6515WU
Motherboard Reference

Trademarks

All brand and product names are trademarks or registered trademarks of their respective companies.

Note

The information in this guide is subject to change without notice.

Caution Texts Concerning Lithium Batteries

DANISH
ADVARSEL!
Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.

NORWEGIAN
ADVARSEL:
Eksplosjonsfare ved feilaktig skifte av batteri. Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten. Brukte batterier kasseres i henhold til fabrikantens instruksjoner.

SWEDISH
VARNING:
Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

FINNISH
VAROITUS:
Paristo voi räjätää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan valmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

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

DEUTSCH
VORSICHT:
Explosionsgefahr bei unsachgemäßem Austausch der Batterie. Ersatz nur durch denselben oder einen vom Hersteller empfohlenen gleich-wertigen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

FRENCH
ATTENTION:
Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

Class B Regulations

U. S. A.

Federal Communications Commission Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning:
Use only shielded cables to connect I/O devices to this equipment.
You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

Canada

Canadian Department Of Communications Radio Interference Regulations Class B Compliance Notice

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Important Safety Instructions

- Read all of these instructions.

- Follow all warnings and instructions marked on the product.

- Unplug this product from the wall outlet before installing an add-on card inside this product.

- Do not use this product near water.

- Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.

- Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.

- This product should be operated from the type of power source indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.

- This product is equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug. We recommend using the power cord supplied with the product. However, if another type of power cord is required, power cord H05VV-F should be used.

- Do not allow anything to rest on the power cord. Do not locate this product where persons will walk on the cord.

- Except as explained elsewhere in this manual, do not attempt to service this product yourself.

- Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

  - When the power cord or plug is damaged or frayed.
  - If liquid has been spilled into the product.
  - If the product has been exposed to rain or water.
  - If the product does not operate normally when the operating instructions are followed.
  - If the product has been dropped or the cabinet has been damaged.
  - If the product exhibits a distinct change in performance, indicating a need for service.

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Preface

This manual contains basic information necessary for both the end user and service personnel. Although most of the information you need are contained in this manual, we recommend you to contact an authorized dealer for service purposes. Making personal alterations to the system can violate the effectivity of your warranty.

This manual is divided into five chapters:

- Chapter 1, **Introduction**, lists the specifications and features of the motherboard.

- Chapter 2, **System Components**, describes the functions of the major system components.

- Chapter 3, **Connector and Jumper Definition**, provides the jumper and connector definitions.

- Chapter 4, **CPU and Memory Installation**, contains the CPU and memory installation information.

- Chapter 5, **The SETUP Program**, explains how you can configure your system by running the SETUP program.

Chapter 1
Introduction

This chapter introduces the specifications and the features of the motherboard.

Features

- **66/100/133 FSB Socket 370 CPU Support**

- **AGP Interface**
  The AGP (Accelerated Graphics Port) interface is integrated into the system.

- **Plug and Play support**
  For automatic resource assignment, your system is PnP version 1.01a compliant.

- **Audio subsystem**
  The audio subsystem allows you to easily record, play, and edit music and voice.

- **Video subsystem**
  The video subsystem allows you to easily play video CD, clip files and 3D games.

- **USB port support**
  The Universal Serial Bus standard gives you the benefits of having one single interface for multiple interfaces when low-to-medium speed peripherals are concerned.

- **Power Management**
  Your system can reduce power consumption automatically while it is idle. It also supports the Windows 98/Windows NT 5.0 power management standard - ACPI (Advanced Configuration Power Interface).

Specifications

CPU, Memory, and Main Components

- **CPU**
  66/100/133 FSB Socket 370 microprocessor

- **System Memory**
  Two 168-pin DIMM sockets to support 8/16/32/64/128/256/512MB SDRAM memory modules, configurable up to 512MB

- **ROM BIOS**
  4Mb flash EEPROM, supporting audio, video, security, setup, and power management

Interfaces and Controllers

- **Intel 815 chipset**
  The chipset consists of the Intel 82815 Graphics Memory Controller Hub (GMCH), the Intel 82801AA I/O Controller Hub (ICH), and the Intel 82802AB FirmWare Hub (FWH).

