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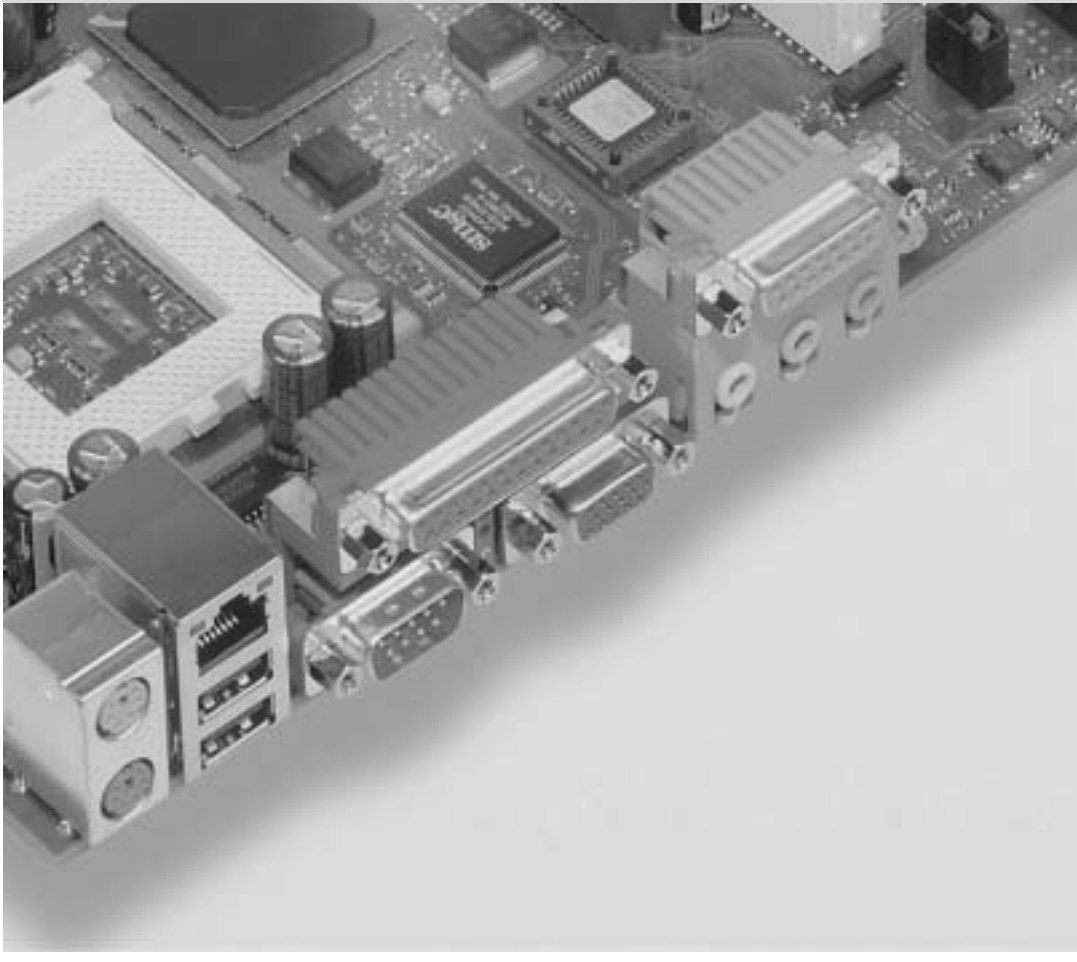
Technisches Handbuch / Technical Manual

System Board D1302

Memory Expansion Board D1303



FUJITSU COMPUTERS SIEMENS

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- your sales outlet

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SYSTEM BOARD D1302

Technical Manual

Introduction

Important Notes

Features

Internal Interfaces and Connectors

Jumper Setting and Connectors

Add-on Modules

BIOS Setup

Onboard SCSI BIOS Utility

Beep Codes

Glossary

November 2001 edition

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Introduction

Depending on the configuration of your system board, some of the hardware components described may not be available.

You may find further information in the description "BIOS Setup".

Further information on drivers is provided in the Readme files on hard disk or on the supplied drivers diskettes or on the "Drivers & Utilities" or "ServerStart" CD.

Notational Conventions

The meanings of the symbols and fonts used in this manual are as follows:

Pay particular attention to text marked with this symbol. Failure to observe this warning may endanger your life, destroy the system, or lead to loss of data.

Supplementary information, remarks and tips follow this symbol.

► Text which follows this symbol describes activities that must be performed in the order shown.

␣ This symbol means that you must enter a blank space at this point.

↵ This symbol means that you must press the Enter key.

Screen output is set `in this typeface`.

Entries you make via the keyboard are set **`in this bold typeface`**.

Text in italics indicates commands or menu items.

"Quotation marks" indicate names of chapters and terms that are being emphasized.

Important Notes

Keep this manual close to the device. If you pass on the device to third parties, you should also pass on this manual.

Be sure to read this page carefully and note the information before you open the device.

You cannot access the components of the system board without first opening the device. How to dismantle and reassemble the device is described in the Operating Manual accompanying the device.

Please note the information provided in the chapter "Safety" in the Operating Manual of the device.

Incorrect replacement of the lithium battery may lead to a risk of explosion. It is therefore essential to observe the instructions in the chapter “Replacing the Lithium Battery".

The shipped version of this board complies with the requirements of the EEC directive 89/336/EEC "Electromagnetic compatibility".

Compliance was tested in a typical PC configuration.

When installing the board, refer to the specific installation information in the Operating Manual or Technical Manual of the receiving device.

Connecting cables for peripherals must be adequately insulated to avoid interference.

Components can become very hot during operation. Make sure you do not touch components when making extensions to the system board. There is a danger of burns!

The warranty is invalidated if the device is damaged during the installation or replacement of system expansions. Information on which system expansions you can use is available from your sales outlet or the customer service centre.

Information on Boards

To prevent damage to the system board or the components and conductors on it, please take great care when you insert or remove boards. Take care above all to ensure that expansion boards are slotted in straight without damaging components or conductors on the system board, or any other components, for example EMI spring contacts.

Be especially careful with the locking mechanisms (catches, centering pins, etc.) when you replace the system board or components on it, for example memory modules or processors.

Never use sharp objects (screwdrivers) for leverage.

Boards with electrostatic sensitive devices (ESD) are identifiable by the label shown.

When you handle boards fitted with ESDs, you must observe the following points under all circumstances:

- You must always discharge yourself before working (for example, by touching a grounded object).
- The equipment and tools you use must be free of static charges.
- Pull out the power plug before inserting or pulling out boards containing ESDs.
- Always hold boards with ESDs by their edges.
- Never touch pins or conductors on boards fitted with ESDs.

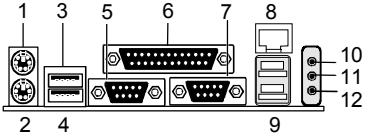
Features

- System board in ATX format
- Dual Intel Xeon™ processor (socket 603) with 100 MHz Front-Side Bus, 400 MHz data transfer rate and 256 KB second-level cache

  Size of third-level cache depends on the processor used
- Intel i860 chipset
  consisting of ICH 2
- Intel 82550 LAN controller (10/100 Mbps) with RJ45 interface
  WOL with Magic Packet™ is supported, as is booting from LAN with RPL or Intel PXE
- AC'97 Audio Code, AD 1881
  internal: Stereo CD-In, Stereo AUX-In
  external: Mono Micro-In, Stereo Line-In, Stereo Line-Out (max. 2 x 0.5 W/8 Ω)
- Qlogic ISP12160A Ultra 160 SCSI
- System monitoring and temperature monitoring
- 8 RIMM slots for 256 to 4 GB main memory (RIMM PC800 or PC600) using Memory Expansion Board (D1303)
- Flash BIOS
- Wake-up events
  - Wake on RTC
  - Wake on Ring (Serial Port 1 and 2)
  - Wake on LAN
  - Wake on USB
  - Wake on PCI Cards
- Energy saving functions:
  - ACPI S1 / Standby (requires an operating system that supports ACPI)
  - ACPI S4 / Save-to-Disk (requires an operating system that supports ACPI)
  - Switching on/off, standby mode, suspend mode via on/off switch
  - Switching on/off via software
- Security functions:
  - Cover monitoring: The cover monitoring reports when the cover has been opened without authorization.
  - System and Setup password
  - Parallel and serial ports can be deactivated
  - Virus protection function for the hard disk boot sector
- 3 PCI slots 32-bit / 33 MHz and 2 PCI slots 64-bit / 66 MHz
  PCI slots 32-bit / 33 MHz support 5.0 V, and PCI slots 64-bit / 66 MHz support 3.3 V main and auxiliary voltages.
- 1 AGP slot
  AGP slot supports 4x AGP and AGP Pro 50 modes. AGP slot supports 1.5 V AGP boards only.
- The system board supports AC Power Loss Recovery.

