C-P6ND CPU Card

USER'S MANUAL

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The product name and revision number are both printed on the board itself. Manual revisions are released for each board design represented by the digit before and after the period of the manual revision number. Manual updates are represented by the third digit in the manual revision number. For updated BIOS, drivers, or product release information you may visit ASUS' home page at: http://www.asus.com.tw/

Product Name:	**C-P6ND**
Manual Revision:	**1.21**
Release Date:	**October 1996**

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FCC & DOC COMPLIANCE

Federal Communications Commission Statement

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

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 manufacturer's 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:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to 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: The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Canadian Department of Communications Statement

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.

I. INTRODUCTION

How this manual is organized

This manual is divided into the following sections:

I. Introduction: Manual information and checklist
II. Features: Information and specifications concerning this product
III. Installation: Instructions on setting up the ASUS CPU card
IV. BIOS Setup: BIOS software setup information
V. DMI Utility: BIOS supported Desktop Management Interface

Item Checklist

Please check that your package is complete. If you discover damaged or missing items, please contact your retailer.

☑ The ASUS C-P6ND CPU Card

☑ Support drivers and utilities as follows (view FILELIST.TXT for details)
- Flash Memory Writer utility to update the FLASH BIOS
- Desktop Management Interface (DMI) utility
- Bus Master IDE Drivers
- Readme files for descriptions and use of the files
- Technical Support Form