- **Audio Controller**
  Cirrus Logic CS4277-JQ AC97audio CODEC

- **Video Controller**
  Integrated in 82815

- **I/O Interfaces**
  The NS PC87360 Super I/O supports:
  – One standard/ECP/EPP parallel port (DB25-F)
  – Two RS-232C serial ports (DB9-M)
  – One PS/2 keyboard connector (6-pin mini-DIN)
  – One PS/2 mouse connector (6-pin mini-DIN)
  – One VGA port (DB15-F, 3-rows)
  – Two USB connectors on the rear panel
  – Three audio ports for Line-in/Mic-in/Earphone-out (jack)
  – Two PCI-IDE connectors for four IDE devices (jack)
  – One floppy disk drive connector (jack)

- **Expansion Slots**
  – Three PCI slots
  – One AGP slot

Chapter 2
System Components

This chapter introduces the components of the motherboard.

Major Components
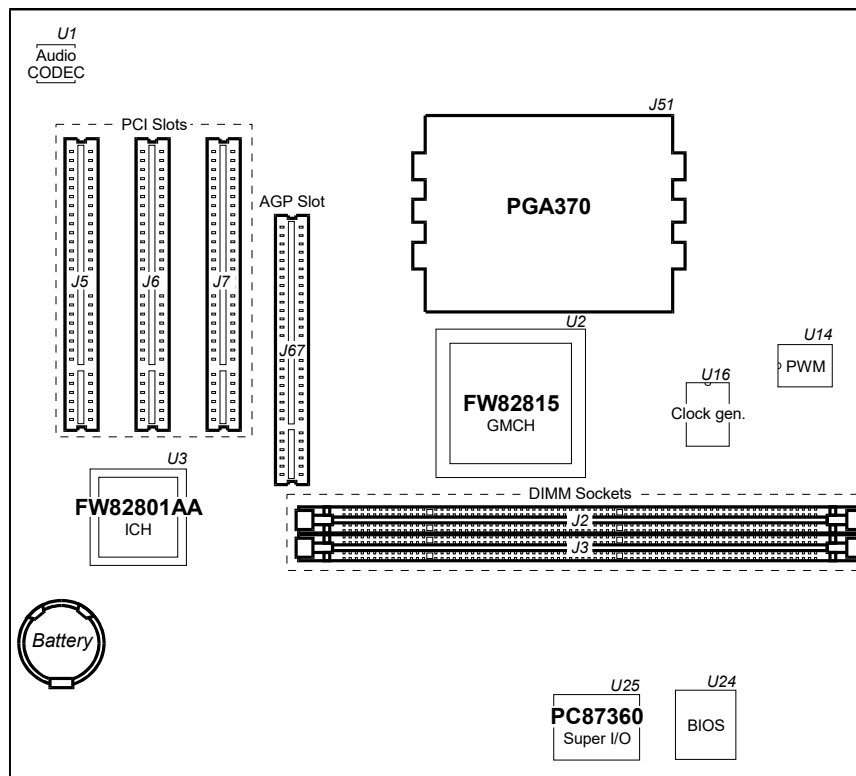
Figure 2-1. Major Components of System Board

Reference	Description	Name

U2	Graphics Memory Controller Hub (GMCH) Controller provides:
	
	• Processor Interface:
	  - Supports Celeron or Pentium III (FC-PGA370) at 66/100/133MHz FSB
	  - GTL+ Compliant host bus
	
	• DRAM Interface:
	  - Supports SDRAM DRAM
	  - Supports 512MB memory using x8, x16, x32, x64 x128, x256 and x512 64-bit SDRAM
	
	• AGP Interface
	  - Supports AGP 2.0 1x/2x/4x operation mode
	
	• Hub Interface:
	  - Private connection between GMCH and ICH
	
	• Power Management:
	  - ACPI rev 1.0 & AP rev 1.2 Compliant support
	
	• IO Device:
	  - 810 ICH
		Intel 82815 (GMCH)