- IDE hard disk controller connected to PCI bus for up to four IDE drives
  (e.g., IDE hard disk drives, ATAPI CD-ROM drives)
  The IDE hard disk controller is ATA33/66/100 and ultra DMA mode capable
- Floppy disk drive controller (possible formats: 720 KB, 1.44 MB)
- The system board supports booting from a 120 MB IDE floppy disk drive (LS-120)
- 1 external parallel port (ECP- and EPP-compatible)
- 2 external serial ports (16C550-compatible with FIFO)
- 1 internal WOL interface
- 2 external PS/2 ports for keyboard and mouse
- 4 external USB ports
- Real-time clock/calendar with integrated battery backup

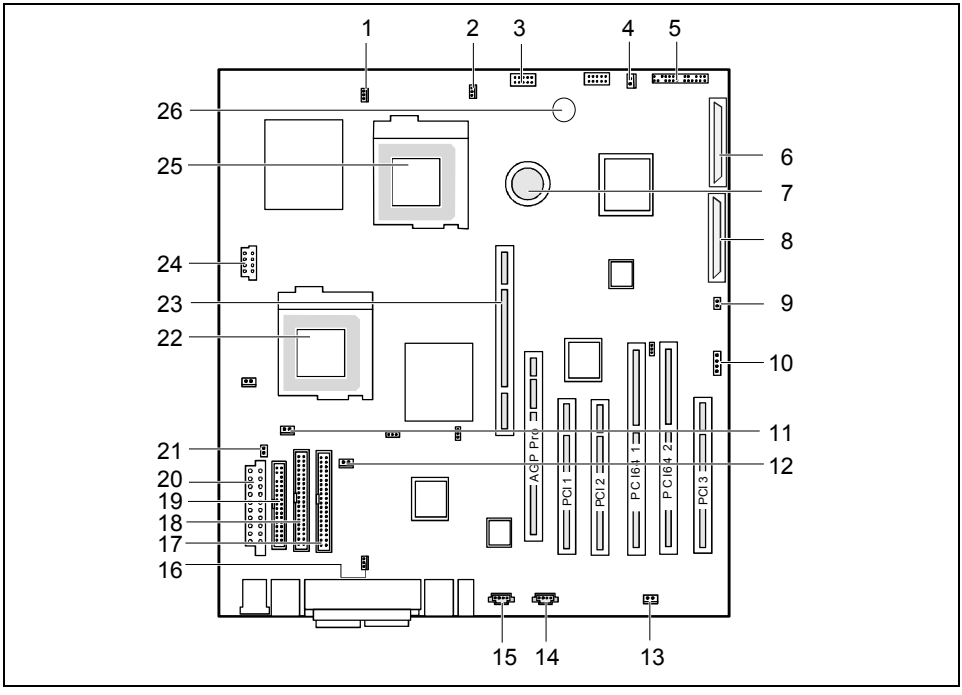
External Connectors



1 = PS/2 mouse port
2 = PS/2 keyboard port
3 = USB port 1
4 = USB port 2
5 = Serial port 1
6 = Parallel port
7 = Serial port 2
8 = LAN port
9 = USB ports 3 and 4
10 = Audio Line-In
11 = Audio Line-Out
12 = Audio Micro-In

Internal Interfaces and Connectors

The picture shows the location of the major components on the system board.



1	CPU 0 fan connector	14	Aux-In connector
2	Upper front system fan 2 connector	15	CD-ROM connector
3	USB internal header	16	CPU 1 fan connector
4	Lower front system fan 3 connector	17	Primary IDE connector
5	Front panel connector	18	Secondary IDE connector
6	Ultra-160 SCSI connector B	19	Diskette Drive connector
7	Battery	20	WTX power connector A
8	Ultra-160 SCSI connector A	21	Rear system fan 1 connector
9	Chassis intrusion connector	22	CPU 1 socket
10	SCSI activity LED input	23	Memory expansion card connector (MECC)
11	Temperature sensor for front system fan 2	24	WTX power connector B
12	Temperature sensor for rear system fan 1	25	CPU 0 socket
13	Temperature sensor for front system fan 3	26	Internal speaker

The components and connectors marked are not necessarily present on the system board.

Temperature Monitoring / System Monitoring

Hardware management features

The hardware management features enable the board to be compatible with the Wired for Management (WfM) specification. The board has several hardware management features, including the following:

- Hardware monitor subsystem
- Chassis intrusion connector
- Fan control and monitoring

Hardware monitor subsystem

The hardware monitor subsystem provides low-cost instrumentation capabilities. The features of the hardware monitor subsystem include:

- Management Level 5 functionality
- Microprocessor system hardware monitor (Winbond W83627HF)
- Integrated temperature and voltage monitoring to detect levels above or below acceptable values (Vcore, 1.8V, 3.3 V, 5 V, 12 V, -12V, 5Vsb).
- Access through the SMBus
- Internal ambient temperature sensing through an onboard thermistor
- Chassis intrusion connector

Voltage monitoring:

The voltages Vcore, 1.8V, 3.3V, 5V, 12V, -12V and the 5Vsb are monitored.

With hardware monitoring—regardless of the operating system and processor—the advantages compared to conventional software monitoring are clear:

- Suitable for all operating systems and processor types
- No additional load on processor (performance)
- Optimum temperature protection, even if process faults or faults are present in the operating system
- Optimum noise reduction

Fan connector descriptions

Connector	Function
System Fan 1, 2, 3	Provides +12 VDC for a system or chassis fan
	Supports speed control
	A tachometer feedback connection is also provided
Processor 0/1 Fan	Provides +12 VDC for processor fan
	The processor fan is always on
	Speed control is not supported
	A tachometer feedback connection is provided

Fan control and monitoring

The system board includes five fan power connectors: two connectors for fans on the processor heat sinks and three connectors for speed-controlled system fans. All five connectors are 3-pin headers. All fans support fan tachometer monitoring, but only the system fans are speed controlled.

The system fans use the system board fan speed control which consists of three states: off, normal speed, and high speed. In normal operation, the system fans operate at normal speed until the thermal sensor junction temperature reaches the high-speed fan threshold temperature. The system fans operate at high speed when the temperature threshold is exceeded.

This threshold temperature can be set in the BIOS Setup.

The user can set the threshold to 28°C for continuous operation of the system fans in high-speed mode in the S0 and S1 sleep states.

Controlling system fan speed

- Set the *Auto Fan Startup Temperature* to the minimum temperature.
- Adjust the *Range* as the working range of fans.
- The fans will be changed to automatic speed between the minimum and maximum temperature as set.

Fan monitoring:

Fans that are no longer available, blocked, or sticky fans are detected.

Fan control:

The fans are regulated according to temperature and the BIOS settings.

Temperature and system monitoring

Hardware monitoring	Supports voltage sensing to detect out-of-range values Supports speed monitoring for five and control for three fans Supports three temperature monitors Supports chassis intrusion detection

One goal of temperature and system monitoring is to reliably protect the computer hardware against damage caused by overheating. In addition, it prevents unnecessary noise by reducing fan speeds and provides information about the system state. The chassis intrusion detection protects the system against unauthorized opening.

The temperature and system monitoring is controlled by Winbond W83627HF and ADM 1031.

The following functions are supported:

Temperature monitoring:

Measurement of both processor temperatures and of the system temperature with three onboard temperature sensors.

Temperature control:

The temperature is controlled with the fan speed of the three system fans.

Cover monitoring:

Unauthorized opening of the cover is detected, even when the system is switched off. However, this will not be indicated until the system is switched on again.

Hard Disk Connection

An Ultra ATA/66 or ATA/100 hard disk must be connected with a cable especially designed for the ATA/66/100 mode.

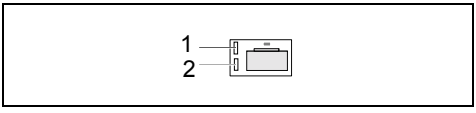
► Connect the cable end marked blue to the system board.

LAN Port

This system board is equipped with the Intel 82550 LAN controller. This LAN controller supports the transfer speeds 10 Mpbs and 100 Mpbs. The LAN controller supports the WOL function through Magic Packet™.

It is also possible to boot a device without its own boot hard disk via LAN. Here, RPL and Intel PXE are supported.

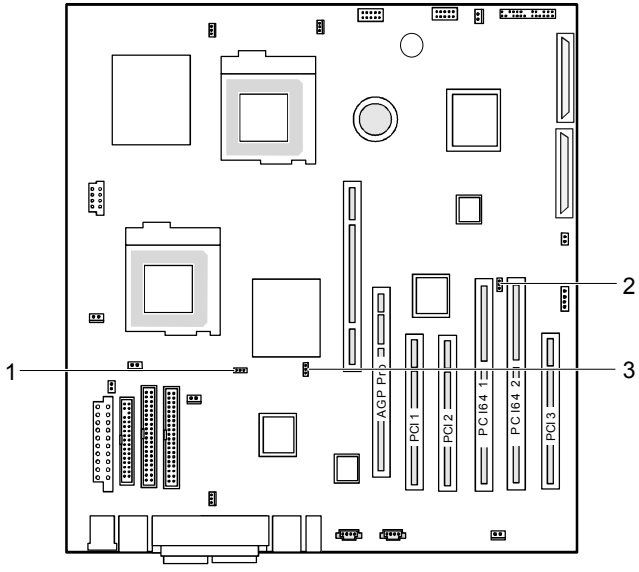
The LAN RJ45 connector is equipped with a yellow and a green light emitting diode (LED).



1 = Green indicator
2 = Yellow indicator

Green	ON	100 Mbps
Green	OFF	10 Mbps
Yellow	ON	LAN link established
Yellow	OFF	LAN link not established
Yellow	Blinking	Traffic on the LAN

Jumper Settings and Connectors



1 = JP1 2 = JP16	3 = JP9

Recovering System BIOS - Jumper JP9

Jumper JP9 enables recovery of the system BIOS after an attempt to update has failed. To restore the system BIOS you need a Flash BIOS Diskette (please call our customer service centre). Furthermore it allows you to start the system with CPU speed in safe mode (800 MHz).

1-2	Normal operation (default setting).
2-3	CPU safe mode: 800 MHz.
OFF	The system BIOS boot block restores the system BIOS from an inserted "Flash BIOS Diskette" in floppy drive A: (no LS-120).

Clearing the CMOS BIOS Settings - Jumper JP1

For further information refer to chapter "BIOS Setup".

1-2	Normal operation (default setting).
2-3	CMOS

Protecting the System BIOS - Jumper JP16

1-2	Flash BIOS protection through BIOS setup (default setting).
2-3	Flash BIOS hard protection: no flash BIOS update possible.
OFF	No Flash BIOS update protection.

