Vig395p Motherboard Manual

Great

Minds

Think

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.

Copyrights and Trademarks

Please note

The material in this manual is subject to change without notice.

Trademarks

Microsoft, Windows, Windows NT, Windows 95,Windows 98, Windows ME, Windows 2000 Pro, Windows XP Pro and MS-DOS are registered trademarks of Microsoft Corporation. IBM PC, XT, AT and PS/2 are trademarks of International Business Machines Corporation. Pentium and Pentium Pro are registered trademarks of Intel Corporation. AMI BIOS is a registered trademark of American Megatrends. All other trademarks are acknowledged. JAC-UP, Genie, Contender, Dossier, Vig, Viglen, and Envy are trademarks of Viglen Limited.

Copyright and Patents

VIG395P Manual Version 1.0
Printed in the United Kingdom

Liability

No warranty or representation, either expressed or implied, is made with respect to this documentation, its quality, performance, merchantability or fitness for a particular purpose. As a result the documentation is licensed as is, and you, the licensee, are assuming the entire risk as to its quality and performance. The vendor reserves the right to revise this operation manual and all accompanying software and documentation and to make changes in the content without obligation to notify any person or organisation of the revision or change.

In no event will the vendor be liable for direct, indirect, special, incidental or consequential damages arising out of the use or inability to use this product or documentation, even if advised of the possibility of such damages. In particular, the vendor shall not have liability for any hardware, software or data stored or used with the product, including the costs of repairing, replacing or recovering such hardware, software or data.

Contents

Chapter 1: Motherboard Overview

Introduction

This manual describes the Viglen VIG395P 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 Vig395P supports dual Intel Xeon dual core processors (w/771 LGA) with front side bus speed of up 667 MHz, 1066 MHz and 1333 MHz. With dual 64-bit Xeon dual core processors built-in, the Vig395P offers substantial functionality enhancements to the Motherboards based on the Intel dual core Net Burst microarchitecture while remaining compatible with the IA-32 software.

The features include Intel Hyper-Threading Technology, Virtualization Technology, Hyper Pipelined Technology, Execution Trace Cache, Thermal Monitor 1/2 (TM1/TM2), Enhanced Intel SpeedStep technology, Advanced Dynamic Execution, Advanced Transfer Cache, Streaming SIMD Extensions 3 (SSE3) and Extended Memory 64 Technology (EM64T). These features allow the Motherboard to operate at much higher speeds with better power management in much safer thermal environments than traditional Motherboards. The Vig395P is ideal for high performance dual processor workstation environments.

This manual contains technical information about the Viglen VIG395P 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.

Feature Summary

The Vig395P Motherboard supports Dual Intel® Xeon processors with up to 8MB of cache integrated in a LGA771 Socket package operating at speeds up to 3.73GHz.

The Motherboard features:

Form factor:

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

CPU Support:

- Dual LGA771 socket for Intel® Xeon processors 5300/5100/5000 sequence (Clovertown/Woodcrest/Dempsey processors).
- Supports Intel® Hyper-Threading Technology, Virtualization Technology, Hyper Pipelined Technology, Execution Trace Cache, Thermal Monitor 1/2 (TM1/TM2), Enhanced Intel SpeedStep technology, Advanced Dynamic Execution, Advanced Transfer Cache, Streaming SIMD Extensions 3 (SSE3) and Extended Memory 64 Technology (EM64T)

Chipset Support:

- Intel 5000X (GreenCreek) chipset including Memory Control Hub (MCH) and enterprise South Bridge 2 (ESB2)

Front Side Bus (FSB):

- 1333/1066/667 MHz

Memory Support:

- Six 240-pin DIMM sockets with support up to 24 GB ECC FBD (Fully Buffered) DDR2 667/533 Memory

Expansion Support:

- 2 x PCI-Express slots (one x16:Slot#6, one x16 slot with x4 signal: Slot#4)
- 2 x 64-bit PCI-X 133 MHz slots (Slot#2/Slot#3)
- 2 x 32-bit PCI 33 MHz slots (Slot#1/#5)
- 1 x PCI-U Slot: PCI-Express x8 slot (Slot#0)

Storage Support:

- Intel® ESB2 Southbridge supports:
    - 1 x Single-channel Ultra DMA 100/66/33
    - 6 x Serial ATA ports (supporting RAID 0, 1, 10 and 5)

AC'97 Audio Support:

- Realtek® AC'97 CODEC
- 6 channel sound for front L&R, rear L&R, centre and subwoofer speakers

LAN Support:

- Intel® GLAN Controller (82563EB) with two Giga-bit LAN ports supported by the ESB 2 South Bridge

USB Support:

- Supports up to 8 USB 2.0 (Universal Serial Bus) (4 ports, 4 Headers)

BIOS Features:

- 8 Mb Phoenix Flash ROM
- DMI 2.3, PCI 2.2, ACPI 1.0, Plug and Play (PnP), USB Keyboard support, Hardware BIOS Virus Protection and SMBIOS 2.3

Rear Panel Port Support:

- 1 x PS/2 keyboard port
- 1 x PS/2 mouse port
- 4 x USB 2.0 ports
- 2 x Serial Ports
- 2 x LAN (RJ-45) port
- 1 x Line-In
- 1 x Line-Out
- Microphone

Internal Connectors:

- 1 x Floppy disk drive connector
- 1 x Primary IDE connector
- 1 x Parallel (Printer) Header
- 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
- 1 x 4-pin ATX 12V power connector
- 1 x 8-pin 12V processor connector
- 1 x Front panel AC'97 Audio connector
- 1 x Chassis intrusion connector
- 1 x Power LED/External Speaker connector
- 1 x CD-In connector

- 1 x Aux.-In connector
- 1 x Power supply alarm reset
- 1 x SMB (System Management Bus) connector
- 2 x SGPIO (Serial 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 Power Management (S1, S3, S4, S5)
- Power-on mode for power recovery

Other:

- External modem ring-on
- Wake-on-LAN (WOL)
- Wake-on-Ring (WOR)
- Console redirection
- Onboard Fan Speed Control by Thermal Management via BIOS

Power Requirements:

- ATX power supply with SSI power connectors (24-pin, 8-pin, 4-pin)
- These connectors need to meet the SSI EPS 12V specification

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 Vig395P. The Motherboard has an onboard System Hardware Monitor chip that supports PC health monitoring.

Onboard voltage monitors for the CPU cores, chipset voltage, +1.8V, +3.3V, +5V, +12V, -12V, +3.3V Standby, +5V Standby and VBAT.

An onboard voltage monitor will scan these voltages continuously. 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.

- **CPU Overheat LED and Control**

This feature is available when the user enables the CPU overheat warning function in the BIOS. This allows the user to define an overheat temperature. When this temperature is exceeded, both the overheat fan and the warning LED are triggered.

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. This also includes consumer devices connected to the PC such as VCRs, TVs, telephones and stereos.

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 Windows 2000, Windows XP and Windows 2003 Server.

- **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 can function as a system suspend button to make the system enter a Soft Off state. The monitor will be suspended and the hard drive will spin down. Pressing the power button again will cause the whole system to wake-up. 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 Power section of the BIOS Setup routine.

- **External Modem Ring-On**

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.

System Board Components

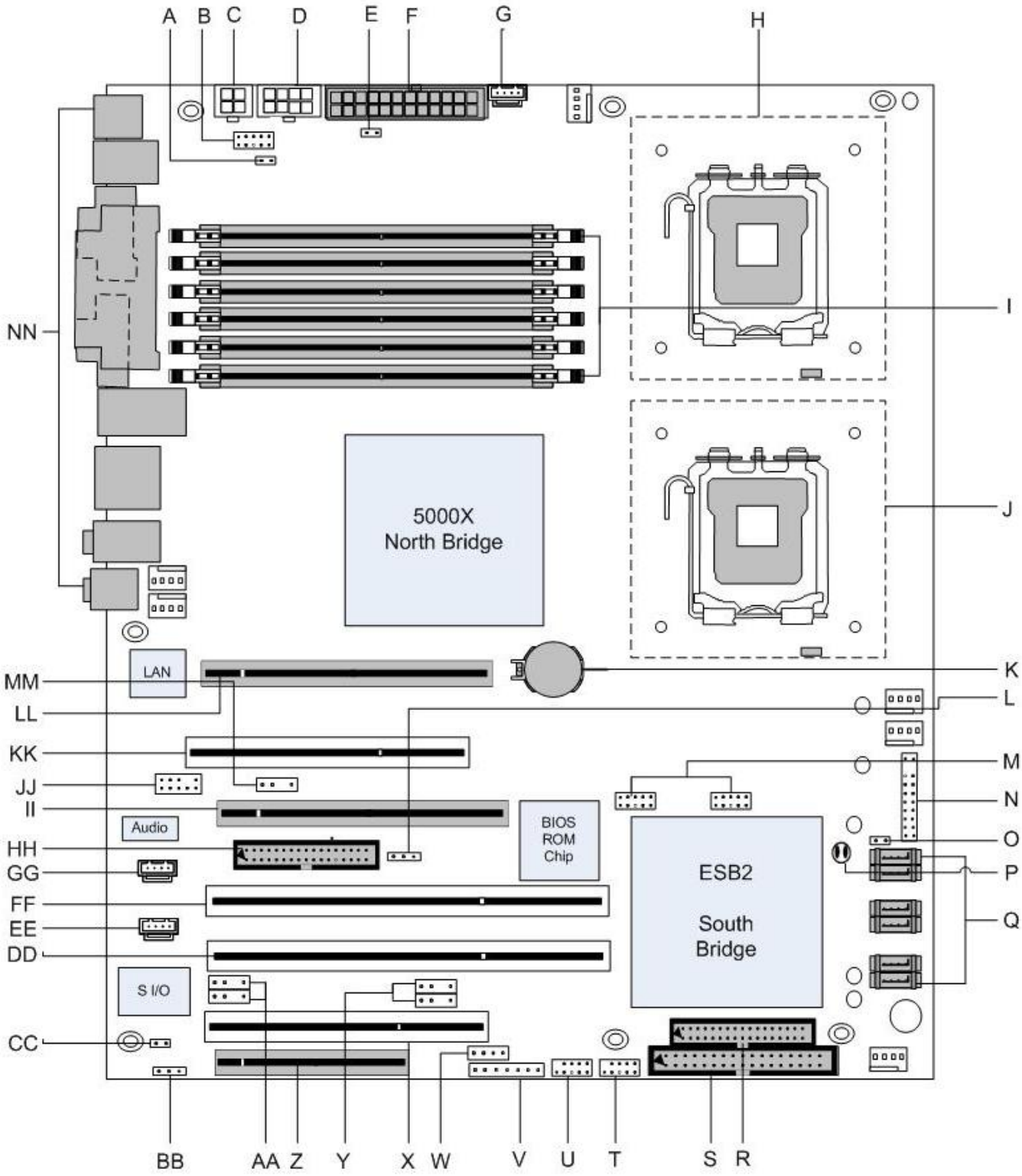


Figure 1: Motherboard Layout & Components

Table 1: Motherboard Connections

Label	Description	Label	Description
A	Alarm Reset Header	U	Front Panel USB connector
B	Power Supply Failure Detect	V	Power LED / Speaker Header
C	+12V 4-pin PCI-Express Power	W	System Management Bus Header
D	+12V 8-pin CPU Power	X	PCI 33MHz Slot 1
E	Power Force-On	Y	SMB to PCI Slot#1/Slot#2 Speed
F	Primary 24-pin ATX PWR Connector	Z	PCI-E x8 Slot
G	Power System Management (I^2C) Header	AA	Gigabit LAN1/Gigabit LAN2 Enable
H	LGA771 processor socket (CPU 1)	BB	Wake-on-LAN Header
I	Memory DDR2 FB-DIMM Slots	CC	Wake-on-Ring Header
J	LGA771 processor socket (CPU 2)	DD	PCI-X 133MHz Slot
K	Battery	EE	Audio Aux-In
L	Watch Dog	FF	PCI-X 133MHz Slot
M	Serial General Purpose Input/Output Headers (SGPIO1/2)	GG	CD-In
N	Front Control Panel Connector	HH	Parallel (Printer) Port
O	Chassis Intrusion Header	II	PCI-E x4 on x16 Slot
P	CMOS Clear	JJ	Front Panel Audio Connector
Q	Intel SATA 0-5 Connectors	KK	PCI 33MHz Slot 2
R	Floppy Disk Drive Connector	LL	PCI-E x16
S	IDE1 Optical Drive/ HDD Connector	MM	Audio Enable
T	Front Panel USB connector	NN	Back Panel 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, one parallel port, four USB ports, one LAN Port and the audio connectors.

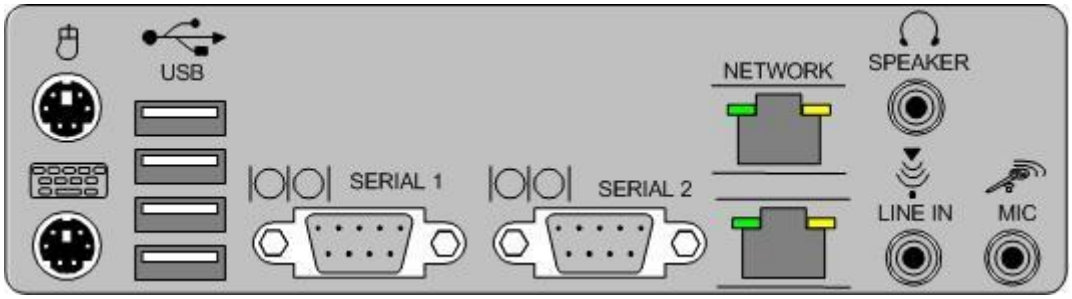


Figure 2: I/O shield

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

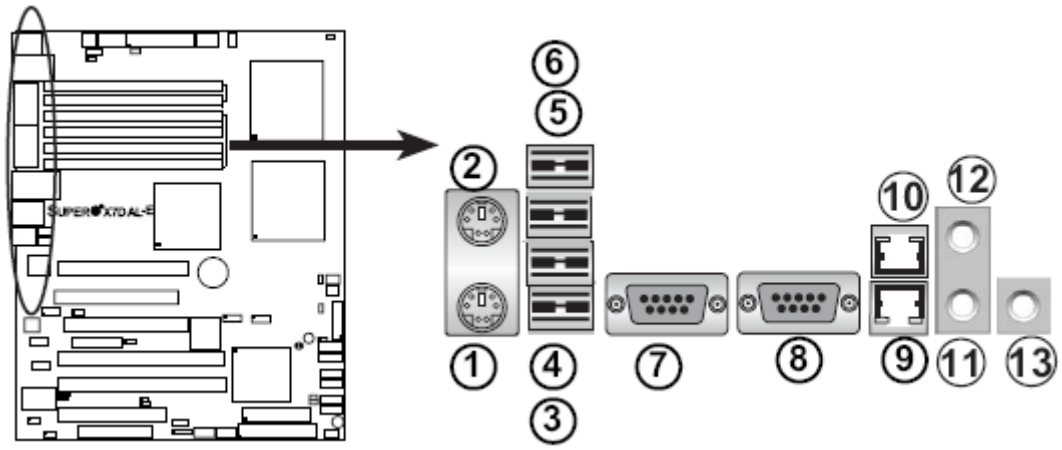


Figure 3: Back Panel Connections

Table 2: Back Panel Connectors

Item	Description	Item	Description
1	PS/2 Keyboard Port (Purple)	8	COM Port 2 (Turquoise)
2	PS/2* Mouse Port (Green)	9	Gigabit LAN RJ45 2
3	Back Panel USB 2.0 Port 0	10	Gigabit LAN RJ45 1
4	Back Panel USB 2.0 Port 1	11	Audio Line In Port (Light blue)
5	Back Panel USB 2.0 Port 2	12	Audio Line Out Port (Lime)
6	Back Panel USB 2.0 Port 3	13	Microphone (Pink)
7	COM Port 1 (Turquoise)		

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.*

Table 3: Audio 2/4/6 Channel configurations

Port	2 channel	4 channel	6 channel
Audio line In (Blue)	Line In	Line In	Bass/Centre
Line Out (Lime green)	Line out	Front Speaker Out L & R	Front Speaker Out L & R
Mic in (Pink)	Mic In	Rear Speaker Out L & R	Rear Speaker Out L & R

Feature Summary

The VIG395P Motherboard supports Intel Xeon™ 5300/5100/5000 sequence (Clovertown/Woodcrest/Dempsey) processors with up to 8 MB Cache integrated in a LGA 771 Socket package operating at speeds up to 3.73GHz. Single or dual processors are supported but should be identical in speed and CPU stepping revision.

Table 4: Feature Summary

Form Factor	VIG395P: 12” x 10” (304.8 mm x 254 mm)
Processor	- Single or dual Xeon 5300/5100/5000 CPU’s - 1333 MHz, 1066 MHz and 667 MHz - Integrated 512MB second and 1MB third level cache - Dual 771-pin LGA Socket
Maximum supported CPU speeds	CPU Speed FSB L2 Cache 3.73 GHz 1333 MHz 8 MB
Memory	- Six 240-pin FB-DIMM (Fully Buffered DIMM) sockets. - Support for up to 24GB of DDR2 667/533MHz FB-DIMM ECC SDRAM 72-bit
Chipset	Intel 5000X chipset, including: the 5000X Memory Control Hub (MCH) and the Enterprise South Bridge 2 (ESB2)
Video	- PCI-Express connector supporting x4 and x16 lane VGA cards
Audio	- Audio subsystem using the Realtek AC’97 6 channel audio codec.
USB	- Support for USB 2.0 devices
Peripheral Interfaces	- Eight USB Ports - Two Serial Port - Six Serial ATA ports (Supporting RAID 0,1,10 and 5) - One EIDE Ultra DMA/100 bus master interface - One floppy port interface - PS/2 keyboard port - PS/2 mouse port - Two GLAN (RJ45) ports - Two Serial ports - 6-channel Audio Surround Sound
LAN Support	- Intel® (ESB2/Gilgal) 82563EB Dual-Port Gigabit Ethernet Controller - Supports 10BASE-T, 100BASE-TX, and 1000BASE-T, RJ45 output - Intel® I/OAT support for fast, scaleable, and reliable networking
BIOS	- 8 Mb Phoenix® Flash ROM - DMI 2.3, PCI 2.2, ACPI 1.0, Plug and Play (PnP), USB Keyboard support, Hardware BIOS Virus Protection and SMBIOS 2.3
Expansion Capabilities	- 1 x PCI-E x16 and 1x PCI-E x4 slot - 2 x PCI-X 64-bit 133/100 MHz (3.3V) slot - 1 x UIO slot
PC Health Monitoring	- Onboard voltage monitors for CPU cores - Fan status monitor with firmware control - CPU/chassis temperature monitors - Low noise fan speed control - Platform Environment Control Interface (PECI) ready - CPU fan auto-off in sleep mode - Pulse Width Modulation (PWM) fan control - I^2C temperature sensing logic - Thermal Monitor 2 (TM2) support - CPU slow-down on temperature overheat - CPU thermal trip support for processor protection - Power-up mode control for recovery from AC power loss - Chassis intrusion detection

Chipset Overview

Built upon the functionality and the capability of the 5000X chipset, the Vig395P Motherboard provides the performance and feature set required for dual processor-based workstations with configuration options optimized for communications, presentation, storage, and computation or database applications. The 5000X chipset supports a single or two Xeon 64-bit dual core processor(s) with front side bus speeds of up to 1333 MHz. The chipset consists of the 5000X Memory Controller Hub (MCH), and the Enterprise South Bridge 2 (ESB2).

The 5000X MCH chipset is designed for symmetric multiprocessing across two independent front side bus interfaces. Each front side bus uses a 64-bit wide, 1333 MHz data bus. The MCH chipset connects up to six Fully Buffered DIMM modules, providing a total memory of up to 24.0 GB/s. In addition, the 5000X chipset offers a wide range of RAS features, including memory interface ECC, x4/x8 Single Device Data Correction, CRC, parity protection, memory mirroring and memory sparing.

The Xeon Dual Core Processor Features

Designed to be used with conjunction of the 5000X chipset, the Xeon dual core Processor provides a feature set as follows:

The Xeon Dual Core Processors

- L1 Cache Size: Instruction Cache (32KB/16KB), Data Cache (32KB/24KB)
- L2 Cache Size: 4MB (2MB per core)
- Data Bus Transfer Rate: 8.5 GB/s
- Package: FC-LGA6/FC-LGA4, 771 Lands

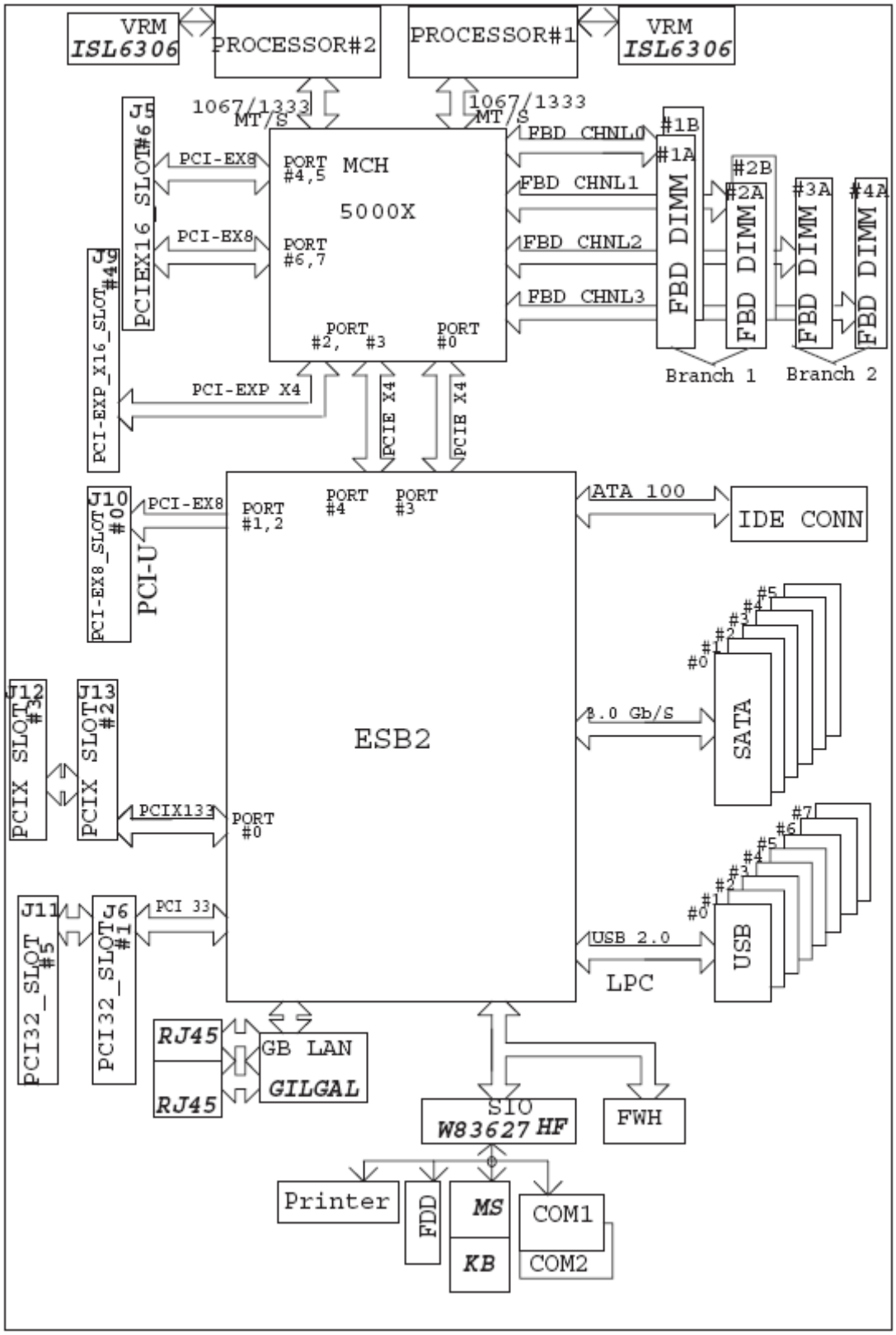


Figure 4: Block Diagram of the 5000X Chipset

System Memory

Main Memory

The Motherboard has six DDR2 Fully Buffered 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:

- 240 pin Fully Buffered DDR2 677/533 MHz DIMMs with gold-plated contacts
- 24 GB maximum total system memory total amount of addressable memory.
- Minimum total system memory: 256 MB
- 72bit registered ECC DIMMs

Note: *Due to OS limitations, some operating systems may not show more than 4GB of memory*

Table 5: DIMM Population Configurations

Optimized DIMM Population Configurations								
	Branch 1				Branch 2			
Number of DIMMs	Bank 1 (Channel 0)		Bank 2 (Channel 1)		Bank 3 (Channel 2)		Bank 4 (Channel 3)	
2 DIMMs	1A	------	2A	------	------	N/A	------	N/A
4 DIMMs	1A	------	2A	------	3A	N/A	4A	N/A
6 DIMMs	1A	1B	2A	2B	3A	N/A	4A	N/A

Notes:

1. **Dimm slot# specified: DIMM slot to be populated; "------": DIMM slot not to be populated**
2. **Both FBD 533 MHz and 667 MHz DIMMs are supported; however, you need to use the memory modules of the same speed and of the same type on a Motherboard**
3. **Interleaving memory is supported when pairs of DIMM modules are installed. To optimize memory performance, please install pairs of memory in both Branch 1 and Branch 2**
4. **For memory to work properly, you need to follow the restrictions listed above.**

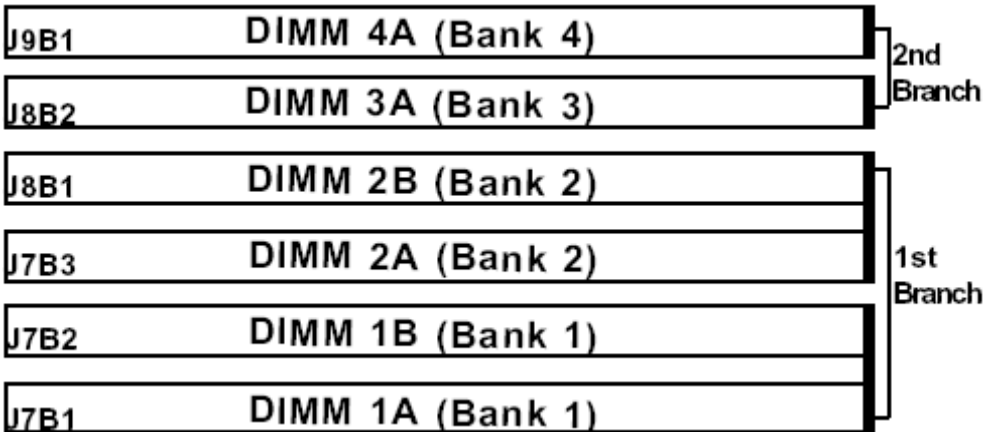


Figure 5: DIMM Population

Memory Configurations

The Vig395P with Intel 5000X chipset supports the mirroring and sparing technology.