U3	IO Controller Hub (ICH) Controller provides: • PCI Rev 2.2 Compliant with 33 MHz PCI operation support • Bus master IDE controller ultra ATA66 supported. • USB controller • I/O APIC • FWH/LPC interface • IRQ controller • Enhanced DMA controller and timer function • SMBus controller	Intel 82801AA (ICH)
U16	Clock Generator: • Supports spread spectrum modulation • H/W power management scheme • SMBus interface	ICS
U24	Flash ROM: • PLCC 512Kx8 EEPROM for system BIOS, VGA BIOS, Plug & Play configuration tables, and power management • Dynamic detect flash type • Applies different code before flashing	Intel 82802AB (FWH)

(To be continued)

Table 2-1. Major Components Description

(Continued)

Reference	Description	Name

U25	• Super I/O Control:
	
	  - An FDD controller for 360KB, 720KB, 1.2MB, 1.44MB and 2.88MB FDD
	  - 3-mode FDD support
	  - Keyboard controller
	  - ECP/EPP mode support
	  - High speed NS16C550 compatible serial port
		NS PC87360

DIMM1, DIMM2	DIMM sockets: • 64-bit data bus • Two 168-pin 3.3V unbuffered DIMM sockets • Supports PC100/133 SDRAM module • 8, 16, 32, 64, 128, 256 and 512MB DIMM module supported	DIMM
J51	FC-PGA370 66/100/133 Pentium III and Celeron: • MMX technology • Dynamic execution microarchitecture • 32K (16K/16K) non-blocking L1 cache • Integrated 128/256K L2 cache • FC-PGA package	Intel CPU

Table 2-1. Major Components Description

Block Diagram

Intel Pentium III Proessor
or
Intel Celeron Proessor

System Memory

DIMM1   DIMM2

System Bus (66/100/133 MHz)

Intel 815 Chipset

AGP Connector

-AGP Graphies
1X/2X/4X
66/133 MHz

-Display Cache
133MHz

GMCH
Graphies & Memory
Controller Hub)

-Memory Controller
-AGP Controller
-Graphies Controller
-3D Engine
-2D Engine
-Video Engine

64 Bit
100/133MHz

PCI1 PCI2 PCI3

VGA
Connector

2 IDE Ports
Ultra ATA66

PCI Bus

2 USB
Ports   USB

USB

ICH
(I/O Controller Hub)

LAN
Controller

LPC

SUPER //O

FWH
(Firmware Hub)

