Vig450J Motherboard Manual

Viglen

Great

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Viglen

Vig450J Motherboard Manual

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).

$$C \in$$

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 effects that you think might be related to your computer, try moving it at least 10 meters away from the affected item. If you still experience problems, contact Viglen's Technical Support department who will put you straight through to an EMC engineer - s/he will do everything possible to help. If modifications are made to your Viglen computer system, it might breach EMC regulations. Viglen take no responsibility (with regards to EMC characteristics) of equipment that has been tampered with or modified.

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

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Chapter 1: Motherboard Overview

Introduction

This manual describes the Viglen Vig450J 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 Vig450J is built upon the functionality and the capability of the Intel C612 chipset platform. The Vig450J Motherboard provides the performance required for dual processor-based CAD workstations or graphic-intensive systems. The C612 chipset consists of the C612 (LGA 2011) processor, with the Intel QuickPath interconnect (QPI) controller built in.

This manual contains technical information about the Viglen Vig450J Motherboard and other hardware components inside your computer. If you are new to computers we recommend that you read the user guide first. If you are an experienced computer user this manual should provide all the information you will need to perform simple upgrades and maintenance.

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

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

Motherboard Features

Form factor, slots, compatibility list:

- Form factor: ATX 12" x 9.6" (305 x 244 mm)
- Slots: 7 slots (details see block diagram)
- Compatible to ACPI, BBS DMI, IAPC, PCI 2.3, WfM, ASF2.0 DASH1.1

CPU Support:

- Intel® Xeon® Processors in the LGA2011 package
- Integrated memory controller
- Intel® Xeon® processor E5-16xx / 26xx V3 series
- Intel® Core™ i7 Processor 59xx series
- Compatible with Intel® processors LGA2011-R3 (up to 160W TDP)

Chipset Support:

- Intel® C612 chipset
- Intel 1217LM Clarkville LAN
- Intel 1210 Springville LAN (only D3348-B)
- Infineon

Memory Support:

- Four channel DDR4 memory architecture
- Eight DDR4 memory sockets
- Support for ECC LR memory modules
- Supports DDR4 1600/1866/2133/2400 memory interface
- Up to 256 GB max memory (With Xeon processor)
- Single- / dual- / quad-rank DDR4 UDIMM 2133MHz (CL15); 1.2V/2.5V; 288-pin max. 64GB; non-ECC for Core i7 Processors
- Non JEDEC standard DIMMs are not supported

LAN – 10/100/1000 Ethernet Controller:
- Wake On LAN by Magic-Packet™
- PXE support
- Support for Jumbo-Frames

Storage Devices:
- 10 serial ATA ports

Communication:
- Internal connector: x2 USB 3.0, x4 USB 2.0, x1 USB 2.0 standard connector (for memory stick)
- External port (I/O Shield) x4 USB 2.0 / x2 USB 3.0, rear

BIOS Features:
- System and BIOS Password
- Hard disk password
- Recovery BIOS support
- Boot sequential control for each floppy and HDD Drive
- Serial access protection
- Boot sector virus warning
- Flash write protection against virus
- SPD EEPROM write protection against virus

Advanced security Features:
- Trusted Platform Module 1.2

Basic system monitoring and management:
- Wake on LAN
- USB voltage short detection
- Advanced Fan Control

Advanced system monitoring and management:
- Fujitsu Technology Solutions System Management
- Fujitsu Technology Solution Thermal Management
- Automatic system reset(ASR)
- Inventory identification

Internal Connectors:
- 8 x DIM sockets (DDR4 2133)
- 6 x SATA (300) and 4 x SATA (sSATA 300)
- 1 x COM1
- 1 x Intrusion Connector
- 1 x SCSI LED Connector
- 1 x Front Panel (Power/Reset/LEDs)
- 1 x 24-Pin ATX PSU
- 1x PSU Fan, PWM
- 4 x Fan connector (PWM)
- 1 x USB 3.0 Front Panel
- 1 x USB 2.0 Internal
- 1 x USB 2.0 Front Panel
- 1 x Socket for USB stick
- 1 x Front Panel Audio
- 1 x TPM Jumper
- 1 x 12V Supply (CPU/Slots)

Power Management:
- ACPI (Save to RAM / Disk) support

Environmental Protection:
- Socketed battery (recyclable)

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 Failure Recovery setting in the Power Settings section to change this setting. The default setting is **Previous State**.

PC Health Monitoring:

This section describes the PC health monitoring features of the Vig450J. All have an onboard System Hardware Monitor chip that supports PC health monitoring via Super Doctor II or III. An onboard voltage monitor will scan these onboard voltages continuously: Vcore1, Vcore2, 1.5V, 5VDD, 5VSB, 12V, -12V, 3.3Vcc, 3.3VSB, VBAT and Vtt. Once a voltage becomes unstable, a warning is given or an error message is sent to the screen. Users can adjust the voltage thresholds to define the sensitivity of the voltage monitor.

- **Fan Status Monitor with Firmware Control**

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

- **Environment Temperature Control**

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

- **System Resource Alert**

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

ACPI Features:

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

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

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

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

- **Main Switch Override Mechanism**

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

Power Supply:

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

The Vig450J can accommodate 24-pin ATX power supplies. Although most power supplies generally meet the specifications required by the CPU, some are inadequate. In addition, the 12V 8-pin power connection is also required to ensure adequate power supply to the system. Also your power supply must supply 1.5A for the Ethernet ports.

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

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

WARNING!

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

Super I/O:

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

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

Block Diagram of the Intel C612 Chipset Platform
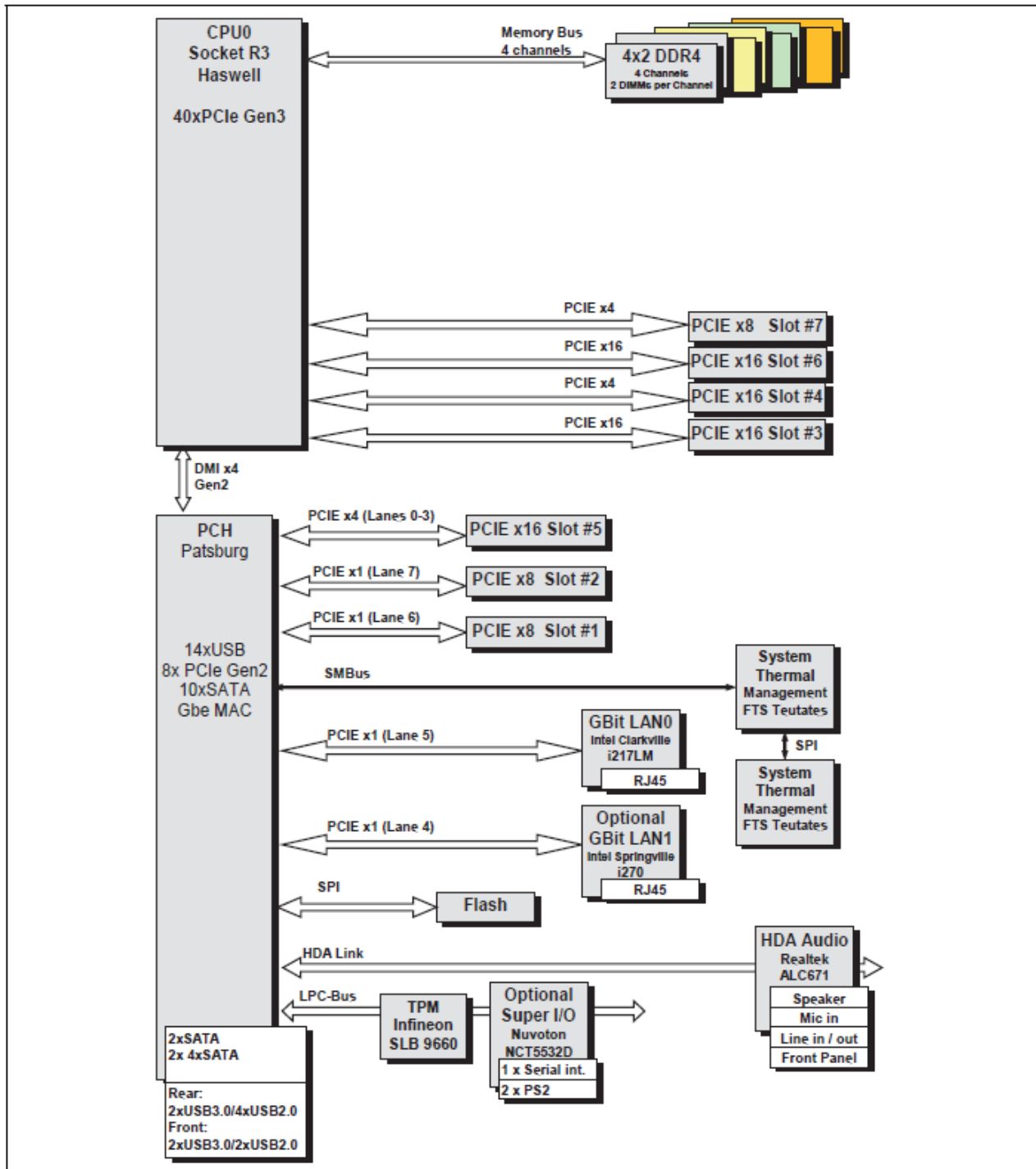
Figure 1: Motherboard Diagram

Note: *The above picture is purely representative. Due to engineering updates and new board revisions, certain components may change and or be repositioned. The picture above may or may not look exactly is like the board you received. The following page includes details on the vital components of this motherboard.*

Chipset Overview

Built upon the functionality and the capability of the Intel C612 chipset platform, the Vig450J Motherboard provides the performance required for high performance CAD workstations or graphic-intensive systems. The C612 chipset consists of the E5-16xx/E5-26xx, i7-59xx (LGA 2011) processor. With the Intel QuickPath interconnect (QPI) controller built in, the E5-26xx Series Processor platform offers the next generation of point-to-point system interconnect interface, outperforming the previous generation of QPI and offering enhanced system performance with increased bandwidth and scalability.

The C612 Chipset supports up to 48 PCI Express lanes, peer-to-peer read and writes transactions. It provides up to six PCI-Express ports, ten SATA ports and fourteen USB connections.

In addition, the C612 platform also supports a wide range of RAS (Reliability, Availability and Serviceability) features. These features include memory interface ECC, x4/x8 Single Device Data Correction (SDDC), Cyclic Redundancy Check (CRC), parity protection, out-of-band register access via SMBus, memory mirroring, memory sparing, and Hot-plug support on the PCI-Express Interface.

Main Features of the E5-16xx/E5-26xx V3 and i7-59xx Series Processors and C612 Chipset

- Up to eight processor cores in each processor with 20MB shared cache among cores
- Two full-width Intel QuickPath interconnect links, up to 8GT/s of data transfer rate in each direction
- Virtualization Technology, Integrated Management Engine supported
- Point-to-point cache coherent interconnect, Fast/narrow unidirectional links, and Concurrent bi-directional traffic
- Error detection via CRC and Error correction via Link level retry

System Board Components
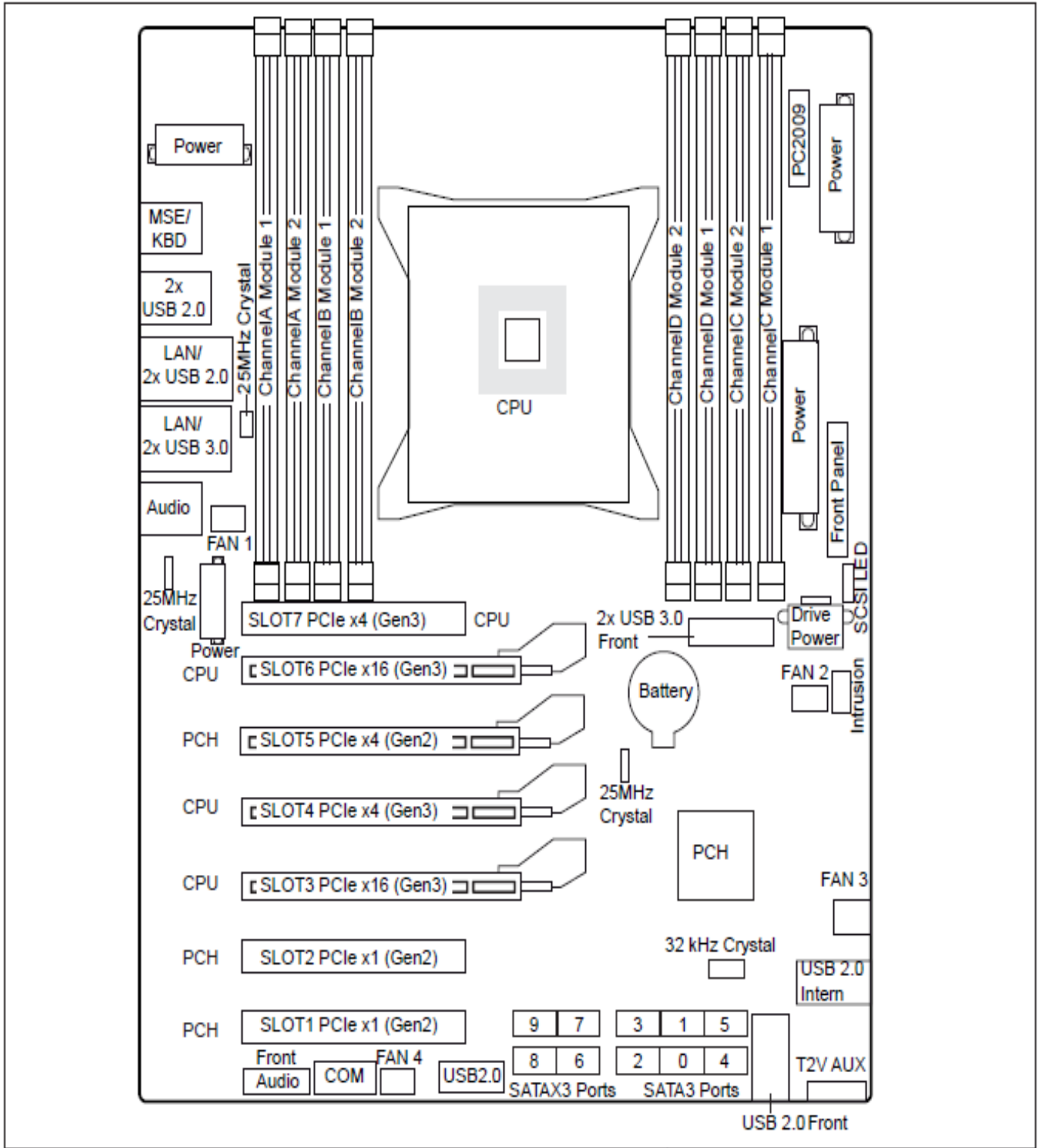
Figure 2: Motherboard Layout & Components

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 change the chassis. 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 six USB ports, two LAN Ports and the audio connectors.

Figure 3: I/O Shield

Note: *Power to the computer should be turned off before a keyboard or mouse is connected or disconnected.*
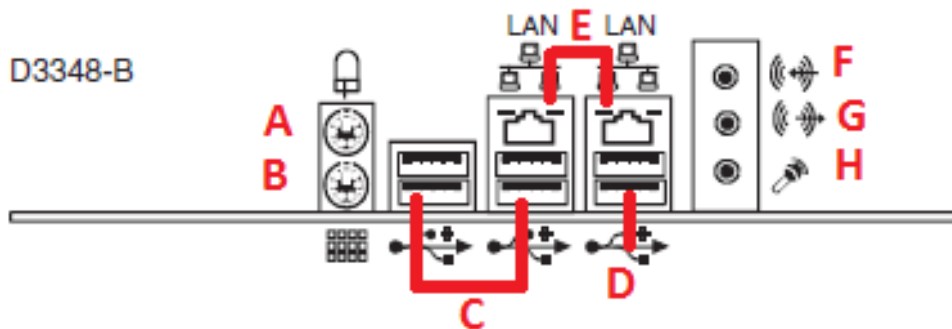
Figure 4: Back Panel Connections

Table 1: Back Panel Connectors

Item	Description	Item	Description
A	PS/2* Mouse Port (Green)	F	Line In
B	PS/2 Keyboard Port (Purple)	G	Audio Out
C	Back Panel USB 2.0 Port 0/1 & 3/4	H	Mic In
D	Back Panel USB 3.0 Port 5/6		
E	Gigabit LAN RJ45 1		

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

This Motherboard features a 5.1 Channel High Definition Audio (HDA) codec that provides 10 DAC channels. The HD Audio connections simultaneously supports multiple- streaming 5.1 sound playback with 2 channels of independent stereo output through the front panel stereo out for front L&R, rear L&R, center and subwoofer speakers. Use the Advanced software included in the CD-ROM with your Motherboard to enable this function.