Mirroring mode:

This mode when enabled in the BIOS Branch 2 contains a replicate copy of the data in Branch 1. The DIMMs must cover the same slot position on both branches. DIMMs that cover a slot position must be identical with respect to size, speed, and organisation. DIMMS within a slot position must match each other, but aren't required to match adjacent slot positions. Refer to page 113 to enable the memory mirroring functions. And the default BIOS setting is disabled.

The total memories size will be half of all installed memories.

Single Channel mode:

At configuration time, a DIMM rank is set aside to replace a defective DIMM rank. When the error rate for a failing DIMM rank reaches a pre-determined threshold, the memory sparing function will issue an interrupt and initiate a spare copy. At the completion of the copy, the failing DIMM rank is disabled and the "spared" DIMM rank will be used in its place. Refer to page 113 to enable the memory sparing functions. And the default BIOS setting is disabled.

Notes:

1. *Each branch contains its own sparing engine and can be enabled or disabled separately.*
2. *This Motherboard does not support rank sparing across branches.*
3. *This Motherboard does not support rank sparing when in mirror mode.*
4. *The DIMM rank with the largest size will be assigned as spare rank. Data can only be copied from a smaller sized rank to a larger sized one.*
5. *A DIMM can contain only one or two ranks. To support sparing function, a DIMM channel should contain at least two ranks.*
6. *When sparing function is enabled, the usable memory size will reduce then size of the spare ranks.*

Note: *Due to memory allocation to system devices, memory remaining available for operational use will be reduced when 4GB of RAM is used. The reduction in memory availability is disproportional. (Refer to Memory Availability Table below for details.)*

Table 6: Memory Allocation & Availability

Possible System Memory Allocation & Availability			
System Device	Size	Physical Memory Remaining (-Available) (3 GB Total System Memory)	Physical Memory Remaining (-Available) (4 GB Total System Memory)
Firmware Hub flash memory (System BIOS)	1MB	3.00	3.99
Local APIC	4 KB	3.00	3.99
Area Reserved for the chipset	2 MB	3.00	3.99
I/O APIC (4 Kbytes)	4 KB	3.00	3.99
PCI Enumeration Area 1	256 MB	3.00	3.76
PCI Express (256 MB)	256 MB	3.00	3.51
PCI Enumeration Area 2 (if needed)- Aligned on 256MB boundary	512 MB	3.00	3.01
VGA Memory	16 MB	2.85	2.85
TSEG	1MB	2.84	2.84
Memory available to BIOS, OS, applications		2.84	2.84

Chapter 2: System Board Options

- The VIG395P Motherboard is capable of accepting Duo Xeon 5300/5100/5000 (Clovertown/Woodcrest/Dempsey) processors. RAM can be upgraded to a maximum of 24GB using ECC FBD (Fully Buffered) DDR2 667/533 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.

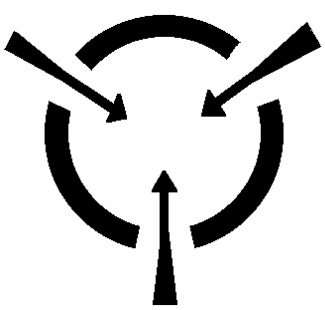
The procedures assume familiarity with the general terminology associated with personal computers and with the safety practices and regulatory compliance required for using and modifying electronic equipment.
Do not operate the system with the cover removed. Always replace the cover before turning on 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 Vig395P 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 VIG395P 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.*

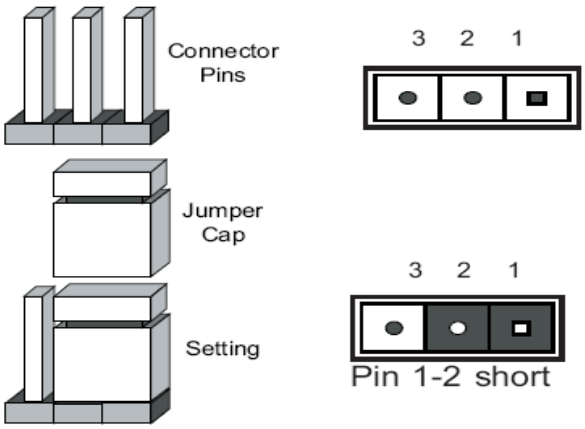


Figure 6: Explanation of jumpers

Motherboard Jumper Settings

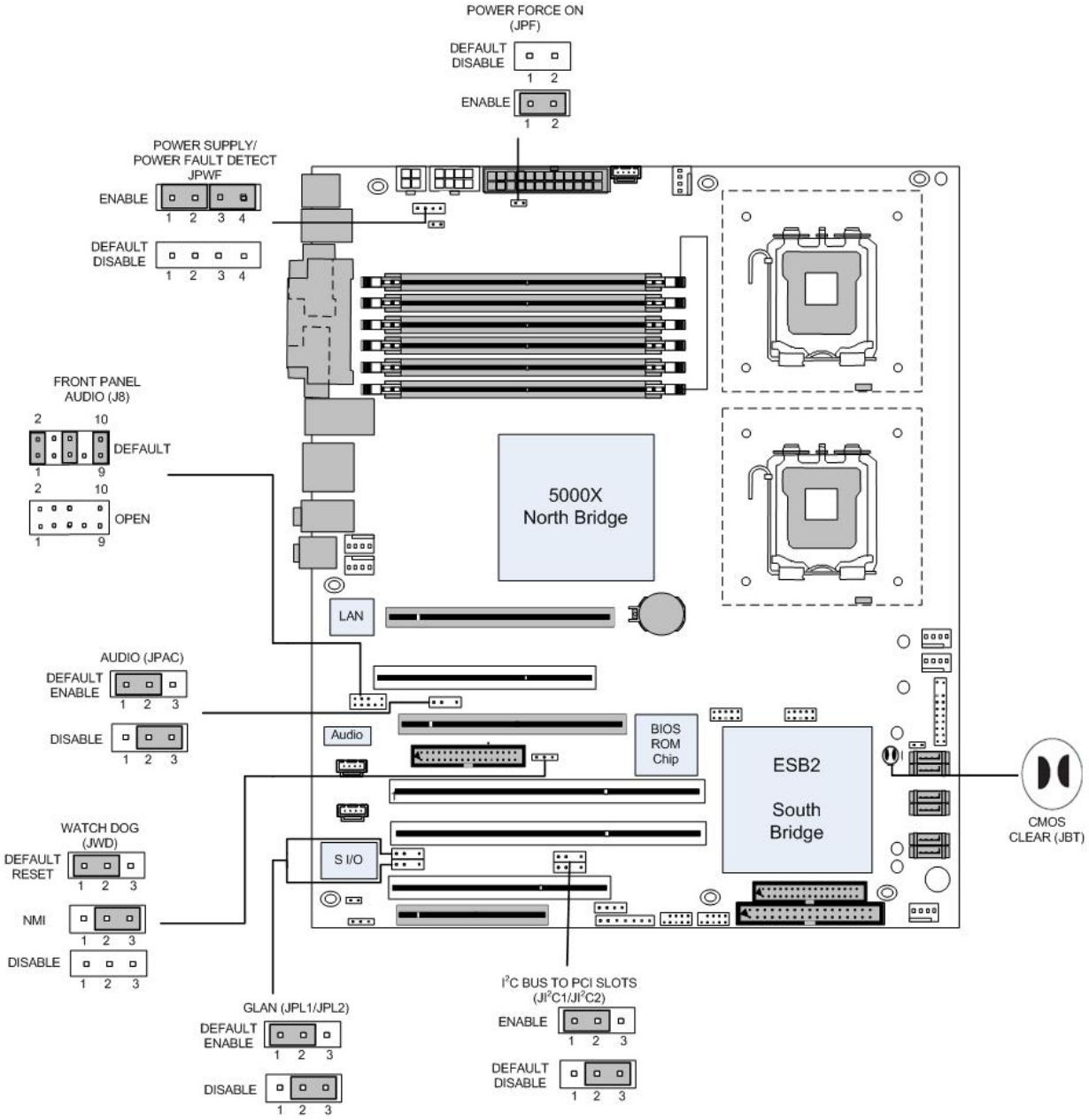


Figure 7: Motherboard Jumper Settings

Note: *There is no jumper setting for configuring the processor speed or bus frequency. The feature for configuring the processor speed is in the Setup program using configure mode. See BIOS Section for information about configure mode.*

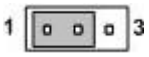
Clear CMOS (JBT)

JBT 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.

GLAN Enable/Disable Jumper (JPL1/JPL2)

JPL1/JPL2 enables or disables the GLAN Port1/GLAN Port2 on the Motherboard. The table below describes the jumper settings.

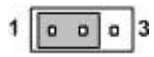
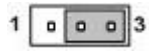
Table 7: GLAN Jumper

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.

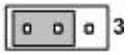
Table 8: Watch Dog Jumper

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.

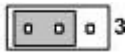
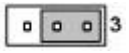
Table 9: Audio Jumper

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.

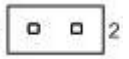
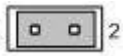
Table 10: I^2C Bus to PCI slots Jumper

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.

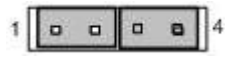
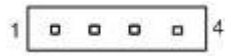
Table 11: Power Force On Enable/Disable Jumper

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

Power Supply Failure/Power Fault Detect (JPWF)

The system can notify you in the event of a power supply failure. This feature is available when three power supply units are installed in the chassis with one acting as a backup. If you only have one or two power supply units installed, you should disable this (the default setting) with JPWF to prevent false alarms. The table below describes the jumper settings.

Table 12: PWR Supply Failure/PWR Fault Detect

Function/Mode	Jumper Setting		Configuration
Enable	Closed		This enables the PWR Supply Failure/PWR Fault Detect function
(Default) Disable	Open		This disables the PWR Supply Failure/PWR Fault Detect function

Front Panel Audio Control Jumper (Front panel audio) (J8)

When front panel headphones are plugged in, the back panel audio output is disabled. This is done through the FP Audio header (J8). If the front panel interface card is not connected to the front panel audio header, jumpers should be installed on the header (J8) 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 13: Front Panel Audio Jumpers (Front panel audio)

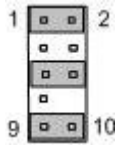
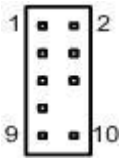
Function/Mode	Jumper Setting		Configuration
(Default)	1-2, 5-6 and 9-10		Allows audio to pass to rear I/O with no front audio cable. The audio line signals are routed back to the line connector.
Front panel audio	Open		Jumpers removed for front panel audio cable. Audio line out and mic in signals are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

Table 14: 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, IDE, Power supply, CD audio, Floppy, IDE, & Front Panel Connectors. The location and/or details of these connections are shown below.

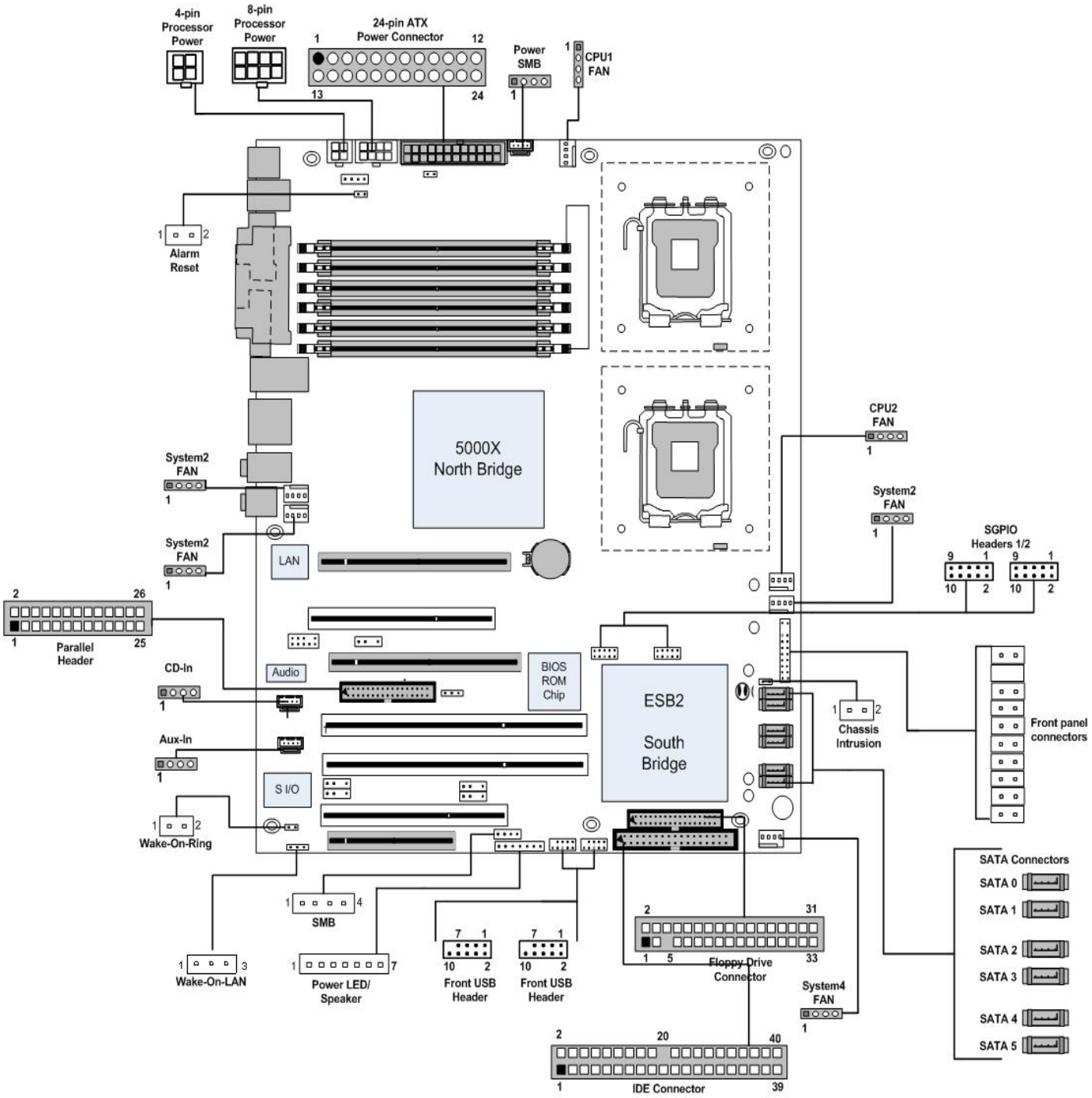


Figure 8: Motherboard Connections

- **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.

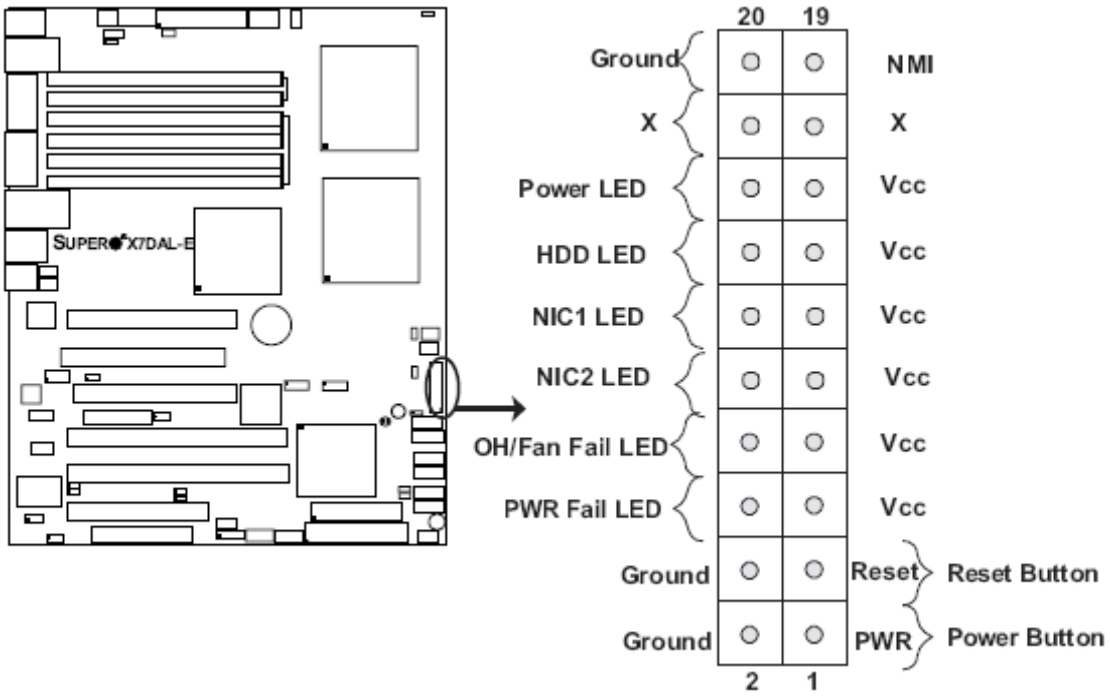


Figure 9: Front panel connections

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.

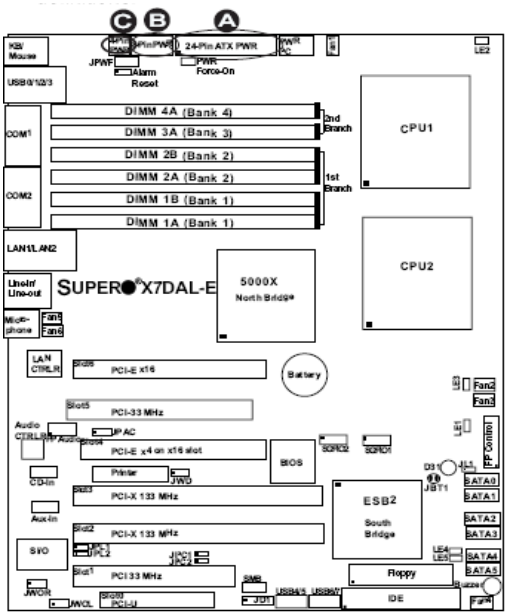
- **Power Connectors**

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- 4-pin processor power connector

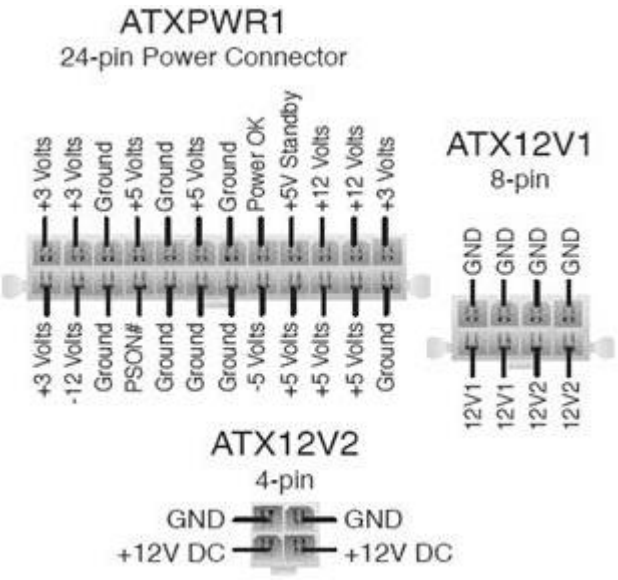


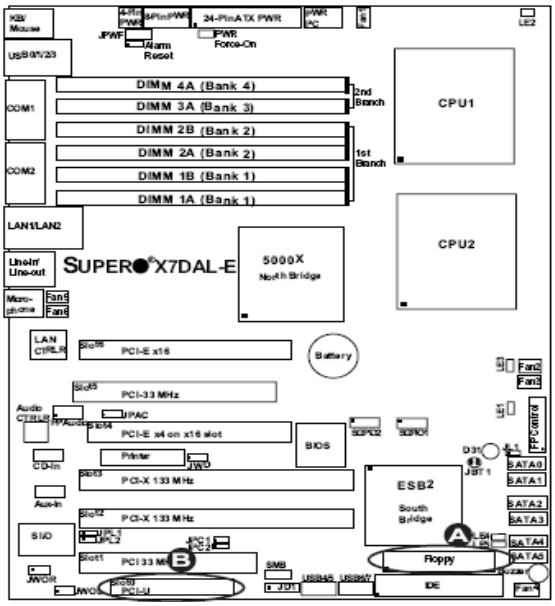
Figure 10: Power Connectors

CAUTION!!

Do not forget to connect the 24+8+4-pin power plugs; otherwise, the system will not boot up.

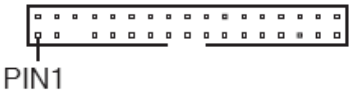
- **Floppy Disk Drive Connector**

This connector is for the provided floppy disk drive (FDD) signal cable. Insert one end of the cable to this connector, and then connect the other end to the signal connector at the back of the floppy disk drive.



A- Floppy
B- PCI-U Slot

NOTE: Orient the red markings on the floppy ribbon cable to PIN 1.

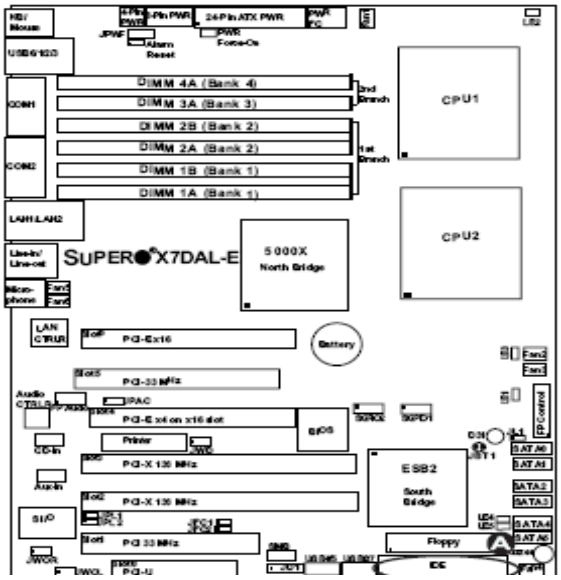


Note: *Pin 5 on the connector is removed to prevent incorrect cable connection when using a FDD cable with a covered Pin 5.*

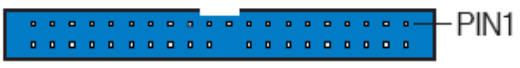
Figure 11: Floppy disk drive connector

- **IDE Connector**

This connector is for an Ultra DMA 100/66 signal cable. The Ultra DMA 100/66 signal cable has three connectors: a blue connector for the primary IDE connector on the Motherboard, a black connector for an Ultra DMA 100/66 IDE slave device (optical drive/hard disk drive), and a grey connector for an Ultra DMA 100/66 IDE master device (hard disk drive).



A- IDE

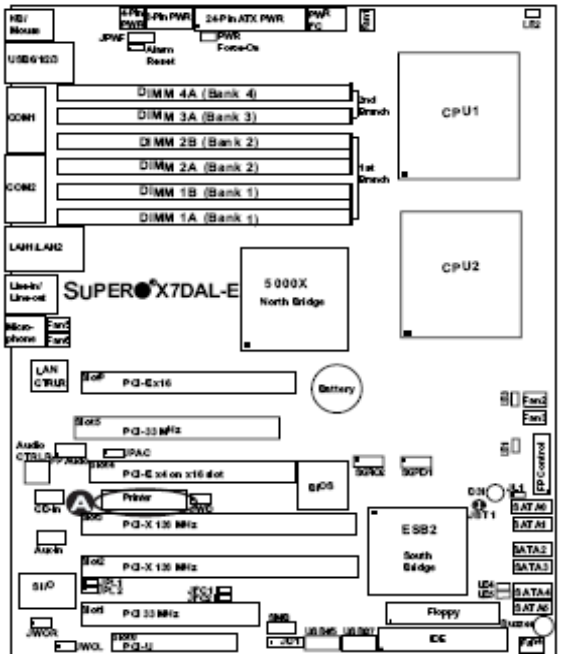


NOTE: Orient the red markings (usually zigzag) on the IDE ribbon cable to PIN 1.