Add-on Modules

Whenever you perform any of the steps described in this section you must first remove the device's power plug from the power outlet.
Even when you have turned off the device, parts of it (memory modules, AGP and PCI expansion boards, etc.) may still be energized.

Supported Processors

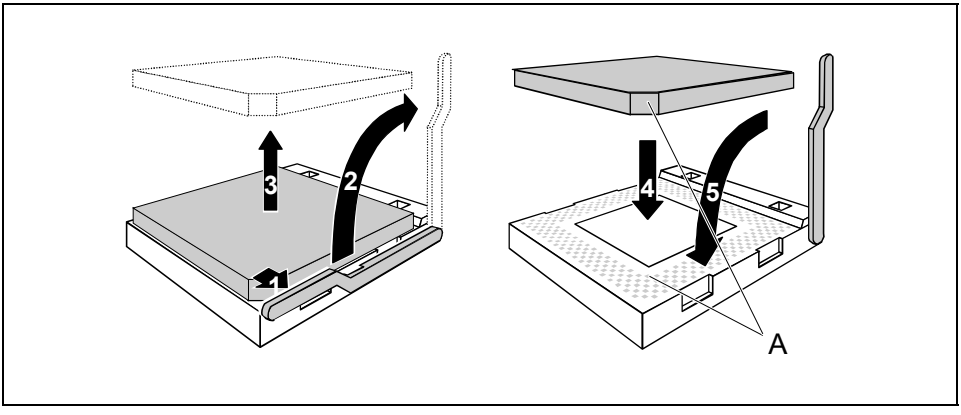
This section describes the processors supported by the system board D1302 and how to install them.

The system board D1302 only supports Intel Xeon processors with a host bus speed of 100 MHz. If two processors are installed, both processors must run at the same core frequency speed. Installing processors of different core frequency speeds may damage the system board and processors.

Single Processor:

Install the processor in the socket marked 'CPU0'.

Installing/removing a processor



- Remove the heat sink.
- Press the retainers in the direction of the arrows (1) and (2) and tilt it upwards.
- Remove the processor (3).
- Insert the new processor in the socket so that the angled corner of the processor matches the coding on the socket (A) with regard to its position (4).

The angled corner of the processor may be covered by the heat sink. In this case, let yourself be guided by the marking in the rows of pins on the underside of the processor.

- ► Apply the heat transfer compound evenly on the underside of the heat sink (approx. 0.5 mm).
- ► Tilt the retainers downwards and press in the direction of the arrow (5) until it engages.
- ► Fit the heat sink on the new processor.

Dual Processors

The following values must be identical for both processors:

- Host bus speed
- Processor core frequency
- Cache size
- Operating voltages

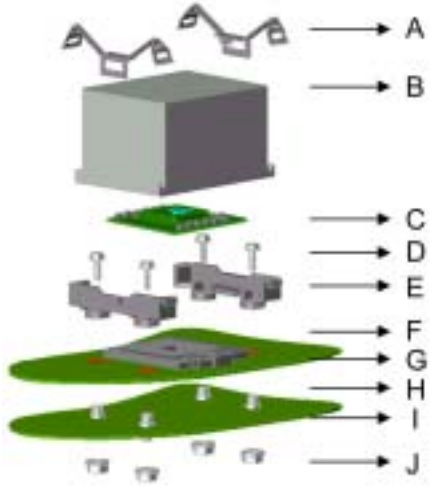
There are three major steps about the Intel Xeon processor installation for a system board D1302.

- ► System board and retainer installation.
- ► Processor installation.
- ► Heat sink installation.

System Board and Retainer Installation

To install the system board on the chassis, you should first examine the way faster retainers (E) are affixed.

Please follow the steps below to fix the retainer (E) on the system board (G).



Screws:

Support the system board (G) on the chassis after you have attached nuts (J) and screws (H) to the chassis (I).

Use screws to attach the retainer (E) to the chassis (I) through the system board (G) so that the retainer (E) will be affixed to the system board.

Processor installation

There is a handle at the side of Socket 603 (F) that you must pull up before you insert the processor (C).

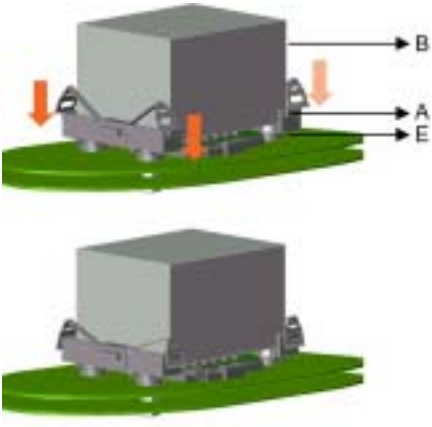
- ► Be sure to align the pins correctly and insert the processor(C).
- ► Press down the handle of Socket 603 (F)

Illustration of CPU installation

Heat sink installation

Before you install a heat sink (B), make sure that the processor (C) has been installed.

- ► Put some thermo grease on the bottom of the heat sink (B) or affix a thermo pad (B).
- ► Place the heat sink (B) on the processor (C) and make sure that they contact each other well either via the thermo grease or the thermo pad.
- ► Connect the clips (A) on the side-edge of heat sink.
- ► Push both ends of clip (A) until they click on the fastener retainer (E).



Upgrading Main Memory

D1303 memory expansion board usage

The memory expansion board D1303 (with two memory repeater hubs) supports the following memory features:

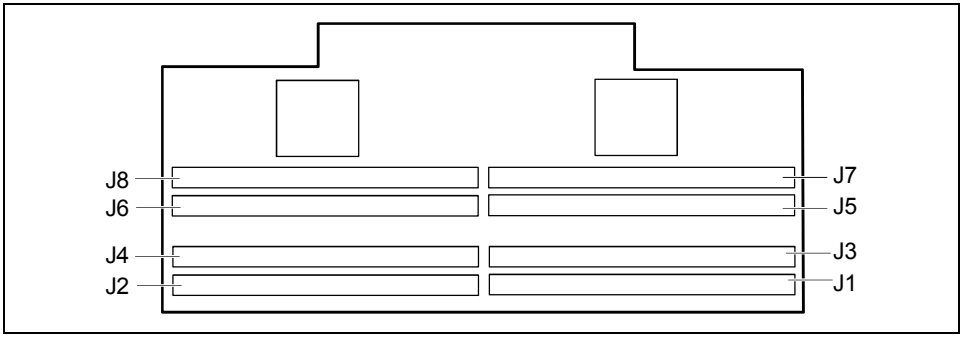
- Up to eight 2.5V, 184-pin RDRAM* interface memory modules (RIMMs*)
- 300/400 MHz direct RDRAM* interface
- Support for PC600 and PC800 RDRAM*
- 4GB maximum capacity with RIMMs using 256-megabit technology
- Single- or double-sided RIMM configurations
- Non-ECC (16-bit) and ECC (18-bit) memory
- Support for 64-Mb,128-Mb and 256-Mb RDRAM* technologies

These slots are suitable for 128 to 512 MB RDRAM memory modules of the RIMM format. The permissible total size of the main memory is 4 GB.

You must not combine memory modules from different manufacturers, different types of modules, or modules of different capacities in the same bank. Different memory capacities are permitted in the various banks. Example: 2 x 128 MB in bank 0 and 2 x 64 MB in bank 1 are permissible; 64 MB + 128 MB in bank 0 are not permissible.

D1303 memory expansion board

The D1303 memory expansion board contains *two* memory channels in which a total of eight RIMMs sockets can be installed.



All locations must always be occupied. Missing memory modules must be replaced with a C-RIMM. This C-RIMM should then be installed in the order nearest to the terminators.

RIMM installation combinations

	J8	J6	J4	J2	J7	J5	J3	J1
2 modules	RDRAM	CRIMM	CRIMM	CRIMM	CRIMM	CRIMM	RDRAM	CRIMM
4 modules	RDRAM	CRIMM	RDRAM	CRIMM	RDRAM	CRIMM	RDRAM	CRIMM
6 modules	RDRAM	RDRAM	RDRAM	CRIMM	RDRAM	CRIMM	RDRAM	RDRAM
8 modules	RDRAM	RDRAM	RDRAM	RDRAM	RDRAM	RDRAM	RDRAM	RDRAM

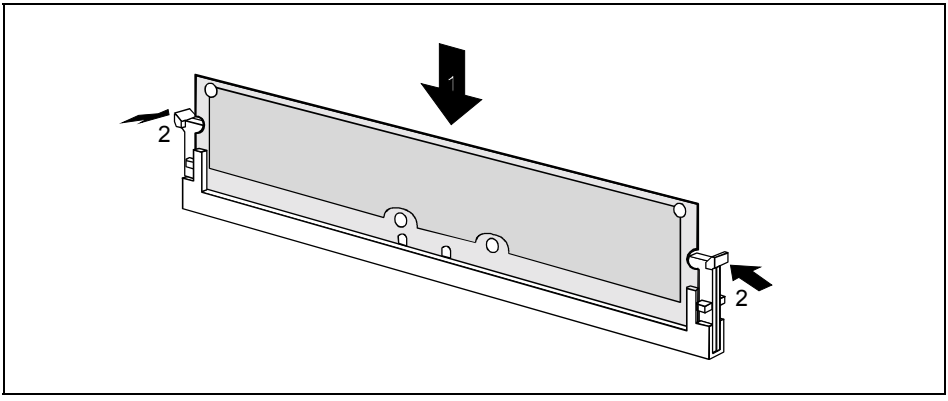
You must install identical memory modules in each of the following pairs of slots:

J2 and J5 J4 and J7 J1 and J6 J3 and J8

The system board supports PC800 and PC600 memory modules. Always use memory modules of the same speed class. You should not mix memory modules that have different speed classes. Optimal system speed is achieved when you use 4 or 8 PC800 RDRAM memory modules.