System Memory

Main Memory

The Motherboard has eight DDR4 Dual Inline Memory Module (DIMM) sockets. Support for up to a maximum memory size of 256GB. The BIOS automatically detects memory type, size, and speed.

The Motherboard supports the following memory features:

- The following memory modules are supported: 4GB, 8GB and 16GB ECC memory modules.
- 256GB maximum total system memory total amount of addressable memory.
- Minimum total system memory: 4GB
- Non JEDEC standard DIMMs are not supported

Table 2: DIMM Population Configurations

Configuration for Quad, Tri, Dual and Single Channel Configurations (1 DIMM Per Channel)			
Quad Channel	**Tri Channel**	**Dual Channel**	**Single Channel**
Channel A Module 1	Channel A Module 1	Channel A Module 1	Channel A Module1
Channel B Module 1	Channel B Module 1	Channel B Module 1	
Channel C Module 1	Channel C Module 1		
Channel D Module 1			
Configuration for Quad, Tri and Dual Channel Configurations (2 DIMM Per Channel)			
Channel A Module 1	Channel A Module 1	Channel A Module 1	
Channel B Module 1	Channel B Module 1	Channel B Module 1	
Channel C Module 1	Channel C Module 1	Channel A Module 2	
Channel D Module 1	Channel A Module 2	Channel B Module 2	
Channel A Module 2	Channel B Module 2		
Channel B Module 2	Channel C Module 2		
Channel C Module 2			
Channel D Module 2			

To reach maximum performance, plugging the module in the following sequence:
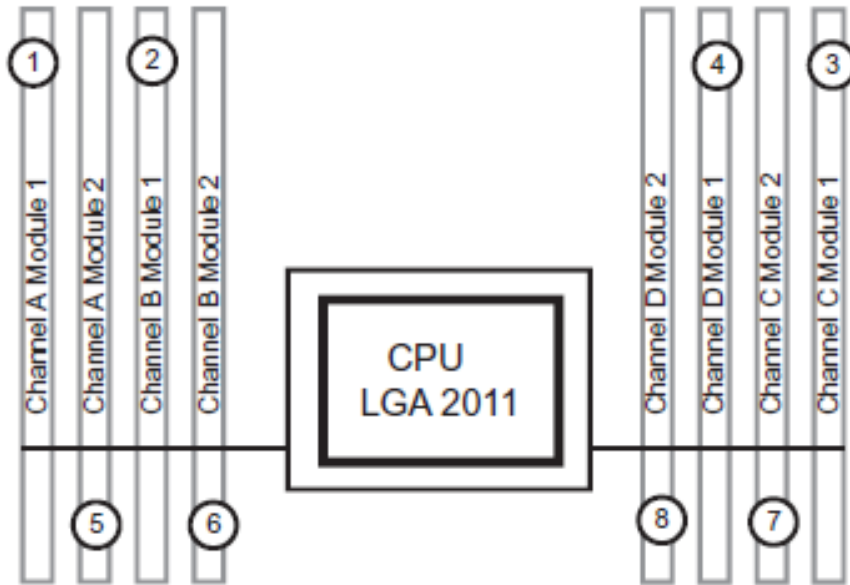
Figure 5: CPU and DIMM Diagram

Notes:

When two memory modules with a different number of ranks are populated in one memory channel, then the module with the higher number of ranks must be populated in the memory slot further away from the CPU.

If the system is upgraded and an additional memory module is added to a channel with an existing module, it might be necessary to swap modules so that the nodule with the higher number of ranks is populated on the outside (further away from the CPU) of that memory channel.

Chapter 2: System Board Options

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.
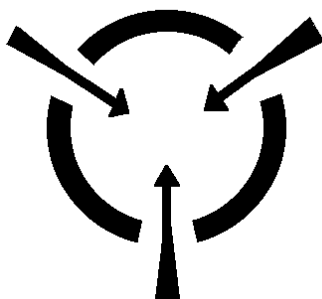
CAUTION!
The Viglen Vig450J Motherboard and associated components are sensitive electronic devices. A small static shock from your body can cause expensive damage to your equipment.

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 Vig450J 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.
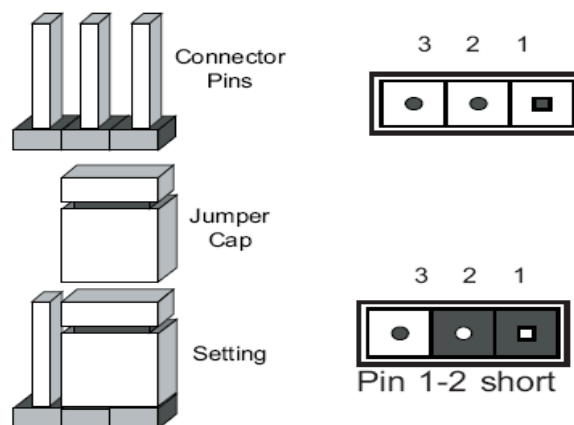
Figure 6: Explanation of jumpers

Motherboard Jumper Settings

Clear CMOS

Instead of pins the "jumper" to Clear CMOS 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.
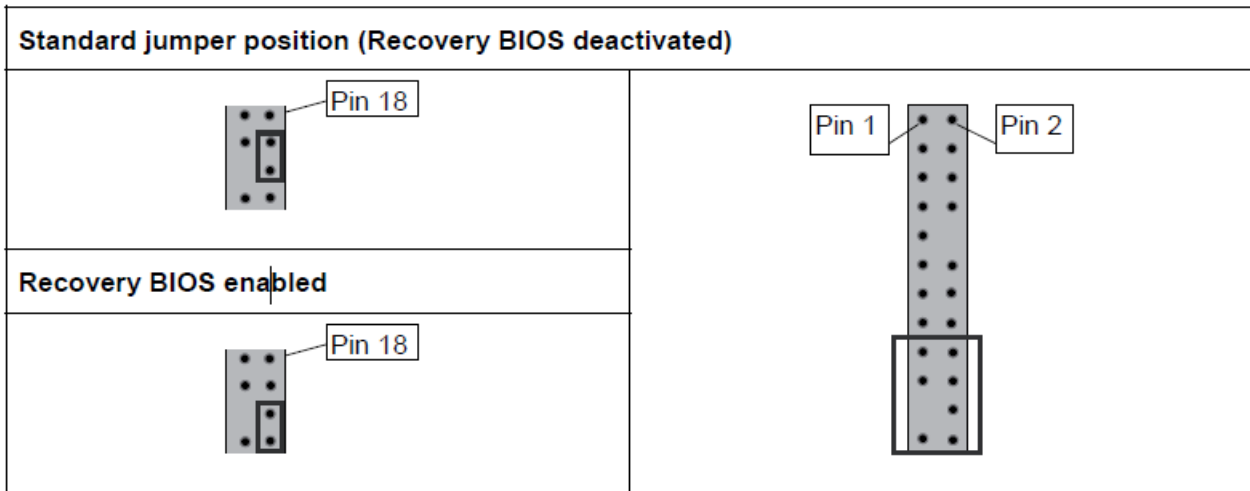
Figure 7: CMOS Clear

Note: For an ATX power supply, you must completely shut down the system, remove the AC power cord and then short the Clear CMOS pads.

Clear ME

To Clear ME you are required to bridge two Pins with a metal device such as a small screwdriver. Always remove the AC power cord from the system before clearing ME.
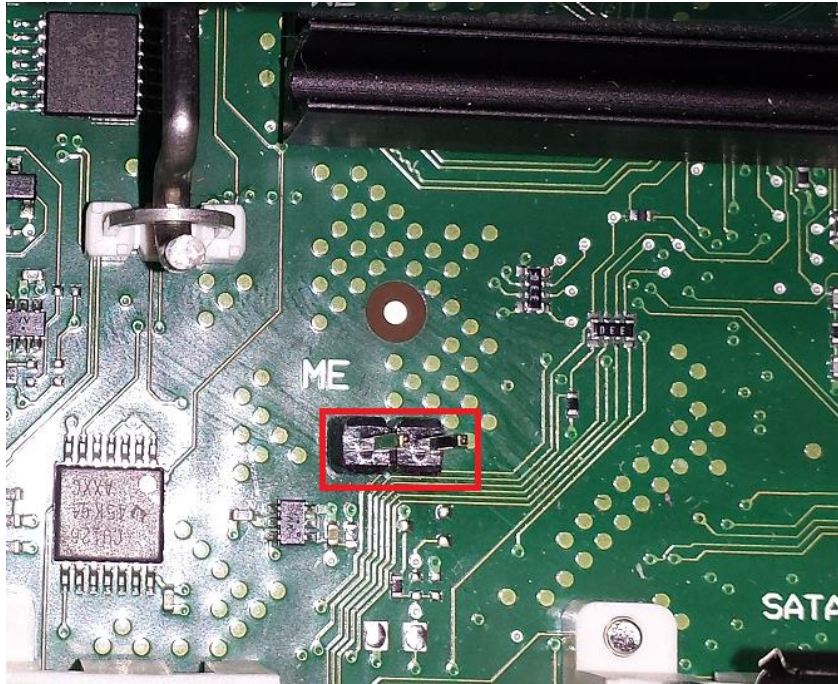
Figure 8: Clear ME

Front Panel Audio Header
When front panel headphones are plugged in, the back panel audio output is disabled. This is done through the AFP (Audio Front Panel) header.

Table 3: Front Panel Audio Header

Function/Mode	Jumper	Configuration
Front panel audio		Front panel audio cable connects to this header to enable the use of front panel audio (Mic and Headphones).

Table 4: Front panel Audio Connector

Pin	Signal name	Pin	Signal name
1	HAD Port 1 Left	2	Analog GND
3	HAD Port 1 Right	4	FP Presence Detect
5	HAD Port 2 Left	6	Jack Sense Port 1
7	Jack Sense common	8	Key
9	HAD Port 2 Right	10	Jack Sense Port 1

Motherboard Connectors

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

Front panel connections

Normally, a chassis has some control or signal wires that can be connected onto the motherboard for hard drive LED, Power LED, power button, and reset button;
The front panel connector has been implemented on D3348 for such purposes.
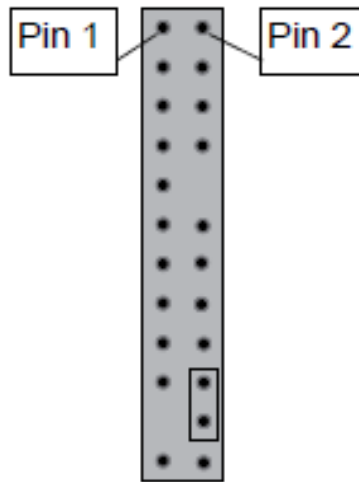
Figure 9: Front Panel connections

Table 5: Front panel Connections

Pin	Signal name	Pin	Signal name
1	HD-LED +	2	Power LED +
3	HD-LED -	4	Power LED -
5	GND	6	Power Button
7	RST L	8	GND
9	Chassis Detect WS L	10	Key
11	Chassis Detect Baku L	12	GND
13	LED1 +	14	LED1 -
15	Power Button (only S5, does not work in low power S5)	16	Power Button (Only S5, does not work in low power S5)
17	Speaker +	18	Password Skip
19	GND	20	GND (0, 1K)
21	Key	22	GND (0, 1K)
23	Speaker -	24	Recover BIOS

- ## Power Connectors

ATX Power Connector

The D3348 is operated with a 12 V power supply or an ATX power supply.

ATX power supply (D3348-B)	
16-pin board power connector	8-pin board power connector

Figure 10: ATX Power Supply Connectors

Processor Power Connector
In addition to the primary ATX power connector, the 12V 4-pin CPU Power connector must also be connected to the Motherboard to provide adequate power to the CPU.

A- 24-pin ATX power connector
B- 8-pin processor power connector
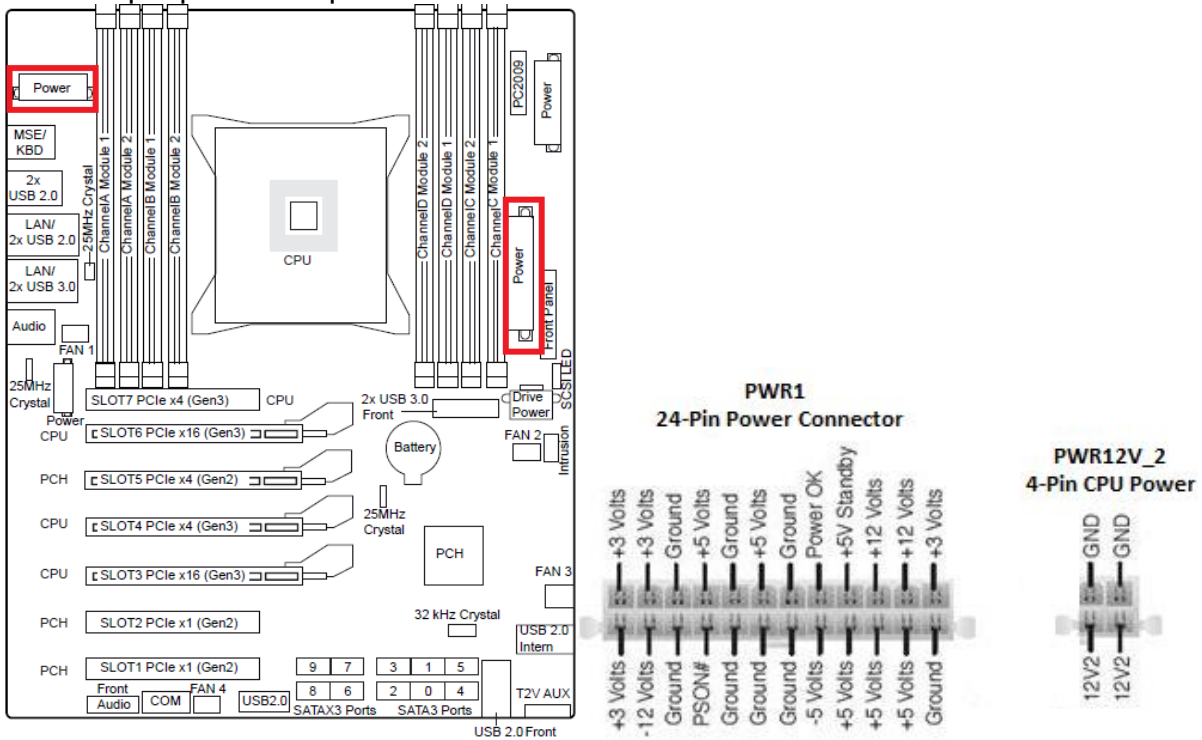
Figure 11: Power Connectors

Caution!!