Figure 12: IDE Connector

- **Parallel (Printer) Header**

The parallel header is located at J21 between PCI-E Slot#4 and PCI-X Slot #3. This 26-pin header connects a parallel printer, a scanner, or other devices.



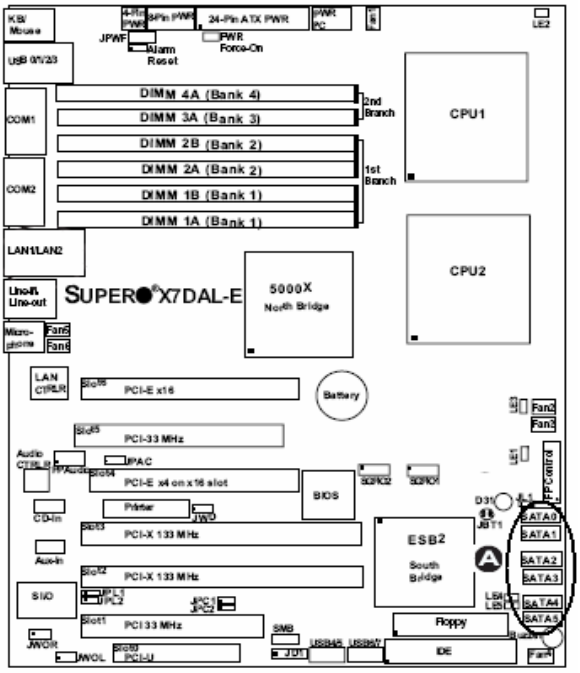
A- Parallel (Printer) Header

Parallel (Printer) Port Connector Pin Definitions			
Pin#	Definition	Pin #	Definition
1	Strobe-	2	Auto Feed-
3	Data Bit 0	4	Error-
5	Data Bit 1	6	Init-
7	Data Bit 2	8	SLCT IN-
9	Data Bit 3	10	GND
11	Data Bit 4	12	GND
13	Data Bit 5	14	GND
15	Data Bit 6	16	GND
17	Data Bit 7	18	GND
19	ACK	20	GND
21	BUSY	22	Write Data
23	PE	24	Write Gate
25	SLCT	26	NC

Figure 13: Parallel Header

- **Serial ATA connectors**

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



A- Serial ATA connectors

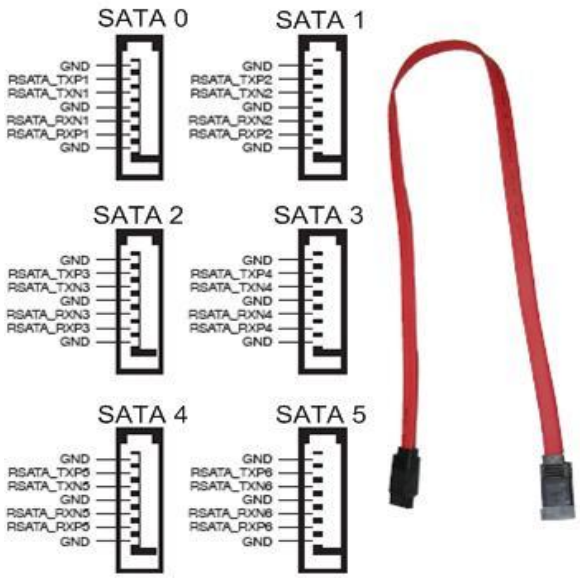


Figure 14: Serial ATA connectors

- **Universal Serial Bus (USB)**

There are eight USB 2.0 (Universal Serial Bus) ports/headers on the Motherboard. Four of them are Back Panel USB ports (USB #0, 1, 2, 3), and the other four are Front Panel USB headers (USB #4, 5, 6, 7)

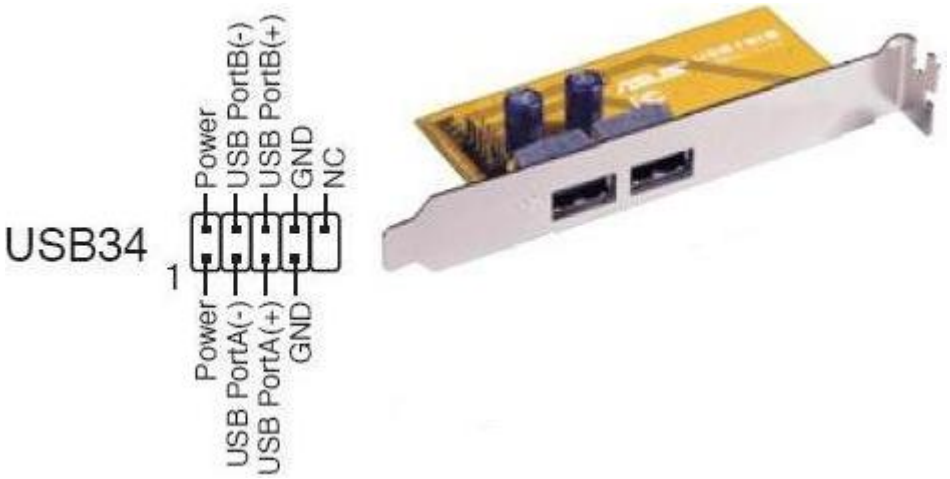
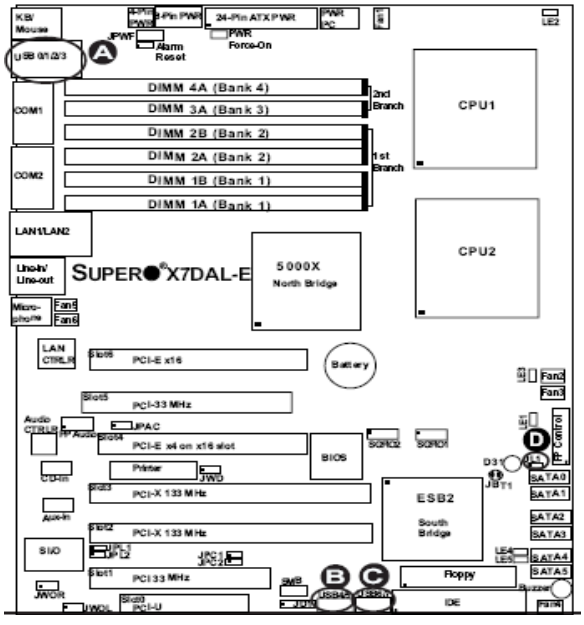


Figure 15: Universal Serial Bus (USB) header

- **Chassis Intrusion**

A chassis intrusion header is located next to the IDE ports on the Motherboard. Attach the appropriate cable from the chassis to inform you of a chassis intrusion when the chassis is opened.



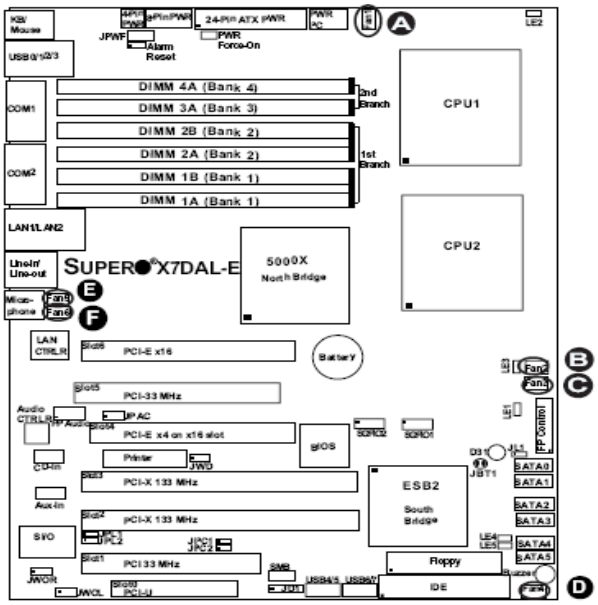
A- Back panel USB 0/1/2/3
B- Front Panel USB 4/5
C- Front Panel USB 6/7
D- Chassis Intrusion

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

Figure 16: USB and Chassis Intrusion connections

- **Fan Connectors**

This Motherboard has six chassis/system fan connectors (Fan 1 to Fan 6). The onboard fan speeds are controlled by Thermal Management via BIOS Hardware Monitor in the Advanced Setting.



A- Fan 1
B- Fan 2
C- Fan 3
D- Fan 4
E- Fan 5
F- Fan 6

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

Figure 17: 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!!

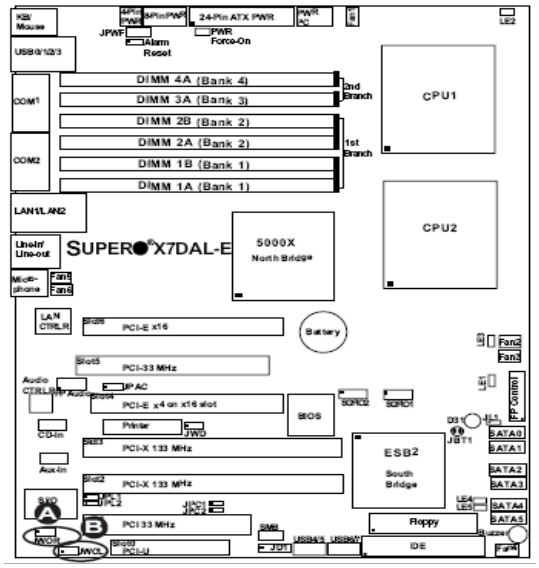
Note: *All these fan connectors are 4-pin. However, Pins 1-3 of the fan connectors are backward compatible with the traditional 3-pin fans*

- **Wake-On-Ring**

The Wake-On-Ring header is designated JWOR. This function allows your computer to receive and “wake up” by an incoming call to the modem when in suspend state. You must have a Wake-On-Ring card and cable to use this feature.

- **Wake-On-LAN**

The Wake-On-LAN header is located at JWOL on the Motherboard. (You must have a LAN card with a Wake-On-LAN connector and cable to use this feature)



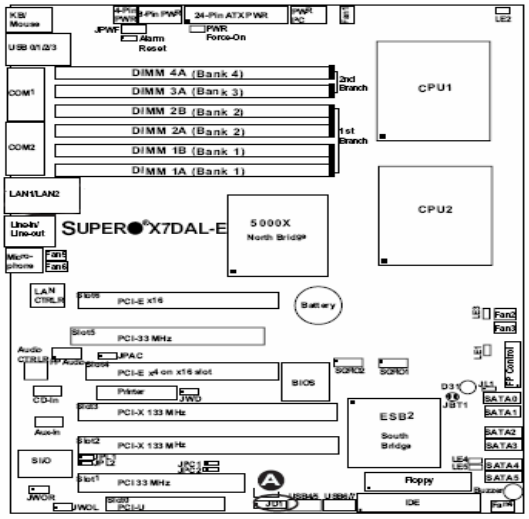
A- WOR
B- WOL

Wake-On-LAN Pin Definitions (JWOL)	
Pin#	Definition
1	+5V Standby
2	Ground
3	Wake-up

Figure 18: Wake-On-Ring and Wake-On-LAN connectors

- **Power LED/Speaker**

On the JD1 header, pins 1-3 are for a power LED and pins 4-7 are for the speaker.



A- Power LED/Speaker

Speaker Connector	
Pin Setting	Definition
Pins 6-7	Internal Speaker
Pins 4-7	External Speaker

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.*

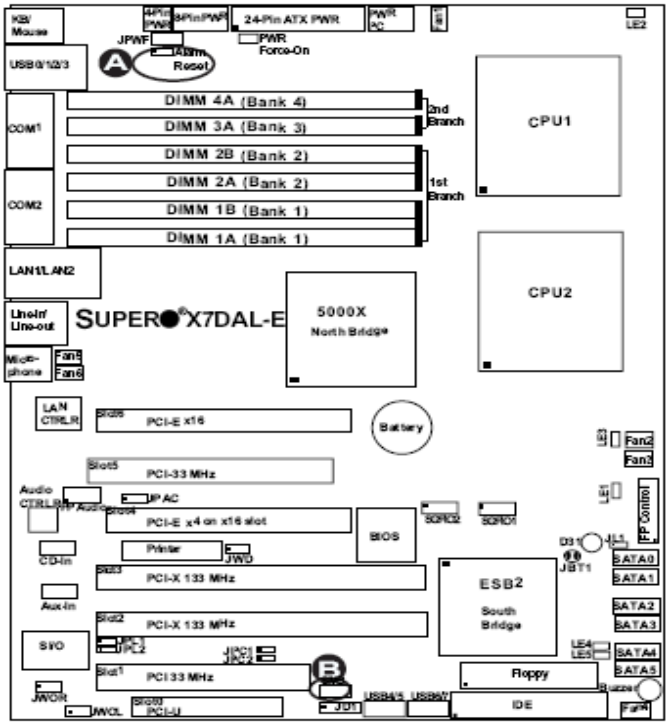
Figure 19: Power LED/Speaker connection

- **Alarm Reset**

If there power supplies are installed and Alarm Reset (JP5) is enabled, the system will notify you when any of the three power modules fail. Connect JP5 to a micro-switch to enable you to turn off the alarm that is activated when a power module fails.

- **SMB**

A SYSTEM Management Bus header is located at J18. Connect appropriate cable here to utilize SMB on your system.



A- Alarm Reset
B- SMB

Alarm Reset	
Pin Setting	Definition
Pin 1	Ground
Pin 2	+5V

SMB Header Pin Definitions	
Pin#	Definition
1	Data
2	Ground
3	Clock
4	No Connection

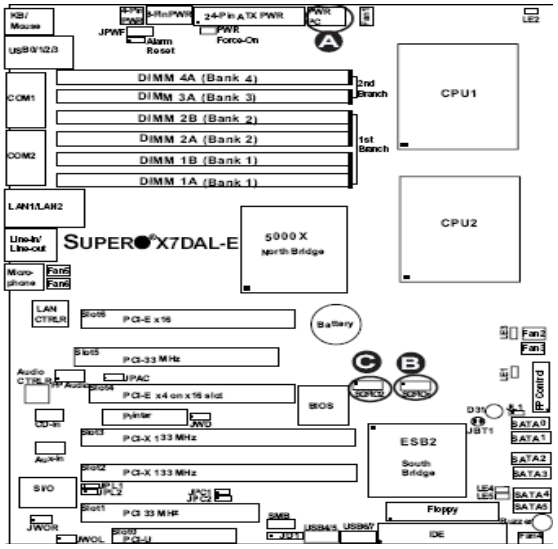
Figure 20: Alarm Reset and SMB connectors

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

Power SMB (I^2 C) Connector (JPI^{2}C) monitors the status of the power supply, Fan and system temperature.

- **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- Power SMB
B- SGPIO1
C- SGPIO2

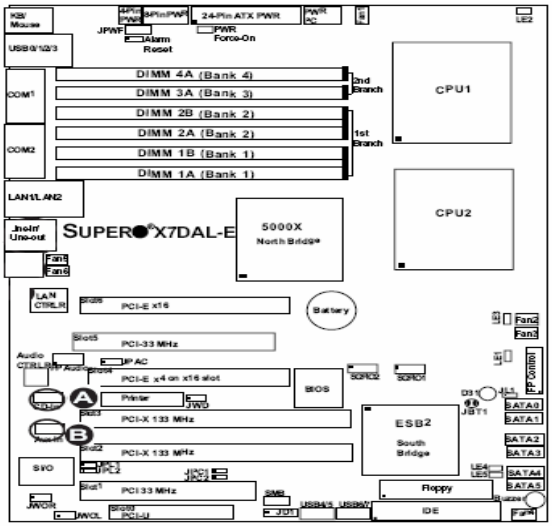
SGPIO Pin Definitions			
Pin#	Definition	Pin	Definition
1	*NC	2	*NC
3	Ground	4	Data
5	Load	6	Ground
7	*NC	8	*NC

*Note: NC= No Connections

Figure 21: Power SMB and SGPIO connectors

- **CD/Aux. Connectors**

Two audio connectors: CD-In (CD1) and Aux-In (AUX1) are located on the Motherboard



A- CD-In
B- Aux.-In

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

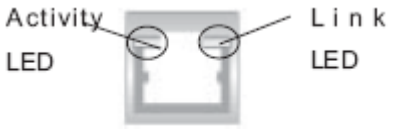
AUX1 Pin Definition	
Pin#	Definition
1	Right
2	Ground
3	Left
4	Ground

Figure 22: CD-In and Aux-In connectors

Onboard Indicators

- **GLAN LEDs**

There are two GLAN ports on the Motherboard. Each Gigabit Ethernet LAN port has two LEDs. The green LED indicates activity. The power LED may be green, orange or off to indicate the speed of the connection. See the tables below for more information.



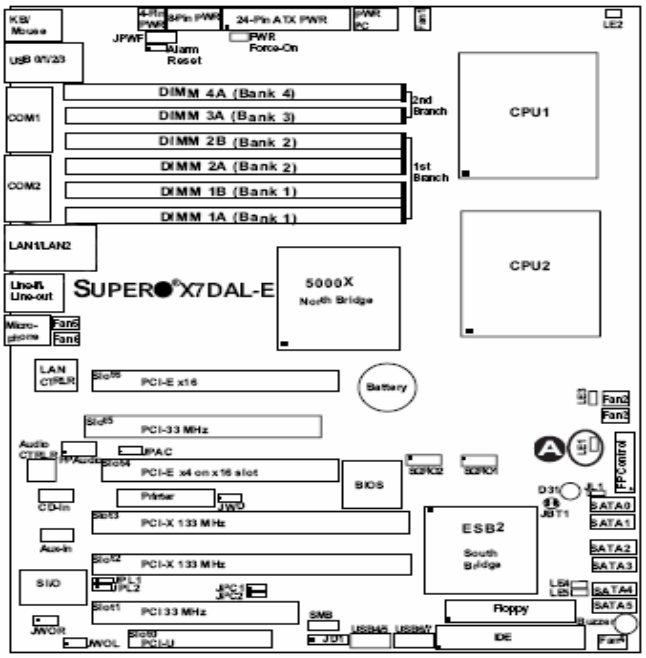
GLAN Activity Indicator		
Color	Status	Definition
Green	Flashing	Active

GLAN Link Indicator	
LED Color	Definition
Off	No Connection or 10 Mbps
Green	100 Mbps
Amber	1 Gbps

Figure 23: 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 Indicator (LE1)	
LED Color	Definition
Off	System Off (*PWR cable not connected)
Green	System On
Green: Flashing Qucikly	ACPI S1 State
Green: Flashing Slowly	ACPI S3 (STR) State

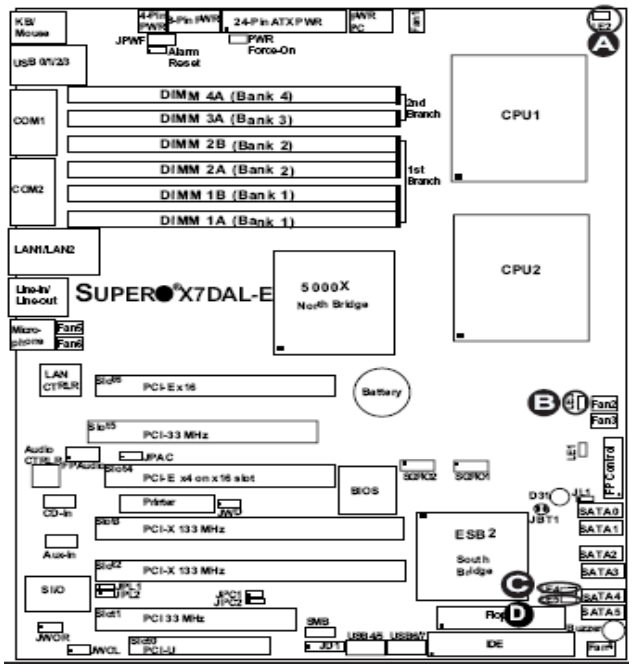
Figure 24: Onboard Power LED indicators

- **CPU VRM Overheat LED Indicators (LE2/LE3)**

There are two CPU VRM Overheat LEDs (LE2, LE3) on the Motherboard. LE2 is for CPU1 VRM and LE3 is for CPU2 VRM. When the temperature of CPU VRM is normal, the CPU VRM Overheat LED is green. When CPU VRM is over 90°C, the CPU VRM Overheat LED will turn yellow and the CPU will slow down to protect the CPU VRM.

- **Post Code LED Indicators (LE4/LE5)**

There are two POST Code LED Indicators (LE4, LE5) located on the Motherboard. These two LEDs indicate POST (Power On Self Test) Code Messages through different sets of green and yellow light combinations. Refer to the table below for POST Code Messages.



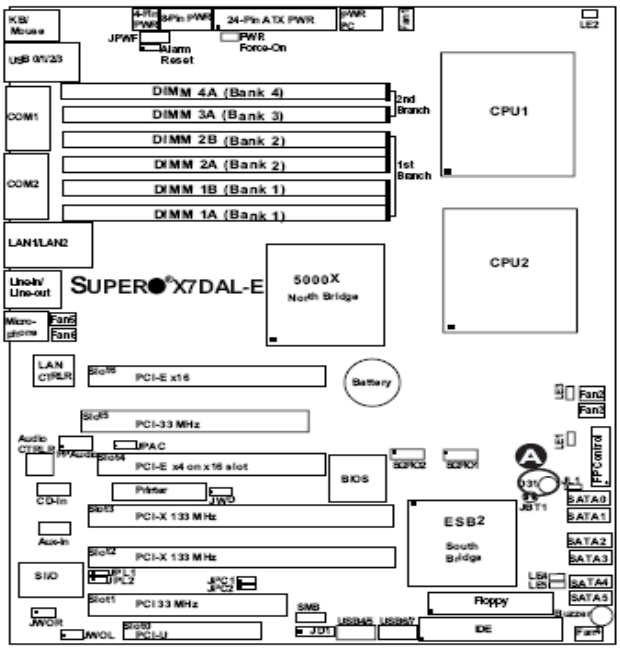
A- LE2:CPU1VRM
B- LE3: CPU2VRM
C- LE4: POST Code LED
D- LE5: POST Code LED

POST Code LED Indicators		
LE4 Yellow	LE5 Green	POST Code Message
On	Off	Memory Initialization @ POST 28h
Off	On	System Shadowing @ POST 38h
On	On	CPU Initialization @ POST 0Ah
Off	Off	POST Initialization: OK

Figure 25: CPU VRM and POST Code LED indicators

- **Status LED (D31)**

There is a Status LED Indicator (D31) located on the Motherboard. This LED displays different colours to show the status of the system. When this amber LED is on, the power cable is still connected. Be sure to unplug the power cable before installing or removing any components from the Motherboard. Refer to the table on the right for system status. See the layout below for the location.