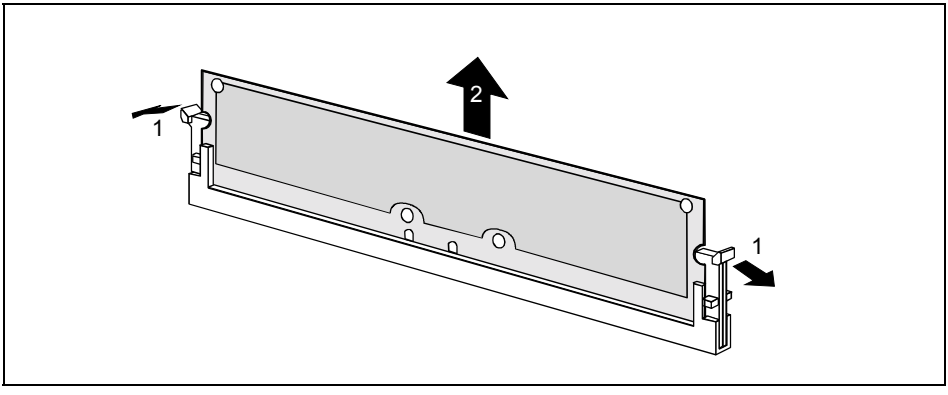
Memory Installation

Installing memory modules



- ► Flip the retaining clips on both sides of the relevant slot outwards.
- ► Insert the memory module into the slot (1).
- ► At the same time, flip the retaining clips upwards until the memory module snaps into place (2).

Removing a memory module



- ► Flip the retaining clips at the ends of the slot outwards (1).
- ► Pull the memory module out of its slot (2).

Installing a Network Board with WOL

- ► Install the network board as described in the operating manual for your unit.
- ► Push the WOL cable onto the WOL plug connector of the system board.

i

To use a network board's WOL functionality, the power supply must provide a 5 V auxiliary voltage of at least 1 A. If the system board was not already installed in a unit when you bought it, you must check whether your power supply can provide the auxiliary voltage.

You may find further information in the documentation for the network board.

Replacing the Lithium Battery

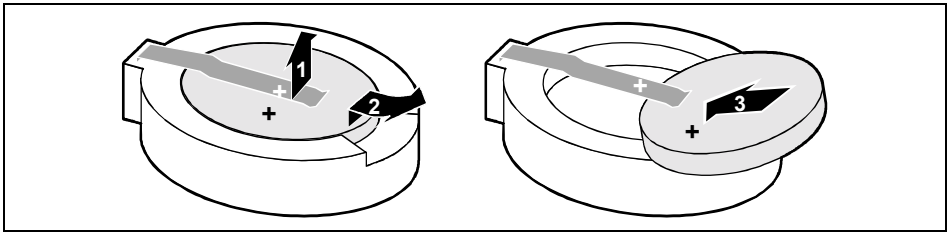
Incorrect replacement of the lithium battery may lead to a risk of explosion.

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer (CR2032).

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

Make sure that you insert the battery with the side up. The plus pole must be on the top!

- **VAROITUS**
  Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.
- **VARNING**
  Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.
- **ADVARSEL**
  Lithiumbatteri - Explosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Lever det brugte batteri tilbage til leverandøren.
- **ADVARSEL**
  Explosionsfare ved feilaktig skifte av batteri. Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten. Brukte batterier kasseres i henhold til fabrikantens instruksjoner.



► Raise the contact (1) a few millimetres and remove the battery from its socket (2).

► Insert a new lithium battery of the same type in the socket (3).

BIOS Setup

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If the description of the BIOS Setup does not agree with your BIOS Setup, then you must update your BIOS Setup. You can update your system BIOS with the flash BIOS update (BIOS updates can be found on the Internet under *http://www.fujitsu-siemens.com*).

BIOS Introduction

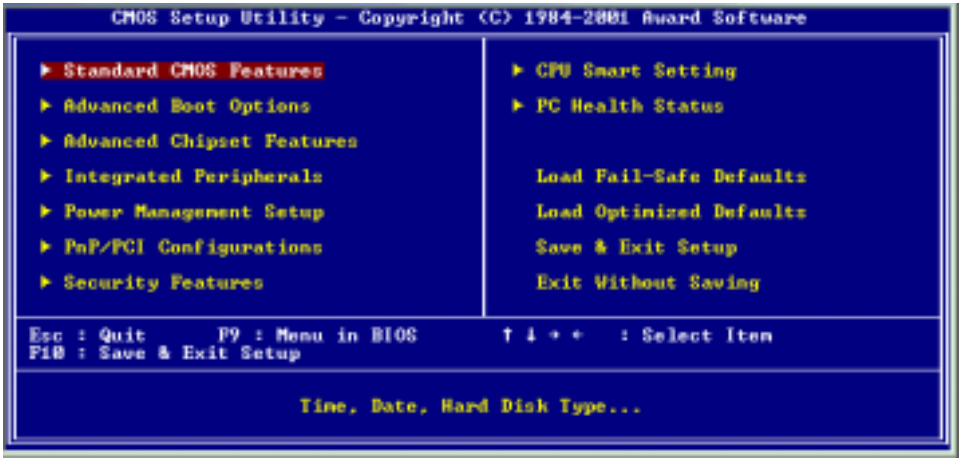
Using BIOS Setup program

Up	Move to the previous field
Down	Move to the next field
Left	Move to the field on the left hand side
Right	Move to the field on the right hand side
<Esc>	Quit from setup program without saving changes, or exit from current menu page and return to main menu page
<PgUp> or <+>	Select the previous value for a field
<PgDn> or <->	Select the next value for a field
<F1>	General help
<F2>	Item help
<F5>	Previous values
<F6>	Fail-safe defaults
<F7>	Optimised defaults
<F10.	Save the current value and exit the setup program

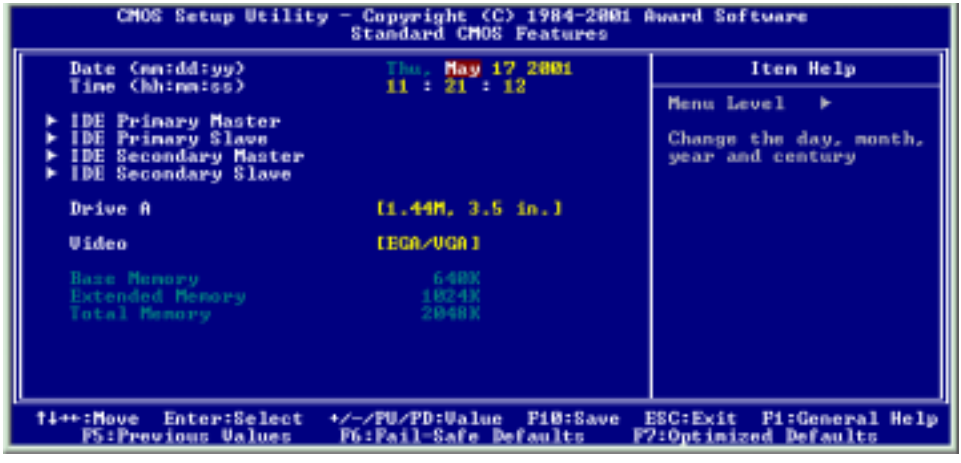
If the system is no longer able to boot after changing the settings, the only way to recover it is to clear the data stored in the RTC CMOS. To reset the RTC CMOS data, take the JP1 jumper cap off pins 1-2, place it onto pins 2-3, and then place it back onto pins 1-2 again. This will return the RTC to the default setting. Then, start the BIOS Setup program and select your appropriate settings.

Main Menu

The main menu allows you to select options from several Setup pages. Use the arrow keys to select among these pages and press the <Enter> key to enter the submenu. A brief description of each highlighted selection appears at the bottom of the screen.



Standard CMOS Features



Date:

- This field specifies the current date. The date format is <month>:<day>:<year>.

Time:

- This field specifies the current time. The time format is <hour>:<minute>:<second>. The time is calculated based on the 24-hour (military-time) clock.

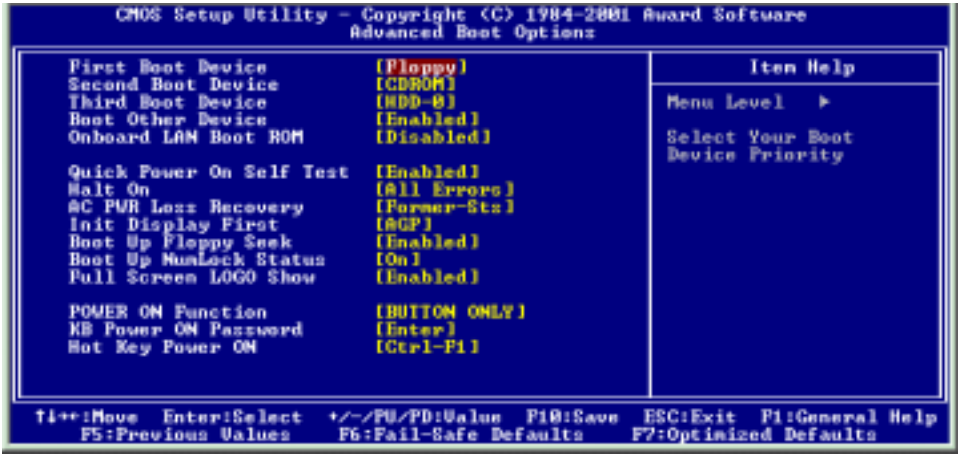
IDE Primary Master / Primary Slave / Secondary Master / Secondary Slave:

- Press “Enter” to open the next page for detailed hard drive settings.

IDE HDD Auto-Detection:

- Auto-detect the HDDs capacity and its parameters, e.g., cylinders, heads and sectors.
- IDE Primary Master / Primary Slave / Secondary Master / Secondary Slave:
- This field specifies the type of drive that corresponds to the drive installed in your system. If you select User, please specify the correct number of cylinders, heads, and sectors.