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

• Serial ATA connectors

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

A- Serial ATA connectors
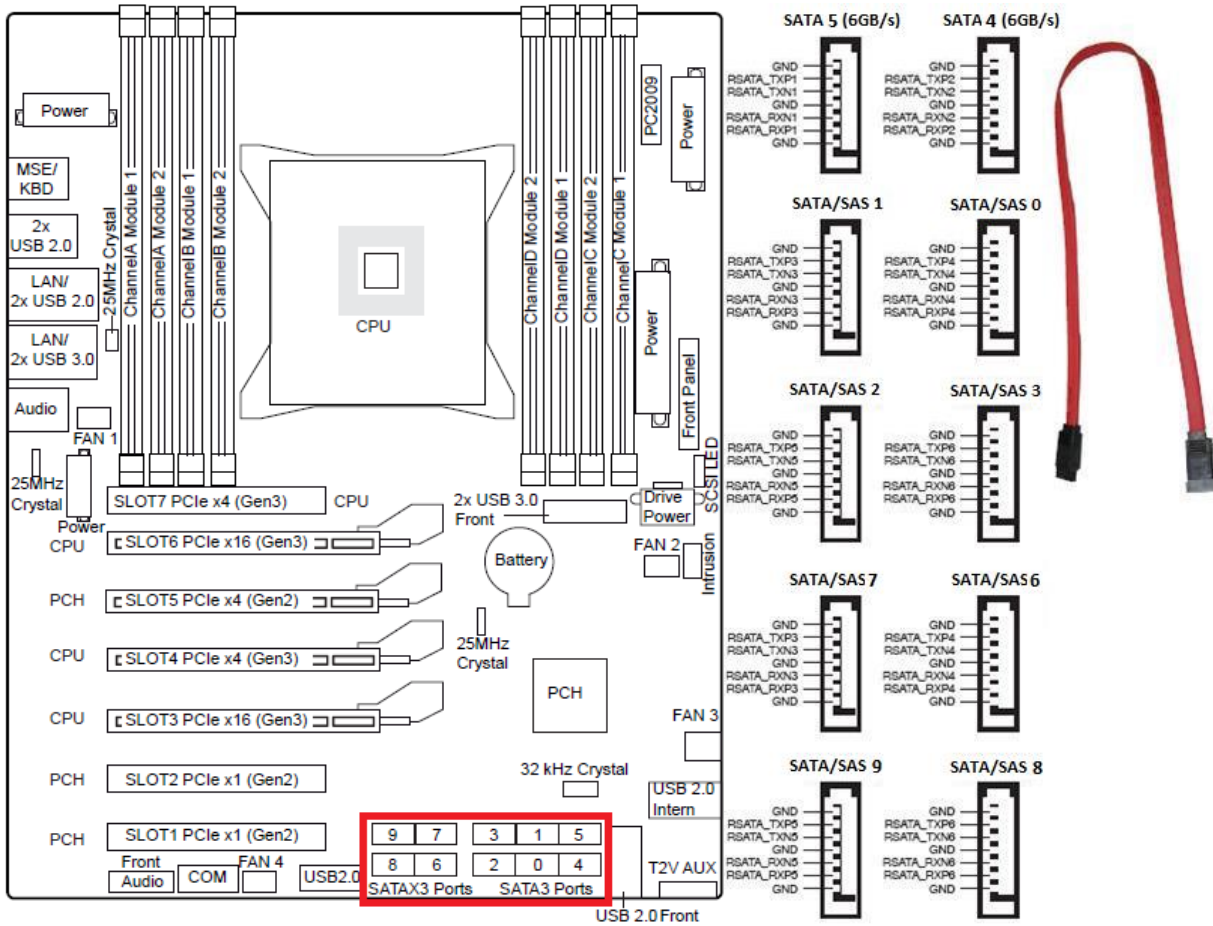
Figure 12: Serial ATA connectors

• Universal Serial Bus (USB)

USB 2.0 port (external)

Pin	Signal
1	VCC AUX (safe mode)
2	Data negative
3	Data positive
4	GND
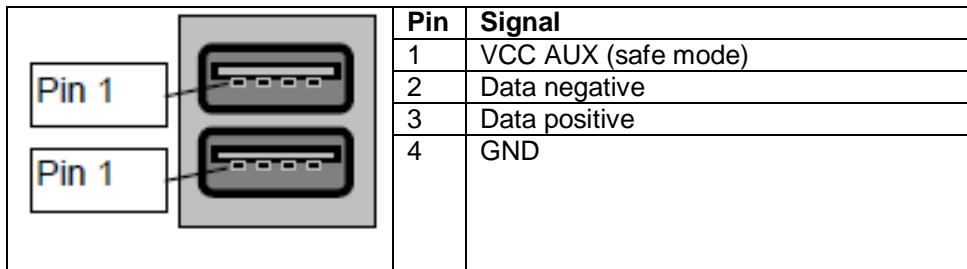
Figure 13: USB2.0 Connectors (External)

USB 2.0 port (internal) – Internal/Front

Pin	Signal	PIN	Signal
1	VCC AUX (safe mode)	2	VCC AUX
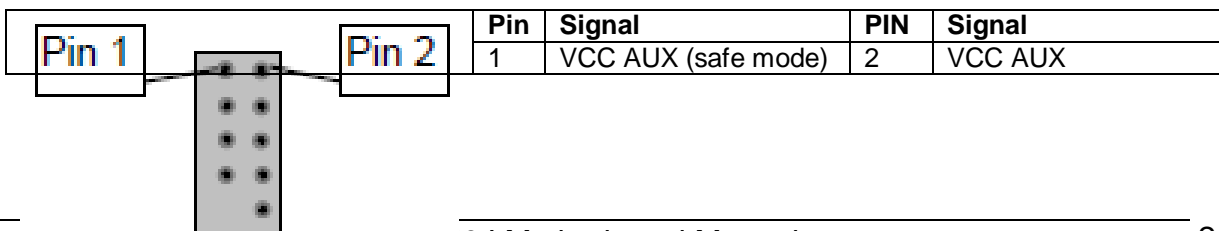
		3	Data negative Port X	4	Data Negative Port Y
		5	Data positive Port X	6	Data Positive Port Y
		7	GND	8	GND
		9	Key	10	NC

Figure 14: USB2.0 Port (Internal)

USB 2.0 port (internal)
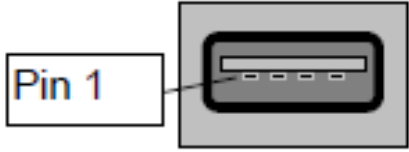
Pin	Signal
1	VCC AUX (safe mode)
2	Data negative
3	Data positive
4	GND

Figure 15: USB2.0 Port (Internal)

USB 3.0 port (internal) – Internal/Front
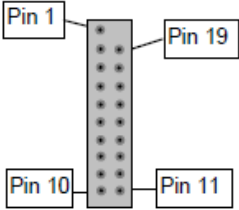
Function/Mode	Jumper	Configuration
USB3.0 Port (Internal) – Internal/Front		Front panel audio cable connects to this header to enable the use of front panel audio (Mic and Headphones).

Table 6: USB3.0 Port (Internal) – Internal/ Front

Table 7: USB3.0 Port (Internal) – Internal/Front

Pin	Signal name	Pin	Signal name
1	VBus	20	Key
2	USB3.0 Port 2 RX Neg	19	VBus
3	USB3.0 Port 2 RX Pos	18	USB3.0 Port 1 RX Neg
4	GND	17	USB3.0 Port 1 RX Pos
5	USB3.0 Port 2 TX Neg	16	GND
6	USB3.0 Port 2 TX Pos	15	USB3.0 Port 1 TX Neg
7	GND	14	USB3.0 Port 1 TX Pos
8	USB3.0 Port 2 Data Neg	13	GND
9	USB3.0 Port 2 Data Pos	12	USB3.0 Port 1 Data Neg
10	Over Current	11	USB3.0 Port 1 Data Pos

Intrusoin connector (internal)
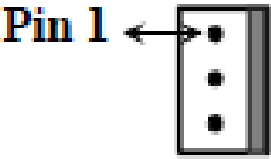
Pin	Signal
1	GND
3	Open
5	Intrusion switch present

Figure 16: Chassis Intrusion

- **Fan Connectors**

This Motherboard has three chassis/system fan headers (Fan 2, 3 and 5) as well as one CPU fan header (Fan 1) and a PSU fan header (Fan 4). All of these are 4-pin fan headers and are backward compatible with the traditional 3-pin fans. However, fan speed control is available for 4-pin fans only.

Fan Header Pin Definitions	
Pin#	Definition
1	Ground
2	+12V
3	Tachometer
4	PWR Modulation
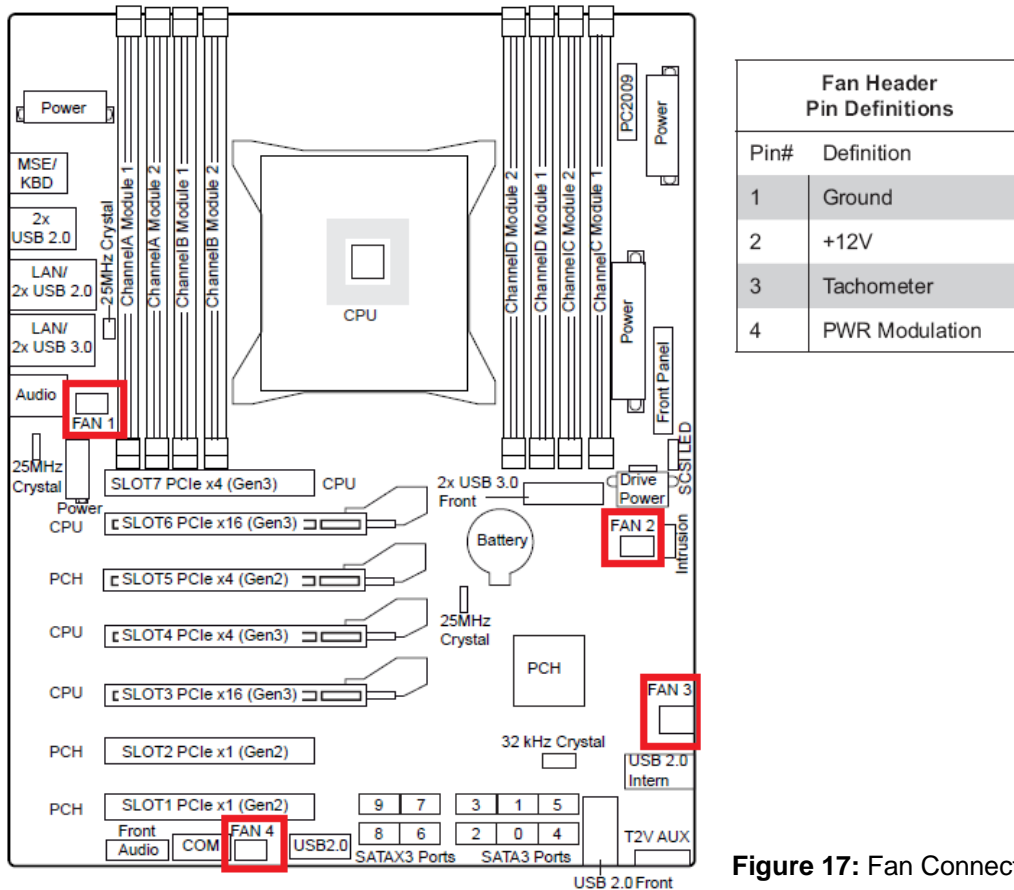
Figure 17: Fan Connectors

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!!

Pin	Signal
1	GND
2	+12V Power
3	FAN Sense
4	Fan PWM
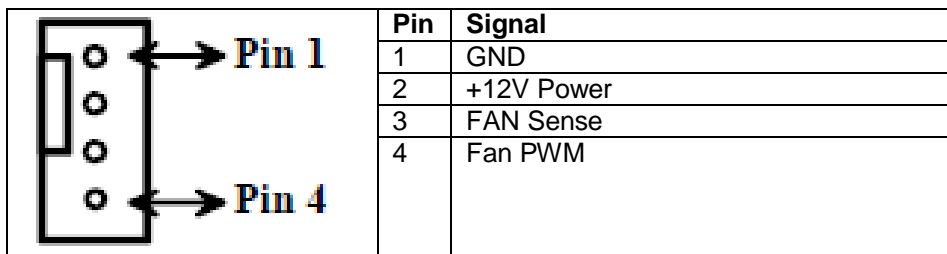
Figure 18: Internal Fan Connector

This 4-pin fan connector suppors tachometer monitoring.
There are four 4-pin fan connectors on Vig450J. Use these connectors to connect chassis and processor cooling fans to your motherboard. Cooling fans can keep the system stable and reliable for its product's life.

Upgrading the Central Processing Unit (CPU)

The Motherboard comes with a surface mount LGA2011 socket designed for the Intel® Xeon E5-16xx, E5-26xx, i7-59xx CPUs

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.

The design of the Vig450J 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 side lid from the system

<table>
<tr><th>CPU heatsink (Top View)</th><th>CPU heatsink (Bottom View)</th></tr>
</table>
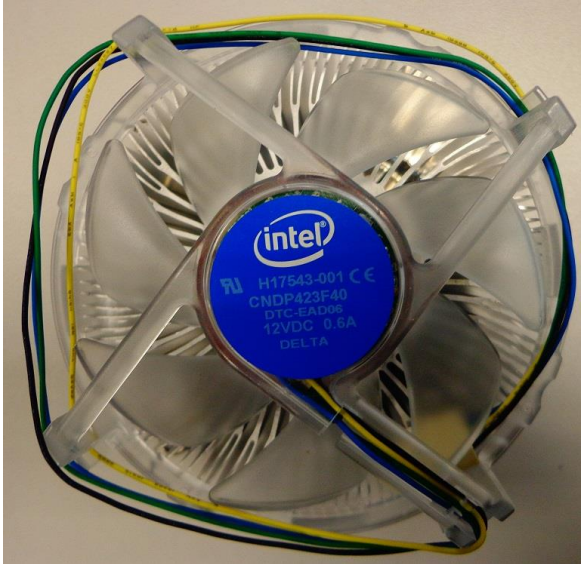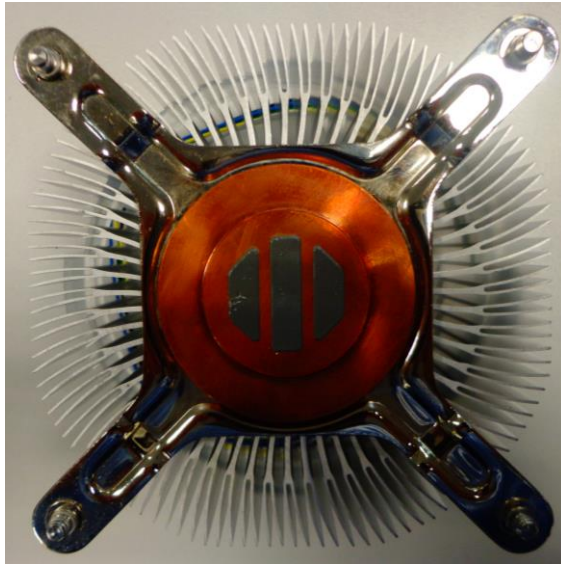
Figure 13: Haswell-EP –Air Heatsink TS13A

2. Unplug the heatsink fan connector from the Motherboard CPU fan header.
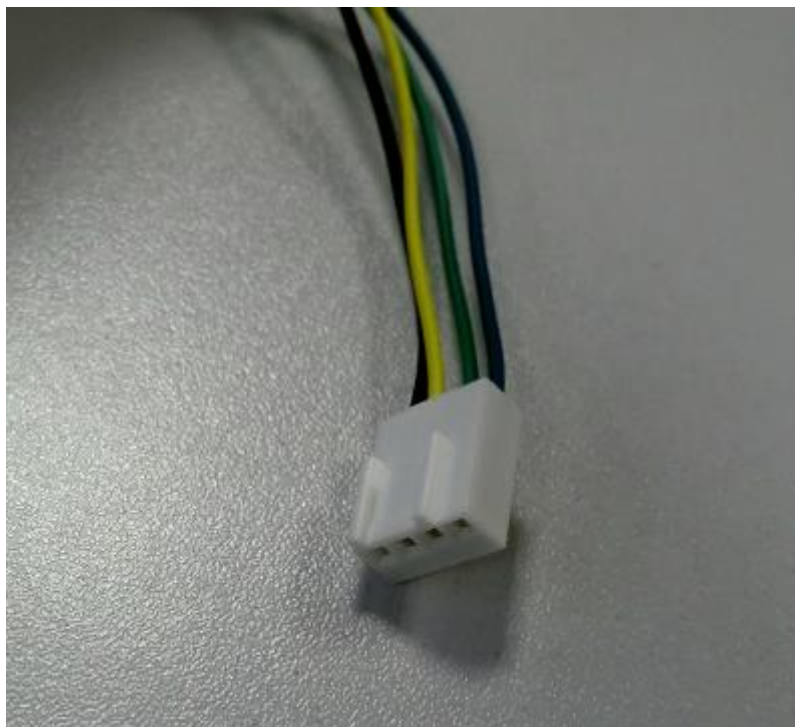
Figure 14: Heatsink Connector

3. Remove the heatsink screws from the Motherboard in the sequence as shown in the picture below.
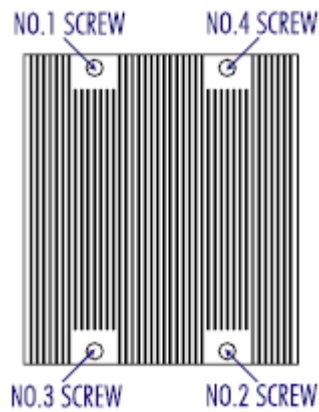
Figure 19: Heatsink Screw Sequence

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

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

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

Installing the Processor and Heat sink

Installing the processor

The processor socket is covered with a protective cap to protect the spring contacts.

In the warranty case the mainboard can only be taken back by Fujitsu Technology Solutions with the protective cap secured!

Never touch the underside of the processor. Even minor soiling such as grease from the skin can impair the processor's operation or destroy the processor.

Place the processor in the socket with extreme care, as the spring contacts of the socket are very delicate and must be bent.