A- D31: System Status LED

Status LED Indicator	
LED Color	Definition
Green	Power On, system: normal
Red	PWR on, PWR problem(s) occur(s) or JPW3 not properly installed
Green	Flashing quickly: S1 state
Amber	System off with PWR cable connected

Figure 26: Status LED indicators

Upgrading the Central Processing Unit (CPU)

The Motherboard comes with a surface mount LGA771 socket designed for the Intel® Xeon 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 VIG395P 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 un-screwing the two screws at the rear of the case

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

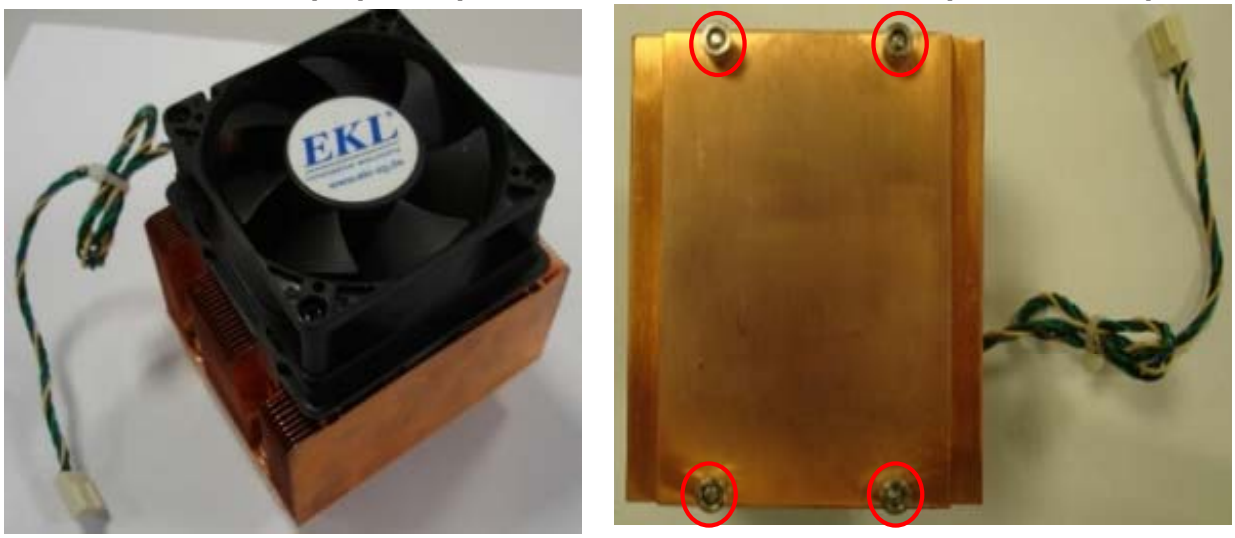


Figure 27: Xeon Active CPU heatsink

2. Unscrew and remove the heatsink screws from the Motherboard in the sequence as shown in the picture below.

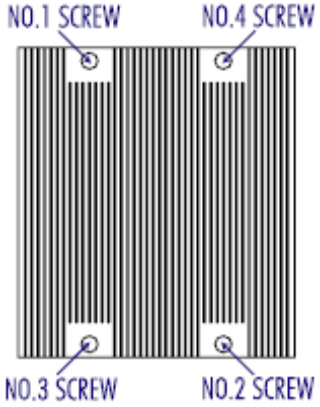


Figure 28: Heatsink screws

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

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

5. 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. Locate the CPU module

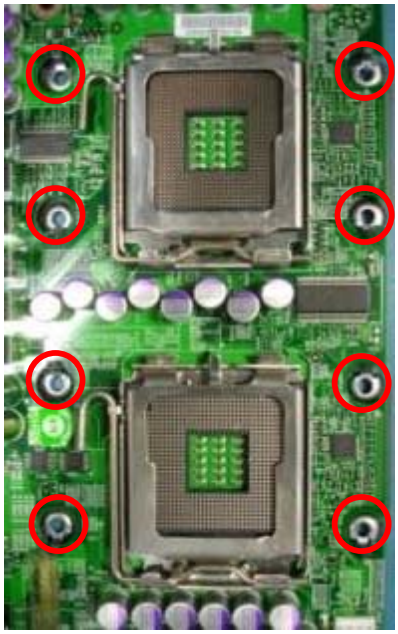


Figure 29: CPU Heatsink mounting holes

Note: *in the figure above the circled holes are not Motherboard mounting holes these hold the Heatsink clips fitted to the Motherboard as shown below in figures 30 and 31.*

Figure 30: CPU sockets showing Heatsink clips

Figure 31: Back of MB showing Heatsink clips

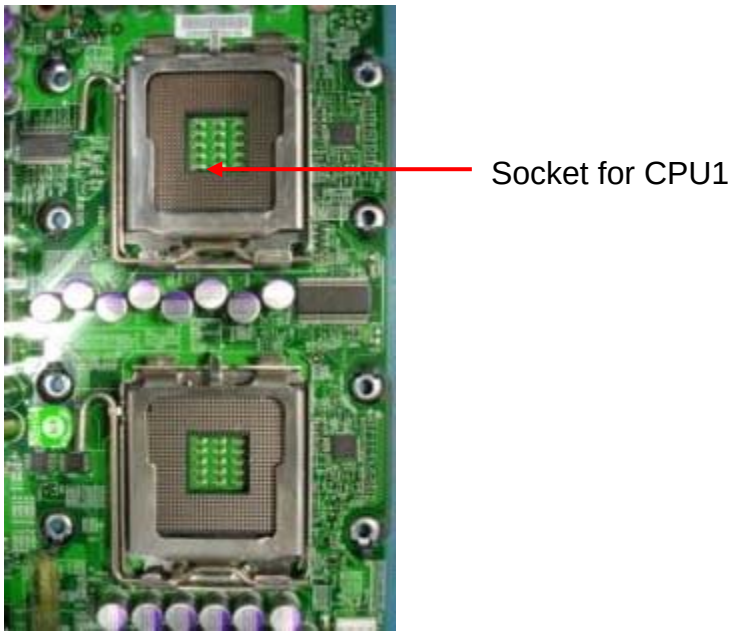


Figure 32: Socket for one CPU install

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

2. Press the load lever to release the load plate, which covers the CPU socket, from its locking position.

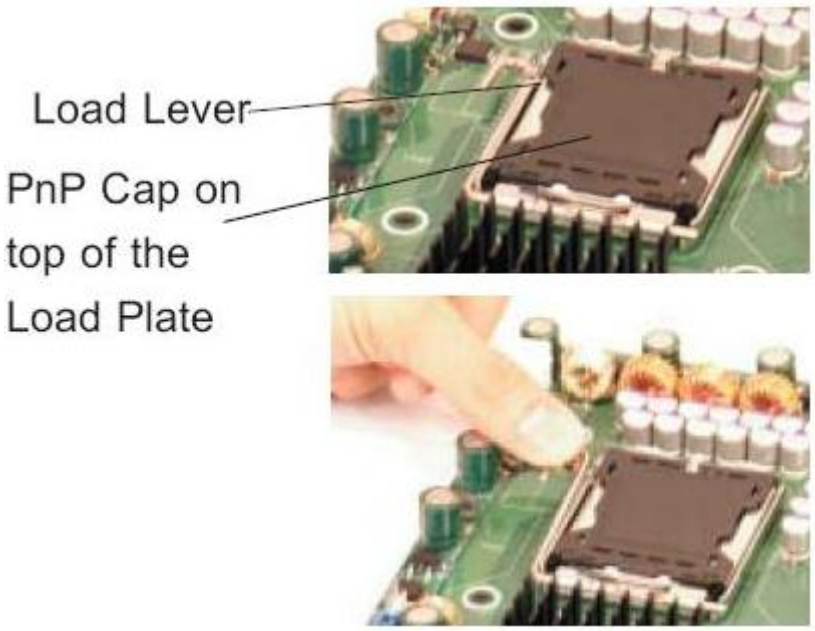


Figure 33: Release of load plate

3. Gently lift the load lever to open the load plate.

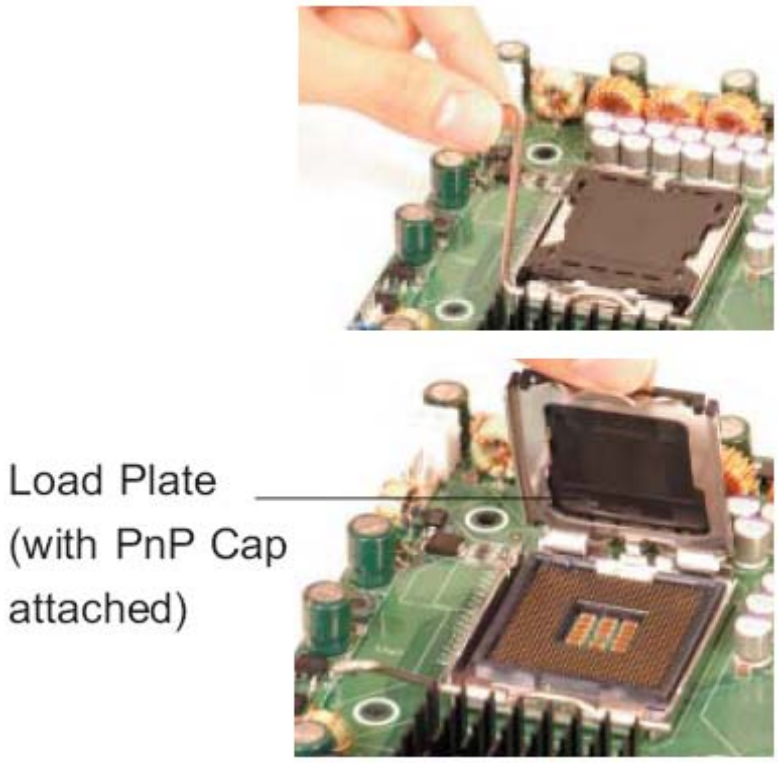


Figure 34: Opening load plate

4. Use your thumb and your index finger to hold the CPU at the North Center Edge and the South Center Edge of the CPU. Lift the CPU Vertically upwards until it is clear of the socket.

Figure 35: Correct way to hold CPU

5. With the new CPU align CPU Pin1 (the CPU corner marked with a triangle) against the socket corner that is marked with a triangle cutout.

6. Align the CPU key that is the semi-circle cutout below a gold dot against the socket key, the notch on the same side of the triangle cutout on the socket.

7. Once aligned, carefully lower the CPU straight down to the socket.

Note: *Do not drop the CPU on the socket. Do not move the CPU horizontally or vertically. Do not rub the CPU against the surface or against any pins of the socket to avoid damage to the CPU or the socket.*

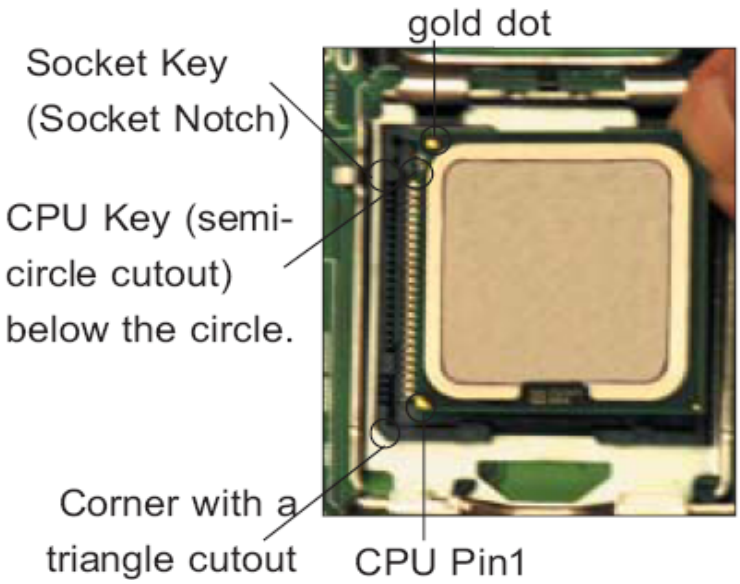


Figure 36: Placing CPU in socket

8. With the CPU inside the socket, inspect the four corners of the CPU to make sure that the CPU is properly installed. Then, close the load plate.

9. Use your thumb to gently push the load lever down to lock it.

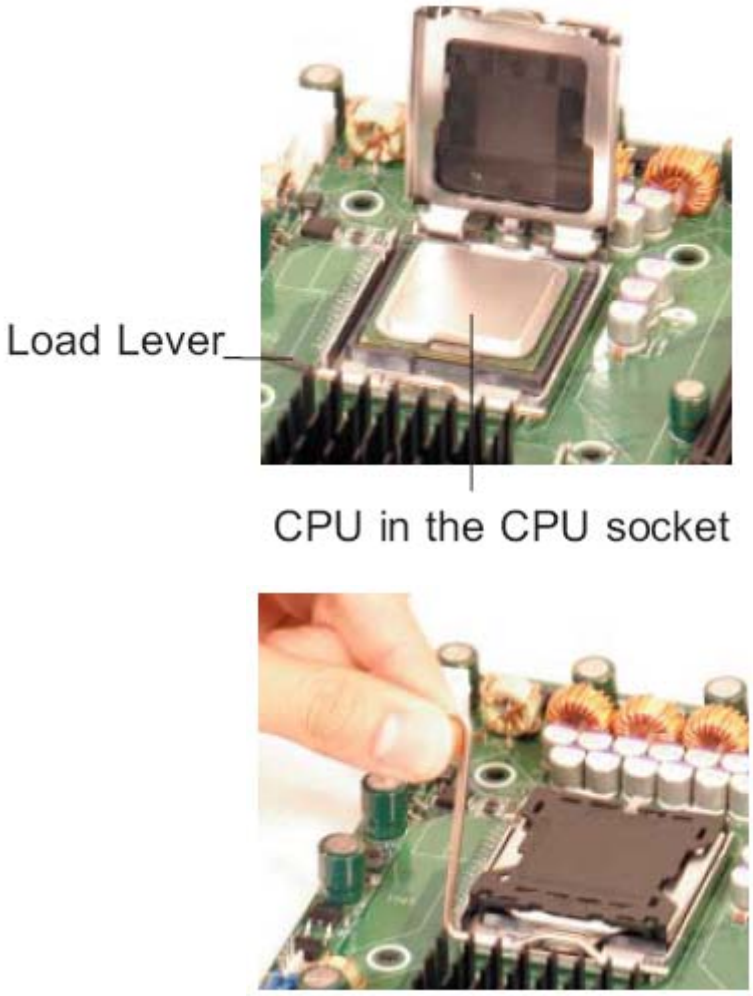


Figure 37: Securely locking CPU into socket using lever

10. Now repeat the steps for the second CPU if required, making sure that the CPU is properly installed with load plate securely locked with lever.

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.)

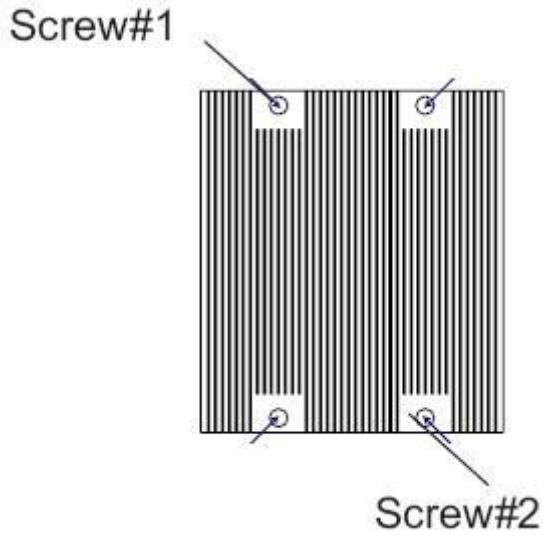


Figure 38: Heatsink diagonal screw locations

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

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

Upgrading the Memory Modules

You can install from 256MB to 24GB of memory in the Motherboard DIMM sockets. The board has six 240-pin FB (Fully Buffered) DDR2 72bit registered ECC SDRAM DIMM sockets. The Motherboard supports the following memory features:

- 240-pin DIMMs with gold-plated contacts.
- ECC (72-bit).
- DDR2 533/667 MHz Memory speeds
- 256MB, 512MB, 1GB, 2GB and 4GB.

When adding memory, follow these guidelines:

- The BIOS detects the size and type of installed memory.

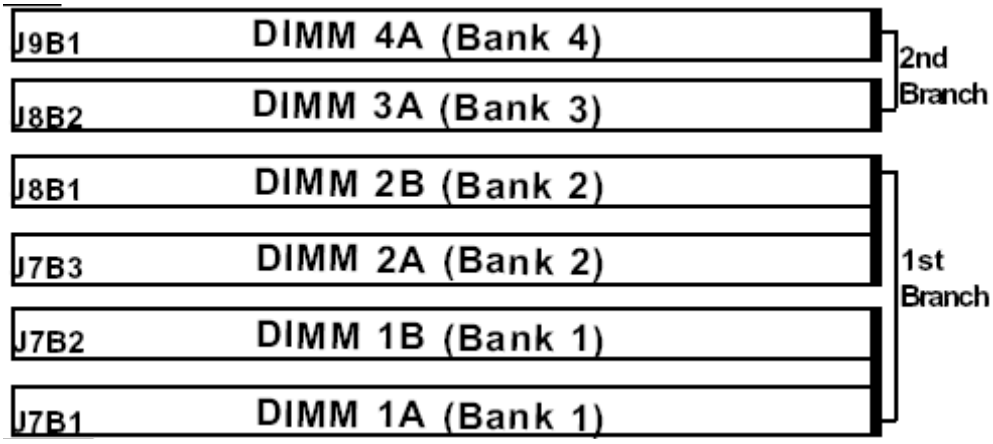


Figure 39: DIMM Configuration

Table 15: DIMM Population Configurations

Optimized DIMM Population Configurations								
	Branch 1				Branch 2			
Number of DIMMs	Bank 1 (Channel 0)		Bank 2 (Channel 1)		Bank 3 (Channel 2)		Bank 4 (Channel 3)	
2 DIMMs	1A	------	2A	------	------	N/A	------	N/A
4 DIMMs	1A	------	2A	------	3A	N/A	4A	N/A
6 DIMMs	1A	1B	2A	2B	3A	N/A	4A	N/A

Notes:

5. **Dimm slot# specified: DIMM slot to be populated; "------": DIMM slot not to be populated**
6. **Both FBD 533 MHz and 667 MHz DIMMs are supported; however, you need to use the memory modules of the same speed and of the same type on a Motherboard**
7. **Interleaving memory is supported when pairs of DIMM modules are installed. To optimize memory performance, please install pairs of memory in both Branch 1 and Branch 2**
8. **For memory to work properly, you need to follow the restrictions listed above.**

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. Unlock a DIMM socket by pressing the retaining clips outward.

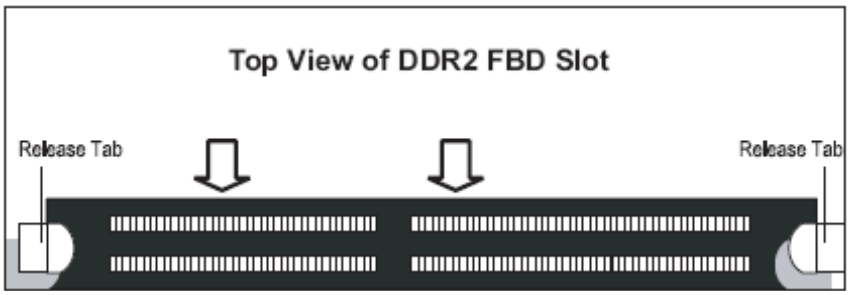


Figure 40: Unlocking DIMM sockets

2. Insert the desired number of DIMMs into the memory slots, starting with DIMM #1A. The memory scheme is interleaved, so you must install two modules at a time, beginning with DIMM #1A, hen DIMM #2A and so on. For optimal performance, please install four modules at a time (4 modules maximum.)

3. 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.

4. Gently press down on the DIMM module until it snaps into place in the slot. Repeat for all modules (see step 1 above).

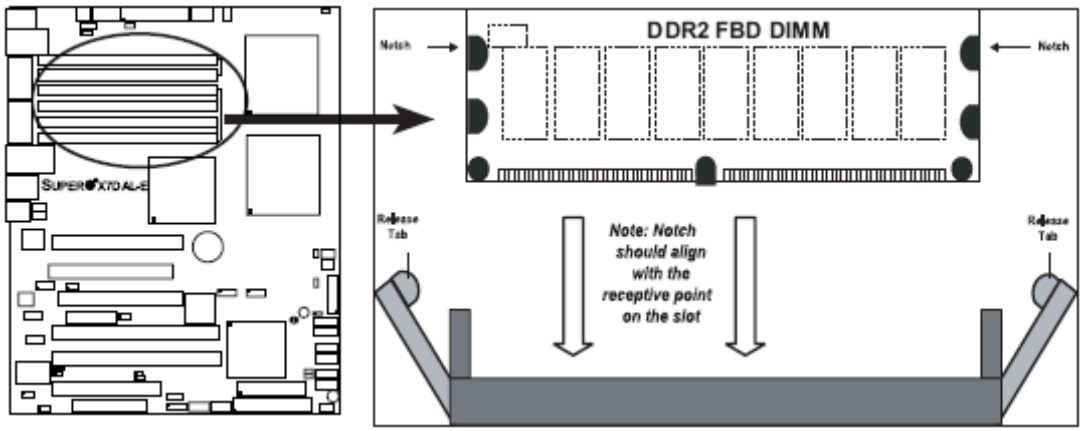


Figure 41: Installing DIMM

Note:

1. *A FB-DIMM is keyed with a notch so that it fits in only one direction. Do not force a DIMM into a socket to avoid damaging the DIMM.*

2. *The sockets do not support DDR/DDR2 DIMMs. DO NOT install DDR/DDR2 DIMMs to the FB-DIMM sockets.*

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

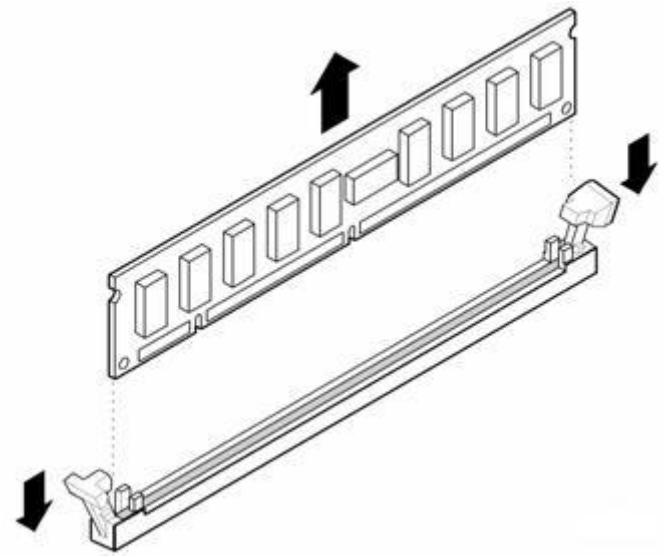


Figure 42: Removing DIMM

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 43: 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 44: 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.

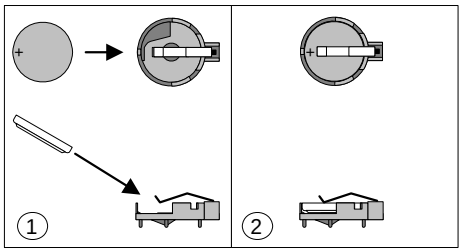


Figure 45: Removing the Battery

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 16: 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.

Problems and Suggestions

Table 17: 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 18: 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.

Recoverable POST Errors
When a recoverable type of error occurs during POST, the BIOS will display an POST code that describes the problem. BIOS may also issue one of the following beep codes:

- 1 long and two short beeps - video configuration error
- 1 repetitive long beep - no memory detected

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 19: 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 20: 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 21: 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 22: 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 23: 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 24: 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 HostRAID Setup Guidelines

After all the hardware has been installed, you must first configure Intel's ESB2 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 ESB2 RAID Controller designed for the Windows OS.*

Introduction to Serial ATA and Parallel ATA

To configure the SATA RAID functions, you must first use the Intel ESB2 SATA RAID Utility program to configure the RAID Level that you desire before installing the Windows XP/2000/2003 operating system and other software drivers. The necessary drivers are all included on the Viglen Driver CD supplied with the system.

Note: *The current version of the ESB2 SATA RAID Utility can only support Windows XP/2000/2003 Operating Systems.*

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 ESB2 Serial RAID

Located in the South Bridge of the 5000X chipset, the I/O Controller Hub (ESB2) 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 ESB2 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 ESB2, 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 "Main" section in BIOS.

4. Scroll down to "SATA Controller Mode" and press the <Enter> key to select "Enhanced".

5. Scroll down to "SATA RAID Enabled" and press <Enter>. Then, select "Enabled."

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

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

8. 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 ESB2 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.