Advanced Boot Option



First / Secondary / Third Boot Device:

The BIOS attempts to load the operating system from the devices in the sequence specified for these items.

Onboard LAN Boot ROM:

Disable (default). When enabled, the system is able to boot from the LAN.

Quick Power On Self Test:

This field allows the system to skip certain tests while booting. This will decrease the time needed to boot the system. Enabled, Disabled (default)

Halt On

<All Errors>: If the self-test detects an error, system start-up is aborted after the self-test, and the system is halted.

<All but Keyboard/Mouse> If the self-test detects an error, system start-up is aborted after self-test except Keyboard/Mouse error.
<All but Floppy> If the self-test detects an error, system start-up is aborted after self-test except Keyboard/Mouse error.
<All but Keyboard/Floppy/Mouse> If the self-test detects an error, system start-up is aborted after self-test except Keyboard/Mouse error.
<No Error>: The system start-up is not aborted. The error is ignored as far as possible.

AC PWR Loss Recovery:

This allows you to specify how you want your system to reboot after the power has been interrupted.
< Always-Off > Leaves your system off.
< Always-on > Starts your system
< Former-Sts > Sets your system back to the state it was before the power interruption.

Init Display First:

This item allows you to decide which slot to activate first. AGP (default), PCI Slot.

Boot Up Floppy Seek:

Seeks disk drives during boot up. Disabling speeds boot-up.

Boot Up Num Lock Status

This field determines the configuration of the numeric keypad after system boot-up. If on, the number keypad uses number keys. If off, the number keypad uses arrow keys.

Full Screen Logo Show:

Enabled (default) shows the system logo. Disabled doesn’t show the logo.

Power-on Function

This field configures the Power-on mode of the system.

Password:

You can assign a password string via the KB Power-On password field.

Hot KEY:

You can assign a hot key through the Hot Key Power-On field. Pressing this hot key will power- on your system.

Any Key:

Power On System by pressing any key on the Keyboard.

Button only(default):

Simply power-on your system by pressing the Power-On button on the front panel of your PC case.

Keyboard 98:

Enables Keyboard 98 function. The function is good only for users of Keyboard 98.

Keyboard Password Power-on

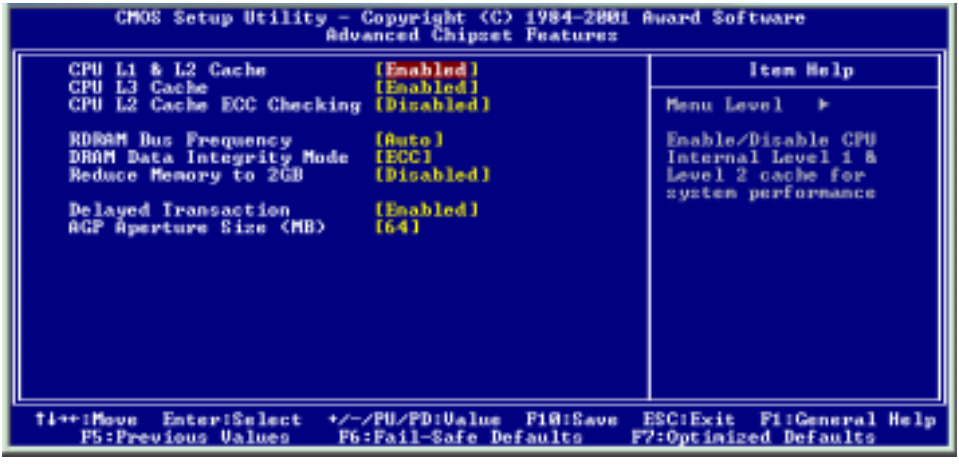
In you wish to use this function, move the cursor to the field labelled Enter, then press <Enter>. The computer will display the message ‘Enter Password’. Type your password and press <Enter>. After the message ‘Confirm Password’ is displayed, re-type your password. The KB Power-on function will be in effect after you save and exit the Setup program.

To disable a password, move the cursor to the ‘Enter’ field again, then press <Enter>. The computer will display the message ‘Enter Password’. Press <Enter>. A message will confirm that the password is disabled.

Hot Key Power-on:

This field specifies the key selection for the Keyboard-Power-on hot key.

Advanced Chipset Features



This Setup page is used to specify advanced features available through the chipset. The default settings have been chosen carefully for most operating conditions. DO NOT change the value of any field on this Setup page without fully understanding the consequences.

CPU L1 & L2 Cache

This field configures the CPU L1 & L2 cache [Enabled (default), Disabled]

CPU L2 Cache ECC Checking:

This function controls the ECC capability in the CPU level 2 cache.
Configuration option: [Enable, Disabled (default)]

CPU L3 Cache:

This field configures the CPU L3 cache [Enabled (default), Disabled]

RDRAM Bus Frequency:

This function sets frequency of RDRAM memory. [Default is Auto]

DRAM Data Integrity Mode:

[Default is ECC]

Reduce Memory to 2GB:

This function should be set to Enabled during installation of Windows NT 4.0 with more than 2 GB memory in the system. After applying Windows NT Service Pack 3 or later this function can be set to Disabled again. [Enabled, Disabled (default)]

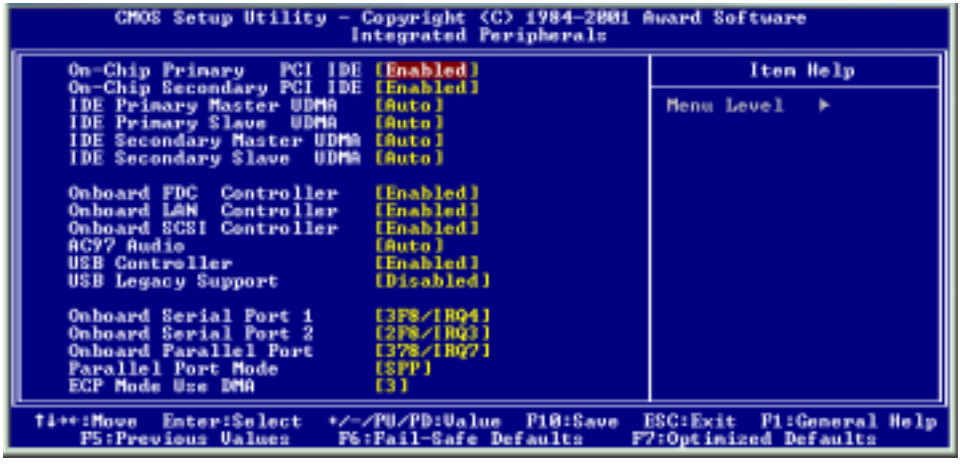
Delayed Transaction:

When enabled, the south bridge ICH2 will support the Delayed Transaction mechanism when it is the target of a PCI transaction. [Enabled (default), Disabled]

AGP Aperture Size (MB):

This field configures the main memory size for AGP graphics data used. 64MB (default)

Integrated Peripherals



On-Chip Primary PCI IDE / On-Chip Secondary PCI IDE

Enabled (default); Disabled

This field allows you to enable and disable the built-in PCI IDE hard disk controller(s). The associated interrupts will only be available if no IDE hard disk drive is physically connected.

Enabled The PCI IDE drive controller is enabled.

Disabled The PCI IDE hard disk controller is disabled.

IDE Primary Master / Slave UDMA

If you select Auto, the IDE controller uses the Ultra DMA 33/66/100 mode to access Ultra DMA-capable IDE devices, depending on the negotiation with your HDD. The maximum transfer rate of Ultra DMA 100 mode is 100 MBPS. [Auto (default), Disabled]

Onboard SCSI Controller:

Enables/disables the onboard SCSI controller. [Enabled (default), Disabled]

Onboard LAN Controller:

This field enables or disables the onboard LAN controller. [Enabled (default), Disabled]

Onboard FDC Controller:

This field enables or disables the onboard floppy disk controller. [Enabled (default), Disabled]

AC97 Audio:

Auto allows the system board's BIOS to detect whether you are using any AC97audio device. If an audio device is detected, the onboard audio controller will be enabled. If no audio device is detected, the onboard audio controller will be disabled. If you want to use different controller cards to connect audio connectors, set this option to disabled. [Disabled, Auto (default)]

USB Controller:

Select Enabled if your system contains USB peripherals. [Enabled (default), Disabled]

USB Legacy Support:

Select Enabled if your system contains USB peripherals in Legacy mode. [Enabled, Disabled (default)]

Onboard Serial Port 1/2:

These fields configure the onboard serial ports. There are several port addresses and IRQ channels to select from.

3F8/IRQ4 (default)	Port address 3F8h, IRQ4
2F8/IRQ3	Port address 2F8h, IRQ3
3E8/IRQ4	Port address 3E8H, IRQ4
2E8/IRQ3	Port address 2E8h, IRQ3
Auto	BIOS assigns port address and IRQ channel automatically.
Disabled	Disables serial port

Onboard Parallel Port:

This field configures the onboard parallel port. There are several port addresses and IRQ channels to select from.