- ➢ Remove the heat sink
- ➢ Press down the lever (1) and unhook it (2).
- ➢ Fold up the frame
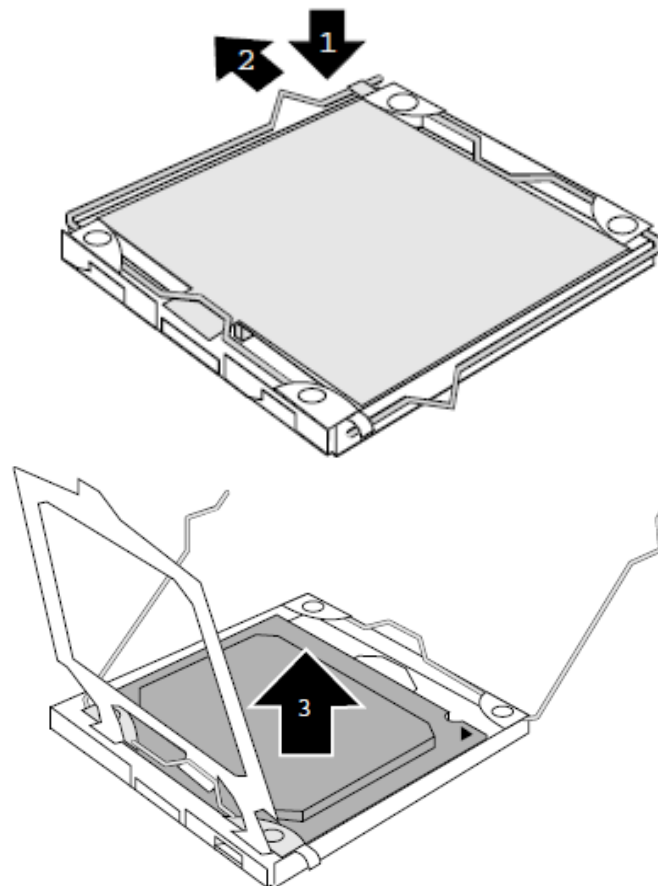
Hold the new processor between your thumb and index finger and insert it into the socket (b) so that the marking of the processor is aligned with the marking on the socket (a).

➢ Remove the old processor (3) form the socket
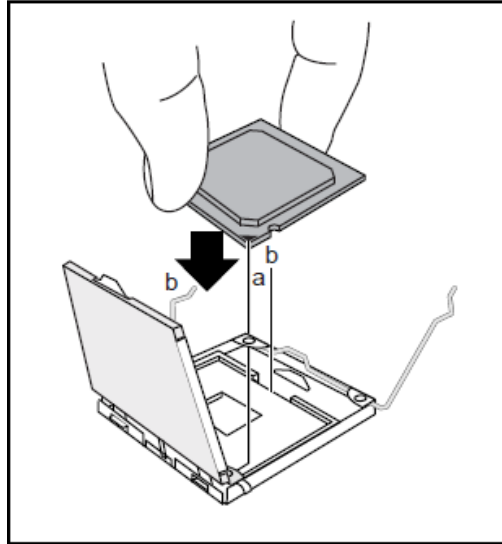
➢ Fold down the frame (1).
➢ Press the lever downward (2) until it is hooked in again.
➢ Remove the protective cap (3) and keep it.
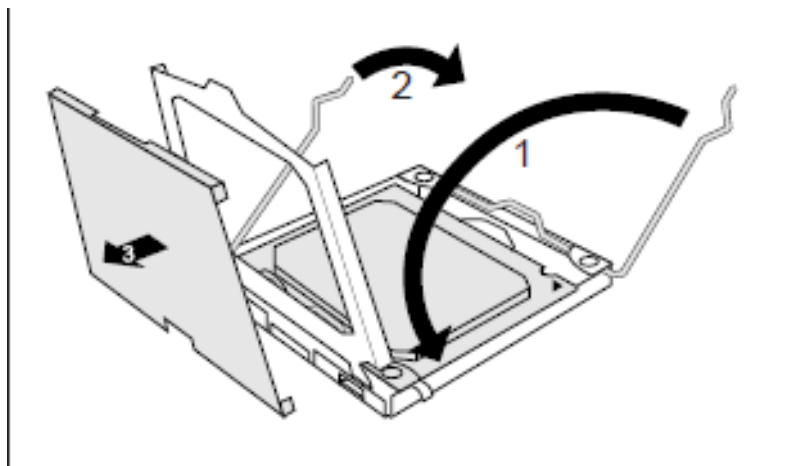
Installing Heatsink

i | Use only the heat sink supplied with your system!

Be sure to use heat conducting material between the processor and the heat sink. If a heat conducting pad (rubber-like foil) is already applied to the heat sink, then use it. Otherwise you must apply a very thin layer of heat conducting paste.
Heat conducting pads can only be used once. If you remove the heat sink, you must clean it and apply new heat conducting paste before you remount it.
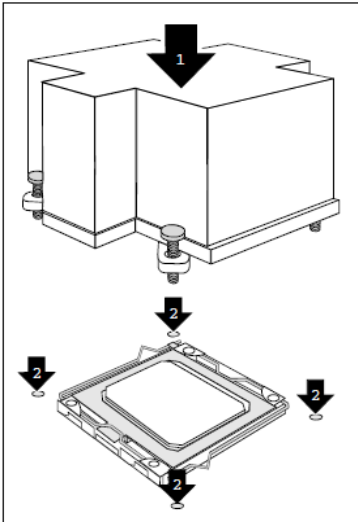
> Depending on the configuration variant, you must pull a protective foil off the heat sink or coat the heat sink with heat conducting paste before fitting it.
> Secure the heat sink – depending on the model – with four screws or push it into the mounts.

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.)

Screw#1
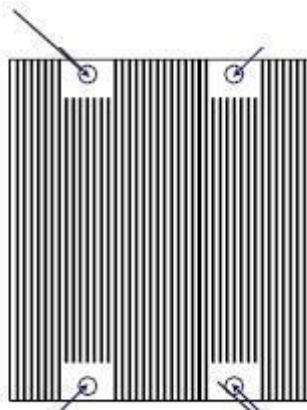
Screw#2

Upgrading System Memory

Memory Installation Procedure
When installing memory modules, make sure the modules align properly with the memory socket. There should be keys (small indents) on your memory modules that fit according to the keys in the memory socket. DDR modules and sockets have only one key, which is slightly near the centre of the module/socket. The method of installing memory modules is detailed in the following diagrams.

Installing a memory module
1. Push the holders on each side of the memory slot outwards.
2. Insert the memory module into the location (1).
3. At the same time flip the lateral holders upwards until the memory module snaps in place (2).
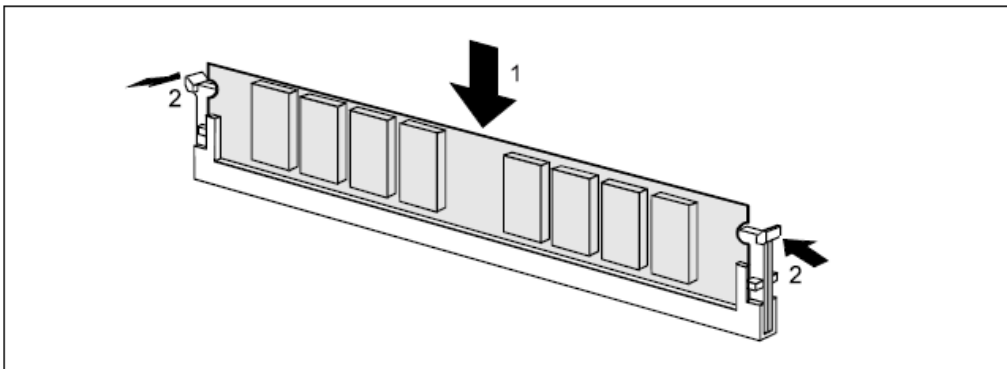
Remove a memory module
1. Push the clips on the right and left of the memory slot outward (1).
2. Pull the memory module out of the memory slot (2).
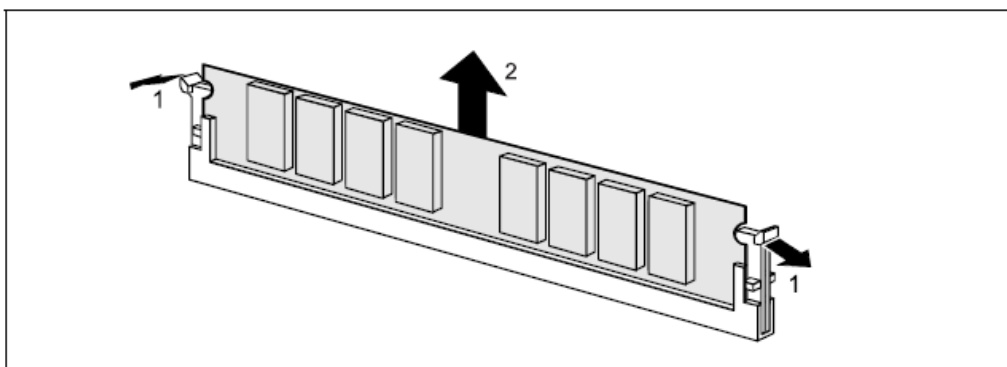
When installing memory, a module may require a considerable amount of force to seat properly, although this is very rare. To avoid bending and

damaging your motherboard, place it on its anti-static bag and onto a flat surface, and then proceed with memory installation.

⚠ You must unplug the power connector to the motherboard before performing system hardware changes, to avoid damaging the board or expansion device.

Installing an expansion card

To install an expansion card:

1. Before installing the expansion card, read the documentation that came with the device 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 32-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 25: Installing a PCI card

PCI Express x16 Slot

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

Figure 26: Install a PCI Express x16 card

Replacing the Clock/CMOS RAM Battery

In order to permanently save the system information, a lithium battery is installed to provide the CMOS-memory with a current. A corresponding error message notifies the user when the charge is too low or the battery is empty. The lithium battery must then be replaced.

⚠ Incorrect replacement of the lithium battery may lead to a risk of explosion!
The lithium battery may be replaced only with an identical battery or with a type recommended by the manufacturer.

Do not throw lithium batteries into the household waste. They must be disposed of an accordance with local regulations concerning special waste.

Make sure that you insert the battery the right way round. The plus pole must be on the top!

The lithium battery holder exists in different designs that function in the same way.

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 'Z' on page 14, Figure 1

To replace the battery, carry out the following:

1. Turn off all peripheral devices connected to the system.
2. Turn off the system.
3. Remove any components that are blocking access to the battery.
4. Press the catch in the direction of the arrow (1). The battery jumps out of the holder slightly.
5. Remove the battery (2).
6. Push the new lithium battery of the identical type into the holder (3) and press it downward until it engages.
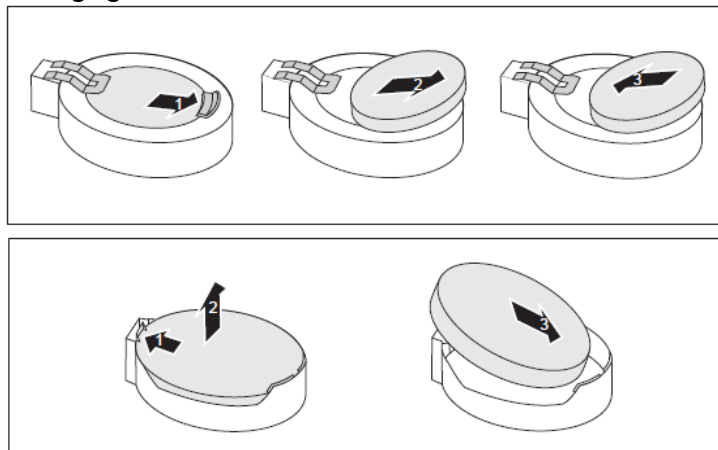
Figure 27: Replacing CMOS Battery

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 9: 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 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 and to be Used by PCI/ISA Card. Please refer to the BIOS manual for details of how to do this.

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

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

No Power

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

No Video

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

Losing the System's Setup Configuration

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

Memory Errors

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

1. Make sure that the DIMM modules are properly and fully installed.
2. Check if different speeds of DIMMs have been installed and check if the BIOS setup is configured for the slowest speed of RAM used. (It is recommended to use the same RAM speed for all DIMMs in the system.)
3. Make sure you are using the correct type of DDR4 ECC 2133 MHz RAM (recommended by the manufacturer.)
4. Check for bad DIMM modules or slots by swapping a single module between all memory slots and check the results.
5. Make sure that all memory modules are fully seated in their slots.
6. Make sure to follow the instructions on Page 17 for DIMM population.

Problems & Suggestions

Table 15: Problems and Suggestions

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

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

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

Error and Information Messages

BIOS POST Messages

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

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

Stuck key
Stuck key on keyboard.

Keyboard error
Keyboard not working.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CD ROM Drive
CD ROM Drive identified.

Entering SETUP ...
Starting Setup program

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

PS/2 Mouse:
PS/2 mouse identified.

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

System BIOS shadowed
System BIOS copied to shadow RAM.

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

Video BIOS shadowed
Video BIOS successfully copied to shadow RAM.

BIOS POST Codes

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

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

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

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

BIOS POST-Codes (Port 80 status indicators)
BIOS-POST codes are visible on the LCD-display (connected to the LCD-connector).

Checkpoint Ranges

Status Code Range	Description
0x01 – 0x0B	SEC execution
0x0C – 0x0F	SEC errors
0x10 – 0x2F	PEI execution up to and including memory detection
0x30 – 0x4F	PEI execution after memory detection
0x50 – 0x5F	PEI errors
0x60 – 0x8F	DXE execution up to BDS
0x90 – 0xCF	BDS execution
0xD0 – 0xDF	DXE errors
0xE0 – 0xE8	S3 Resume (PEI)
0xE9 – 0xEF	S3 Resume errors (PEI)
0xF0 – 0xF8	Recovery (PEI)
0xF9 – 0xFF	Recovery errors (PEI)

Standard Checkpoints

SEC Phase

Status Code	Description
0x00	0x00 Not used
Progress Codes	
0x01	Power on. Reset type detection (soft/hard).
0x02	AP initialization before microcode loading
0x03	North Bridge initialization before microcode loading
0x04	South Bridge initialization before microcode loading
0x05	OEM initialization before microcode loading
0x06	Microcode loading
0x07	initialization after microcode loading

0x08	North Bridge initialization after microcode loading
0x09	South Bridge initialization after microcode loading
0x0A	OEM initialization after microcode loading
0x0B	Cache initialization
SEC Error Codes	
0x0C – 0x0D	Reserved for future AMI SEC error codes
0x0E	Microcode not found
0x0F	Microcode not loaded

SEC Beep Codes

None

SEC Phase

Status Code Description	Status Code Description
Progress Codes	
0x10	PEI Core is started
0x11	Pre-memory CPU initialization is started
0x12	Pre-memory CPU initialization (CPU module specific)
0x13	Pre-memory CPU initialization (CPU module specific)
0x14	Pre-memory CPU initialization (CPU module specific)
0x15	Pre-memory North Bridge initialization is started
0x16	Pre-Memory North Bridge initialization (North Bridge module specific)
0x17	Pre-Memory North Bridge initialization (North Bridge module specific)
0x18	Pre-Memory North Bridge initialization (North Bridge module specific)
0x19	Pre-memory South Bridge initialization is started
0x1A	Pre-memory South Bridge initialization (South Bridge module specific)
0x1B	Pre-memory South Bridge initialization (South Bridge module specific)
0x1C	Pre-memory South Bridge initialization (South Bridge module specific)
0x1D – 0x2A	OEM pre-memory initialization codes
0x2B	Memory initialization. Serial Presence Detect (SPD) data reading
0x2C	Memory initialization. Memory presence detection
0x2D	Memory initialization. Programming memory timing information
0x2	Memory initialization. Configuring memory
0x2F	Memory initialization (other).
0x30	Reserved for ASL (see ASL Status Codes section below)
0x31	Memory Installed
0x32	CPU post-memory initialization is started
0x33	CPU post-memory initialization. Cache initialization
0x34	CPU post-memory initialization. Application Processor(s) (AP) initialization
0x35	CPU post-memory initialization. Boot Strap Processor (BSP) selection
0x36	CPU post-memory initialization. System Management Mode (SMM) initialization
0x37	Post-Memory North Bridge initialization is started
0x38	Post-Memory North Bridge initialization (North Bridge module specific)
0x39	Post-Memory North Bridge initialization (North Bridge module specific)
0x3A	Post-Memory North Bridge initialization (North Bridge module specific)
0x3B	Post-Memory South Bridge initialization is started
0x3C	Post-Memory South Bridge initialization (South Bridge module specific)
0x3D	Post-Memory South Bridge initialization (South Bridge module specific)
0x3E	Post-Memory South Bridge initialization (South Bridge module specific)
0x3F-0x4E	OEM post memory initialization codes