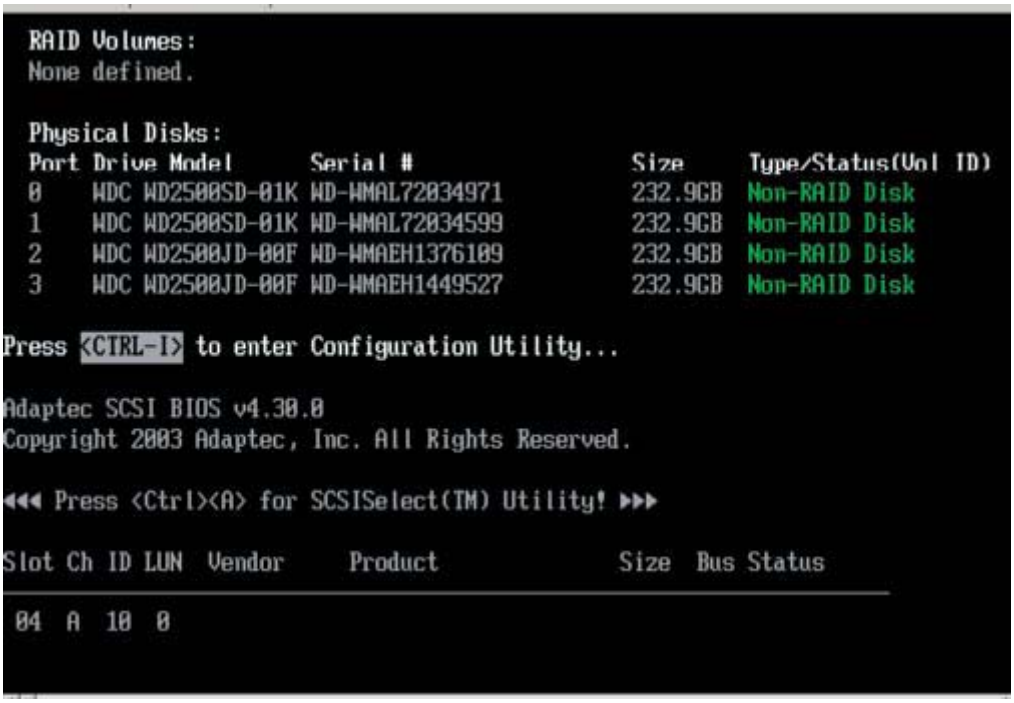


Figure 46: Entering the Intel ESB2 SATA Utility

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:

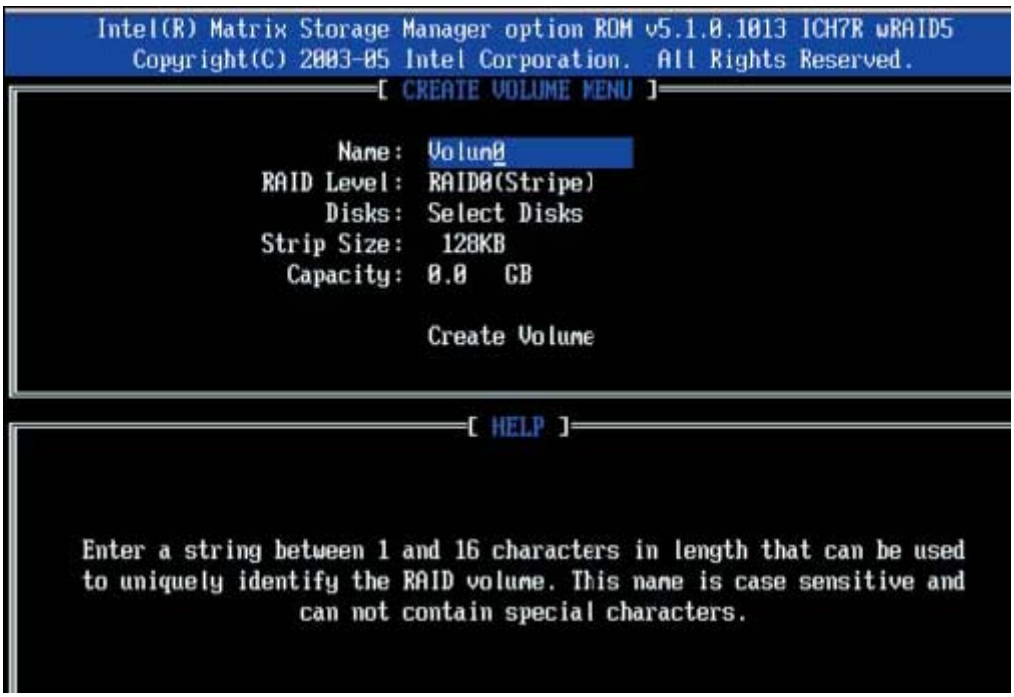


Figure 47: Creating a RAID 0 Volume

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:

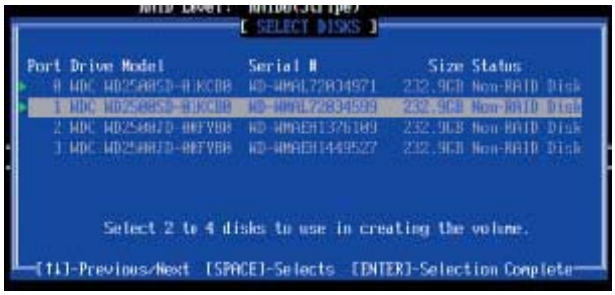


Figure 48: Selecting Drives for RAID 0 Volume

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:

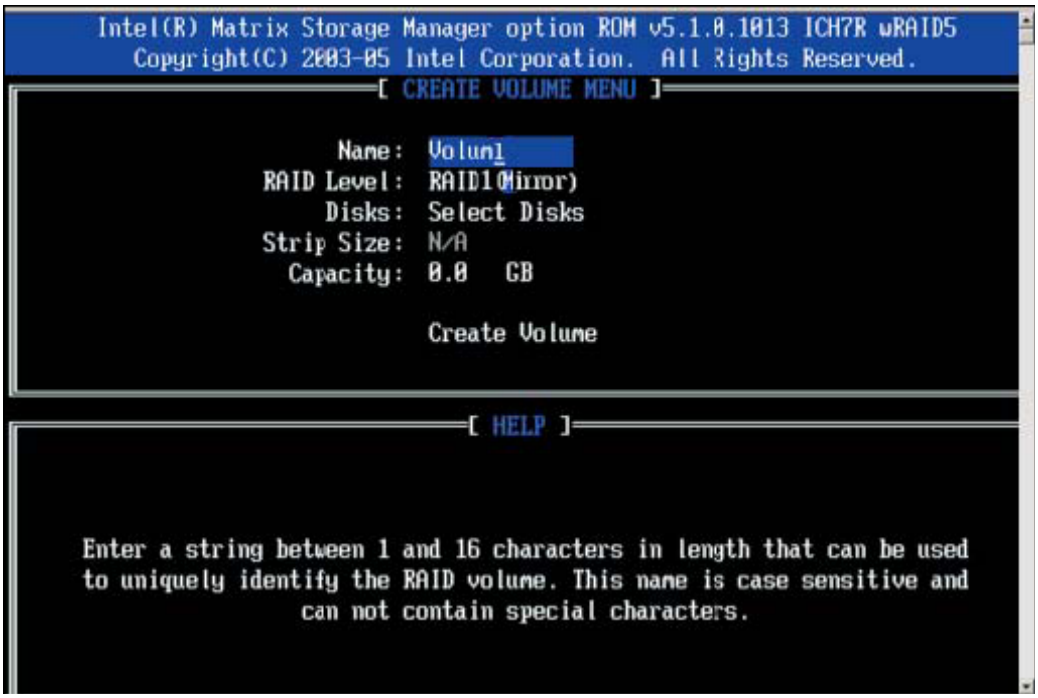


Figure 49: Creating a RAID 1 Volume

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:

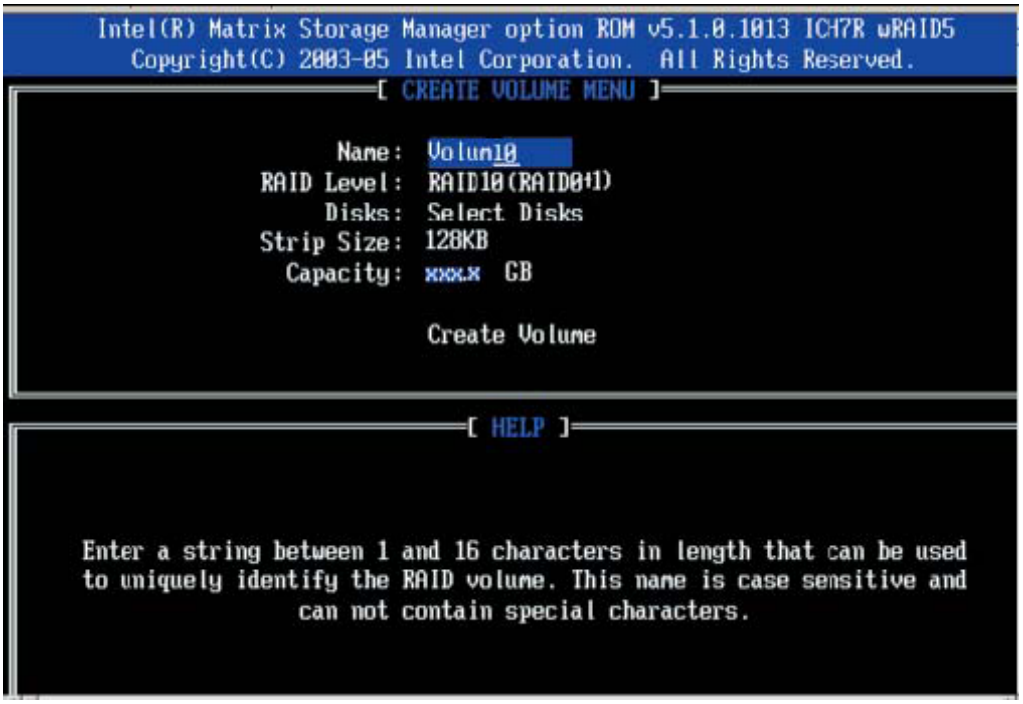


Figure 50: Creating a RAID 10 (RAID 1 + RAID 0) Volume

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:

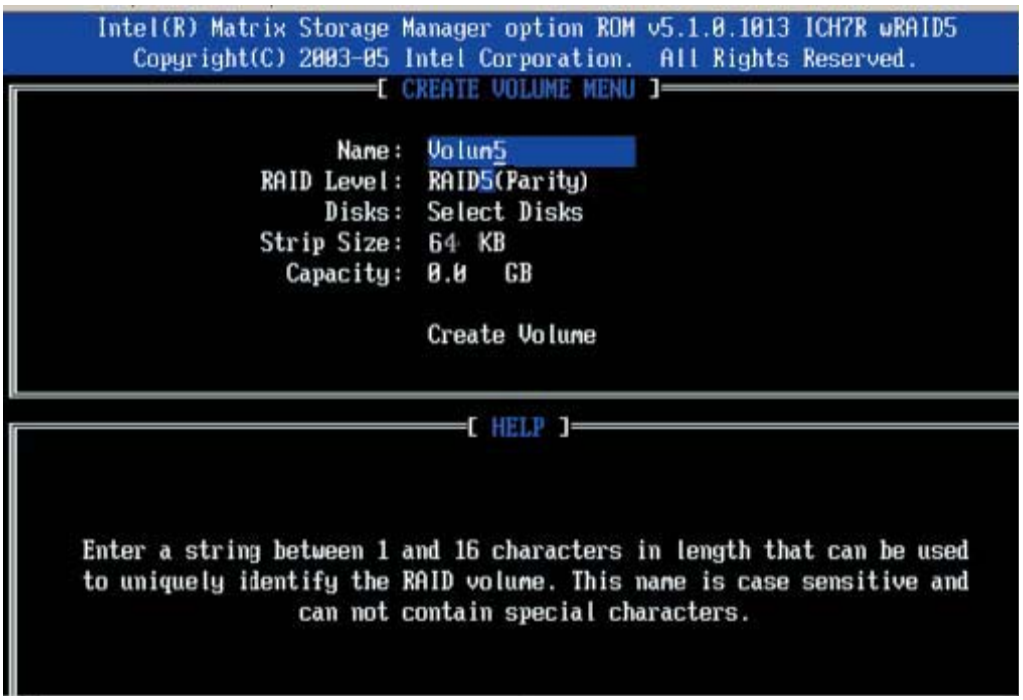


Figure 51: Creating a RAID 5 (Parity) Volume

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 52: 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 53: 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/2000/2003 for systems with RAID Functions

New Operating System-Windows XP/2000/2003 Installation

1. Copy the Intel ESB2 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/2000/2003 Setup CD in the CD Driver, and the system will start booting up from CD.

Note: *If using a Viglen Recovery CD, please skip to step 7. All drivers for RAID functions are included on the 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/2000/2003 Setup screen appears, press "S" to specify additional device(s).

6. Insert the driver diskette-"Intel AA RAID XP/2000/2003 Driver for ESB2 into Drive A: and press the <Enter> key.

7. Choose the Intel ESB2 SATA RAID Controller from the list indicated in the XP/2000/2003 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/2000/2003 Setup screen, press the <Enter> key. The XP/2000/2003 Setup will automatically load all device files and then, continue the Windows XP/2000/2003 installation.

10. After Windows XP/2000/2003 Installation is completed, the system will automatically reboot.

Note: *the current version of the ESB2 SATA RAID Utility can only support Windows XP/2000/2003 Operating System.*

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 Enterprise South Bridge 2 (ESB2) 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 ESB2 I/O Controller Hub

Located in the South Bridge of the Intel 5000X Chipset, the ESB2 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 functions (Windows, Red Hat & Suse Linux)

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

2. Use the arrow keys to select the "Main" section in BIOS.

3. Scroll down to "SATA Control Mode" and press the <Enter> key to select "Enhanced".

4. Scroll down to "SATA RAID Enabled" and press <Enter>. Then, select "Enabled."

5. Scroll down to "ICH RAID Codebase" and select "Adaptec". Then press <Enter>. (For ICH RAID Codebase: Change the setting from Intel to Adaptec.)

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

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

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

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.*

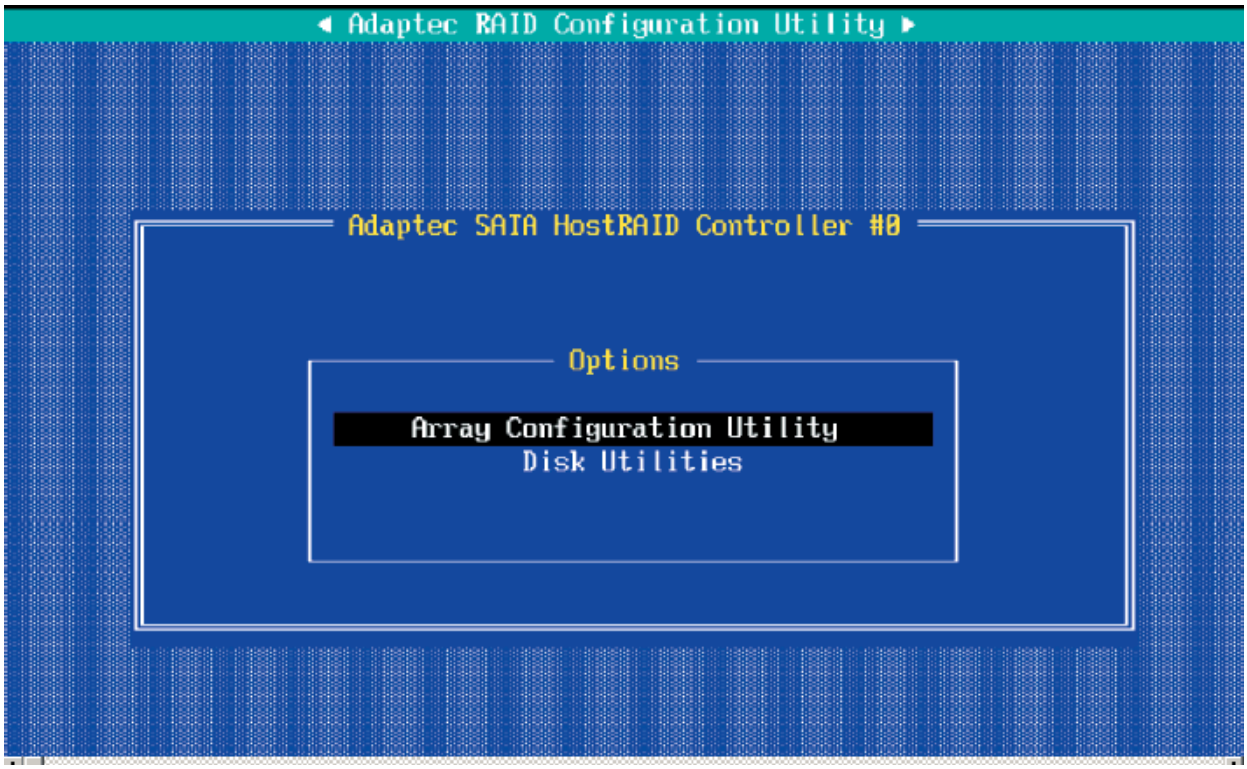


Figure 54: Selecting the Array Configuration Utility

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 55: 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.)

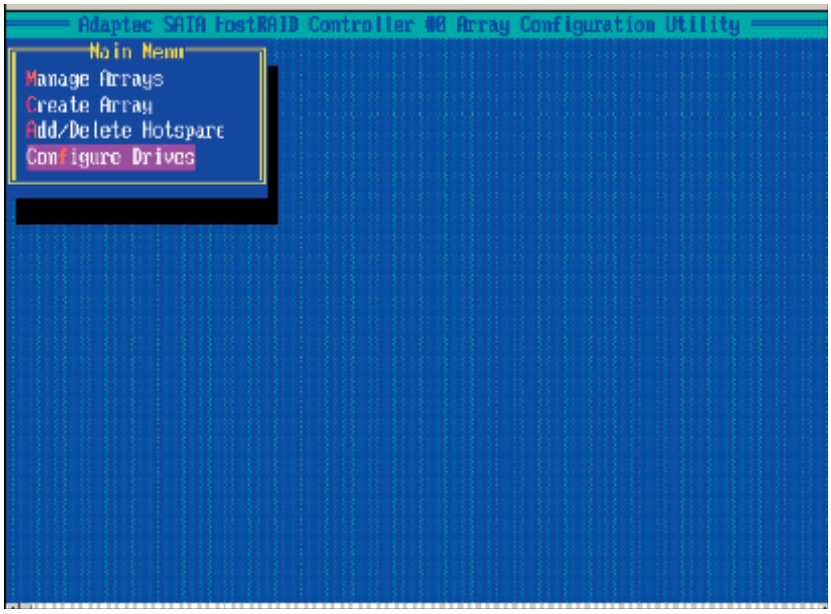


Figure 56: Configuring Drives

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

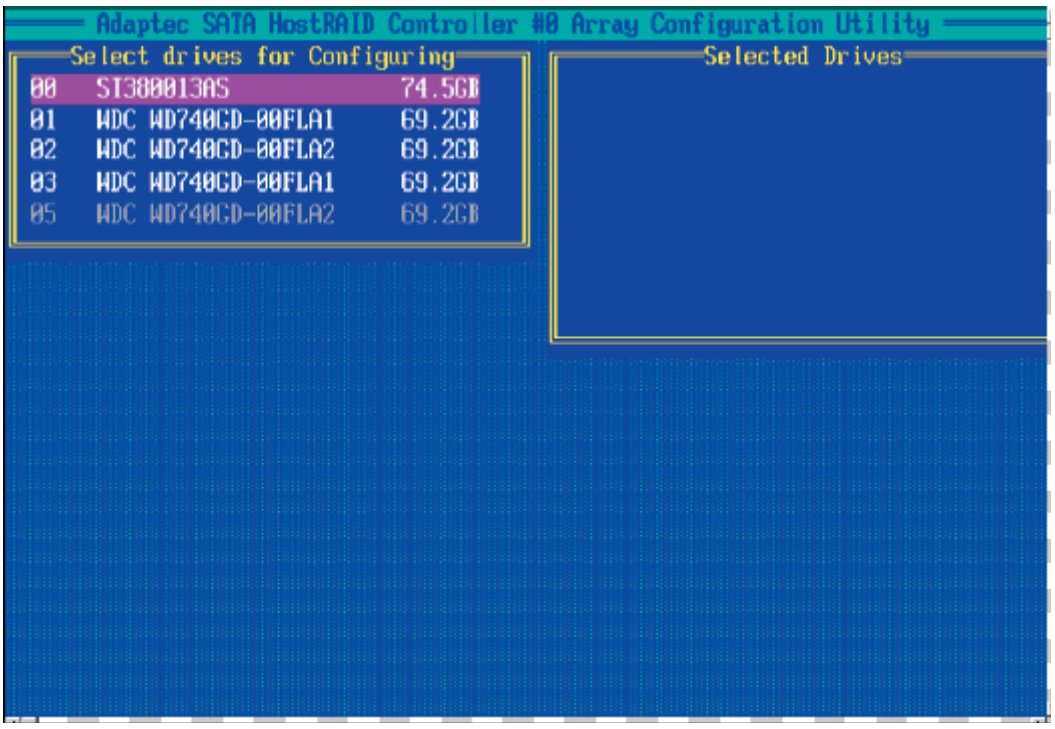


Figure 57: Selecting Drives To Be Configured

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.

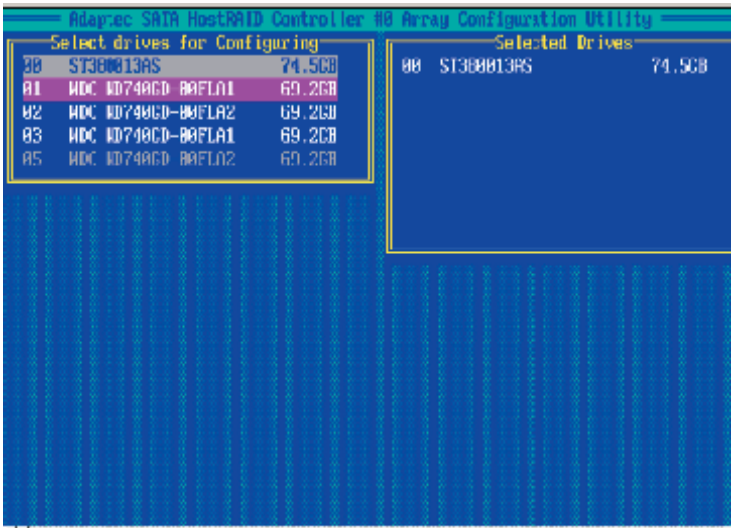


Figure 58: List of Selected Drives for Configuration

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

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

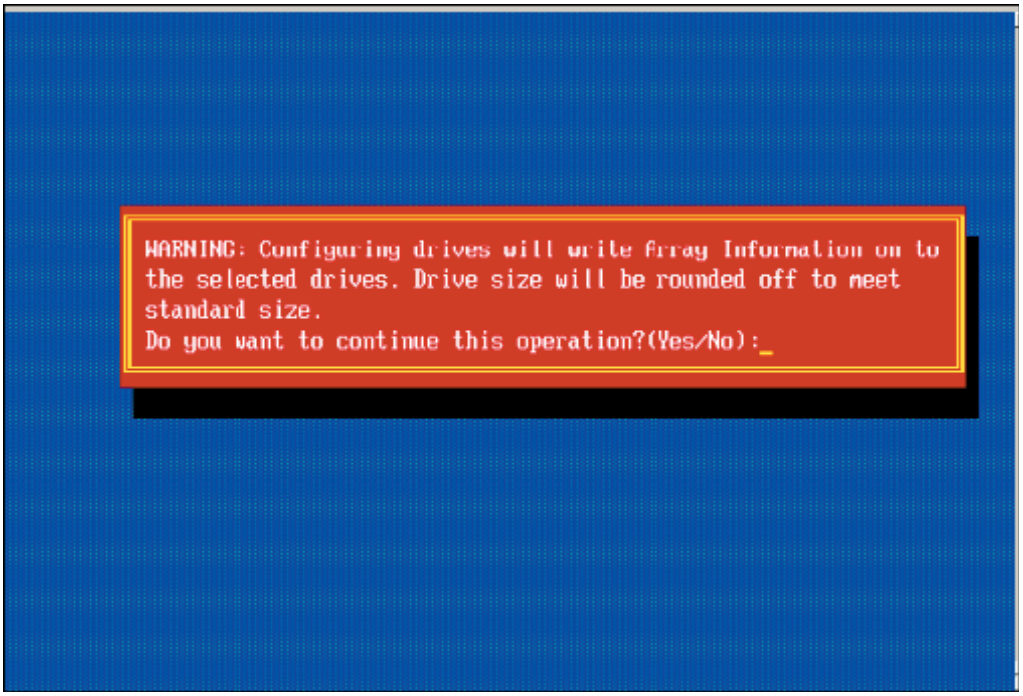


Figure 59: List of Selected Drives for Configuration

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**.*

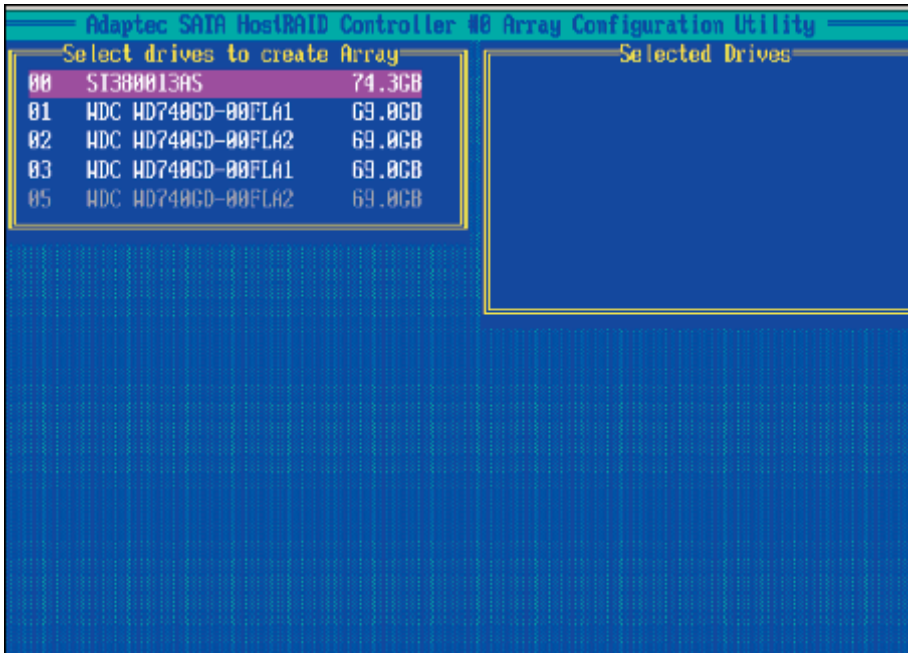


Figure 60: Creating Arrays

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.

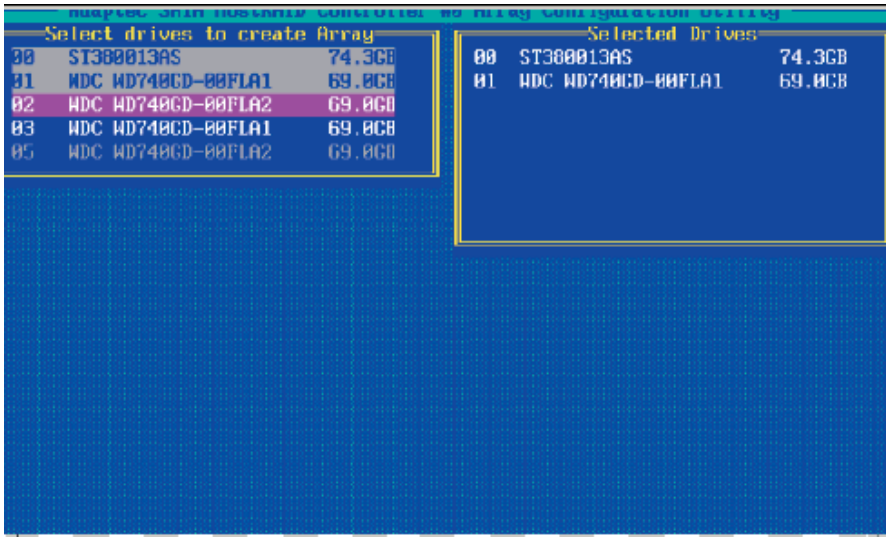


Figure 61: Selecting Drives to Create an Array

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 62: 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).