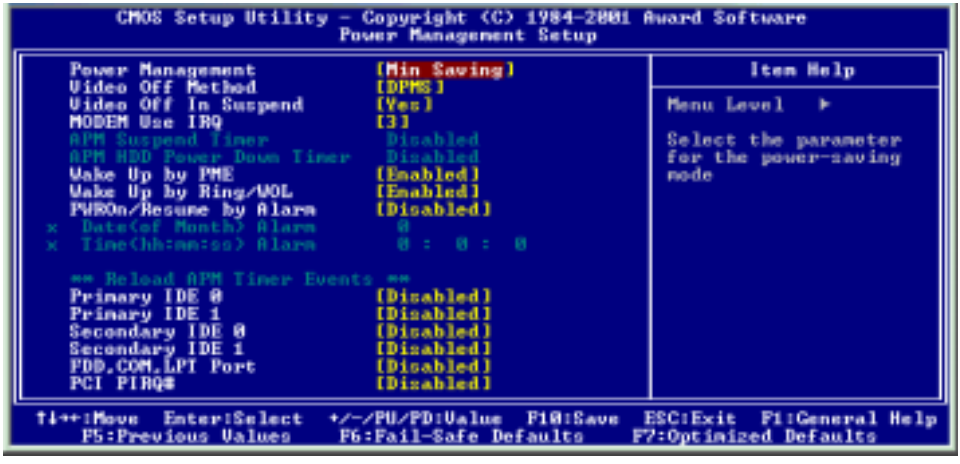
378/IRQ7 (default)	Port address 378h, IRQ7
278/IRQ5	Port address278h, IRQ5
3BC/IRQ7	Port address 3BCh,IRQ7
Disabled	Disables parallel port

Parallel Port Mode:

This field configures the operating mode of an onboard parallel port. Make sure that you know the specifications of your parallel port devices before you select one of these options. [SPP (default), EPP, ECP, ECP+EPP]

Power Management Setup

Each power-saving mode has a respective timer. The value of each timer can be assigned or reloaded and will be counted down to zero. When the timer equals zero, the system will be forced into the corresponding suspend or power-saving mode. If any predefined signal or event is detected during the timer countdown, the timer restarts automatically.



This feature allows the user to select the default parameters for the power-saving mode.

Power Management:

Min Saving	When idle for one hour, the system enters suspend mode
Max Saving	When idle for fifteen minutes, the system enters suspend mode.
User Define (default)	User can specify the time when the system enters suspend mode.

Video off Method:

V/H SYNC +Blank (default)	Turns off the vertical and horizontal synchronization ports and writes blanks to the video buffer.
Blank Screen	Writes blanks to the video buffer only.
DPMS	Initial display power management signalling with DPMS.

Video Off In Suspend:

This determines the manner in which the monitor is blanked. [NO, Yes (default)]

MODEM Use IRQ:

This determines the IRQ which the MODEM can use. [3 (default), 4, 5, 7, 9, 11, NA]

APM Suspend Timer:

This field specifies when the system enters power-saving mode. It is available only when the Power Management field is set to User Define. [1Min, 2Min, 4Min, 8Min, 12Min, 20Min, 30Min, 40Min, 1Hour, Disabled(default)]

APM HDD Power Down Timer:

This field specifies when the system enters HDD power down. It is available only when the Power Management field is set to User Define. [1Min, 2 Min, 3Min, 4Min, 5 Min, 6 Min, 7 Min , 8Min, 9 Min , 10 Min, 11 Min, 12 Min, 13Min, 14 Min, 15 Min, Disabled (default)]

Wake up by PME:

When Wake up by PME (Power Management Enable) is enabled, the PC can power-on via the onboard LAN controller.

Wake up by RING/WOL:

When Wake up by RING/WOL function is enabled, the PC can power-on via a LAN adapter connected to the WOL header on the system board or through a modem connected on COM1 or COM2 (Serial 1 or Serial 2).

Power On/Resume by Alarm:

When enabled, you can set the date and time to automatically power-on your PC (similar to an alarm clock).

Enabled	Sets the date (0-31) and time (hr, min, sec) to power-on the PC. When the date is set to 0, the timer is set for every day.
Disabled (default)	Disables the RTC alarm function.

Reload APM Timer Events:

This field enables the system to detect activity and restart the power-saving mode timer.

Primary IDE 0:

If enabled, the timer restarts whenever the master disk of the primary IDE channel is active. [Enabled, Disabled (default)]

Primary IDE 1:

If enabled, timer restarts whenever the slave disk of the primary IDE channel is active. [Enabled, Disabled (default)]

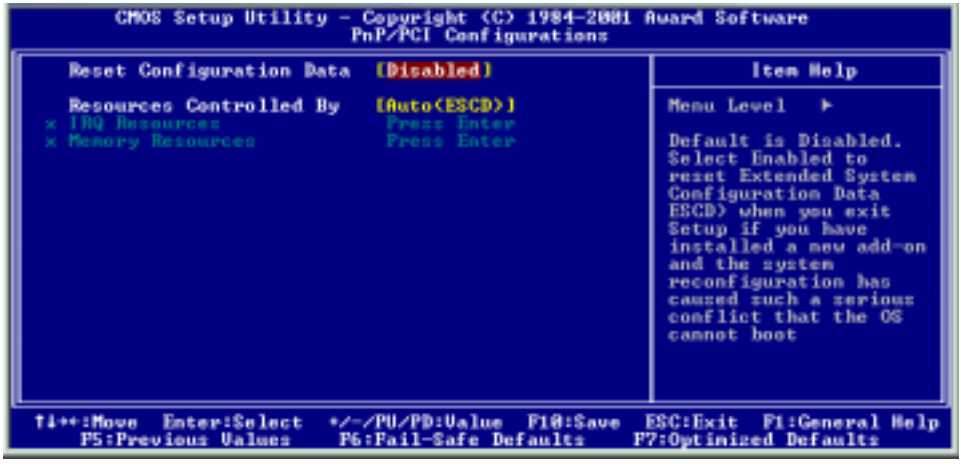
Secondary IDE 0:

If enabled, timer restarts whenever the master disk of the secondary IDE channel is active. [Enabled, Disabled (default)]

Secondary IDE 1:

If enabled, timer restarts whenever the slave disk of the secondary IDE channel is active. [Enabled, Disabled (default)]

PnP/ PCI Configurations



Reset Configuration Data:

Normally, you leave this field as Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system cannot boot. [Enabled, Disabled (default)]

Resources Controlled By:

The Award Plug-and-Play BIOS has the capacity to automatically configure all of the boot and Plug-and-Play-compatible devices. However, this capability means absolutely nothing unless you are using a Plug-and-Play operating system such as Windows98/95/NT. If you set this field to Manual, choose specific resources by going into each of the submenus that follow this field.

Manual	Resources controlled by the user
Auto (ESCD) (default)	Resources controlled by BIOS automatically.

IRQ Resources:

When resources are controlled manually, assign to each system interrupt a type, depending on the type of device using the interrupt. IRQ3/4/5/7/9/10/11/12/14/15 assigned to [PCI Device Reserved (default)]

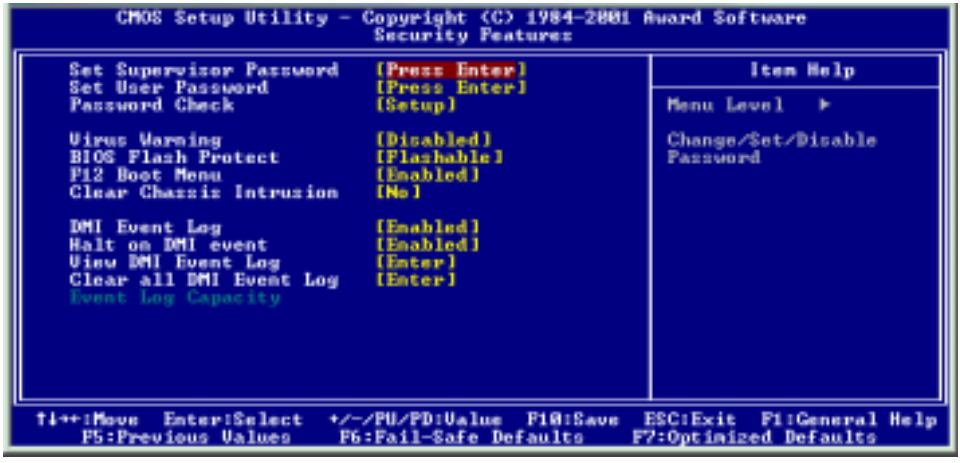
Reserved Memory Base:

Reserves a low memory for the legacy device (non-PnP device). [C800, CC00 , D000, D800, DC400, N/A (default)]

Reserved Memory Length:

Reserves a low memory length for the legacy device (non-PnP device). [8K (default), 16K, 32K, 64K]

Security Features



Set Supervisor / User Password Setting / Password Check

These Setup pages are used for setting passwords. When a password has been enabled and the Password Check field is set to Setup, you will be required to enter the password each time you try to enter the BIOS Setup program. This prevents an unauthorized person from changing any part of your system configuration. Additionally, if the Password Check field is set to Boot, the BIOS will request a password every time your system boots. This prevents unauthorized use of your computer.

If you wish to use this function, move the cursor to this field and press <Enter>. The computer will display the message, “Enter Password”. Type your password and press <Enter>. After the message “Confirm Password” is displayed, re-type your password. The Supervisor Password function will be in effect after you save and exit the Setup program.

To disable a password, move the cursor to this field and press <Enter>. The computer will display the message, “Enter Password”. Press <Enter>. A message will confirm that the password is disabled. Once the password is disabled, the system will boot and you can enter the Setup program freely.

Virus Warning

When this function is enabled, the BIOS monitors the boot sector and partition table of the hard disk drive for any attempt of modification. If an attempt is made, the BIOS will halt the system and display an error message. Afterwards, if necessary, you can run an anti-virus program to locate and remove the problem before any damage occurs.

Many disk diagnostic programs will attempt to access the boot sector table, which can cause the above warning message. If you run such a program, we recommend that you first disable the Virus Warning function beforehand.

[Enabled, Disabled (default)]

BIOS Flash protect

<Flashable> Flashing of BIOS is possible if jumper JP16 is set to position 1-2.

<Non-Flash> BIOS is protected against flashing.

For further information see chapter "Jumper Settings and Connectors".

F12 Boot Menu

<Enabled> Allows the user to access the Boot Menu by pressing F12 at BIOS POST (default).

<Disabled> Prevents the user from entering the Boot Menu.