0x4F	DXE IPL is started
PEI Error Codes	
0x50	Memory initialization error. Invalid memory type or incompatible memory speed
0x51	Memory initialization error. SPD reading has failed
0x52	Memory initialization error. Invalid memory size or memory modules do not
0x53	Memory initialization error. No usable memory detected
0x54	Unspecified memory initialization error.
0x55	Memory not installed
0x56	Invalid CPU type or Speed
0x57	CPU mismatch
0x58	CPU self-test failed or possible CPU cache error
0x59	CPU micro-code is not found or micro-code update is failed
0x5A	Internal CPU error
0x5B	reset PPI is not available
0x5C-0x5F	Reserved for future AMI error codes
S3 Resume Progress Codes	
0xE0 S3	Resume is stared (S3 Resume PPI is called by the DXE IPL)
0xE1 S3	Boot Script execution
0xE2	Video repost
0xE3	OS S3 wake vector call
0xE4-0xE7	Reserved for future AMI progress codes
S3 Resume Error Codes	
0xE8 S3	S3 Resume Failed
0xE9 S3	S3 Resume PPI not Found
0xEA S3	S3 Resume Boot Script Error
0xEB S3	S3 OS Wake Error
0xEC-0xEF	Reserved for future AMI error codes
Recovery Progress Codes	
0xF0	Recovery condition triggered by firmware (Auto recovery)
0xF1	Recovery condition triggered by user (Forced recovery)
0xF2	Recovery process started
0xF3	Recovery firmware image is found
0xF4	Recovery firmware image is loaded
0xF5-0xF7	Reserved for future AMI progress codes
Recovery Error Codes	
0xF8	Recovery PPI is not available
0xF9	Recovery capsule is not found
0xFA	Invalid recovery capsule
0xFB – 0xFF	Reserved for future AMI error codes

PEI Beep Codes

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

DXE Phase

Status Code	Description
0x60	DXE Core is started
0x61	NVRAM initialization
0x62	Installation of the South Bridge Runtime Services
0x63	CPU DXE initialization is started
0x64	CPU DXE initialization (CPU module specific)
0x65	CPU DXE initialization (CPU module specific)
0x66	CPU DXE initialization (CPU module specific)
0x67	CPU DXE initialization (CPU module specific)
0x68	PCI host bridge initialization
0x69	North Bridge DXE initialization is started
0x6A	North Bridge DXE SMM initialization is started
0x6B	North Bridge DXE initialization (North Bridge module specific)
0x6C	North Bridge DXE initialization (North Bridge module specific)
0x6D	North Bridge DXE initialization (North Bridge module specific)
0x6E	North Bridge DXE initialization (North Bridge module specific)
0x6F	North Bridge DXE initialization (North Bridge module specific)
0x70	South Bridge DXE initialization is started
0x71	South Bridge DXE SMM initialization is started
0x72	South Bridge devices initialization
0x73	South Bridge DXE Initialization (South Bridge module specific)
0x74	South Bridge DXE Initialization (South Bridge module specific)
0x75	South Bridge DXE Initialization (South Bridge module specific)
0x76	South Bridge DXE Initialization (South Bridge module specific)
0x77	South Bridge DXE Initialization (South Bridge module specific)
0x78	ACPI module initialization
0x79	CSM initialization
0x7A – 0x7F	Reserved for future AMI DXE codes
0x80 – 0x8F	OEM DXE initialization codes
0x90	Boot Device Selection (BDS) phase is started
0x91	Driver connecting is started
0x92	PCI Bus initialization is started
0x93	PCI Bus Hot Plug Controller Initialization
0x94	PCI Bus Enumeration
0x95	PCI Bus Request Resources
0x96	PCI Bus Assign Resources
0x97	Console Output devices connect
0x98	Console input devices connect
0x99	Super IO Initialization
0x9A	USB initialization is started
0x9B	USB Reset
0x9C	USB Detect
0x9D	USB Enable
0x9E – 0x9F	Reserved for future AMI codes
0xA0	IDE initialization is started
0xA1	IDE Reset

0xA2	IDE Detect
0xA3	IDE Enable
0xA4	SCSI initialization is started
0xA5	SCSI Reset
0xA6	SCSI Detect
0xA7	SCSI Enable
0xA8	Setup Verifying Password
0xA9	Start of Setup
0xAA	Reserved for ASL (see ASL Status Codes section below)
0xAB	Setup Input Wait
0xAC	Reserved for ASL (see ASL Status Codes section below)
0xAD	Ready To Boot event
0xAE	Legacy Boot event
0xAF	Exit Boot Services event
0xB0	Runtime Set Virtual Address MAP Begin
0xB1	Runtime Set Virtual Address MAP End
0xB2	Legacy Option ROM Initialization
0xB3	System Reset
0xB4	USB hot plug
0xB5	PCI bus hot plug
0xB6	Clean-up of NVRAM
0xB7	Configuration Reset (reset of NVRAM settings)
0xB8 – 0xBF	Reserved for future AMI codes
0xC0 – 0xCF	OEM BDS initialization codes
DXE Error Codes	
0xD0	CPU initialization error
0xD1	North Bridge initialization error
0xD2	South Bridge initialization error
0xD3	Some of the Architectural Protocols are not available
0xD4	PCI resource allocation error. Out of Resources
0xD5	No Space for Legacy Option ROM
0xD6	No Console Output Devices are found
0xD7	No Console Input Devices are found
0xD8	Invalid password
0xD9	Error loading Boot Option (LoadImage returned error)
0xDA	Boot Option is failed (StartImage returned error)
0xDB	Flash update is failed
0xDC	Reset protocol is not available

DXE Beep Codes

# of Beeps	Description
1	Invalid password
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
6	Flash update is failed
7	Reset protocol is not available

8	Platform PCI resource requirements cannot be met
1	Invalid password

OEM-Reserved Checkpoint Ranges

Status Code Description	Status Code Description
0x05	OEM SEC initialization before microcode loading
0x0A	OEM SEC initialization after microcode loading
0x1D – 0x2A	OEM pre-memory initialization codes
0x3F – 0x4E	OEM PEI post memory initialization codes
0x80 – 0x8F	OEM DXE initialization codes
0xC0 – 0xCF	OEM BDS initialization codes

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 18: 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 19: 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

POST Code	Description
59h	Initialize POST display service
5Ah	Display prompt "Press <ESC> to enter SETUP"
5Bh	Disable CPU cache

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

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

POST Code	Description
96h	Clear huge ES segment register
97h	Fix up Multi Processor table

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)

POST Code	Description
CDh	Reclaim console redirection vector
D2h	Unknown interrupt
D4h	Check Intel Branding string

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

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

The following are for boot block in Flash ROM

Table 22: POST code description

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

Note:

*If the BIOS detects error 2C, 2E, or 30 (base 512K RAM error), it displays an additional word-bitmap (**xxxx**) indicating the address line or bits that failed. For example, "2C 0002" means address line 1 (bit one set) has failed. "2E 1020" means data bits 12 and 5 (bits 12 and 5 set) have failed in the lower 16 bits. The BIOS also sends the bitmap to*

the port-80 LED display. It first displays the checkpoint code, followed by a delay, the high-order byte, another delay, and then the loworder byte of the error. It repeats this sequence continuously.

Chapter 4: System BIOS

Introduction

This chapter describes the Phoenix BIOS™ Setup utility for the Vig450J. 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.

How to Enter the BIOS

To enter the BIOS Setup you will need to repeatedly press the F2 button when the machine is first turned on and is performing its Power On Self Test (POST).

How to Access the Boot Menu

To access the Boot Menu you will need to repeatedly press the F12 button when the machine is first turned on and is performing its Power On Self Test (POST).

Updating the BIOS

The system BIOS can be updated using one of the following methods:

- o Flash BIOS update under Windows
- o Flash BIOS update with a USB stick

All necessary BIOS files can be obtained from the Viglen FTP site at:
http://download.viglen.co.uk/files/

- **Flash BIOS update under Windows**
    1. Start your system and boot into Windows
    2. Download the latest BIOS update for Windows from Viglen FTP site
    3. Run the application to begin update process
    4. **For additional help refer to readme.txt (included in download package)**

CAUTION!!
Do not shut down or reset the system while updating the BIOS. Doing so may cause permanent damage to the motherboard

- **Flash BIOS update with a USB Stick (DOS)**
    1. Have a bootable USB stick ready
    2. Download and decompress (unzip) the latest BIOS update for DOS from Viglen FTP site
    3. Copy the contents to the root of your bootable USB stick
    4. Restart your system and press F12 during POST to open the Boot Menu
    5. Select your bootable USB stick
    6. Launch the flash BIOS update using the necessary commands
    7. **For additional help refer to readme.txt (included in download package)**

CAUTION!!
Do not shut down or reset the system while updating the BIOS. Doing so may cause permanent damage to the motherboard

Main BIOS Setup

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 BIOS Setup Menu. The next section describes in detail how to navigate through the menus and submenus

Note: To enter the BIOS Setup you will need to repeatedly press the F2 button when the machine is first turned on and is performing its Power On Self Test (POST).

```
┌──────────────────────────────────────────────────────────────────────────┐
│ Main  Advanced  Security  Power  Event Logs  Boot  Save & Exit            │
│                                                                            │
│  BIOS Information                                      This submenu provides details │
│  BIOS Vendor              American Megatrends          on the system configuration  │
│  Customized by            Fujitsu                                          │
│  Core Version             4.6.4.0                                          │
│                                                                            │
│ ▶ System Information                                                       │
│                                                                            │
│  System Language          [English]                                        │
│                                                                            │
│  System Date              [Thu 12/02/2010]                                 │
│  System Time              [17:30:18]                                       │
│                                                                            │
│  Access Level             Administrator                                    │
│                                                                            │
│                                                       →←: Select Screen     │
│                                                       ↑↓: Select Item       │
│                                                       Enter: Select         │
│                                                       +/-: Change Opt.      │
│                                                       F1: General Help      │
│                                                       F2: Previous Values   │
│                                                       F3: Optimized Defaults │
│                                                       F4: Save & Exit       │
│                                                       ESC: Exit             │
│                                                                            │
└──────────────────────────────────────────────────────────────────────────┘
```
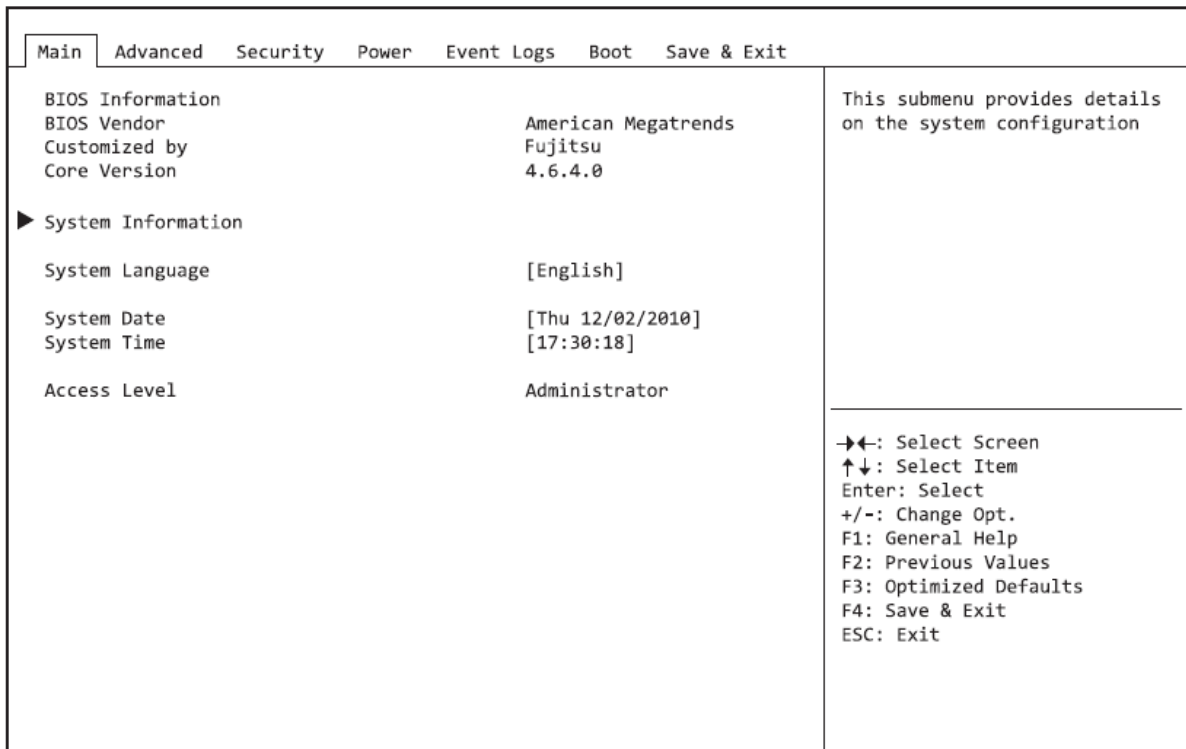
Figure 28: Main BIOS Setup

System Information
This submenu contains descriptions of the system configuration. Some parameters are only available optionally.

Board and Firmware Details
Shows the current information on the installed system board and firmware:

- **BIOS Revision:** Shows the current BIOS version.
- **Build Date and Time:** Shows the date and time of the formation of the current BIOS.
- **Board:** Shows information about the current system board.
- **Ident Number:** Shows the identification number of the system.
- **UUID:** Shows the 16-byte long Universal Unique ID, also known as the Globally Unique Identifier (GUID).

Network Controller Details

Shows the 6-byte long MAC address (Media Access Control) of the LAN controller.

Processor Details

- **Processor Type:** Shows the CPU designation.
- **CPU / Patch ID:** Shows the CPU ID and the current Patch ID.
- **Processor Speed:** Shows the speed of the processor core.
- **Cache Counts & Sizes:** Shows detailed information about the cache.
- **Active Package, Core & Thread Count (maximum):** Shows the number of active and maximum available CPU packages, cores and threads.

Memory Details

Shows the details of memory Quantities

- **Memory Size / Frequency:** Shows the total memory in Megabytes and the memory frequency in MHz.
- **DIMM n:** Shows the memory size in Megabytes for the corresponding memory slot.

System Language

Specifies the language used in the BIOS Setup

System Date / System Time

Shows the currently set date/the currently set time of the system. The date has the format "Day of the week, month/day/year". The time has the format "hours/minutes/seconds". If you wish to change the currently set date/the currently set time, enter the new date in the field System Date and the new time in the field System Time. Use the tab key to switch the cursor between the System Time and System Date fields.

Note: If the system date & time fields are often set incorrectly when starting the computer, the lithium battery is possibly discharged and must be changed. The procedure for changing the lithium battery is described in the system board manual.

Access Level

Shows the current access level in BIOS Setup. If the system is not protected by a password, or an administrator password has been allocated, the access level is Administrator. If administrator and user passwords are allocated, the access level depends on the password entered.

Advanced System Configuration

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

```
  Main  Advanced  Security  Power  Event Logs  Boot  Save & Exit

   Erase Disk                          [Disabled]          Enable or Disable Boot Option
                                                           for Legacy Network Devices.
  ► PCI Subsystem Settings
  ► Trusted Computing
  ► CPU Configuration
  ► Runtime Error Logging
  ► Memory Configuration
  ► SATA Configuration
  ► SAS Configuration
  ► Acoustic Management Configuration
  ► Intel TXT Configuration
  ► USB Configuration
  ► System Monitoring
  ► Onboard Device
  ► Memory Status                                         →←: Select Screen
  ► Super I0 Configuration                                ↑↓: Select Item
  ► AMT Configuration                                     Enter: Select
  ► Serial Port Console Redirection                       +/-: Change Opt.
  ► Network Stack                                         F1: General Help
  ► Option ROM Configuration                              F2: Previous Values
  ► PCI Status                                            F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit
```

Figure 29: Advanced System Configuration

Erase Disk
Erase Disk is a firmware incorporated in Fujitsu Technology Solutions (UEFI: Unified Extensible Firmware Interface), to delete all the data from SATA hard disk(s).
This function allows all the data on internal or external SATA hard disks connected via the eSATA connection to be irretrievably deleted, before disposal of the hard disks or the complete computer system. The function can also be used if hard disks need to be completely deleted, for example before installing a new operating system.