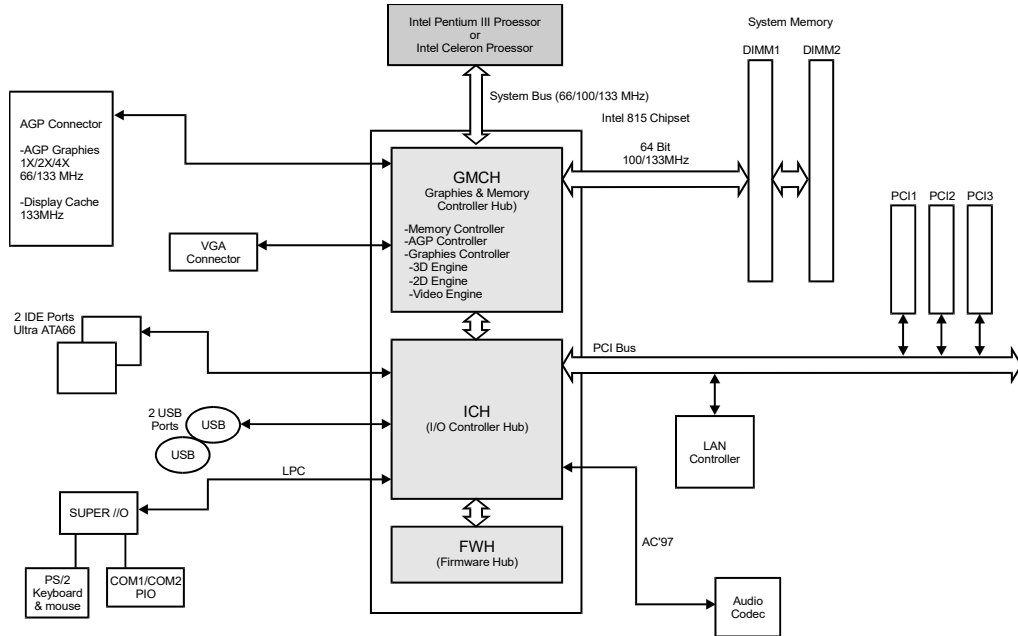AC'97

PS/2
Keyboard
& mouse

COM1/COM2
PIO

Audio
Codec

Figure 2-2. Block Diagram of System Board

Chapter 3
Connector and Jumper Definition

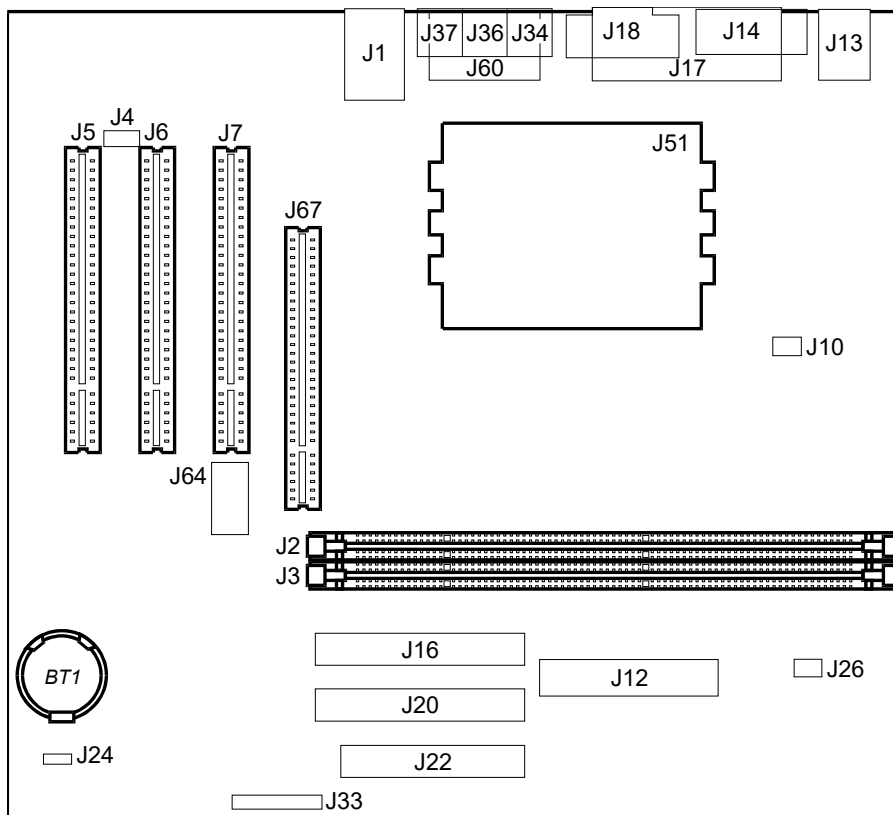This chapter defines the connectors and jumpers on the motherboard.

Figure 3-1. Connector and Jumper Locations

Connector Definitions

Internal Connectors

Connector	Definition
J2, J3	DIMM sockets
J5, J6, J7	PCI slots
J10	CPU fan
J12	ATX power
J16	2nd IDE
J20	1st IDE
J22	FDD
J26	System fan

J33
    1-2-3
    5-6
    7-8
    9-10
	
	Power LED
	HDD LED
	Power button
	Keylock

J51	CPU socket
J64	ATX Riser
J67	AGP slot
BT1	Battery

Table 3-1. Internal Connector Definition

External Connectors

Connector	Definition
J1	USB
J4	CD-in

J13
    upper
    down
	
	PS/2 mouse
	PS/2 keyboard

J14	SIO1
J17	PIO port
J18	VGA
J34	Line-out
J36	Line-in
J37	Mic-in
J60	SIO2

Table 3-2. External Connector Definition

Jumper and Switch Settings

> **NOTE:** Jumpers not described in this chapter are reserved for factory use only. Do not change the default settings.