Clear Chassis Intrusion

Set this option to Yes to clear the chassis intrusion information on next reboot. After reboot, this option will change back to No automatically.
[No (default), Yes]

DMI Event Log

<Enabled> DMI Event Logging is activated.

<Disabled> DMI Event Logging is deactivated.

Halt on DMI event

Enable this option to force the system to halt at BIOS POST if the DMI Event Log is not empty.
[Enabled (default), Disabled]

View DMI Event Log

Displays the DMI Event Log.

Clear All DMI Event Log

Choose this option to clear the DMI Event Log.

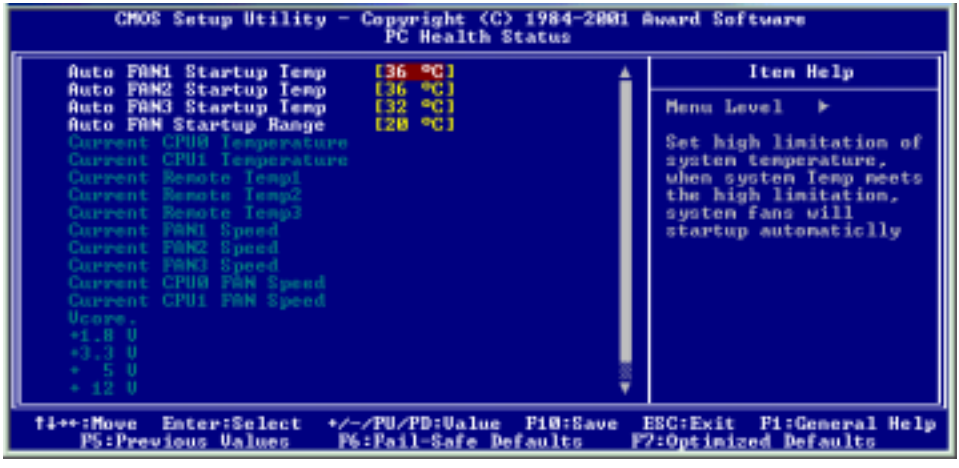
Event Log Capacity

Shows whether or not space is available for the DMI event logging.

CPU Smart Setting

CPU smart setting allows users to change the CPU frequency.

PC Health Status



This page monitors the status of your computer. CPU/system temperatures, fan speeds and voltages are displayed.

Onboard SCSI BIOS Utility (SCSI BIOS Setup)

Introduction

The onboard SCSI controller can be configured with the SCSI BIOS Setup. You access the SCSI BIOS Setup by pressing <ALT>-<Q> during the onboard SCSI BIOS initialisation (it may take a few seconds for the SCSI BIOS Setup menu to appear).

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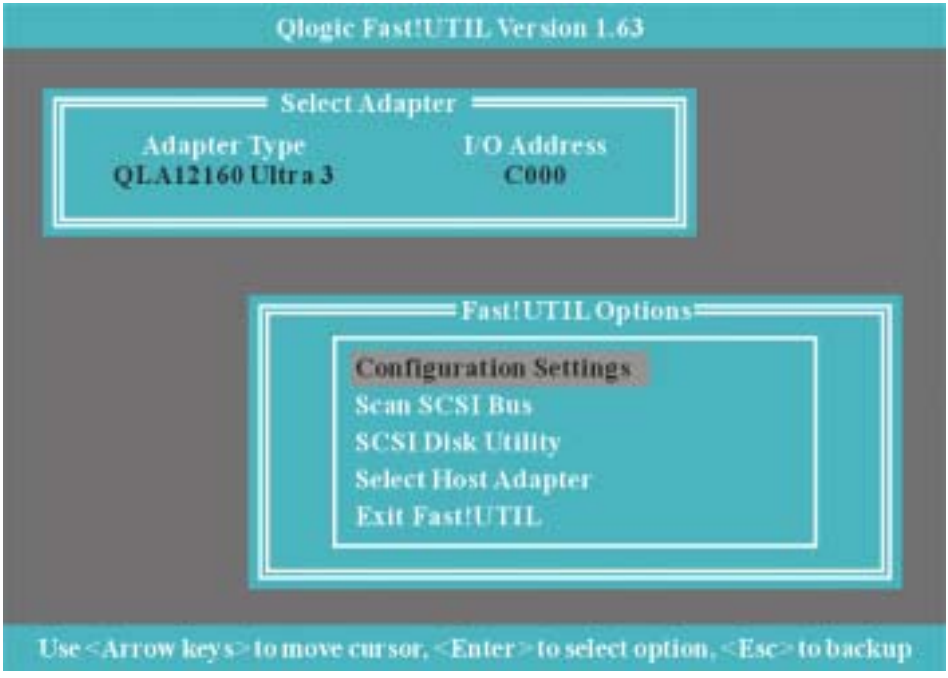
If the configuration settings are incorrect, your onboard SCSI controller will not function properly.

The following sections describe the SCSI BIOS Setup options.

Configuration Settings

The first item on the Fast !UTIL Options menu is Configuration Settings. These settings configure the SCSI devices and the onboard SCSI controller to which they are attached.



Host Adapter Settings

From the Configuration Settings menu in SCSI BIOS Setup, select Host Adapter Settings.

The default settings for the onboard SCSI host are listed in Table A-1 and are described in the following paragraphs.

Table A-1: Host adapter settings

Setting	Options	Default
Host Adapter BIOS	Enabled or Disabled	Enabled
PCI DMA Burst	Enabled or Disabled	Enabled
CDROM Boot	Enabled or Disabled	Disabled
Adapter Configuration	Auto, Manual, Safe	Auto
Drivers Load RISC code	Enabled or Disabled	Enabled
>4Gbyte Addressing	Enabled or Disabled	Disabled
Fast Command Posting	Enabled or Disabled	Enabled

Host Adapter BIOS

When this setting is disabled, the ROM BIOS on the Onboard SCSI is disabled, freeing space in upper memory. The RAM BIOS and other drivers still recognize the Onboard SCSI.
Do not disable this setting if you are booting from a SCSI disk drive attached to the Onboard SCSI. The default is Enabled.

PCI Bus DMA Burst

When this setting is enabled, burst transfers are performed. When this setting is disabled, data is transferred in nonburst mode, with each cycle initiated by a new address phase. The default is Enabled.

CDROM Boot

When this setting is enabled, the ROM BIOS boots from the attached SCSI CD-ROM if a bootable CD-ROM is installed. If no bootable CD-ROM is found, the system boots from the first bootable SCSI drive. When this setting is disabled, the ROM BIOS does not boot from the CD-ROM. The default is Disabled.

Drivers Load RISC Code

When this setting is enabled, the Onboard SCSI uses the RISC firmware that is embedded in the software driver. When this setting is disabled, the software driver loads the latest version of RISC firmware found on the system. The default is Enabled.

i The driver being loaded must support this setting. If the driver does not support this setting, the result is the same as disabled, regardless of the setting. Leaving this option enabled guarantees a certified combination of software driver and RISC firmware.

Scan and Configure SCSI Devices

i You must set the Adapter Configuration setting in the Host Adapter Settings to Manual to use Auto configure; otherwise, all changes made with Auto configure are reset when your system is rebooted.

The onboard SCSI is designed to sense and configure the devices connected to your system board. With the Adapter Configuration set to Manual, the Auto-configure option gives you control of when the bus is scanned and configured.

Selecting the Auto-configure SCSI Devices option from the Configuration Settings menu causes the onboard SCSI to scan the devices on the SCSI bus and set the following options, based on the capabilities of each device:

Enable Device	Negotiate Wide	Tagged Queuing
Disconnects	Negotiate Synchronous	Enable LUN Support

If you use Auto configure to configure your system, you should run SCSI BIOS Setup and select “Auto configure” SCSI Devices after adding or reconfiguring devices attached to the onboard SCSI.

Selectable Boot Settings

The Selectable Boot Settings option is accessed from the Configuration Settings menu. If you enable this option, you can select the SCSI ID from which you want to boot. SCSI ID values range from 0 to 15. Once enabled, this option forces the system to boot from the selected SCSI drive, ignoring any IDE drives attached to your system. If you disable this option, the system looks for an IDE drive from which to boot. If an IDE drive is not found, the system looks for the first bootable SCSI drive. In disabled mode, the SCSI Boot ID and SCSI Boot LUN parameters have no effect.

This option applies only to disk devices; it does not apply to CD-ROMs, tape drives, and other non-disk devices.

Restore Default Adapter Settings

The Restore Defaults option from the Configuration Settings menu restores the onboard SCSI default settings. The default settings are displayed on the SCSI Device Settings screen. Use the arrow keys to change the settings.

Raw NVRAM Data

This option displays the adapter's non-volatile random access memory (NVRAM) contents in hexadecimal format. This is a troubleshooting tool; you cannot modify the data.

Scan SCSI Bus

This option scans the SCSI bus and lists all the connected devices by SCSI ID. Information about each device is listed, for example, vendor name, product name, and revision. This information is useful when configuring your Onboard SCSI and attached devices.

SCSI Disk Utility

This option scans the SCSI bus and lists all the connected devices by SCSI ID. You can select a disk device and perform a low-level format or verify the disk media.

Performing a low-level format destroys all data on the disk.

Select Host Adapter

From the Configuration Settings menu in SCSI BIOS Setup, select Host Adapter Settings. Select other Host Adapter from this item.

Beep Codes

Currently there are two kinds of beep codes in BIOS. This code indicates that a video error has occurred and the BIOS cannot initialise the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps. The other code indicates that a DRAM error has occurred. This beep code consists of a single long beep repeatedly.