PCI Subsystem Settings
Opens the PCI Subsystem Settings submenu

- **PCI Option ROM Handling**
    1. **PCI ROM Priority –** Specifies Which PCI Option ROMs are started if multiple option ROMs are available:
        1. **Legacy ROM –** Legacy Option ROMs are started
        2. **EFI Compatible ROM –** EFI compatible Option ROMs are started

2. **PERR# Generation –** Specifies whether the PERR# (PCI Parity Errors) are created:
    1. **Disabled –** PCI Parity Errors will not be created
    2. **Enabled –** PCI Parity Errors will be created

3. **SERR# Generation –** Specifies whether SERR# (PCI System Errors) will be created:
    1. **Disabled –** PCI System Errors will not be created
    2. **Enabled –** PCI System Errors will be created

- **PCI Express Link Register Settings**
    1. **ASPM Support –** Configure Active State Power Management (ASPM), to gradually reduce the power consumption of the PCI Express Link and so save energy. Even if ASPM is generally enabled by this selection, it is only then invoked for a particular connection if the corresponding PCI Express adapter card or the corresponding Onboard Controller also supports this.
        1. **Disabled –** ASPM is disabled. The power consumption for PCI Express connections is reduced. Best Compatibility
        2. **Auto –** Configure maximum energy saving. Set the low power mode of the PCI Express connections to L0s (uni-directional) or L1 (bi-directional).
        3. **Limit to L0s –** Limit the Low Power Mode of PCI Express connections to L0s (uni-directional). Compromise between compatibility and energy saving

    2. **Slot n Link Speed –** Allows the maximum possible link speed to be limited for individual PCIe slots
        1. **GEN1 –** The maximum possible link speed will be limited to GEN1 (2.5GT/s)
        2. **GEN2 –** The maximum possible link speed will be limited to GEN2 (5GT/s)
        3. **GEN3 –** The maximum possible link speed will be limited to GEN3 (8GT/s)

Trusted Computing

Opens the submenu for enabling TPM and changing the TPM settings. If this setup menu is available, the system board contains a security and encryption chip (TPM - Trusted Platform Module) which complies with TCG specification 1.2. This chip allows security-related data (passwords, etc.) to be stored securely. The use of TPM is standardised and is specified by the Trusted Computing Group (TCG).

- **TPM Support**
Specifies whether the TPM (Trusted Platform Module) hardware is available. If the TPM is disabled, the system behaves like any other system without the TPM hardware
    1. **Disabled –** Trusted Platform Module is not available
    2. **Enabled –** Trusted Platform Module is available

- **TPM State**
  Specifies whether TPM (Trusted Platform Module) can be used by the operating system
    1. **Disabled –** Trusted Platform Module cannot be used
    2. **Enabled –** Trusted Platform Module can be used

- **Pending TPM Operation**
  Specifies a TPM operation which will be performed during the next boot process
    1. **None –** No TPM operation will be performed
    2. **Enable Take Ownership –** the operating system can assume ownership of the TPM
    3. **Disable Take Ownership –** the operating system cannot assume ownership of the TPM
    4. **TPM Clear –** TPM is reset to the factory settings

- **Current TPM Status Information**
  Shows the current TPM (Trusted Platform Module) status
    1. **TPM Support OFF –** is displayed if the TPM support is disabled
    2. **TPM Enabled Status –** indicates whether TPM can be used
    3. **TPM Active Status –** indicates whether TPM is enabled
    4. **TPM Owner Status –** indicates the TPM owner status

CPU Configuration
Opens the CPU Configuration Submenu

- **Socket n CPU Information**
  The submenu opens to show information about the CPU in socket n
    - **Processor Type:** Shows the CPU type.
    - **CPU Signature:** Shows the CPU ID.
    - **Microcode Patch:** Shows the CPU Micropatch ID.
    - **Max CPU Speed:** Shows the maximum speed of the processor core without turbo mode.
    - **Min CPU Speed:** Shows the minimum speed of the processor core.
    - **Processor Cores:** Shows the maximum number of available CPU cores.
    - **Intel HT Technology:** Shows whether Intel® Hyper Threading Technology is supported by the CPU.
    - **Intel VT-x Technology:** Shows whether Intel® VT-x (Virtualisation Technology) is supported by the CPU.
    - **Intel SMX Technology:** Shows whether Intel® SMX (Safer Mode Extensions) is supported by the CPU.
    - **L1 Data Cache:** Shows the memory size of the L1 Data Cache.
    - **L1 Code Cache:** Shows the memory size of the L1 instruction cache.
    - **L2 Cache:** Shows the memory size of the L2 cache.
    - **L3 Cache:** Shows the memory size of the L3 cache.

- **Hyper-Threading**
Hyper-threading technology allows a single physical processor to appear as several logical processors. With this technology, the operating system can better utilise the internal processor resources, which leads to an increase in performance. The advantages of this technology can only be used by an operating system that supports ACPI. This setting has no effect on operating systems without ACPI support.

  1. **Disabled –** An ACPI operating system can only use the first logical processor of the physical processor. This setting should therefore only be chosen if the operating system does not support hyper-threading technology.
  2. **Enabled –** An ACPI operating system can use all the logical processors of the physical processor.

- **Active Processor Cores**
On processors which contain multiple processor cores, the number of active processor cores can be limited. Inactive processor cores will not be used and are hidden from the operating system.

  1. **All –** All available processor cores are active and can be used.
  2. **[1..n] –** Only the selected number of processor cores is active. The other processor cores are disabled.

- **Limit CPUID Maximum**
Specifies the number of CPUID functions which can be called from the processor. Some operating systems cannot process new CPUID commands which support more than three functions. This parameter should be enabled for these operating systems.

  1. **Enabled –** All CPUID functions are supported
  2. **Disabled –** for reasons of compatibility with operating system, only a reduced number of CPUID functions is supported by the processor

- **Execute Disable Bit**
Makes it possible to prevent the execution of programs in certain areas of memory (anti-virus protection). The function is only effective if it is also supported by the operating system. The Execute Disable bit (XD bit) is also called the NX bit (No Execute).
  1. **Enabled –** Allows the operating system to switch on the Execute Disable function
  2. **Disabled –** Prevents the operating system from switching on the Execute Disable function

- **Hardware Prefetcher**
  If this function is enabled, an automatic prefetch of the memory content anticipated to be needed occurs when the memory bus is inactive. If the content is loaded from the cache and not from the memory, the latency is reduced. This particularly applies to applications with linear data access.

  o With this parameter you can make performance settings for non-standard applications. For standard applications, we recommend that the default settings are maintained.
    1. **Disabled –** Deactivates the hardware prefetcher of the CPU
    2. **Enabled –** Activates the hardware prefetcher of the CPU

- **Adjacent Cache Line Prefetcher**
  Available if the processor offers a mechanism by which an adjacent 64-byte cache line can also be loaded during each cache request. The number of hits in the cache increases as a result in the case of applications with high spatial locality.

  o With this parameter you can make performance settings for non-standard applications. For standard applications, we recommend that the default settings are maintained.
    1. **Disabled –** the processor loads the requested cache line
    2. **Enabled –** the processor loads the requested cache line and the adjacent cache line

- **DCU (Data Cache Unit) Streamer Prefetcher**
  With this option, data content which will probably be needed is automatically pre-loaded into the L1 data cache when the memory bus is inactive. Because content is called from cache instead of from memory, the latency is reduced, especially for applications with linear data access.

  o You can use this parameter to change the performance settings for non-standard applications. We recommend that the default settings are kept for standard applications.
    1. **Enabled –** Enables the DCU Streamer Prefetcher function of the CPU
    2. **Disabled –** Disables the DCU Streamer Prefetcher function of the CPU

- **DCU Ip (Instruction pointer-based) Prefetcher**
  Performance increases can be expected if code is used sequentially and in contiguous storage.

    1. **Enabled –** Enables the DCU Streamer Prefetch function of the CPU
    2. **Disabled –** Disabled the DCU Streamer Prefetch function of the CPU

- **Intel Virtualisation Technology**
  Used to support the visualisation of platform hardware and multiple software environments. Based on Virtual Machine Extensions (VMX), to support the application of multiple software environments by using virtual computers. The virtualisation technology enhances the processor support for virtualisation purposes on the over 16-bit and 32-bit protected modes and on the Intel® Extended Memory 64 Technology (EM64T) mode.

  o In active mode, a Virtual Machine Monitor (VMM) can use the

    1. **Disabled –** a VMM cannot use the additional performance features of the hardware
    2. **Enabled –** a VMM can use the additional performance features of the hardware

- **VT-d**
  VT-d (Intel Virtualization Technology for Directed I/O) is a hardware support for the common use of I/O devices by several virtual machines. VMM systems (Virtual Machine Monitor) can use VT-d to manage various virtual machines which access the same physical I/O device.

    1. **Disabled –** VT-d is disabled and is not available for the VMMs
    2. **Enabled –** VT-d is available for the VMMs

- **Power Technology**
  Configures the CPU power management functions

    1. **Disabled –** the CPU power management functions are disabled
    2. **Energy Efficient –** the CPU power management functions are optimised for energy efficiency
    3. **Custom –** further setting options are available for the CPU power management configuration

- **Enhanced SpeedStep**
  Specifies the voltage and frequency of the processor. EIST (Enhanced Intel SpeedStep® Technology) is an energy-saving function.

  o The processor voltage is adapted to the particular system requirements which are needed at any one time. A reduction in the clock frequency causes the system to require less energy.

    1. **Disabled –** Enhanced SpeedStep functionality is disabled
    2. **Enabled –** Enhanced speedStep functionality is enabled

- **Turbo Mode**
  The processor may work faster than the specified frequency when the operating system requires the maximum performance state (P0). This function is also known as Intel® Turbo Boost Technology.

  1. **Disabled –** Turbo Mode is disabled
  2. **Enabled –** Turbo Mode is enabled

- **Energy Performance**
  Energy efficiency specifications for the processor on non-legacy operating systems. The processor receives the instruction to adapt energy consumption and performance.

  1. **Performance –** optimisation with respect to performance, where required at the cost of energy efficiency
  2. **Balanced Performance –** optimisation with respect to performance, with good energy efficiency
  3. **Balanced Energy –** Optimisation with respect to energy efficiency, with good performance
  4. **Energy Efficient –** optimisation with respect to energy efficiency, where required at the cost of performance

- **P-State Coordination**
  Processor performance coordination model that is used to communicate with the OS Power Management (OSPM).

  1. **HW_ALL –** the processor hardware is responsible for the co-ordination of the performance states of all the logical processors (recommended)
  2. **SW_ALL –** OSPM is responsible for the co-ordination of the performance states of all logical processors. Performance transitions must be initiated on all logical processors (not recommended)
  3. **SW_ANY –** OSPM is responsible for the co-ordination of the performance states of all logical processors. Performance transitions can be initiated on any logical processor.

- **CPU C3 Report**
  Passes the processor C3 status as ACPI-C2/C3 status to the OSPM, if this is supported by the particular legacy operating system being used.

  1. **Disabled –** CPU C3 is not passed to the OSPM
  2. **ACPI C-2 –** CPU C3 is passed to the ACPI-C2 status to the OSPM
  3. **ACPI C-3 –** CPU C3 is passed to the ACPI-C3 status to the OSPM

- **CPU C6 Report**
  Passes the processor C6 status as ACPI-C3 status to the OSPM to enable Processor Deep Power Down Technology.

  1. **Disabled –** CPU C6 is not passed as ACPI-C3 status to the OSPM
  2. **Enabled –** CPU C6 is passed as ACPI-C3 status to the OSPM

- **CPU C7 Report**
  Passes the processor C7 status as ACPI-C3 status to the OSPM, to enable Processor Deep Power Down Technology.

  1. **Disabled –** CPU C7 is not passed as ACPI-C3 status to the OSPM
  2. **Enabled –** CPU C7 is passed as ACPI-C3 status to the OSPM

- **Package C State Limit**
  Allows the C state limit of the processor to be configured.

  1. **C0 –** the C state limit is C0
  2. **C1 –** the C state limit is C1
  3. **C6 –** the C state limit is C6
  4. **C7 –** the C state limit is C7
  5. **No Limit –** Any C state can be enabled

- **QPI Link Frequency Select**
  Creates the connection between the processors. QPI links can operate at different speeds, depending on the processors. These parameters control the speed of the QPI links in your system.

  1. **Auto –** the BIOS determines the maximum speed depending on the processors in your system

  o If you wish to set the speed of the QPI links manually, select another value, provided this is supported by your system.

- **Frequency Floor Override**
  Specifies whether the processor is operated with the maximum processor frequency, independent of the system demands. This increases I/O performance and reduces the response times of the CPU during high power demands on the CPU.

  1. **Disabled –** depending on the system demands, the processor will be operated at the maximum processor frequency
  2. **Enabled –** the processor will always be operated at the maximum processor frequency

Runtime Error Logging
Opens the Runtime Error Logging submenu

- **ECC Memory Error Logging**
  Specifies whether ECC memory errors will be recognised and entered in the SMBIOS event log.

    1. **Enabled –** both single-bit memory errors and multi-bit memory errors will be entered in the SMBIOS event log
    2. **Multi-bit Errors Only –** only multi-bit memory errors will be entered in the SMBIOS event log
    3. **Disabled –** no memory errors will be entered into the SMBIOS event log

- **PCI Error Logging**
  Specifies whether PCI errors will be entered in the SMBIOS event log.

    o To be able to recognise PCI errors, the creation of PERR# (PCI parity errors) or SERR# (PCI system errors) must be enabled in advance in the menu PCI Subsystem Settings.

    1. **Disabled –** no PCI errors will be entered in the SMBIOS event log
    2. **Enabled –** PCI errors will be entered in the SMBIOS event log

Memory Configuration
Opens the Memory Configuration submenu

- **DDR Performance**
  The memory modules can operate at various speeds (frequencies). The performance increases with higher speeds, on the other hand the energy-saving increases with lower speeds. The possible memory speeds are determined by the particular memory module configuration.

    1. **Low-Voltage Optimised –** Highest possible speed at low voltage
    2. **Energy Optimised –** lowest possible speed, to save energy
    3. **Performance Optimised –** Highest possible speed, for the best performance

SATA Configuration
Opens the SATA configuration submenu.

- **SATA Mode**
  Specifies in which mode the SATA ports will be operated.

    1. **Disabled –** the SATA port is disabled
    2. **IDE –** the SATA port is operated in IDE Mode
    3. **AHCI –** the SATA port is operated in AHCI Mode

- **Aggressive Link Power Management**
  In AHCI mode, makes it possible to allow Aggressive Link Power Management (ALPM) to save energy.

  1. **Disabled –** ALPM is disabled
  2. **Enabled –** ALPM is enabled

- **Serial ATA Controller 0**
  In IDE mode, defines the mode in which the SATA controller 0 will be operated.

  1. **Disabled –** the SATA controller 0 is disabled
  2. **Enhanced -** The resources allocated to the SATA controller 0 are not restricted to the legacy resources. Depending on the operating system, the performance may be higher than in compatible mode.
  3. **Compatible -** Only pre-defined legacy resources (I/O ports, IRQ) will be allocated to the SATA controller 0. This mode is particularly suitable for older operating systems when the enhanced or AHCI mode is not supported.

- **Serial ATA Controller 1**
  In IDE mode, defines the mode in which the SATA controller 1 will be operated.

  1. **Disabled –** the SATA controller 1 is disabled
  2. **Enhanced -** The resources allocated to the SATA controller 1 are not restricted to the legacy resources. Depending on the operating system, the performance may be higher than in compatible mode.

- **Staggered Spin-Up**
  Reduces the electrical load during boot up of systems with multiple SATA devices. The SATA devices run one after the other at the request of the HOST controller.

  1. **Disabled –** staggered spin-up is disabled
  2. **Enabled –** Staggered spin-up is enabled

- **External SATA Port**
  Specifies whether the port will be operated internally as SATA or externally as eSATA.

  1. **Disabled –** the port will be used internally as SATA
  2. **Enabled –** the port will be used as external SATA (eSATA)

- **Hot Plug**
  Specifies whether hot plug support of the port is enabled.

  1. **Disabled –** the hot plug support of the port is disabled
  2. **Enabled –** the hot plug support of the port is enabled

Acoustic Management Configuration

Open the submenu to set the noise level of hard disks or optical drives.

- **Acoustic Management**
  Specifies whether the functionality for setting the noise level of hard disks or optical drives (Automatic Acoustic Management) is available.