Switch (J24)	Setting
1	On : Clear configuration Off : normal
2	On : Clear password Off : normal
3	On : Bootblock recovery enabled Off : Bootblock recovery disabled
4	On : SW bootblock protection Off : HW bootblock protection
5	Reserved

Table 3-3. Switch Settings

Chapter 4
CPU and Memory Installation

> **NOTE:** To avoid damage during installation, you are advised to ask your dealer for help.

> **NOTE:** Static electricity can destroy electronic devices. Whenever you handle any option outside of its protective packaging, first discharge any static electricity from your body by touching a protective grounding device or unpainted metal on the rear panel of the system unit.

CPU Installation

To install CPU in a ZIF socket:

1. Find the ZIF socket (J51) on the motherboard. (See p.11.)

2. Lift the ZIF socket arm up to the vertical position.

3. Align the CPU so its Pin 1 corner (beveled corner) is at the Pin 1 corner of the ZIF socket. Then insert the CPU's pins into the corresponding holes in the socket.
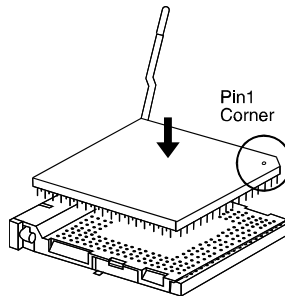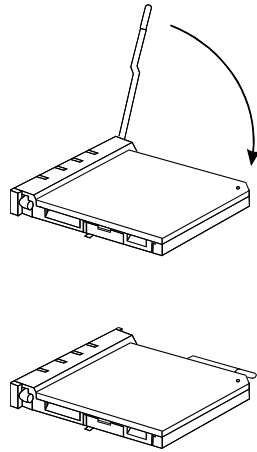

Pin1
Corner

Figure 4-1. Inserting CPU

> **NOTE:**
> *You are suggested to install a cooling fan to cool the CPU.*

4. Press the arm downwards to the horizontal position. You will feel some resistance while doing so. This is normal as the pressure starts to secure the CPU in place.