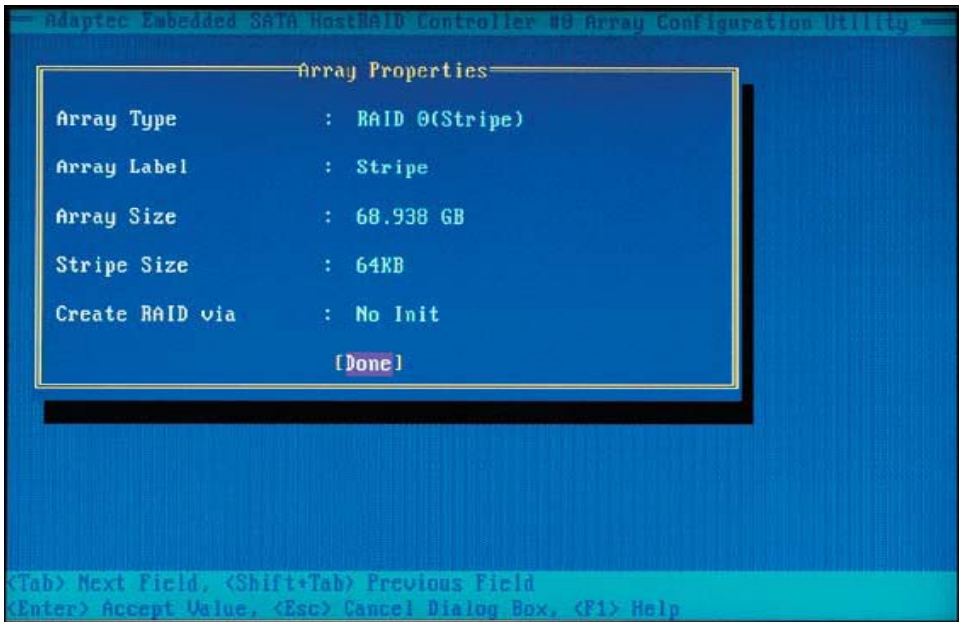


Figure 63: Assigning Array Properties

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)

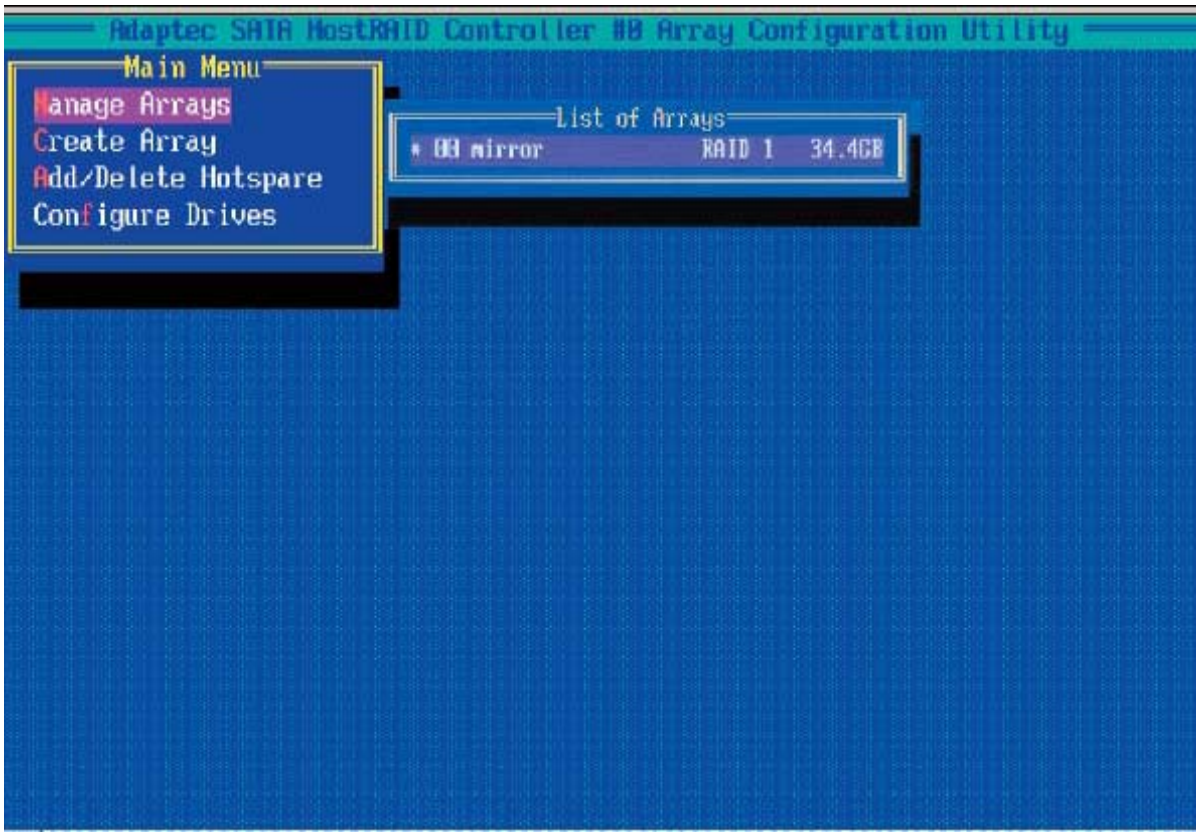


Figure 64: Adding a Bootable Array

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.

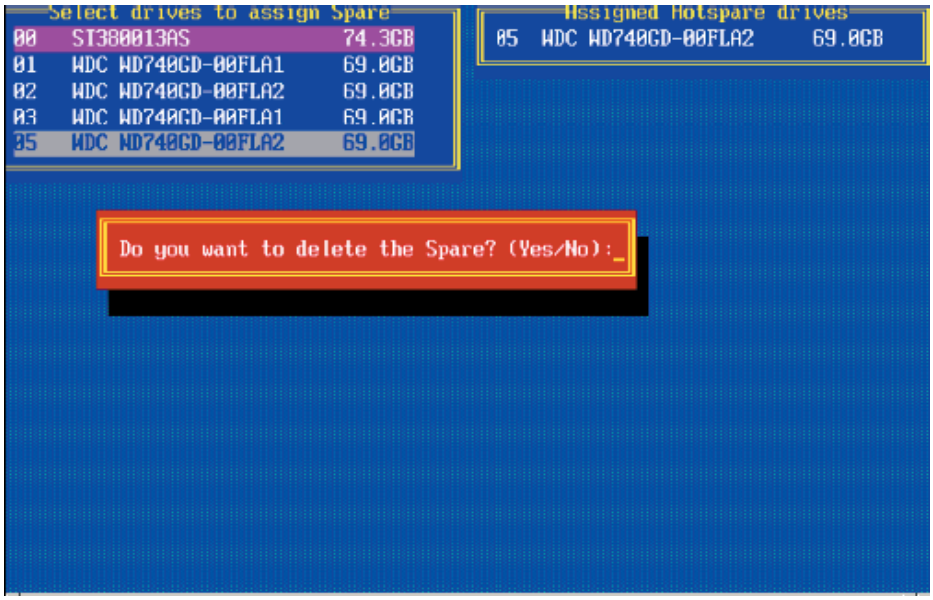


Figure 65: Deleting Hotspare

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.

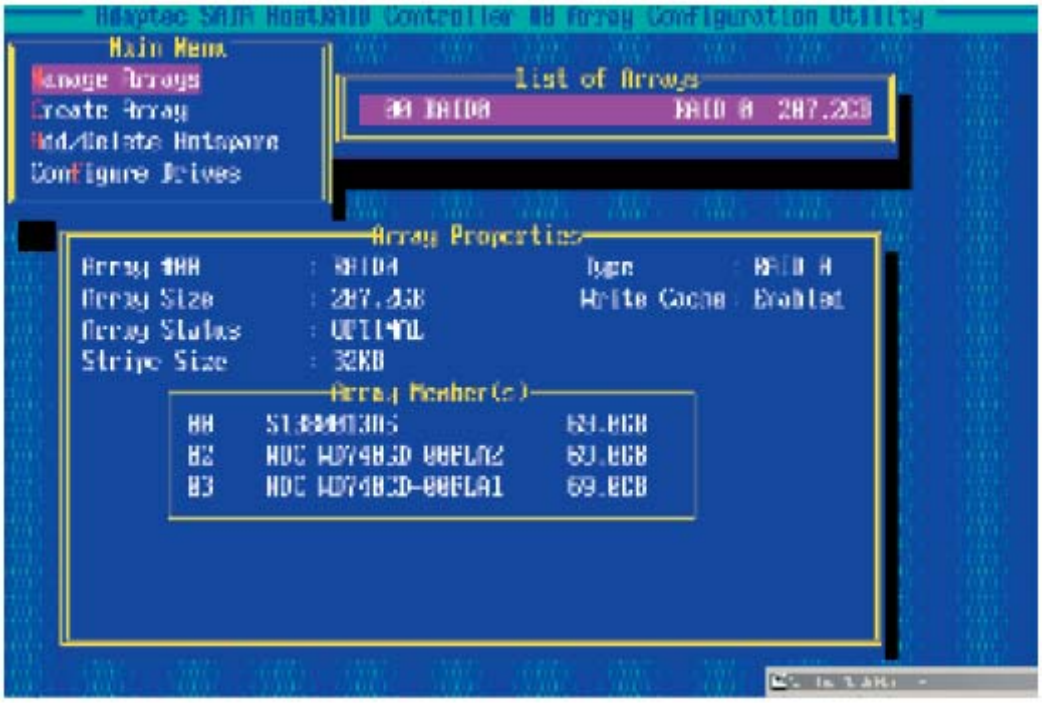


Figure 66: Deleting Hotspare

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 67: 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:

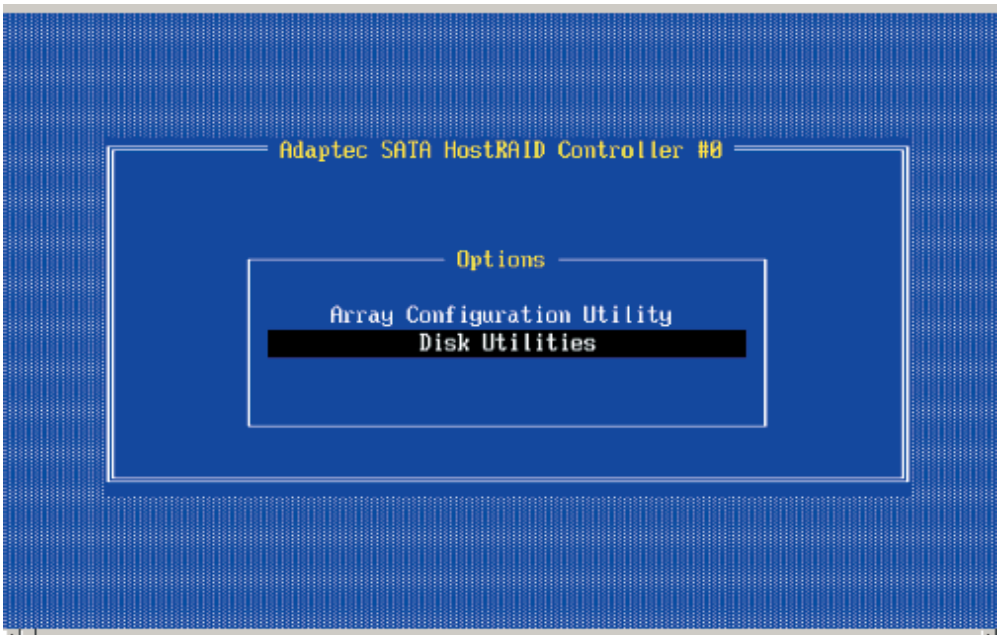


Figure 68: Accessing Disk Utilities

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

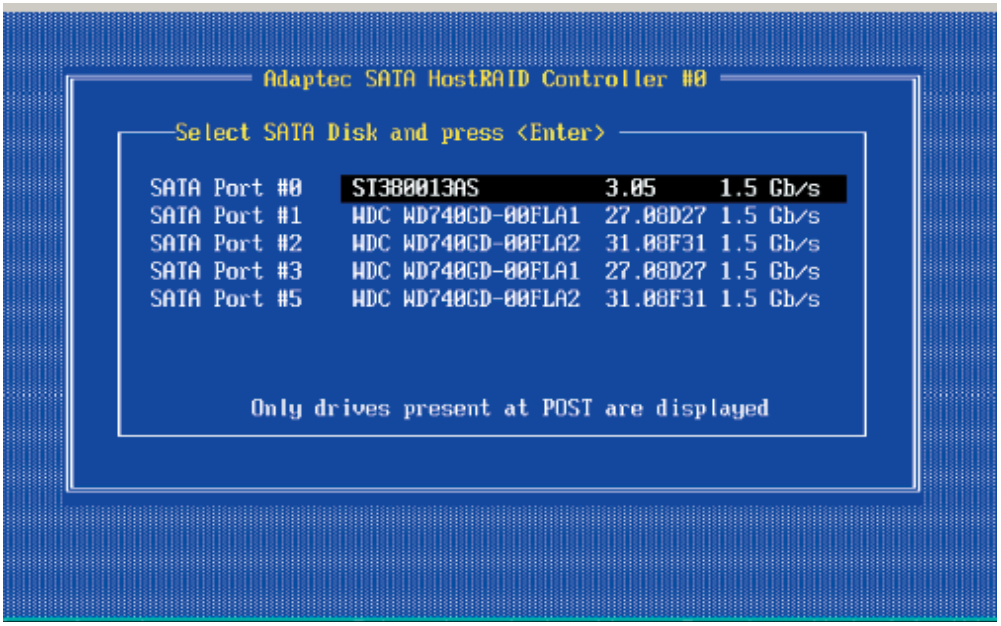


Figure 69: Disk Utilities Main Menu

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:

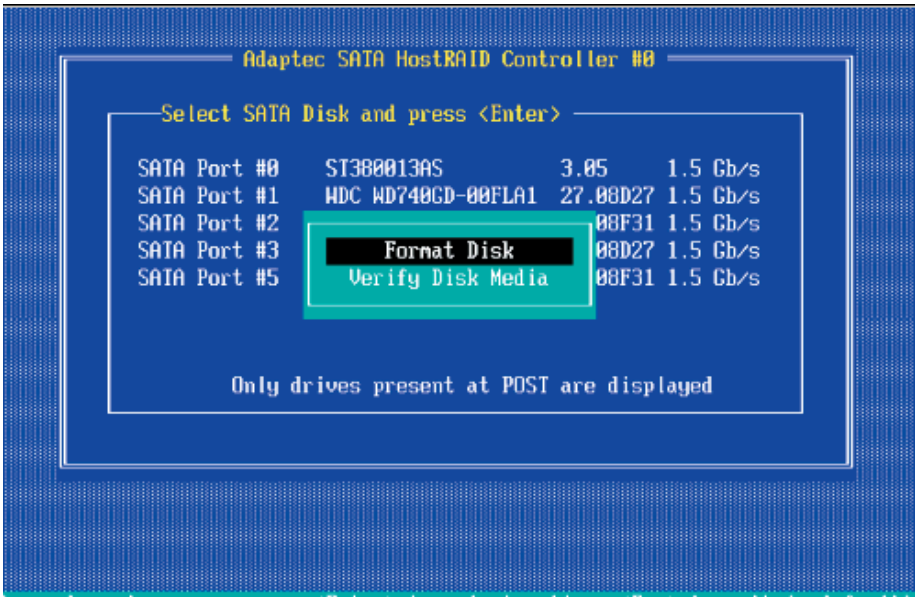


Figure 70: Formatting Disk

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.

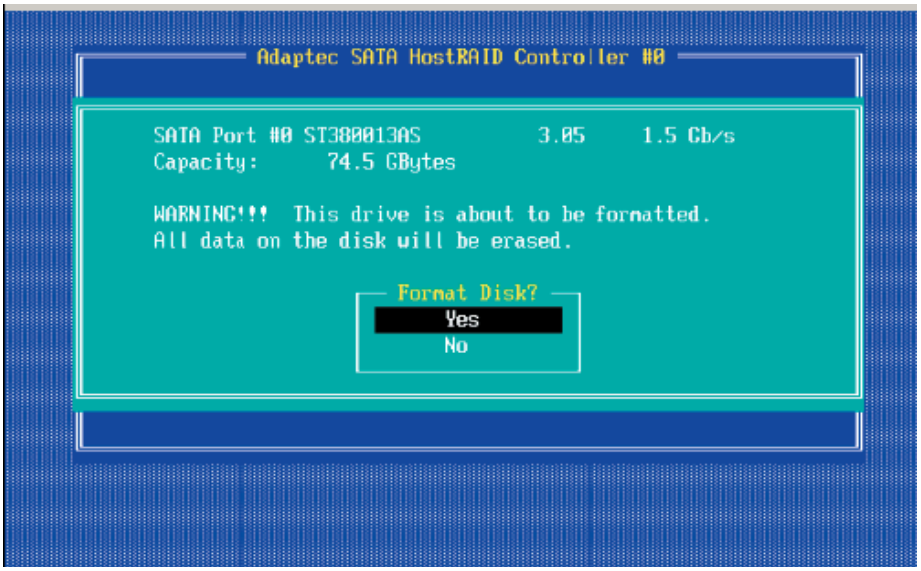


Figure 71: Formatting Disk

To verify disk media:

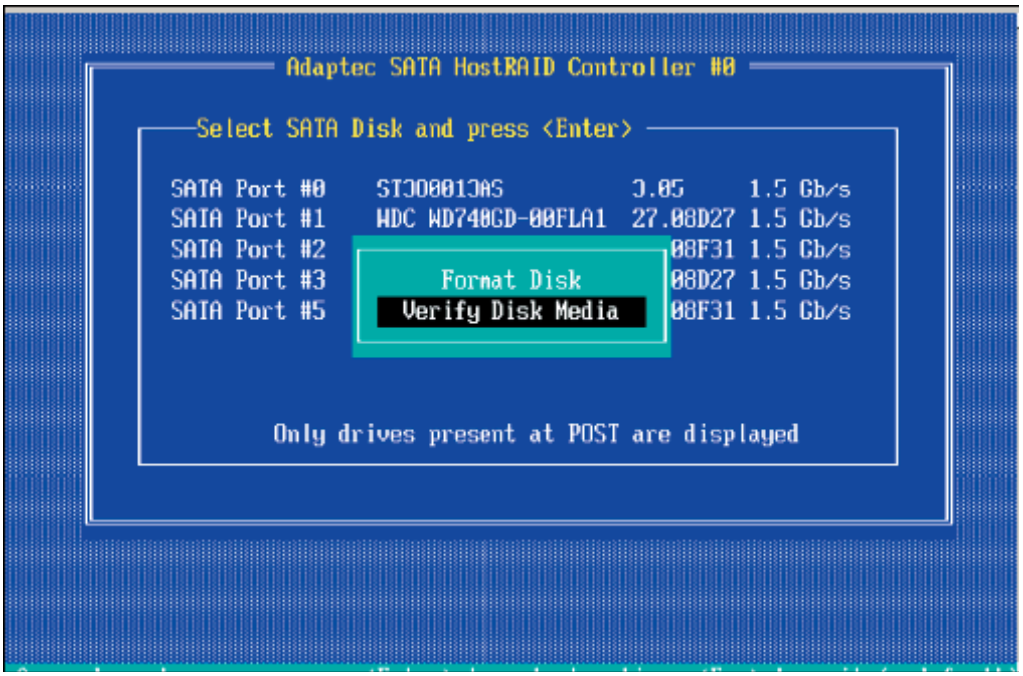


Figure 72: Verifying Disk Media

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>.**

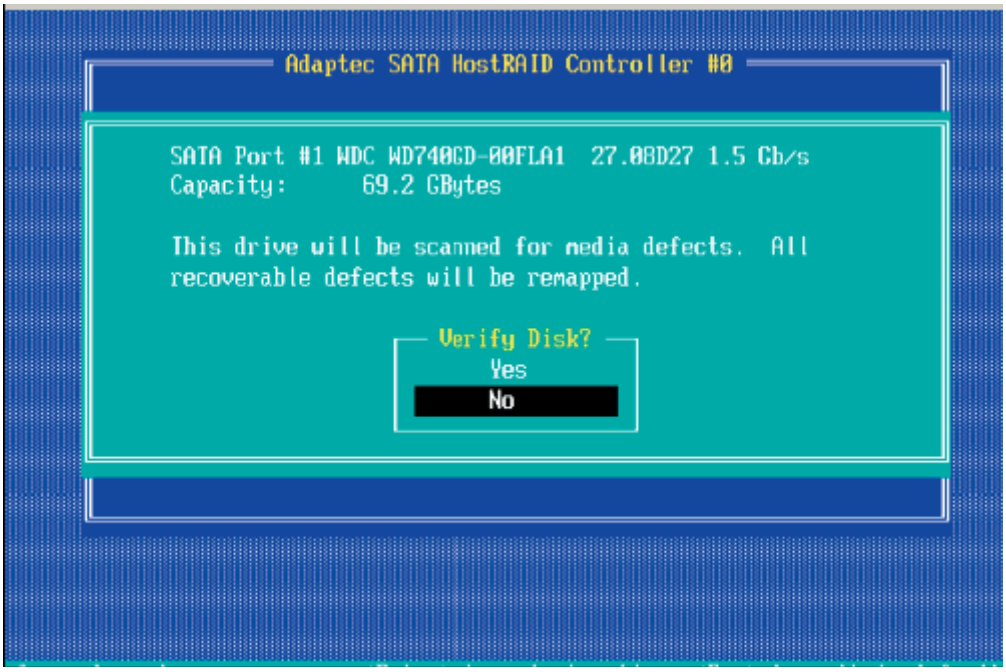


Figure 73: Verifying Disk Media

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.

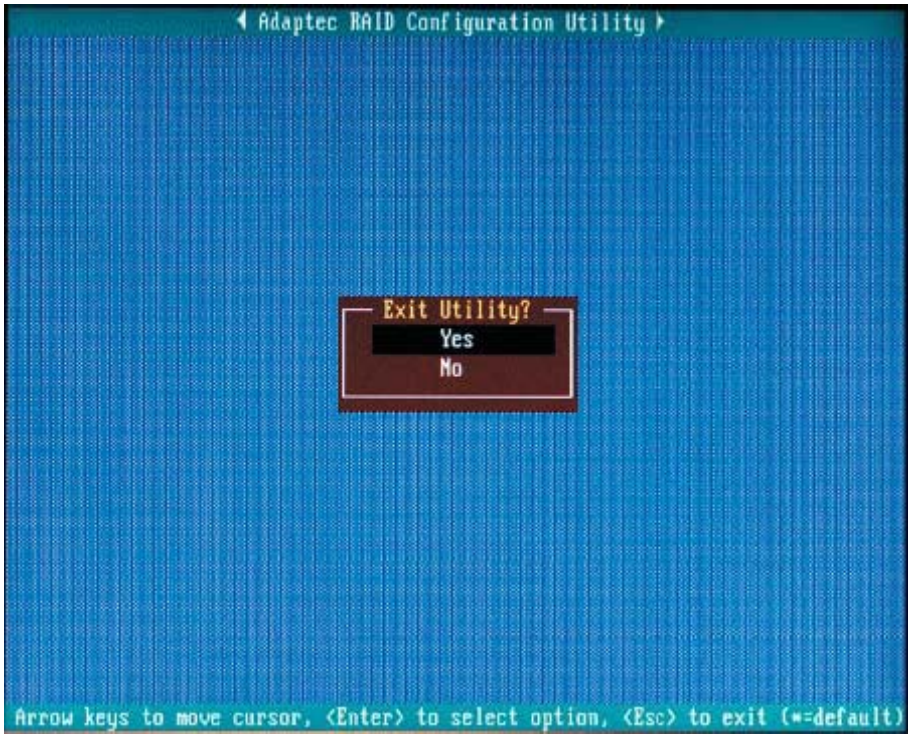


Figure 74: Exiting utility

Installing Intel's ESB2 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.

