chapter 8: Suggestions

Viglen is interested in continuing to improve the quality and information provided in their manuals. Viglen has listed some questions that you may like to answer and return to Viglen. This will help Viglen help to keep and improve the standard of their manuals.

1. Is the information provided in this and other manuals clear enough?

2. What could be added to the manual to improve it?

3. Does the manual go into enough detail?

4. Would you like an on-line version of this manual?

5. How do you rate the Viglen Technical support and Service Departments?

6. Are there any technological improvements that could be made to the system?

7. Other points you would like to mention?

Please return this slip to: Product Development Dept.
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