Figure 4-2. Installing CPU

System Memory Installation

1. Locate the DIMM sockets (J2, J3) on the motherboard.

AGP Slot

J67

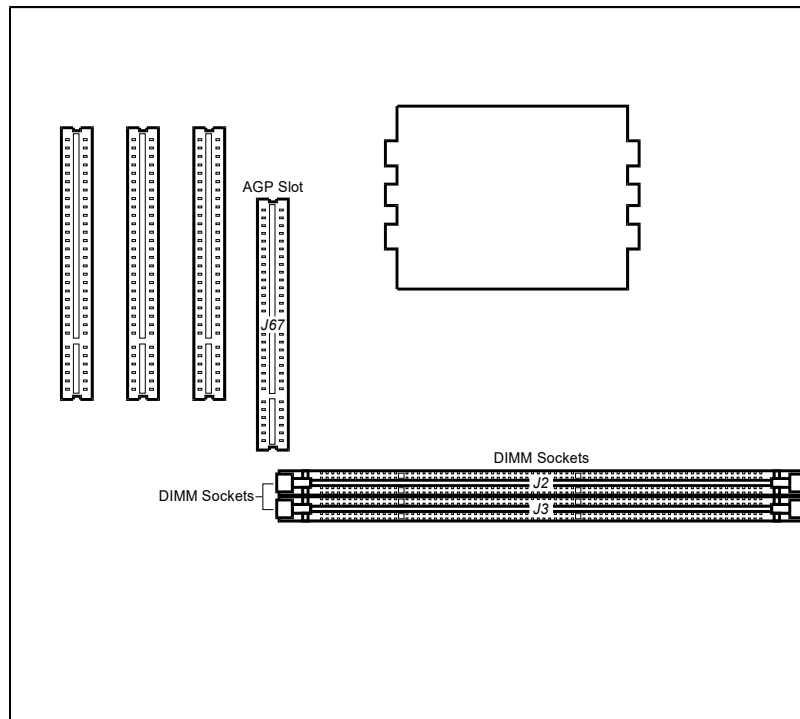DIMM Sockets

DIMM Sockets

J2

J3

Figure 4-3. DIMM Socket Locations

2. Align the DIMM module with the socket and firmly insert the DIMM into the socket. Then, push the plastic clips to snap it into place.
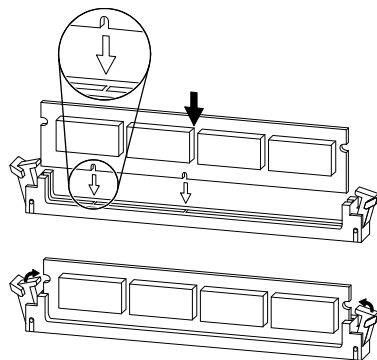
Figure 4-4. Installing DIMM Module

Chapter 5
The SETUP Program

This chapter tells you how to configure your system using the SETUP program.

Introduction

The SETUP program allows you to enter the system configuration information. This information is needed by the system to identify the type of devices installed and to set up special features. Typical configuration information includes the date and time, the type of disk drives, and the amount of memory; special features include security and power savings.

The configuration information is stored in a special kind of memory called CMOS (Complementary Metal Oxide Semiconductor) RAM. CMOS RAM data are backed up by a RTC backup battery.

You may need to run SETUP when:

- You see an error message on the screen requesting you to run SETUP.

- You change factory default settings for some special features.

- You want to modify the configuration information.

Running SETUP and Moving Around

The SETUP program is built into the system board. To run SETUP program, press **[F2]** during system startup.

> **NOTE:**
> The SETUP program may have been updated after this manual was published.

The SETUP program contains five options:

- Main -   Basic system configuration

- Advanced -   Detailed configuration besides basic system configuration, including the configuration of internal chipset

- Boot -   Boot sequence settings

- Power -   Power management settings

- Exit -   Exiting the SETUP program

A brief description of keyboard usage is listed below:

Key	Description
[↑], [↓]	Move the highlight to the previous or the next item.
[Home], [End]	Move the highlight to the first or the last item.
[←], [→]	Move the highlight to the previous or next option.
[+]/[F8], [−]/[F7]	Cycle through the pre-defined values for the selected item. Pressing [+]/[F8] brings up the next value; pressing [−]/[F7] brings up the previous one.
Enter	Select a sub-menu.
[Esc]	1) From the SETUP menu, exit SETUP without saving. 2) From a sub-menu, return to the previous menu.
F9	Load the SETUP default values.
F10	Save the changes and exit SETUP.

Table 5-1. Keyboard Usage in the SETUP Program

In general, you use the **[←]/[→]** arrow keys to highlight options, the **[↑]/[↓]**arrow keys to highlight items, and the **[+]/[−]** keys to change values.

Main

The "Main" option contains the basic configuration settings of the system. The followings describe in sequence all the items of this option.

Date / Time

The date and time might be incorrect when you start up your system for the first time. Enter the correct value for each field. Note that the time is based on a 24-hour format.

Keyboard Features

This item selects the keyboard features, such as *Numlock*, *keyboard auto-repeat rate* and *keyboard auto-repeat delay*. Press **[Enter]** to go to the sub-menus for settings.

CPU Type / CPU Speed / Cache RAM / Base Memory / Extended Memory

These items are not user-definable. They show the system, the extended and the cache memory capacity.

Advanced

The "Advanced" option contains all the items of your system's special enhanced features. The followings describe in sequence all the items of this option.

CPU Bus Ratio

This item allows you to define the CPU bus ratio.