Note: *If using a Viglen Recovery CD, please skip to step 7. All drivers for RAID functions are included on the 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 Adaptec Embedded Host Serial ATA Raid Controller 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 Vig395P. 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 VIG395P 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 Phoenix Phlash16 utility (PHLASH16.exe) from the Motherboard support CD to the bootable floppy disk you created earlier with the following files:

   - Latest BIOS file (X7DAL(V).ROM)
   - FLASH.BAT
   - CHKFLASH.COM
   - PHLASH.EXE
   - Platform.bin

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

   flash.bat filename.rom

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

Figure 75: Typing the BIOS filename

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

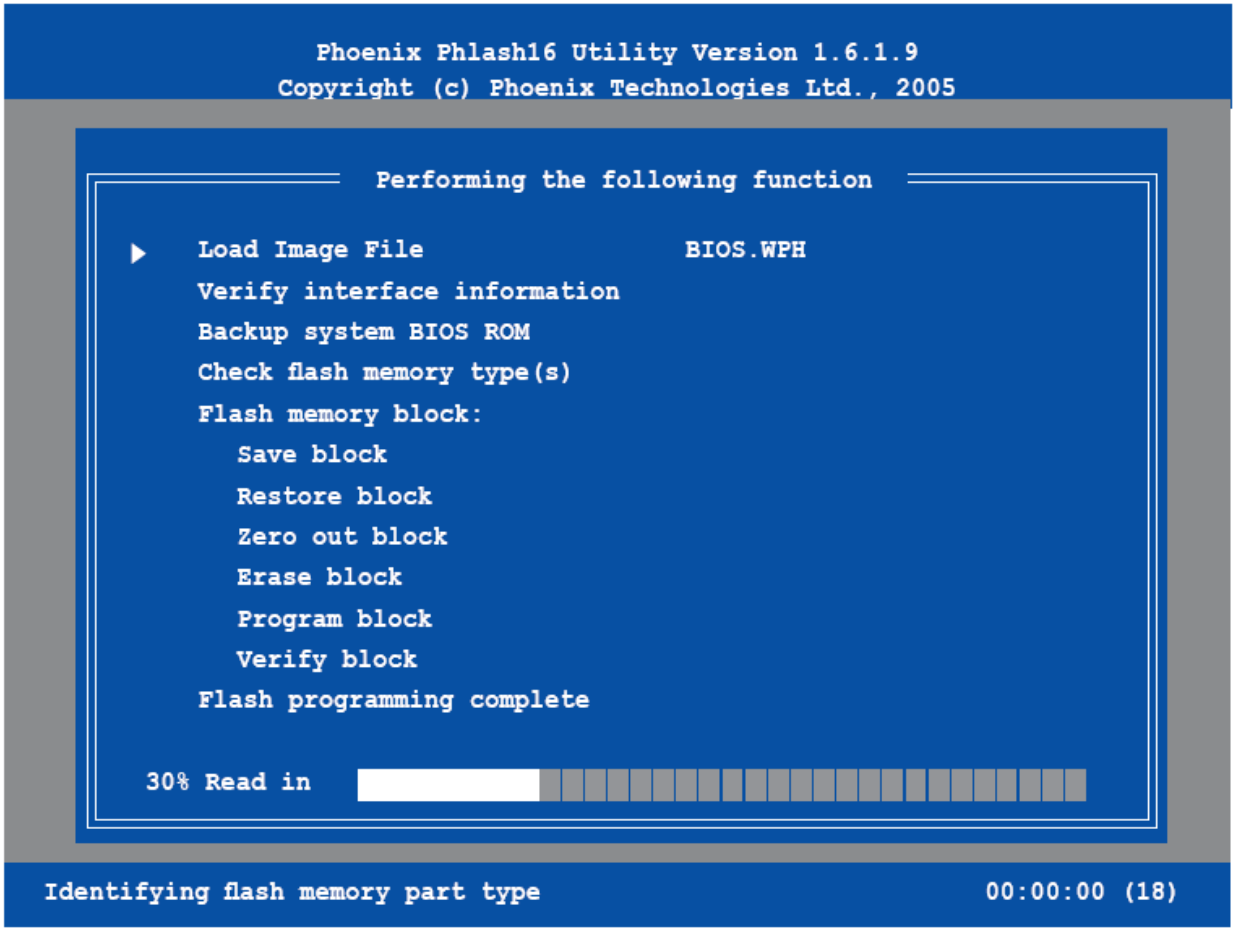


Figure 76: Utility Updating the System BIOS

CAUTION!!

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

5. When the utility completes the updating process, a message appears, informing you that the flash memory has been programmed successfully.

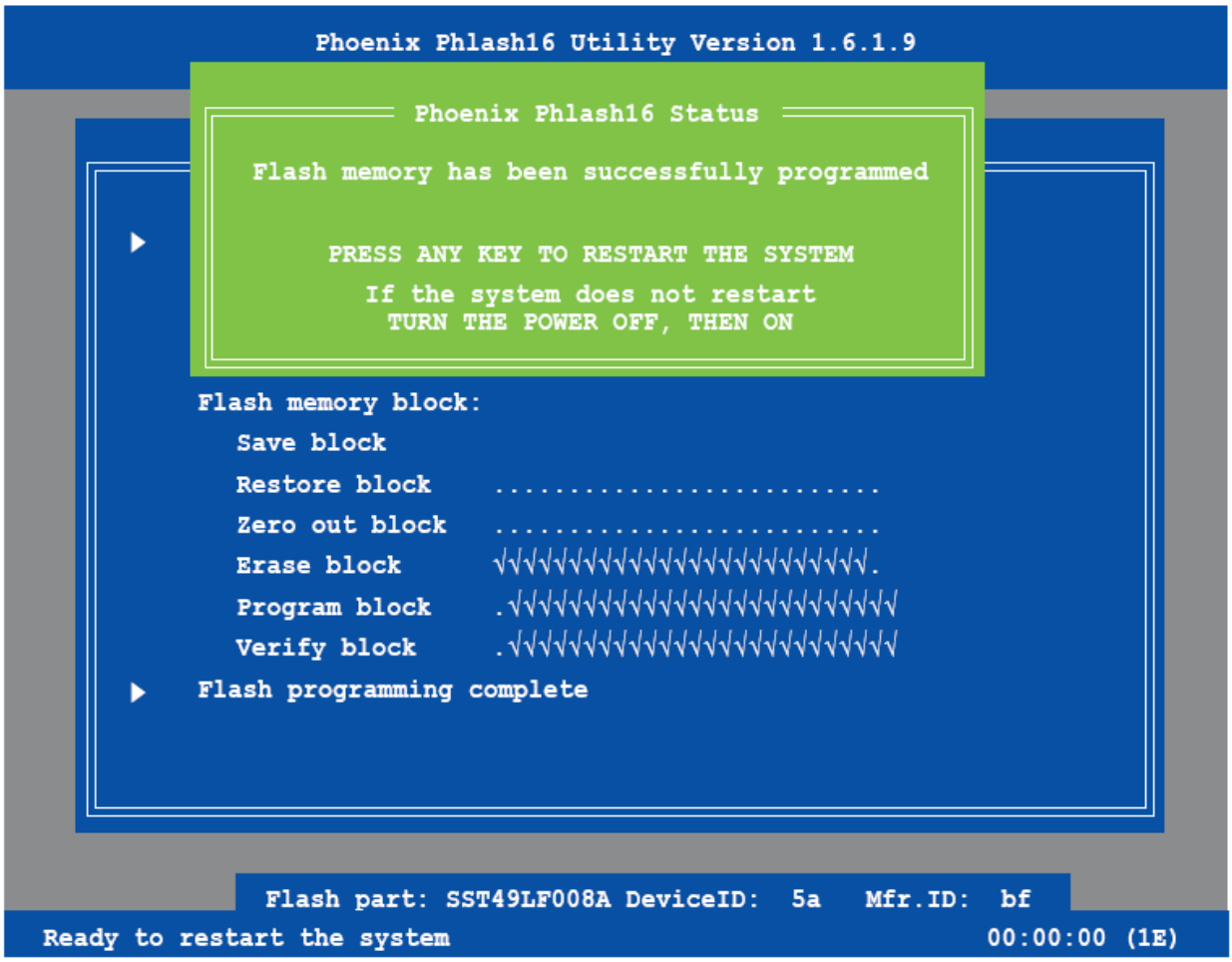


Figure 77: BIOS Update Complete

6. Press the power button for more than four seconds to turn off the system.

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

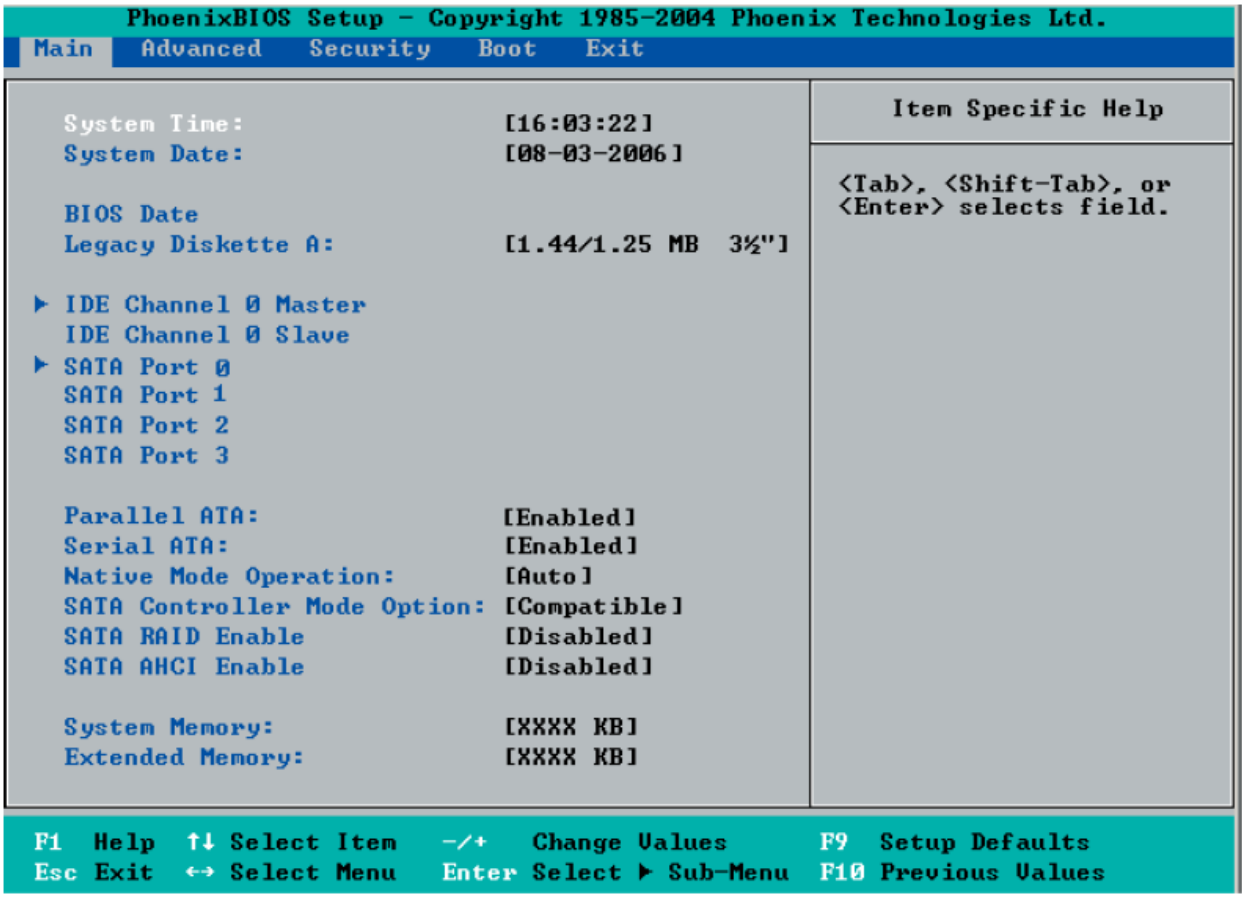


Figure 78: BIOS Screen Layout

- ### Main Setup Features

System Time
To set the system date and time, key in the correct information in the appropriate fields. Then press the <Enter> key to save the data.

System Date
Using the arrow keys, highlight the month, day and year fields, and enter the correct data. Press the <Enter> key to save the data

BIOS Date
This field displays the date when this version of BIOS was built.

Legacy Diskette A
This setting allows the user to set the type of floppy disk drive installed as diskette A. The options are Disabled, 360Kb 5.25 in, 1.2MB 5.25 in, 720Kb 3.5 in, **1.44/1.25MB**, 3.5 in and 2.88MB 3.5 in.

- **IDE Channel 0 Master/Slave, SATA Port0, SATA Port1, SATA Port2 and SATA Port3**

These settings allow the user to set the parameters of IDE Channel 0 Master/ Slave, SATA Port0, SATA Port1, SATA Port2, and SATA Port3 slots. Hit <Enter> to activate the following sub-menu screen for detailed options of these items. Set the correct configurations accordingly. The items included in the sub-menu are:

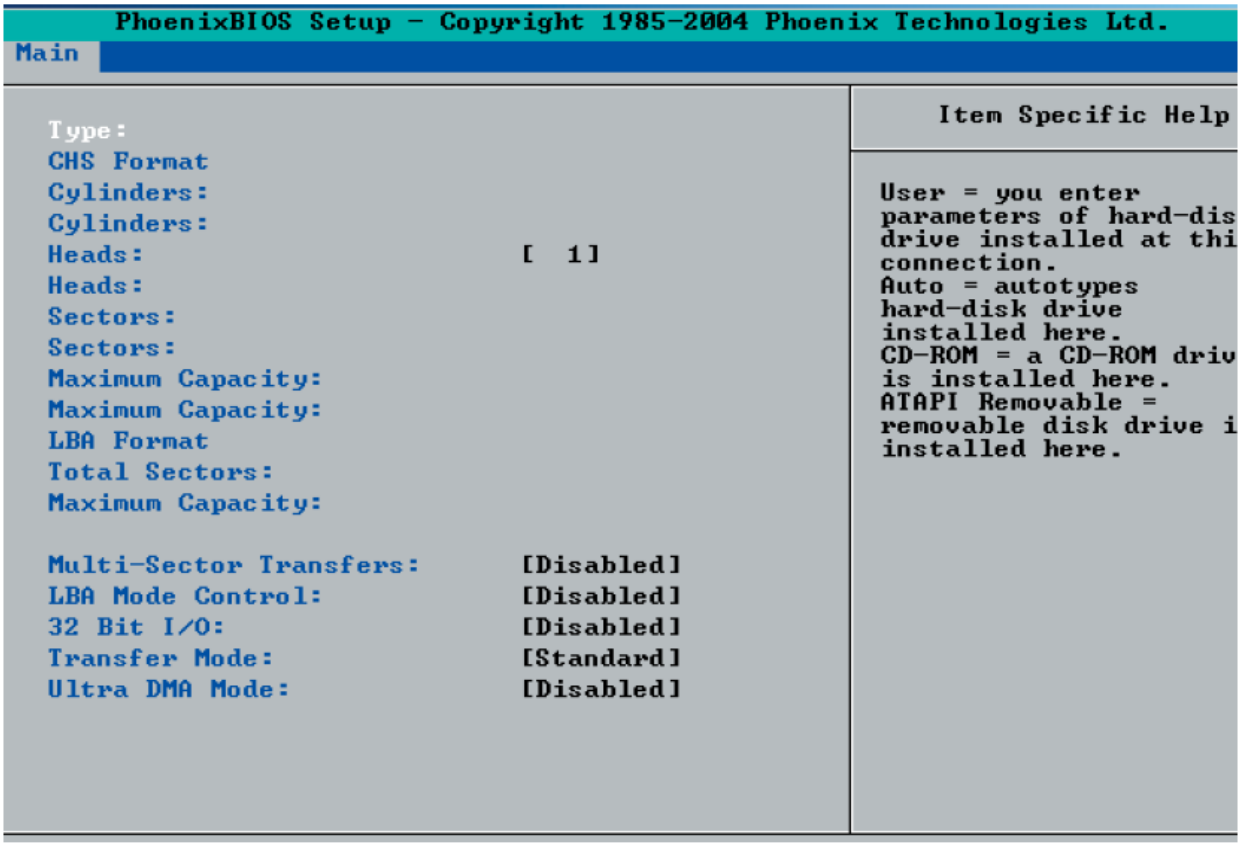


Figure 79: IDE and SATA Parameters Menu

Type
Selects the type of IDE hard drive. The options are **Auto**, (which allows the BIOS to automatically determine the hard drive's capacity, number of heads, etc.), a number from 1-39 to select a predetermined type of hard drive, CDROM and ATAPI Removable. The option "User" will allow the user to enter the parameters of the HDD installed at this connection. The option "Auto" will allow the BIOS to automatically configure the parameters of the HDD installed at the connection. Choose the option 1-39 to select a predetermined HDD type. Select CDROM if a CDROM drive is installed. Select ATAPI if a removable disk drive is installed.

CHS Format
The following items will be displayed by the BIOS:

TYPE: This item displays the type of IDE or SATA Device
.
Cylinders: This item indicates the status of Cylinders.

Headers: This item indicates the number of headers.

Sectors: This item displays the number of sectors.

Maximum Capacity: This item displays the maximum storage capacity of the system.

LBA Format
The following items will be displayed by the BIOS:

Total Sectors: This item displays the number of total sectors available in the LBA Format.

Maximum Capacity: This item displays the maximum capacity in the LBA Format.

Multi-Sector Transfers
This item allows the user to specify the number of sectors per block to be used in multi-sector transfer. The options are **Disabled**, 4 Sectors, 8 Sectors, and 16 Sectors.

LBA Mode Control
This item determines whether the Phoenix BIOS will access the IDE Channel 0 Master Device via the LBA mode. The options are Enabled and **Disabled.**

32 Bit I/O
This option allows the user to enable or disable the function of 32-bit data transfer. The options are Enabled and **Disabled**.

Transfer Mode
This option allows the user to set the transfer mode. The options are **Standard**, Fast PIO1, Fast PIO2, Fast PIO3, Fast PIO4, FPIO3/DMA1 and FPIO4/DMA2.

Ultra DMA Mode
This option allows the user to select Ultra DMA Mode. The options are **Disabled**, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4, and Mode 5.

Parallel ATA
This setting allows the user to enable or disable the function of Parallel ATA. The options are Disabled and **Enabled**.

Serial ATA
This setting allows the user to enable or disable the function of Serial ATA. The options are Disabled and **Enabled.**

Native Mode Operation
Select the native mode for ATA. The options are: Parallel ATA, Serial ATA, Both, and **Auto**.

SATA Controller Mode
Select **Compatible** to allow the SATA and PATA drives to be automatically-detected and be placed in the Legacy Mode by the BIOS. Select Enhanced to allow the SATA and PATA drives to be to be automatically-detected and be placed in the Native IDE Mode. (***Note: The Enhanced mode is supported by the Windows 2000 OS or a later version.)**

When the SATA Controller Mode is set to "Enhanced", the following items will display:

Serial ATA (SATA) RAID Enable
Select Enable to enable Serial ATA RAID Functions. (*For the Windows OS environment, use the RAID driver if this feature is set to Enabled. When this item is set to Enabled, the item: "ICH RAID Code Base" will be available for you to select either Intel or Adaptec Host RAID firmware. If this item is set to **Disabled**, the item- SATA AHCI Enable will be available.) The options are Enabled and **Disabled**.

ICH RAID Code Base
Select Intel to enable Intel's SATA RAID firmware. Select Adaptec to use Adaptec's HostRAID firmware. The options are **Intel** and Adaptec**.**

SATA AHCI
Select Enable to enable the function of Serial ATA Advanced Host Interface. (Take caution when using this function). This feature is for advanced programmers only. The options are Enabled and **Disabled**.)

System Memory
This display informs you how much system memory is recognized as being present in the system.

Extended Memory
This display informs you how much extended memory is recognized as being present in the system.

- **Advanced Setup**

Choose Advanced from the Phoenix 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>.

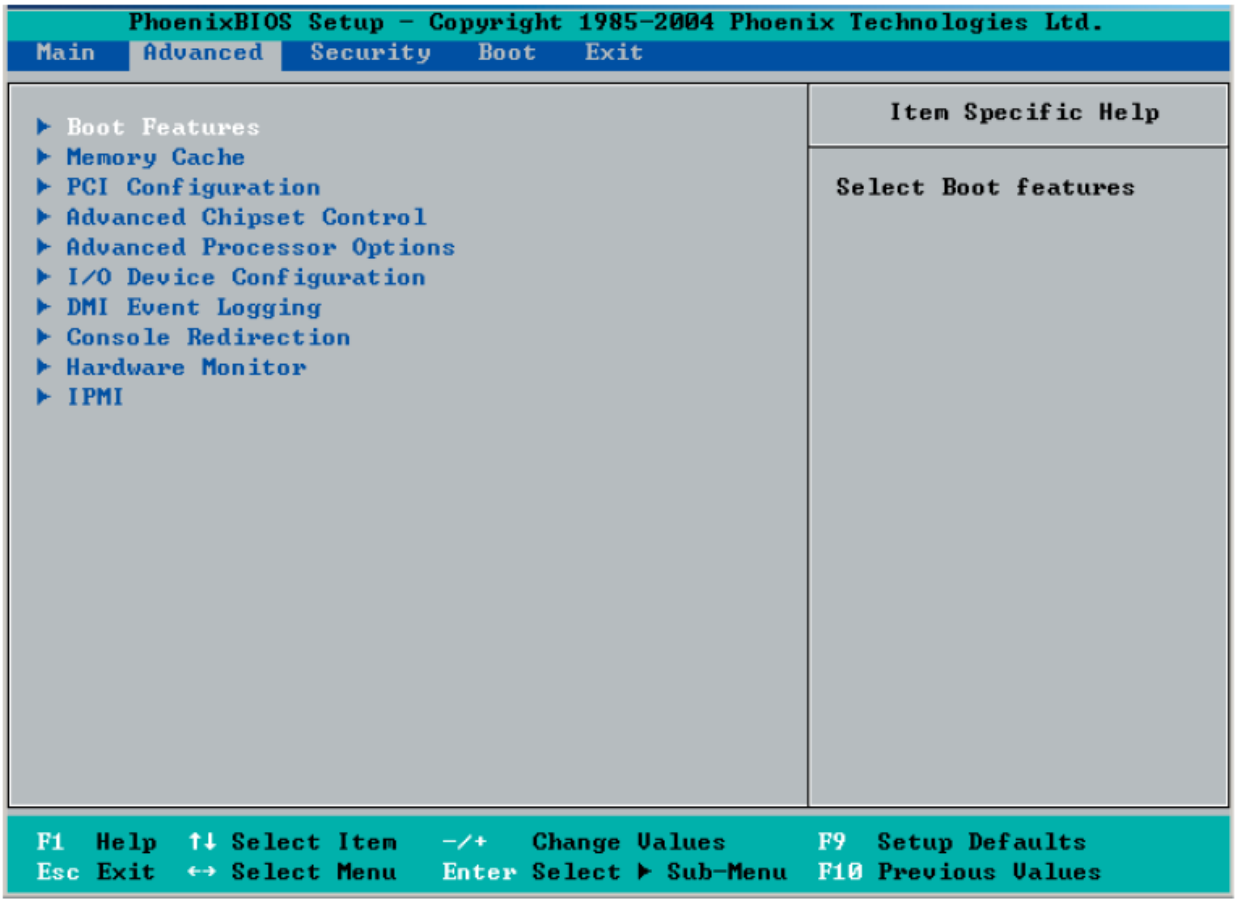


Figure 80: Advanced Menu Layout

- **Boot Features**

Access the submenu to make changes to the following settings.

QuickBoot Mode
If enabled, this feature will speed up the POST (Power On Self Test) routine by skipping certain tests after the computer is turned on. The settings are **Enabled** and Disabled. If Disabled, the POST routine will run at normal speed.

QuietBoot Mode
This setting allows you to **Enable** or Disable the graphic logo screen during boot-up.

POST Errors
Set to **Enabled** to display POST Error Messages if an error occurs during bootup. If set to Disabled, the system will continue to boot without displaying any error message even when a boot error occurs.
ACPI Mode
Use the setting to determine if you want to employ ACPI (Advanced Configuration and Power Interface) power management on your system. The options are **Yes** and No.

ACPI Sleep Mode
Use the setting to determine if you want to employ ACPI (Advanced Configuration and Power Interface) power management on your system when the system goes into the sleep mode. The options are **S1,** S3 and S1S3.

Power Button Behavior
If set to **Instant-Off**, the system will power off immediately as soon as the user hits the power button. If set to 4-sec., the system will power off when the user presses the power button for 4 seconds or longer. The options are instant-off and 4-sec override.

Resume On Modem Ring
Select On to “wake your system up” when an incoming call is received by your modem. The options are On and **Off**.

Power Loss Control
This setting allows you to choose how the system will react when power returns after an unexpected loss of power. The options are Stay Off, Power On, and **Last State**.

Watch Dog
If enabled, this option will automatically reset the system if the system is not active for more than 5 minutes. The options are Enabled and **Disabled**.

Summary Screen
This setting allows you to **Enable** or Disable the summary screen which displays the system configuration during bootup.

- ## Memory Cache

Cache System BIOS Area
This setting allows you to designate a reserve area in the system memory to be used as a System BIOS buffer to allow the BIOS write (cache) its data into this reserved memory area. Select "**Write Protect**" to enable this function and this area will be reserved for BIOS ROM access only. Select "Uncached" to disable this function and make this area available for other devices.

Cache Video BIOS Area
This setting allows you to designate a reserve area in the system memory to be used as a Video BIOS buffer to allow the BIOS write (cache) its data into this reserved memory area. Select "**Write Protect**" to enable the function and this area will be reserved for Video BIOS ROM access only. Select "Uncached" to disable this function and make this area available for other devices.

Cache Base 0-512K
If enabled, this feature will allow the data stored in the base memory area: block 0-512K to be cached (written) into a buffer, a storage area in the Static DROM (SDROM) or to be written into L1, L2 cache inside the CPU to speed up CPU operations. Select "Uncached" to disable this function. Select "Write Through" to allow data to be cached into the buffer and written into the system memory at the same time. Select "Write Protect" to prevent data from being written into the base memory area of Block 0-512K. Select "Write Back" to allow CPU to write data back directly from the buffer without writing data to the System Memory for fast CPU data processing and operation. The options are Uncached, Write Through, Write Protect, and **Write Back**.