  1. **Disabled –** automatic acoustic management is not available
  2. **Enabled –** automatic acoustic management is available

- **Acoustic Mode**
  Specifies the noise level of the hard disk or the optical drive. The noise level of the drive is reduced by decreasing its rotational speed. This function must be supported by the drive.

  o If the functionality for setting the noise level ("Automatic Acoustic Management") is disabled, the "Acoustic Mode" is "Not Available". If the functionality for setting the noise level ("Automatic Acoustic Management") is enabled, but is not supported by the connected SATA device, then "Acoustic Mode" is automatically set to "Not supported".

  1. **Bypass –** The drive is operated with its preset speed of rotation.
  2. **Quiet –** The drive is operated with the slowest possible speed of rotation. The drive is operated with lower noise and limited performance.
  3. **Medium Performance –** The drive is operated with a medium speed of rotation. The drive is operated with reduced noise and slightly reduced performance.
  4. **High Performance –** The drive is operated at slightly less than the highest possible speed of rotation.
  5. **Max Performance –** The drive is operated at the highest possible speed of rotation.

Intel TXT Configuration

Opens the submenu for configuring the Intel® Trusted Execution Technology (TXT).

- **Intel TXT Support**
  Enables Trusted Execution Technology (TXT) support. Intel® TXT is available if the CPU in use supports Secure Mode Extensions (SMX), and both Virtualization Technology (VT) and VT-d are enabled in the CPU submenu.

  o Intel TXT Support must be disabled before the BIOS update of the system is started.

  1. **Disabled –** TXT is disabled
  2. **Enabled –** TXT is enabled

USB Configuration

Opens USB Configuration submenu

- **USB Devices**
  Shows the number of available USB devices, USB keyboards, USB mice and USB hubs.

- **USB Legacy Support**
  Specifies whether legacy USB support is available. This function should always be enabled or set to Auto so that the operating system can be booted from a USB device if required.

  1. **Disabled –** Legacy USB support is not available. A USB keyboard or USB mouse can only be used if this is supported by the operating system. Booting the operating system from a USB device is not possible.
  2. **Enabled –** Legacy USB support is available. A USB keyboard or USB mouse can also be used if the operating system does not support USB. Booting the operating system from a USB device is possible.
  3. **Auto –** Legacy USB support will be disabled if no USB devices are connected.

  o Legacy USB support should be disabled if the operating system supports USB and you do not want to boot the operating system from USB devices.

- **Mass Storage Devices**
  List of USB Mass Storage Device(s) – Allows the user to force a particular device emulation. When set to Auto, the devices are emulated according to their media format. Optical drives are emulated as "CD ROM" and drives without data media according to the drive type.

  1. **Auto –** Emulation is chosen depending on the USB device
  2. **Floppy –** Force USB floppy emulation
  3. **Hard Disk –** force USB hard disk emulation
  4. **CD-ROM –** Force USB CD-ROM emulation

- **USB Port Security**
  Opens the USB Port Security submenu to configure the USB interfaces present.

- **USB Port Control**
  Configures the use of the USB ports. Disabled USB ports are neither available during the POST or under the operating system.

  1. **Enable all ports –** All USB ports are enabled
  2. **Disable all ports –** All USB ports are disabled

3. **Enable front and Internal Ports –** All USB ports on the rear of the device are disabled
4. **Enable rear and internal ports –** all USB ports on the front of the device are disabled
5. **Enable internal ports only –** all external USB ports are disabled
6. **Enable used ports –** all unused USB ports are disabled

- **USB Device Control**
  There are additional options available here for some of the settings made under USB Device Control.

  1. **Enable all devices –** Those settings made under USB Port Control will be used without any limitation
  2. **Enable Keyboard and Mouse Only –** On those USB ports enabled under USB Port Control, only a USB keyboard and a USB mouse can be used. All ports on which there is no USB keyboard or USB mouse will be disabled.
  3. **Enable all devices except mass storage devices/hubs –** USB ports on which USB storage devices or USB hubs are connected will be disabled.

System Monitoring
Opens System Monitoring submenu

- **Controller Revision**
  Shows the version of the system monitoring controller.

- **Firmware Version**
  Shows the firmware version of the system monitoring controller.

- **Chassis Type**
  Displays the current chassis type.

- **TVC Version**
  Shows the TCV version (Temperature Characteristics Values).

- **Fan Control**
  Controls the speed of the fan. The preset mode can be changed depending on the system configuration and the applications used. If the system is fully configured with all available expansions/upgrades, then silent mode is not recommended.

  1. **Enhanced –** The fan speed will be increased automatically so that the maximum CPU performance is achieved.

2. **Auto –** The fan speed is adjusted automatically. A compromise between system temperature and CPU performance.
3. **Disabled –** All fans are operated at maximum speed.

Onboard Device Configuration

Opens the submenu to configure devices on the system board. Some of them are only available under certain conditions.

- **SCU Device**
  Specifies whether the SAS and SATA devices installed on the Storage Controller Unit (SCU) are available.

  1. **Disabled –** The SAS and SATA devices installed on the SCU are not available.
  2. **Enabled –** The SAS and SATA devices installed on the SCU are available.

- **Audio Configuration**
  Azalia HD Audio – Allows the onboard Azalia HD audio controller to be enabled

  1. **Disabled –** The onboard audio controller is disabled
  2. **Enabled –** The onboard audio controller is enabled.
- **Front Panel Audio**
  Makes it possible to use a legacy front audio connector (AC97). The automatic check of whether an audio connection is occupied is not supported with this setting.

  1. **High Definition –** For the use of a high definition audio cable with automatic occupancy recognition.
  2. **Legacy –** For the use of a legacy audio cable without automatic occupancy recognition.

- **High Precision Event Timer Configuration**
  High Precision Timer – Provided that it is enabled, the operating system is able to make use of the High Precision Event Timer, which allows it to meet the requirements of time-critical applications. The advanced timer is also known as the Multimedia Timer.

  1. **Disabled –** The High Precision Event Timer is disabled
  2. **Enabled –** The High Precision Event Timer is enabled

- **LAN 1**
  Specifies whether the LAN 1 controller is available

  1. **Disabled –** The LAN 1 controller is not available
  2. **Enabled –** The LAN 1 controller is available

- **LAN 2**
  Specifies whether the LAN 2 controller is available

    1. **Disabled –** The LAN 2 controller is not available
    2. **Enabled –** The LAN 2 controller is available

#

Memory Status

Memory modules can be marked as faulty in this submenu. Faulty memory modules are no longer used when the system is rebooted, provided at least one error-free bank is available. The memory capacity is reduced accordingly

- **DIMM-xx**
  Shows the current status of the memory modules

    1. **Failed –** The memory module will not be used by the system. It was automatically disabled by the system after a memory error. If you have replaced a defective memory module, you must reset the entry to Enabled.
    2. **Disabled –** The memory module will not be used by the system. It was manually disabled
    3. **Enabled –** The system uses the memory module
    4. **Empty –** There is no memory module present.

Super IO Configuration

- **Super IO Chip**
  Shows information about the Super IO Chip

- **Serial Port 0 Configuration**
  Opens the submenu to configure the serial port 0 (COMA)

- **Serial Port**
  Specifies whether the serial port is available

    1. **Disabled –** the serial port is not available
    2. **Enabled –** the serial port is available

- **Device Settings**
  Shows the base I/O address and the interrupt which is used to access the particular serial port

AMT Configuration

Opens the submenu to configure Intel® Active Management Technology

- **ME Version**
  Shows the current AMT/ME version

- **ME Subsystem**
  Specifies whether Intel® AMT/ME (Management Engine) is enabled

  o The system properties may change if this is disabled

    1. **Disabled –** Intel® AMT/ME is disabled
    2. **Enabled –** Intel® AMT/ME is enabled

- **Unconfigure AMT/ME**
  If this option is enabled, an MBEx (Management Engine BIOS eXtension) query occurs at the next reboot to establish whether the AMT/ME configuration should be reset to the default values

    1. **Disabled –** Do not change the AMT/ME configuration
    2. **Enabled –** Start the reset of the AMT/ME configuration. The option is then automatically reset to Disabled.

- **Execute MEBx**
  Specifies whether the MEBx (Management Engine BIOS eXtension) Setup can be called during a restart

    1. **Disabled –** The MEBx Setup cannot be called during POST
    2. **Enabled –** The MEBx Setup can be called during POST. The message 'Press Ctrl + P to open MEBx Setup' will be displayed during POST

Serial Port Console Redirection

The parameters for terminal communication via Serial Port Console Redirection can be shown and set in this submenu. Some parameters are only available under certain conditions

- **Console Redirection Settings (for COM0 and COM1)**
  Specifies the data exchange process of the host and remote system via the COM0 and COM1 ports (iAMT/SOL (Serial overLAN))

  o Both systems require identical or compatible settings

  o **Terminal Type**

Specifies the type of terminal
Permitted values: VT100, VT100+, VT-UTF8, ANSI
The terminal type allocated will be used to transfer data to the host.

- o **Bits per Second**
  Specifies the transfer rate for communication with the host
  Permitted Values: 9600, 19200, 38400, 57600, 115200
  The data will be transferred to the hose at the transfer rate set

- o **Data Bits**
  Shows the number of data bits used for communication with the host
  7 – seven data bits are used for the communication
  8 – Eight data bits are used for the communication

- o **Parity**
  Specifies the use of parity bits for communication with the host. Parity bits are used for error detection
  None – No parity bits are used. Error detection is not possible
  Even – Parity bit is 0 if the number of ones in the data bit is an even number
  Odd – Parity bit is 0 if the number of ones in the data bit is an odd number
  Mark – Parity bit is always 1
  Space – Parity bit is always 0

- o **Stop Bits**
  Shows the number of stop bits used to indicate the end of a serial data packet
  1 – one stop bit is used
  2 – two stop bits are used
- o **Flow Control**
  This setting determines the transfer control over the interface
  None – the interface is operated without transfer control
  Hardware CTS/RTS – the transfer control is undertaken by the hardware. This mode must also be supported by the cable

- o **VT-UTF8 Combo Key Support**
  Specifies whether VT-UTF8 combination key support for ANSI/VT100 terminals is available
  Disabled – VT-UTF8 combination key support is not available
  Enabled – VT-UTF8 combination key support is available

- o **Recorder Mode**
  Specifies whether only text will be sent. This is used to capture terminal data
  Disabled – recorder mode is not available
  Enabled – recorder mode is available

- o **Resolution 100x31**
  Indicates whether enhanced terminal resolution is available
  Disabled – enhanced terminal resolution is not available
  Enabled – enhanced terminal resolution is available

- o **Legacy OS Redirection Resolution**
  Specifies the number of lines and columns for the legacy OS redirection
  80x24 – resolution 80x24 is used
  80x25 – resolution 80x25 is used

- **Serial Port for Out-of-Band Management / Windows Emergency Management Services (EMS)**
  Microsoft Windows Emergency Management Services (EMS) makes it possible to remotely manage a Windows Server operating system.

- **Console Redirection for (for Out-of-Band Management / EMS)**
  Specifies whether a serial port for Out-of-Band Management / Windows Emergency Management Services (EMS) is available

    1. **Disabled –** EMS is not available
    2. **Enabled –** EMS is available

- **Console Redirection Settings (for Out-of-Band Management / EMS)**

  - o **Out-of-Band Mgmt Port**
    Assigns a serial port for Out-of-Band Management
    COM0 (Disabled) – Port COM0 will be used for Out-of-Band management
    COM1 (PCI Dev0, Func0) (Disabled) – Port COM1 will be used for Out-of-Band Management
  - o **Terminal Type**
    Specifies the type of terminal
    Permitted Values: VT100, VT100+, VT-UTF8, ANSI
    The terminal type allocated will be used to transfer data to the host

  - o **Bits per Second**
    Specifies the transfer rate for communication with the host
    Permitted values: 9600, 19200, 38400, 57600, 115200
    The data will be transferred to the host at the transfer rate set

  - o **Flow Control**
    This setting determines the transfer control over the interface
    None – the interface is operated without transfer control
    Hardware CTS/RTS – the transfer control is undertaken by the hardware. This mode must also be supported by the cable
    Software Xon/Xoff – the interface transfer control is undertaken by the software

  - o **Data Bits**
    Shows the number of data bits used to communicate with the host

  - o **Parity**
    Specifies the use of parity bits for communication with the host

o **Stop Bits**
Shows the number of stop bits used to indicate the end of a serial data packet

Option Rom Configuration
Calls the Option ROM Configuration submenu

- **Launch Slot n OpROM**
Specifies whether Option ROMs for expansion cards which are plugged into this slot should be started

    1. **Disabled –** Do not start any Option ROMs for expansion cards in this slot
    2. **Enabled –** Start Option ROMs for expansion cards in this slot

Security Settings

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

```
Main   Advanced   Security   Power   Event Logs   Boot   Save & Exit

  Password Description                                     Set Setup Administrator
                                                           Password
  If ONLY the Administrator's password is set,
  then this only limits access to Setup and is
  only asked for when entering Setup.
  If the User's password is set, then this
  is a power on password and must be entered to
  boot or enter Setup. In Setup the User will
  have User rights.
  The password must be in the following range:
  Minimum legth:      3
  Maximum length:    32

  Administrator Password
  User Password                                          →←: Select Screen
  User Password on Boot                                  ↑↓: Select Item
  Cabinet Monitoring            [Disabled]               Enter: Select
  Skip Password on WOL          [Disabled]               +/-: Change Opt.
  FLASH Write                   [Enabled]                F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit
```

Figure 30: Security Settings

- **Administrator Password**
  If you press the enter key, a window will open in which you can assign the administrator password. Enter a character string to define the password. If you confirm an empty password field, the password will be deleted

  o To call up the complete BIOS Setup, you need the administrator level of access. If an administrator password is allocated, the user password only allows very limited access to the BIOS Setup

- **User Password**
  If you press the enter key, a window will open in which you can assign the user password. Enter a character string to define the password. With the user password, you can prevent unauthorised access to your system

  o In order to be able to assign a user password, an administrator password must already have been assigned

- **User Password on Boot**
  Specifies whether a user password must be entered before the boot process

  1. **On Every Boot –** Entry of a user password is required before every boot process
  2. **Disabled –** the system starts without requiring the entry of a user password

  o If the administrator password and the user password have been assigned and the setting Disabled has been chosen for this item, simply press Enter to get USER access to the BIOS Setup. In this case the user password does not have to be entered

- **Cabinet Monitoring**
  Specifies whether opening of the casing should be monitored

  1. **Disabled –** The system continues to operate normally even if the casing has been opened
  2. **Enabled –** If the casing has been opened, then the boot process is suspended until the BIOS Setup is called. If the BIOS Setup is protected with a password, then this must be entered. An SMBIOS event log entry will be generated

- **Skip Password on WOL**
  Specifies whether a user password will be skipped or must be entered during a system boot via Wake on LAN

  1. **Disabled –** The user password must be entered via using the keyboard during the system boot.
  2. **Enabled –** The user password is deactivated during the system boot with Wake On LAN

- **Flash Write**
  Supplies the system BIOS with write protection

  1. **Disabled –** The system BIOS cannot be written. A flash BIOS update is not possible
  2. **Enabled –** The system BIOS can be written. A flash BIOS update is possible

- **Smartcard SystemLock**
  With SystemLock (Smartcard Pre-boot Authentication - PBA), the PC can only be started with an initialised Smartcard and personal identification number (PIN). Smartcard and PIN are already checked during system booting in the BIOS, i.e. before the operating system is booted.

  The OS application SystemLock Manager is used to initialise the Smartcard(s). Systems without the menu item Smart Card System Lock do not support the SystemLock function

  - Settings in the Smartcard SystemLock menu can only be changed with an Admin Smartcard
  - If the Smartcard is defective or unavailable, the user can get authorisation for a boot process either from the local administrator or from the Fujitsu Service Desk

- **Uninstall SystemLock**
  Uninstalls the Smartcard Security function

  - To reinstall SystemLock it will be necessary to reinitialise your Smartcards

- **No –** Smarcard Security is not uninstalled
- **Yes –** Smartcard Security is disabled during the next boot process

- **Single Sign On**
  The Single Sign On function allows the BIOS to communicate with a different application during logon to the operating system, in order to determine the Smartcard access rights.