Plug & Play O/S

This item allows you to use an operating system that supports Plug and Play, such as Windows 95.

Reset Configuration Data

This item allows you to clear the system configuration data.

Memory Hole At 15M-16M

This item, when enabled, turns system RAM off to free address space for use with an option card. 1MB extended memory gap, starting at 15MB, will be created in system RAM.

Processor Serial Number

The processor serial number is an electronic number incorporated into latest processors such as the Pentium III. If the user chooses to enable it, the number can serve as a means of identifying his system. It has no effect on Pentium II or Celeron processors.

USB Legacy Mode

This item allows you to enable or disable the support for legacy Universal Serial Bus in no USB-aware operating system like DOS.

Integrated USB Interface

This item allows you to enable or disable the integrated USB interface.

Integrated Audio Interface

This item allows you to enable or disable the integrated audio interface.

Cache Options

This item allows you to enable or disable the internal cache of CPU (L1 cache). The cache feature enhances system performance because the most frequently-used data is accessed from and written to the high-speed cache memory. Press **[Enter]** to go to the sub-menus for settings.

Flexible Disk Drive

This item allows you to configure the floppy disk device and information, such as *Base I/O address* and *Legacy Diskette A*. Press **[Enter]** to go to the sub-menus for settings.

IDE Devices

This item allows you to configure the I/O devices and information, such as *Primary Master*, *Primary Slave*, *Secondary Master*, *Secondary Slave* and *Large Disk Access Mode*. Press **[Enter]** to go to the sub-menus for settings.

Video Options

This item allows you to define the video primary controller. Press **[Enter]** to go to the sub-menus for settings.

Integrated I/O Ports

This item allows you to configure the I/O devices and information, such as *Serial port A*, *Serial port B* and *Parallel port*. Press **[Enter]** to go to the sub-menus for settings.

PCI Configuration

This item allows you to configure the PCI devices. Press **[Enter]** to go to the sub-menus for settings.

Boot

QuickBoot Mode

The "quick boot" mode, when enabled, speeds up the booting procedure by bypassing the memory test.

Boot-time Diagnostic Screen

This item allows you to enable or disable the Diagnostic Screen when the system starts up.

Boot Device Priority

This item sets the search order of the boot devices like *Removable Devices*, *LS, Hard Drive*, *SCSI*, *ATAPI CD-ROM Drive*, and *ZIP*. Press **[Enter]** to go to the sub-menus for settings.

Hard Disk Drives

This item is not user-definable. Press **[Enter]** to go to the sub-menu for the hard disk drive list in this system.

Removable Devices

This item is not user-definable. Press **[Enter]** to go to the sub-menu for the removable device list in this system.

Power

The "Power" option allows you to configure you system to save energy. The followings describe in sequence all the items of this category.

State after Power Failure

This item sets the state that your PC returns to after a power failure. If set to *off*, the PC will not boot after a power failure. If set to *Auto*, the system uses the same power state before power failure.

Advanced Power Management (APM) Mode

Auto Suspend Time Out

This item sets the time-out period for the system to enter Suspend mode if the system has been idle for the set period.

Suspend Wakeup on

This item lets the system monitor the activities on the specific IRQs. Any activity detected wakes up the system from the Suspend mode; if no activity is detected, system will enter the Suspend mode.

Power-up on

This item, when it is set to *enabled*, powers up your system after receiving a signal on the PCI bus. This item is usually used to power up your system with a LAN card.

Advanced Configuration and Power Interface (ACPI) Mode

Suspend to RAM

This item, when it is set to *enabled*, sets the ACPI Suspend type to S3 mode.

Exit

To exit the SETUP program, you can choose *Exit Saving Changes*, *Exit Discarding Changes* or *Load Default Values for all Settings* from the "Exit" option.

Exit Saving Changes

After finished with your settings, you must save and exit SETUP so that the settings can take effect.

Exit Discarding Changes

After finished with your settings, you can exit SETUP without saving so that the settings will not take effect.

Load Default Values for all Settings

After finished with your settings, you can still reload the default SETUP values.