Award BIOS POST Codes

POST (hex)	Description
CFh	Test CMOS R/W functionality.
C0h	Early chipset initialization: -Disable shadow RAM -Disable L2 cache (socket 7 or below) -Program basic chipset registers
C1h	Detect memory - Auto-detection of DRAM size, type and ECC. Auto-detection of L2 cache (socket 7 or below)
C3h	Expand compressed BIOS code to DRAM
C5h	Call chipset hook to copy BIOS back to E000 & F000 Shadow RAM.
01h	Expand the Xgroup codes locating in physical address 1000:0
02h	Reserved
03h	Initial Superio_Early_Init
04h	Reserved
05h	1. Blank out screen 2. Clear CMOS error flag
06h	Reserved
07h	1. Clear 8042 interface 2. Initialize 8042 self-test
08h	1. Test special keyboard controller for Winbond 977 series Super I/O chips. 2. Enable keyboard interface.

09h	**Reserved**
0Ah	1. Disable PS/2 mouse interface (optional). 2. Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). 3. Reset keyboard for Winbond 977 series Super I/O chips.
0Bh	Reserved
0Ch	Reserved
0Dh	Reserved
0Eh	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.
0Fh	Reserved
10h	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
11h	Reserved
12h	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
13h	Reserved
14h	Program chipset default values into chipset. Chipset default value is MODBINable by OEM customers.
15h	Reserved
16h	Initial onboard clock generator if Early_Init_Onboard_Generator Is defined. See also POST 26h

17h	**Reserved**
18h	Detect CPU information including brand, SMI type (Cyrix or Intel) and (CPU level (586 or 686).
19h	Reserved
1Ah	Reserved
1Bh	Initial interrupts vector table. If no special specified, all H/W Interrupts are directed to SPURIOUS_INT_HDLR & S/W Interrupts to SPURIOUS_soft_HDLR.
1Ch	Reserved
1Dh	Initial EARLY_PM_INIT switch.
1Eh	Reserved
1Fh	Load keyboard matrix (notebook platform)
20h	Reserved
21h	HPM initialization (notebook platform)
22h	Reserved
23h	1. Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute. 2 . Load CMOS settings into BIOS stack. If CMOS checksum fail , use default value instead.

24h	Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information.
25h	Early PCI initialization: - Enumerate PCI bus number - Assign memory & I/O resource - Search for a valid VGA device & VGA BIOS, and put it into C000:0.
26h	1. If Early_Init_Onboard_Generator is not defined Onboard clock generator initialization. Disable respective Clock resource to empty PCI & DIMM slots. 1. Init onboard PWM 2. Init onboard H/W monitor devices
27h	Initialize INT 09 buffer
28h	Reserved
29h	1. Program CPU internal MTRR (P6 & PII) for 0-640K memory address. 2. Initialize the APIC for Pentium class CPU. 3. Program early chipset according to CMOS setup. Example: onboard IDE controller. 4. Measure CPU speed.

2Ah	**Reserved**
2Bh	Invoke Video BIOS
2Ch	Reserved
2Dh	1. Initialize double-byte language font (Optional) 2. Put information on screen display, including Award title, CPU type, CPU speed , full screen logo
2Eh	Reserved
2Fh	Reserved
30h	Reserved
31h	Reserved
32h	Reserved
33h	Reset keyboard if Early_Reset_KB is defined e.g. Winbond 977 series Super I/O chips. See also POST 63h
34h	Reserved
35h	Test DMA Channel 0
36h	Reserved
37h	Test DMA Channel 1
38h	Reserved
39h	Test DMA page registers
3Ah	Reserved
3Bh	Reserved
3Ch	Test 8254
3Dh	Reserved

3Eh	Test 8259 interrupt mask bits for channel 1.
3Fh	Reserved
40h	Test 8259 interrupt mask bits for channel 2.
41h	Reserved
42h	Reserved
43h	Test 8259 functionality.
44h	Reserved
45h	Reserved
46h	Reserved
47h	Reserved
48h	Reserved
49h	1. Calculate total memory by testing the last double word of each 64K page. 2. Program write allocation for AMD K5 CPU.
4Ah	Reserved
4Bh	Reserved
4Ch	Reserved
4Dh	Reserved
4Eh	1. Program MTRR of M1 CPU 2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. 3. Initialize the APIC for P6 class CPU. 4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.

4Fh	**Reserved**
50h	Initialize USB Keyboard & Mouse
51h	Reserved
52h	Test all memory (clear all extended memory to 0)
53h	Clear password according to H/W jumper (Optional)
54h	Reserved
55h	Display number of processors (multi-processor platform)
56h	Reserved
57h	1. Display PnP logo 2. Early ISA PnP initialization -Assign CSN to every ISA PnP device.
58h	Reserved
59h	Initialize the combined Trend Anti-Virus code.
5Ah	Reserved
5Bh	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional)
5Ch	Reserved
5Dh	1. Initialize Init_Onboard_Super_IO 2. Initialize Init_Onbaord_AUDIO .
5Eh	Reserved
5Fh	Reserved
60h	Okay to enter Setup utility; i.e. not until this POST stage can users Enter the CMOS setup utility.
61h	Reserved
62h	Reserved
63h	Reset keyboard if Early_Reset_KB is not defined

64h	**Reserved**
65h	Initialize PS/2 Mouse
66h	Reserved
67h	Prepare memory size information for function call: INT 15h ax=E820h
68h	Reserved
69h	Turn on L2 cache
6Ah	Reserved
6Bh	Program chipset registers according to items described in Setup & Auto-configuration table.
6Ch	Reserved
6Dh	1. Assign resources to all ISA PnP devices. 2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to “AUTO”.
6Eh	Reserved
6Fh	1. Initialize floppy controller 2. Set up floppy related fields in 40:hardware.
70h	Reserved
71h	Reserved
72h	Reserved
73h	Reserved
74h	Reserved
75h	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM…..

76h	(Optional Feature) Enter AWDFLASH.EXE if : -AWDFLASH is found in floppy drive. -ALT+F2 is pressed
77h	Detect serial ports & parallel ports.
78h	Reserved
79h	Reserved
7Ah	Detect & install co-processor
7Bh	Reserved
7Ch	Init HDD write protect
7Dh	Reserved
7Eh	Reserved
7Fh	Switch back to text mode if full screen logo is supported. - If errors occur, report errors & wait for keys - If no errors occur or F1 key is pressed to continue: - Clear EPA or customization logo.
80h	Reserved
81h	Reserved
E8POST.ASM starts	
82h	1. Call chipset power management hook. 2. Recover the text fond used by EPA logo (not for full screen logo) 3.If password is set, ask for password.

83h	Save all data in stack back to CMOS
84h	Initialize ISA PnP boot devices
85h	1. USB final Initialization 2. Switch screen back to text mode
86h	Reserved
87h	NET PC: Build SYSID Structure
88h	Reserved
89h	1.Assign IRQs to PCI devices 2. Set up ACPI table at top of memory
8Ah	Reserved
8Bh	1. Invoke all ISA adapter ROMs 2. Invoke all PCI ROMs (except VGA)
8Ch	Reserved
8Dh	1. Enable/Disable Parity Check according to CMOS Setup 2. APM Initializtion
8Eh	Reserved
8Fh	Clear noise of IRQs
90h	Reserved

91h	Reserved
92h	Reserved
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	1. Enable L2 cache 2. Program Daylight Saving 3. Program boot up speed 4. Chipset final initialization. 5. Power management final initialization 6. Clear screen & display summary table 7. Program K6 write allocation 8. Program P6 class write combining
95h	Update keyboard LED & typematic rate
96h	1. Build MP table 2. Build & update ESCD 3. Set CMOS century to 20h or 19h 4. Load CMOS time into DOS timer tick 5. Build MSIRQ routing table.
FFh	Boot attempt (INT 19h)

Glossary

The technical terms and abbreviations given below represent only a selection of the full list of common technical terms and abbreviations.
Not all technical terms and abbreviations listed here are applicable for the described system board.

ACPI	Advanced Configuration and Power Management Interface
AC'97	Audio Codec '97
AGP	Accelerated Graphics Port
AOL	Alert On LAN
APM	Advanced Power Management
ATA	Advanced Technology Attachment
ATAPI	ATA Packet Interface for CD-ROMs
ATX	ATX Specification
BIOS	Basic Input Output System
CAN	Controller Area Network
CPU	Central Processing Unit
CNR	Communication Network Riser
C-RIMM	Continuity Rambus Inline Memory Module
DIMM	Dual Inline Memory Module
ECC	Error Correcting Code
EEPROM	Electrical Erasable Programmable Read Only Memory
EPP	Enhanced Parallel Port
FDC	Floppy Disk Controller
FIFO	First-In First-Out
FSB	Front Side Bus
FWH	Firmware Hub
GMCH	Graphics and Memory Controller Hub
I^2C	Inter Integrated Circuit
IAPC	Instantly Available Power Managed Desktop PC Design
ICH	I/O Controller Hub
IDE	Intelligent Drive Electronics
IPSEC	Internet Protocol Security

ISA	Industrial Standard Architecture
LAN	Local Area Network
LSA	LAN Desk Service Agent
MCH	Memory Controller Hub
MMX	MultiMedia eXtension
P64H	PCI64 Hub
PCI	Peripheral Component Interconnect
PXE	Preboot eXecution Environment
RAM	Random Access Memory
RAMDAC	Random Access Memory Digital Analog Converter
RDRAM	Rambus Dynamic Random Access Memory
RIMM	Rambus Inline Memory Module
RPL	Remote Program Load
RTC	Real Time Clock
SB	Soundblaster
SDRAM	Synchronous Dynamic Random Access Memory
SGRAM	Synchronous Graphic Random Access Memory
SIMD	Streaming mode instruction (**S**ingle **I**nstruction **M**ultiple **D**ata)
SMBios	System Management BIOS
SMBus	System Management Bus
SVGA	Super Video Graphic Adapter
USB	Universal Serial Bus
VGA	Video Graphic Adapter
WfM	Wired for Management baseline
WTX	Workstation chassis specification
WOL	Wake on LAN