  1. **Disabled –** Single Sign On is not available
  2. **Enabled –** Single Sign On is available

- **Smartcard & PIN**
  Determines whether an authorised Smartcard is needed for access to the system

  1. **Always Required –** An authorised Smartcard is needed to access the system
  2. **Ignore on WOL –** If the Wakeup On LAN function is enabled, the Smartcard Security function is bypassed

- **Unblock Smartcard**
  To assign a new PIN if the PIN is not known or the Smartcard is blocked

  o The Smartcard becomes blocked after 3 incorrect attempts to enter the PIN, and it will be blocked permanently after 10 incorrect attempts to enter the PUK. Please note that the default PIN and PUK for a new Smartcard is always 12345678. This PIN/PUK must be changed for security reasons

    1. **Prohibited –** No new PIN can be assigned
    2. **Allowed –** A new PIN can be assigned

Power Settings

- **Power On Source**
  Specifies whether the switch-on sources for the system are managed via BIOS or via an ACPI operating system

    1. **BIOS Controlled –** the switch-on sources are managed via BIOS
    2. **ACPI Controlled –** the switch-on sources are managed via the ACPI operating system

- **Low Power Soft Off**
  Reduces the energy consumption of a system which is switched off

  o When Low Power Soft Off is enabled, the system can only be switched on with the power button on the casing. The device cannot be switched on using the power button of a USB keyboard or a Wake-on-LAN signal

    1. **Disabled –** Low Power Soft Off is disabled
    2. **Enabled –** Low Power Soft Off is enabled

- **Power Failure Recovery – System status after power failure**
  Specifies how the system behaves during a reboot following a power failure

    1. **Always Off –** The system switches on briefly, performs a status check (initialisation), and then switches off
    2. **Always On –** The system switches on
    3. **Previous State –** The system switches on briefly, performs a status check, and then returns the mode it was in before the power failure occurred (ON or OFF).
    4. **Disabled –** The system does not switch on

- **Hibernate like Soft Off**
  In order to also reduce the energy consumption in hibernate mode (S4), when the system is switched off it will be brought into Low Power Soft Off or Zero Watt mode (S5). The energy consumption will only reduce if Low Power Soft Off or Zero Watt mode is enabled

  1. **Disabled –** The system will be brought into hibernate mode (S4).
  2. **Enabled –** Instead of going into hibernate mode (S4), the system will be brought into Low Power Soft Off or Zero Watt mode (S5).

- **USB at Power Off**
  Enables/disables the power supply for the USB ports. This option is only available if Low Power Soft Off and Zero Watt mode are disabled

  1. **Always Off –** The USB ports are no longer supplied with power after the system is shut down
  2. **Always On –** The USB ports continue to be supplied with power after the system is shut down

- **Wake-Up Resources**
  This submenu is only available if neither Zero-Watt mode nor Low Power Soft Off is enabled

- **LAN**
  Determines whether the system can be switched on via a LAN controller (on the system board or expansion card).

  1. **Enabled –** The system can be switched on via a LAN controller
  2. **Disabled –** The system cannot be switched on via a LAN controller

- **Wake on LAN Boot**
  Specifies the system behaviour when switched on by means of network signals

  1. **Boot Sequence –** After being switched on via the LAN, the system boots up according to the device sequence specified in the boot menu
  2. **Force LAN Boot –** After being switched on via the LAN, the system is booted remotely via the LAN.

- **Wake Up Timer**
  The time at which the system should be switched on can be specified here

  1. **Disabled –** Wake Up Timer is not enabled
  2. **Enabled –** Wake Up Timer is enabled. The system is switched on at the time specified.

- **Wake Up Mode**
  Specifies whether the system should be switched on daily or only once a month at the specified time.

  1. **Daily –** The system will be switched on daily at the time specified
  2. **Monthly –** The system will be switched on once a month at the time specified

- **Wake Up Day**
  Specifies the day of the month on which the system is to be switched on. Permitted values are 1-31

- **USB Keyboard**
  Specifies whether the system can be switched on via the network key of a USB keyboard, if the keyboard supports this function

  o Switching on the system via a USB keyboard is only available if USB At Power-Off is set to Always On

  1. **Disabled –** The network key of the USB keyboard is disabled
  2. **Enabled –** The network key of the USB keyboard is enabled

Event Logs – Configure and Display of the Event Log

- **SMBIOS Event Log**
  Specifies whether the SMBIOS event log is enabled

  1. **Disabled –** The SMBIOS event log is disabled
  2. **Enabled –** The SMBIOS event log is enabled

- **Erase Event Log**
  Specifies whether the SMBIOS event log should be deleted

  1. **No –** The SMBIOS event log will not be deleted
  2. **Yes, Next Reset –** The SMBIOS event Log is deleted once during the next system boot up. Afterwards, this option is automatically reset to No
  3. **Yes, Every Reset –** The SMBIOS event log is deleted every time the system is booted

- **When Log is Full**
  Specifies the course of action to be taken when the SMBIOS event log is full

  1. **Do Nothing –** When the SMBIOS event log is full, no further entries are added. The SMBIOS event log must first be deleted before new entries can be added
  2. **Erase Immediately –** When the SMBIOS event log is full, it will be erased immediately. All existing entries will be deleted!

- **Log Full Boot Event**
  Specifies whether every boot of the system is logged in the SMBIOS event log

    1. **Disabled –** System boots are not recorded in the SMBIOS event log
    2. **Enabled –** All system boots are recorded in the SMBIOS event log

- **MECI**
  Multiple Event Count Increment: the number of double events which must occur before the multiple event counter is updated, including the associated log entry. The value is in the range between 1 and 255.

- **METW**
  Multiple Event Time Window: the number of minutes which must elapse between double event logs which use a multiple event counter. The value is in the range between 0 to 99 minutes.

- **Log OEM Codes**
  Enables or disables the log function of EFI codes as OEM codes (if not already legacy converted)

- **Convert OEM Codes**
  Enabling or disabling the conversion of EFI status codes to standard SMBIOS types (not all may be translated).

- **View SMBIOS Event Log**
  Opens the submenu to show all SMBIOS event log entries present

Boot Configuration Menu

Use this menu to configure boot settings.

```
 Main   Advanced   Security   Power   Event Logs  | Boot |  Save & Exit

 Boot Configuration                                          Select the keyboard Numlock
 Bootup NumLok State                  [On]                   state

 Quiet Boot                           [Enabled]

 Option ROM Messages                  [Force BIOS]
 POST Errors                          [Enabled]
 Remove Invalid Boot Options          [Disabled]
 Boot Removable Media                 [Enabled]

 Boot Option Priorities
 Boot Option #1                       [P4: Optiarc DVD RW...]
 Boot Option #2                       [P0: WDC WD5000AAKS...]
 Boot Option #3                       [IBA GE Slot 00C8 v...]
 Boot Option #4                       [UEFI: Unknown Device]      →←: Select Screen
                                                                  ↑↓: Select Item
                                                                  Enter: Select
                                                                  +/-: Change Opt.
                                                                  F1: General Help
                                                                  F2: Previous Values
                                                                  F3: Optimized Defaults
                                                                  F4: Save & Exit
                                                                  ESC: Exit
```

Figure 31: Boot Configuration Menu

- **Boot NumLock State**
  The setting of the NumLock function after a system boot is provided here. NumLock controls the functionality of the numeric keypad

    1. **On –** NumLock is enabled, the numeric keypad can be used
    2. **Off –** NumLock is disabled, the numeric keypad keys can be used to control the cursor

  o The Num indicator light on your keyboard shows the current boot up NumLock state. The Num key on the keyboard can be used to toggle between ON and OFF.

- **Quiet Boot**
  The boot logo is shown on the screen instead of the POST boot up information

    1. **Enabled –** The boot logo is displayed
    2. **Disabled –** The POST boot up information is shown on the screen

- **Option ROM Messages**
Specifies whether Option ROM messages will be displayed during POST

    1. **Force BIOS –** Option ROM messages will be displayed during POST
    2. **Keep Current –** Option ROM messages will NOT be displayed during POST

- **POST Errors**
Specifies whether the system boot process aborts and the system is stopped when an error is detected

    1. **Disabled –** The system boot is not aborted. The error will be ignored, as far as this is possible
    2. **Enabled –** If an error is detected during POST, the boot process is aborted and the system stopped.

- **Remove Invalid Boot Options**
Specifies whether UEFI boot settings for devices which are no longer connected to the system should be removed from the boot options priorities list.

    1. **Disabled –** UEFI boot settings are not removed from the boot options priorities list
    2. **Enabled –** UEFI boot settings are removed from the boot options priorities list.

- **Primary Display**
Specifies which plug-in graphics card acts as the image source during the Power On Self Test (POST)

    1. **Slot n –** Select the plug-in graphics card slot which should be used as the image source during POST

- **Boot Removable Media**
Specifies whether booting via a removable data storage device such as a USB stick is supported

    1. **Disabled –** Booting via a removable data storage device is disabled
    2. **Enabled –** Booting via a removable data storage device is enabled

- **Virus Warning**
  Checks the boot sectors of the hard disks for changes since the last system boot. If the boot sectors have been changed without any apparent reason, a suitable virus detection program should be run.

    1. **Disabled –** The boot sectors will not be checked
    2. **Enabled –** If the boot sector has been changed since the last system boot (e.g. new operating system or a virus attack), a warning notice is displayed. The warning notice remains on the screen until you confirm the changes by going into BIOS Setup and setting this item to Confirm or disable the function
    3. **Confirm –** Confirm a required change to a boot sector (e.g. new operating system)

- **Boot Option Priorities**
  Displays the current boot sequence

    o Use the cursor keys to select the device whose boot sequence you would like to change.
    o To increase the priority for the selected device, press the + key. To decrease the priority, press the – key
    o To remove the selected device from the boot sequence, press the Enter key and select Disabled. If one or more devices have been disabled, the last entry in the boot sequence is set to Disabled

Save & Exit Menu – Finish BIOS Setup

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

```
Main    Advanced   Security   Power   Boot  | Save & Exit |  Event Logs

   Save Changes and Exit                              Exit system Setup after saving
   Discard Changes and Exit                           the changes.
   Save Changes and Reset
   Discard Changes and Reset

   Save Options
   Save Changes
   Discard Changes

   Restore Defaults
   Save as User Defaults
   Restore User Defaults

   Boot Override
   SATA: Optiarc DVD RW AD-7250H               →←: Select Screen
   SATA: WDC WD5000AAKS-07V0A0                 ↑↓: Select Item
   IBA GE Slot 00C8 v1365                      Enter: Select
                                               +/-: Change Opt.
   Launch EFI Shell from filesystem device     F1: General Help
                                               F2: Previous Values
                                               F3: Optimized Defaults
                                               F4: Save & Exit
                                               ESC: Exit
```
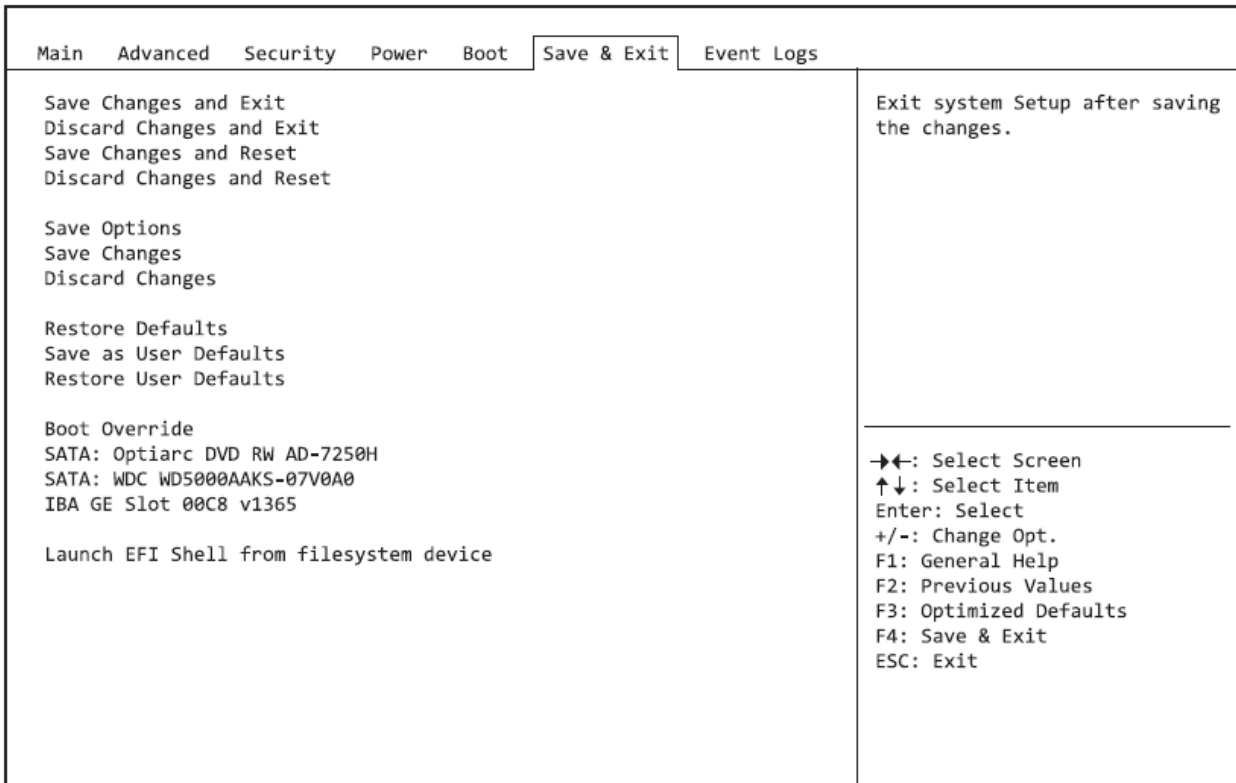
Figure 32: Save & Exit Menu

- **Save Changes and Exit**
  To save the current entries in the menus and exit the BIOS Setup, select Save Changes and Exit and then Yes. The new settings become effective and POST continues, provided a reboot is not necessary due to a changed option

- **Discard Changes and Exit – Quit without Saving**
  To discard the changes made since calling up the BIOS Setup or since the last time the function "Save Changes" was called, select Discard Changes & Exit and Yes. BIOS Setup is terminated and POST continues.

- **Save Changes and Reset**
  To save the current entries in the menus and exit BIOS Setup, select Save Changes and Reset and Yes. The system reboots and the new settings take effect

- **Discard Changes and Reset**
  To discard the changes made since calling up the BIOS Setup or since the last time the function "Save Changes" was called, select Discard Changes and Reset and Yes. BIOS Setup is closed and the system reboots

- **Save Changes**
  To save the changes made so far without leaving BIOS Setup, select Save Changes and Yes

- **Discard Changes**
  To discard the changes made since calling the BIOS Setup or since the last time the function "Save Changes" was called, but without leaving the BIOS Setup, select Save Changes and Yes

- **Restore Defaults**
  To reset all the menus of the BIOS setup to the default values, select Restore Defaults and Yes. If you wish to leave the BIOS Setup with these settings, select Save Changes and Exit and Yes

- **Save as User Defaults**
  To save the changes made so far as user default settings, select Save as User Defaults and Yes

- **Restore User Defaults**
  To reset all the menus of the BIOS Setup to the user default settings, select Restore User Defaults and Yes. If you wish to leave the BIOS Setup with these settings, select Save Changes and Exit and Yes

- **Boot Override**
  Use the cursor keys to select the drive from which the operating system should be booted. Press the Enter key to start the boot process from the selected drive

Chapter 5: BIOS Recovery

Warning!

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

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

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

Notes:

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

Flash Memory Recovery Update

This Flash Memory Recovery Update feature allows the user to recover a BIOS image using a USB device without additional utilities needed. A user can download the BIOS image to a USB flash device and perform BIOS recovery using the following procedure:

- **Recovery Update Procedure**
    1. Have a bootable USB stick ready
    2. Switch off the system and unplug it from the mains supply
    3. Open the casing and enable Recovery using the jumper / DIP switch on the system board
    4. Connect the system to the mains supply again and switch it on
    5. Use cd DOS to change directory, launch BIOS Recovery Update with the command necessary command and follow any further instructions
    6. After the Recovery process has finished, switch off the system and disconnect it from the mains supply
    7. Remove the USB stick
    8. For all jumpers / DIP switches which were changed, return them to their original positions
    9. Connect the system to the mains supply again and switch it on
    10. The system will now boot up with the new version of BIOS
    11. Check the settings in the BIOS Setup. If necessary, configure the settings once again
    12. For additional help refer to readme.txt (included in download package)

CAUTION!!
Do not shut down or reset the system during BIOS Recovery. Doing so may cause permanent damage to the motherboard

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?

_____
_____
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_____
_____

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?

_____
_____
_____
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_____
_____
_____

Please return this slip to: Product Development Dept.
XMA Ltd
7 Handley Page Way
Colney Street
St Albans
Hertfordshire
AL2 2DQ