Cache Base 512K-640K
If enabled, this feature will allow the data stored in the memory area: 512K-640K to be cached (written) into a buffer, a storage area in the Static DROM (SDROM) or written into L1, L2, L3 cache inside the CPU to speed up CPU operations. Select "Uncached" to disable this function. Select "Write Through" to allow data to be cached into the buffer and written into the system memory at the same time. Select "Write Protect" to prevent data from being written into the base memory area of Block 512-640K. Select "Write Back" to allow CPU to write data back directly from the buffer without writing data to the System Memory for fast CPU data processing and operation. The options are Uncached, Write Through, Write Protect, and **Write Back**.

Cache Extended Memory
If enabled, this feature will allow the data stored in the extended memory area to be cached (written) into a buffer, a storage area in the Static DROM (SDROM) or written into L1, L2, L3 cache inside the CPU to speed up CPU operations. Select "Uncached" to disable this function. Select "Write Through" to allow data to be cached into the buffer and written into the system memory at the same time. Select "Write Protect" to prevent data from being written into the base memory area of Block 0-512K. Select "Write Back" to allow CPU to write data back directly from the buffer without writing data to the System Memory for fast CPU data processing and operation. The options are Uncached, Write Through, Write Protect, and **Write Back**.

Discrete MTRR Allocation
If enabled, MTRRs (-Memory Type Range Registers) are configured as distinct, separate units and cannot be overlapped. If enabled, the user can achieve better graphic effects when using a Linux graphic driver that requires the write-combining configuration with 4GB or more memory. The options are Enabled and **Disabled**.

- **PCI Configuration**

Access the submenu to make changes to the following settings for PCI devices.

Onboard GLAN1/Onboard GLAN2 (Gigabit- LAN) OPROM Configure
Enabling this option provides the capability to boot from GLAN. The options are **Disabled** and Enabled.

PCI Parity Error Forwarding
The feature allows SERR and PERR errors detected in PCI slots to be sent (forwarded) to the BIOS DMI Event Log for the user to review. The options are Enabled and **Disabled**.

Reset Configuration Data
If set to Yes, this setting clears the Extended System Configuration Data- (ESCD) area. The options are Yes and **No**.

Frequency for PCI-X#2-#3
This option allows the user to change the bus frequency for the devices installed in the slot indicated. The options are **Auto**, PCI 33 MHz, PCI 66 MHz, PCI-X 66 MHz, PCI-X 100 MHz, and PCI-X 133 MHz.

- **Slot1 PCI 33MHz, Slot2 PCI-X 133MHz, Slot3 PCI-X 133MHz, Slot4 PCI-Exp x4, Slot5 PCI 33MHz, Slot6 PCI-Exp x16**

Access the submenu for each of the settings above to make changes to the following:

Option ROM Scan
When enabled, this setting will initialize the device expansion ROM. The options are **Enabled** and Disabled.

Enable Master
This setting allows you to enable the selected device as the PCI bus master. The options are **Enabled** and Disabled.

Latency Timer
This setting allows you to set the clock rate for Bus Master. A high-priority, high-throughout device may benefit from a greater clock rate. The options are **Default**, 0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, and 00E0h. For Unix, Novell and other Operating Systems, please select the option: other. If a drive fails after the installation of a new software, you might want to change this setting and try again. A different OS requires a different Bus Master clock rate**.**

Large Disk Access Mode
This setting determines how large hard drives are to be accessed. The options are **DOS** or Other (for Unix, Novelle NetWare and other operating systems).

- **Advanced Chipset Control**

Access the submenu to make changes to the following settings.

CAUTION!!

Take Caution when changing the Advanced settings. Incorrect values entered may cause system malfunction. Also, a very high DRAM frequency or incorrect DRAM timing may cause system instability. When this occurs, revert to the default setting.

SERR Signal Condition
This setting specifies the ECC Error conditions that an SERR# is to be asserted.
The options are None, **Single Bit**, Multiple Bit, and Both.

4GB PCI Hole Granularity
This feature allows you to select the granularity of PCI hole for PCI slots. If MTRRs are not enough, this option may be used to reduce MTRR occupation. The options are: **256 MB**, 512 MB, 1GB and 2GB.

Memory Branch Mode
This option determines how the memory branch operates. System address space can either be interleaved between two channels or Sequential from one channel to another. Single Channel 0 allows a single DIMM population during system manufacturing. The options are **Interleave**, Mirroring, Sequential and Single Channel 0.

Branch 0 Rank Interleaving & Sparing
Select enable to enable the functions of Memory Interleaving and Memory Sparing for Branch 0 Rank. The options for Memory Interleaving are 1:1, 2:1 and **4:1**. The options for Sparing are Enabled and **Disabled**.

Branch 1 Rank Interleaving & Sparing
Select enable to enable the functions of Memory Interleaving and Memory Sparing for Branch 1 Rank. The options for Memory Interleaving are 1:1, 2:1 and **4:1**. The options for Sparing are Enabled and **Disabled**.

Enhanced x8 Detection
Select **Enabled** to enable Enhanced x8 DRAM UC Error Detection. The options are Disabled and **Enabled**.

Crystal Beach Features
This feature cooperates with Intel I/O AT (Acceleration Technology) to accelerate 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.) The options are
Enabled and Disabled.

Route Port 80h Cycles to
This feature allows the user to decide which bus to send debug information to. The options are Disabled, PCI and **LPC**.

Clock Spectrum Feature
If Enabled, the BIOS will monitor the level of Electromagnetic Interference caused by the components and will attempt to decrease the interference whenever needed. The options are Enabled and **Disabled**.

Enabling Multi-Media Timer
Select Yes to activate a set of timers that are alternative to the traditional 8254 timers for the OS use. The options are Yes and **No**.

USB Function
Select Enabled to enable the function of USB devices specified. The settings are **Enabled** and Disabled.

Legacy USB Support
This setting allows you to enable support for Legacy USB devices. The settings are **Enabled** and Disabled.

- ## Advanced Processor Options

Access the submenu to make changes to the following settings.

CPU Speed
This is a display that indicates the speed of the installed processor.

Frequency Ratio (Available when supported by the CPU.)
The feature allows the user to set the internal frequency multiplier for the CPU. The options are: **Default,** x12, x13, x14, x15, x16, x17 and x18.

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

Core-Multi-Processing (Available when supported by the CPU.)
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 Disabled and **Enabled.**

Machine Checking (Available when supported by the CPU.)
Set to Enabled to activate the function of Machine Checking and allow the CPU to detect and report hardware (machine) errors via a set of model-specific registers (MSRs). The options are Disabled and **Enabled**.

Thermal Management 2 (Available when supported by the CPU.)
Set to **Enabled** to use Thermal Management 2 (TM2) which will lower CPU voltage and frequency when the CPU temperature reaches a predefined overheat threshold. Set to Disabled to use Thermal Manager 1 (TM1), allowing CPU clocking to be regulated via CPU Internal Clock modulation when the CPU temperature reaches the overheat threshold.

C1 Enhanced Mode (*Available when supported by the CPU.)
Set to Enabled to enable Enhanced Halt State to lower CPU voltage/frequency to prevent overheat. The options are Enabled and **Disabled**. (***Note:** please refer to Intel's web site for detailed information.)

Execute Disable Bit (*Available when supported by the CPU and the OS.)
Set to Enabled to enable Execute Disable Bit and allow the processor to classify areas in memory where an application code can execute and where it cannot, and thus preventing a worm or a virus from inserting and creating a flood of codes to overwhelm the processor or damage the system during an attack. (*Note: this feature is available when your OS and your CPU support the function of Execute Disable Bit.) The options are **Disabled** and Enabled. (Note: For more information regarding hardware/software support for this function, please refer to Intel's and Microsoft's web sites.)

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. The options are **Disabled** and Enabled.

Hardware Prefetcher (Available when supported by the CPU.)
Set to this option to **Enabled** to enable the hardware components that are used in conjunction with software programs to prefetch data in order to shorten execution cycles and maximize data processing efficiency. The options are Disabled and **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.

Intel EIST Support (Available when supported by the CPU.)
Select Enabled to use the Enhanced Intel SpeedStep Technology and allows the system to automatically adjust processor voltage and core frequency in an effort to reduce power consumption and heat dissipation. The options are Enabled and **Disabled**. Please refer to Intel's web site for detailed information.

- **I/O Device Configuration**

Access the submenu to make changes to the following settings.

KBC Clock Input
This setting allows you to select clock frequency for KBC. The options are 6MHz, 8MHz, **12MHz,** and 16MHz.

Serial Port A
This setting allows you to assign control of serial port A. The options are **Enabled** (user defined), Disabled, and Auto (BIOS- or OS- controlled).

Base I/O Address
This setting allows you to select the base I/O address for serial port A. The options are **3F8**, 2F8, 3E8, and 2E8.

Interrupt
This setting allows you to select the IRQ (interrupt request) for serial port A. The options are IRQ3 and **IRQ4**.

Serial Port B
This setting allows you to assign control of serial port B. The options are **Enabled** (user defined), Disabled, Auto (BIOS controlled) and OS Controlled.

Mode
This setting allows you to set the type of device that will be connected to serial port B. The options are **Normal** and IR (for an infrared device).

Base I/O Address
This setting allows you to select the base I/O address for serial port B. The options are 3F8, **2F8**, 3E8 and 2E8.

Interrupt
This setting allows you to select the IRQ (interrupt request) for serial port B. The options are **IRQ3** and IRQ4.

Parallel Port
This setting allows you to assign control of the parallel port. The options are **Enabled** (user defined), Disabled and Auto (BIOS-or OS- controlled).

Base I/O Address
Select the base I/O address for the parallel port. The options are **378**, 278 and 3BC.

Interrupt
This setting allows you to select the IRQ (interrupt request) for the parallel port. The options are IRQ5 and **IRQ7**.

Mode
This feature allows you to specify the parallel port mode. The options are Output only, Bi-Directional, EPP and **ECP**.

DMA Channel
This item allows you to specify the DMA channel for the parallel port. The options are DMA1 and **DMA3**.

Floppy Disk Controller
This setting allows you to assign control of the floppy disk controller. The options are **Enabled** (user defined), Disabled, and Auto (BIOS and OS controlled).

Base I/O Address
This setting allows you to select the base I/O address for the Floppy port. The options are **Primary** and Secondary.

DMI Event Logging
Access the submenu to make changes to the following settings.

Event Log Validity
This is a display to inform you of the event log validity. It is not a setting.

Event Log Capacity
This is a display to inform you of the event log capacity. It is not a setting.

View DMI Event Log
Highlight this item and press <Enter> to view the contents of the event log.

Event Logging
This setting allows you to **Enable** or Disable event logging.

ECC Event Logging
This setting allows you to **Enable** or Disable ECC event logging.

Mark DMI Events as Read
Highlight this item and press <Enter> to mark the DMI events as read.

Clear All DMI Event Logs
Select Yes and press <Enter> to clear all DMI event logs. The options are Yes and **No**.

- ## Console Redirection

Access the submenu to make changes to the following settings.

COM Port Address
This item allows you to specify to redirect the console to Onboard COM A or Onboard COM B. This setting can also be **Disabled**.

BAUD Rate
This item allows you to select the BAUD rate for console redirection. The options are 300, 1200, 2400, 9600, **19.2K**, 38.4K, 57.6K, and 115.2K.

Console Type
This item allows you to choose from the available options to select the console type for console redirection. The options are VT100, VT100, 8bit, PC-ANSI, 7bit, **PC ANSI**, VT100+, and VT-UTF8.

Flow Control
This item allows you to choose from the available options to select the flow control for console redirection. The options are: None, XON/XOFF, and **CTS/RTS**.

Console Connection
This item allows you to choose select the console connection: either **Direct** or Via Modem.

Continuing Console Redirection after POST
Choose whether to continue with console redirection after the POST routine. The options are On and **Off**.

- ## Hardware Monitor Logic 1

Note: The Phoenix BIOS will automatically detect the type of CPU(s) and hardware monitoring chip used on the Motherboard and will display the Hardware Monitoring Screen accordingly. Your Hardware Monitoring Screen may look like Hardware Monitor Logic 1 or Hardware Monitor Logic 2, depending on the type of CPU(s) and HW Monitoring chip you are using.

CPU Temperature Threshold
This option allows the user to set a CPU temperature threshold that will activate the alarm system when the CPU temperature reaches this pre-set temperature threshold. The hardcode default setting is **75°C**.

Temperature Monitoring (Available if supported by the CPU)
Highlight this and hit <Enter> to see monitor data for the following PECI (Platform Environment Control Interface) items:
CPU1 Temperature/CPU1 Second Core
CPU2 Temperature/CPU2 Second Core
PECI Agent 1 Temperature
PECI Agent 2 Temperature
PECI Agent 3 Temperature
PECI Agent 4 Temperature
System Temperature
Fan1-Fan8 Speeds: If the feature of Auto Fan Control is enabled, the BIOS will automatically display the status of the fans indicated in this item.

Fan Speed Control Modes
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 vise versa. If the option is set to “3-pin fan”, the fan speed is controlled by voltage. If the option is set to “4-pin”, the fan speed will be controlled by Pulse Width Modulation (PWM). Select “3-pin” if your chassis came with 3-pin fan headers. Select “4-pin” if your chassis came with 4-pin fan headers. Select “Workstation” if your system is used as a Workstation. Select “Server” if your system is used as a Server. Select “Disable” to disable the fan speed control function to allow the onboard fans to run at the full speed (12V) at all the time. The Options are:

1. **Disable**
2. 3-pin (Server)
3. 3-pin (Workstation)
4. 4-pin (Server)
5. 4-pin (Workstation)

Voltage Monitoring
The following items will be monitored and displayed:
Vcore A/Vcore B
-12V/+12V
P1V5
+3.3V
5Vsb
5VDD
P_VTT
Vbat

Hardware Monitor Logic 2

CPU Temperature Threshold
This option allows the user to set a CPU temperature threshold that will activate the alarm system when the CPU temperature reaches this pre-set temperature threshold. The options are 70°C, 75°C, **80°C** and 85°C.

Highlight this and hit <Enter> to see monitor data for the following items:

CPU1 Temperature
CPU1 Second Core
CPU2 Temperature
CPU2 Second Core
System Temperature
Fan1-Fan6 Speeds: If the feature of Auto Fan Control is enabled, the BIOS will automatically display the status of the fans indicated in this item.

Fan Speed Control Modes
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 vise versa. If the option is set to “3-pin fan”, the fan speed is controlled by voltage. If the option is set to “4-pin”, the fan speed will be controlled by Pulse Width Modulation (PWM). Select “3-pin” if your chassis came with 3-pin fan headers. Select “4-pin” if your chassis came with 4-pin fan headers. Select “Workstation” if your system is used as a Workstation. Select “Server” if your system is used as a Server. Select “Disable” to disable the fan speed control function to allow the onboard fans to run at the full speed (12V) at all the time. The Options are:

1. **Disable**
2. 3-pin (Server)
3. 3-pin (Workstation)
4. 4-pin (Server)
5. 4-pin (Workstation)

Voltage Monitoring
The following items will be monitored and displayed:
P12V_VR0
P12V_VR1
FSB VTT
PXH Vcore
ES2B Vcore
CPU1Vcore
CPU2Vcore
P3V3

- **Security**

Choose Security from the Phoenix BIOS Setup Utility main menu with the arrow keys. You should see the following display. Security setting options are displayed by highlighting the setting using the arrow keys and pressing <Enter>. All Security BIOS settings are described in this section.

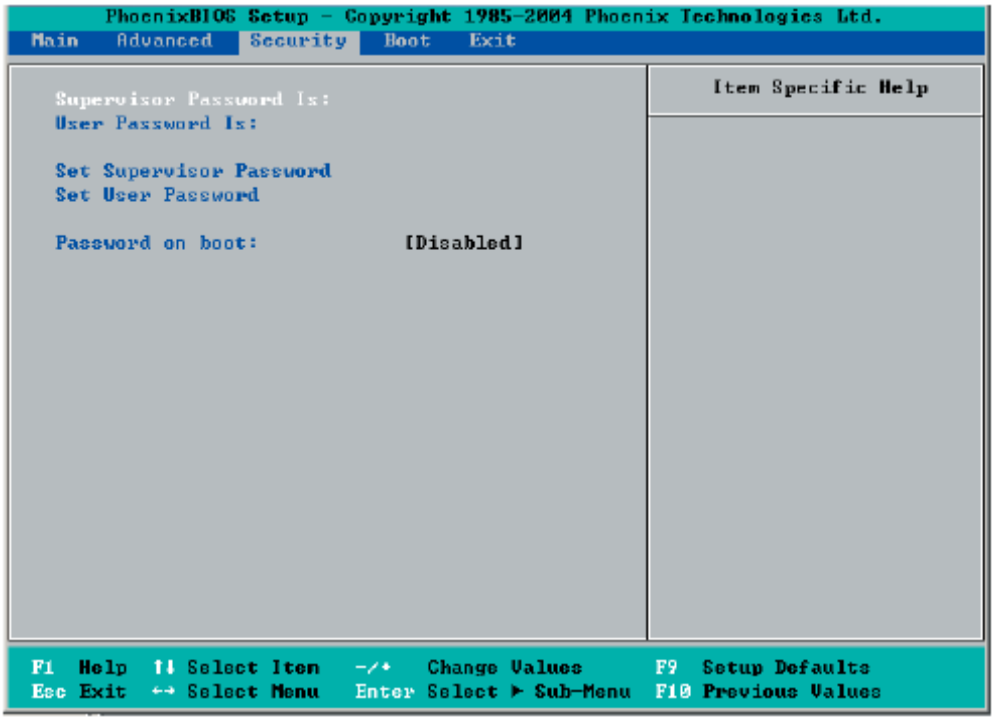


Figure 81: Security Menu Layout

Supervisor Password Is:
This displays whether a supervisor password has been entered for the system. Clear means such a password has not been used and Set means a supervisor password has been entered for the system.

User Password Is:
This displays whether a user password has been entered for the system. Clear means such a password has not been used and Set means a user password has been entered for the system.

Set Supervisor Password
When the item "Set Supervisor Password" is highlighted, hit the <Enter> key. When prompted, type the Supervisor's password in the dialogue box to set or to change supervisor's password, which allows access to the BIOS.

Set User Password
When the item "Set User Password" is highlighted, hit the <Enter> key. When prompted, type the user's password in the dialogue box to set or to change the user's password, which allows access to the system at boot-up.

Password on Boot
This setting allows you to require a password to be entered when the system boots up. The options are **Enabled** (password required) and Disabled (password not required).

- **Boot**

Choose Boot from the Phoenix BIOS Setup Utility main menu with the arrow keys. You should see the following display. See details on how to change the order and specs of boot devices in the Item Specific Help window. All Boot BIOS settings are described in this section.

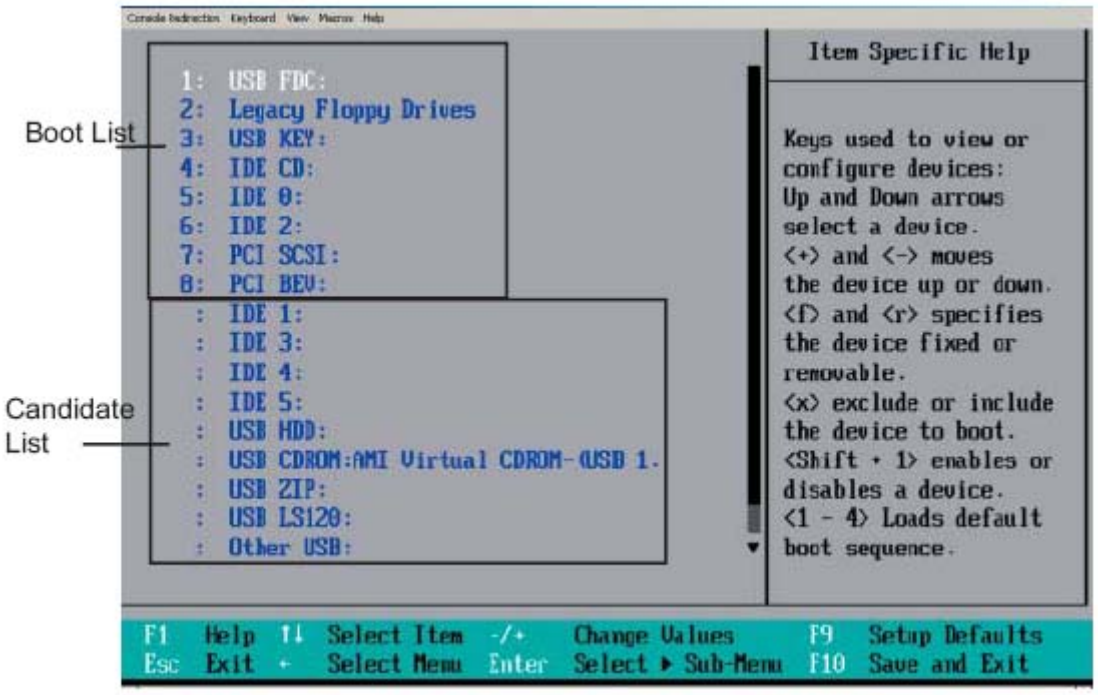


Figure 82: Boot Menu Layout

Boot Priority Order/Excluded from Boot Orders

The devices included in the boot list section (above) are bootable devices listed in the sequence of boot order as specified. The boot functions for the devices included in the candidate list (above) are currently disabled. Use a <+> key or a <-> key to move the device up or down. Use the <f> key or the <r> key to specify the type of an USB device, either fixed or removable. You can select one item from the boot list and hit the <x> key to remove it from the list of bootable devices (to make its resource available for other bootable devices). Subsequently, you can select an item from the candidate list and hit the <x> key to remove it from the candidate list and put it in the boot list. This item will then become a bootable device. See details on how to change the priority of boot order of devices in the "Item Specific Help" window.

Note: Pressing <Esc> does not immediately exit this menu. Select one of the options from this menu or <F10> from the legend bar to exit.

Exit

Choose Exit from the Phoenix BIOS Setup Utility main menu with the arrow keys. You should see the following display. All Exit BIOS settings are described in this section.

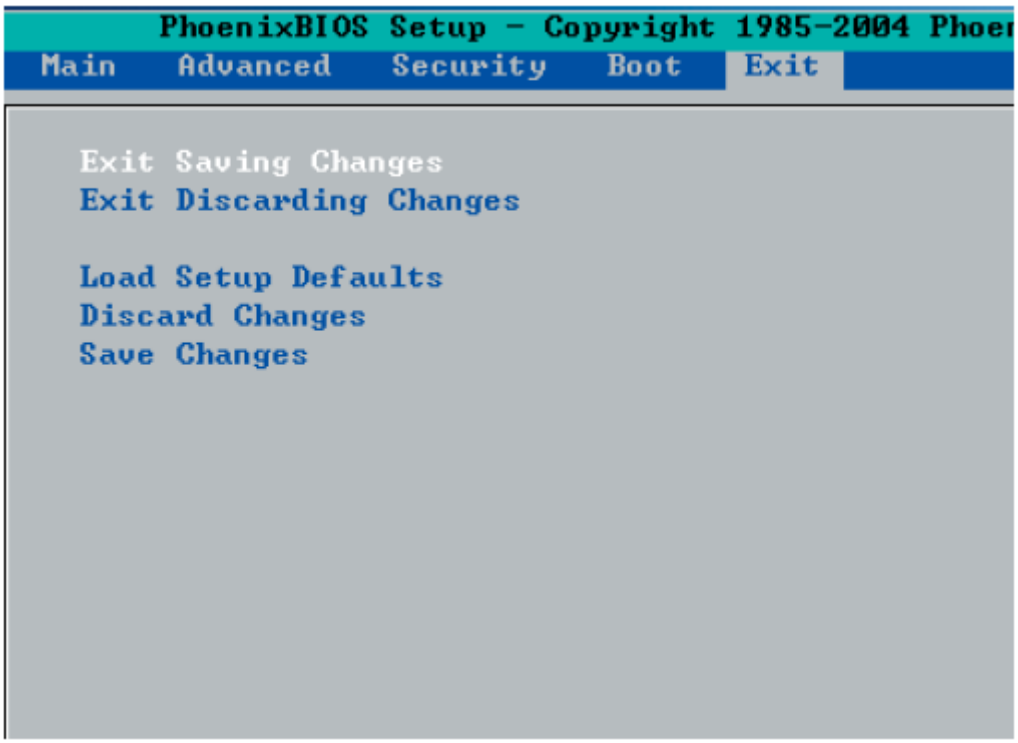


Figure 83: Exit Menu Layout

Exit Saving Changes
Highlight this item and hit <Enter> to save any changes you made and to exit the BIOS Setup utility.

Exit Discarding Changes
Highlight this item and hit <Enter> to exit the BIOS Setup utility without saving any changes you may have made.

Load Setup Defaults
Highlight this item and hit <Enter> to load the default settings for all items in the BIOS Setup. These are the safest settings to use.

Discard Changes
Highlight this item and hit <Enter> to discard (cancel) any changes you made. You will remain in the Setup utility.

Save Changes
Highlight this item and hit <Enter> to save any changes you made. You will remain in the Setup utility.

Chapter 6: 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 7: 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.
Viglen Ltd
7 Handley Page Way
Colney Street
St Albans
Hertfordshire
AL2 2DQ