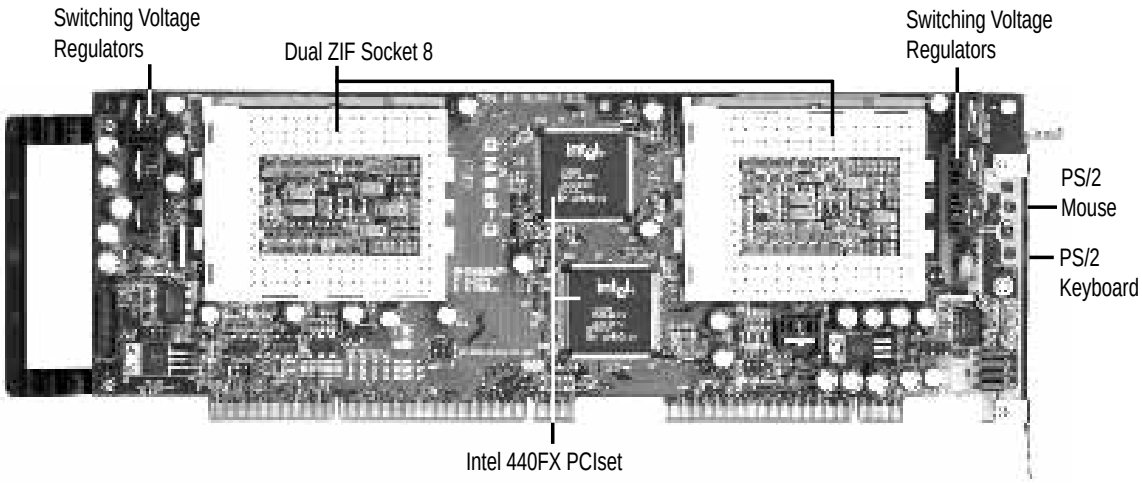
☑ This user's manual

II. FEATURES

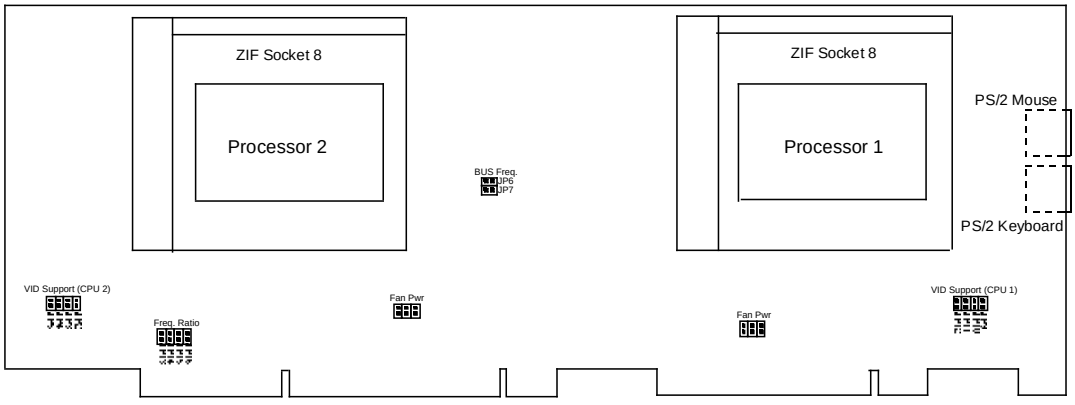
Features of the ASUS CPU Card

The ASUS C-P6ND is carefully designed for the demanding PC user who wants great versatility in the assembly of a computer system. This CPU card:

- **PS/2 Connectors:** PS/2 Mouse & PS/2 Keyboard connectors on bracket.
- **Versatile Processor Support:** Supports dual 150-200MHz Pentium Pro Processor in ZIF socket 8.
- **Intel Chipset:** Features Intel's 440FX PCIset with I/O subsystems.
- **Error Checking and Correcting (ECC):** Using Intel's 440FX PCIset and parity DRAM modules can detect and correct 1 bit memory errors.
- **Internal L2 Cache Support:** Supports Intel CPU's built-in 256KB/512KB (depending on CPU) Level 2 cache so that no external SRAM chips are needed.



Map of the ASUS CPU Card



III. INSTALLATION

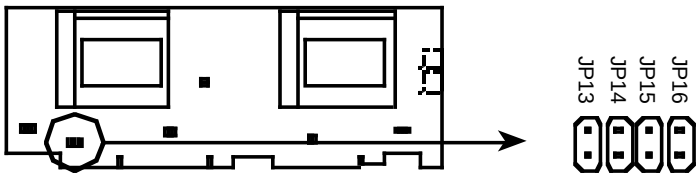
Jumper Settings

1. CPU to BUS Frequency Ratio (JP13, 14, 15, 16)

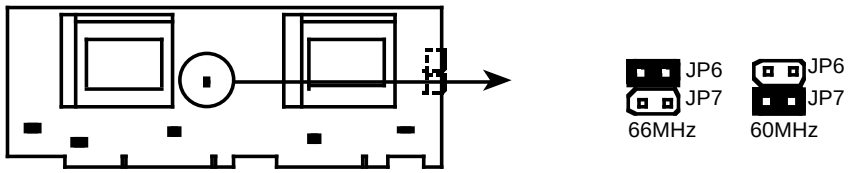
These jumpers set the frequency ratio between the *Internal* frequency of the CPU and the *External* frequency (called the *BUS Clock*) within the CPU. These must be set together with the above jumpers *CPU External (BUS) Frequency Selection*.

2. CPU External (BUS) Frequency Selection (JP6, 7)

These jumpers tells the chipset what frequency the CPU is using.

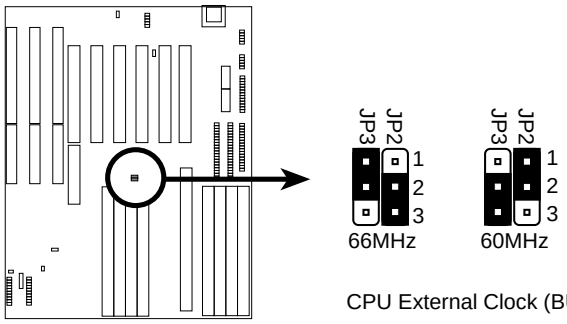


CPU : BUS Frequency Ratio (2.0x, 2.5x, 3.0x, 3.5x, 4.0x)
Both processors must use the same settings.



CPU External Clock (Chipset) Frequency Selection
for 440FX PCIset (BUS Freq. Selection on baseboard)

You must also the the CPU External Frequency on the baseboard as follows:



CPU External Clock (BUS) Frequency Selection

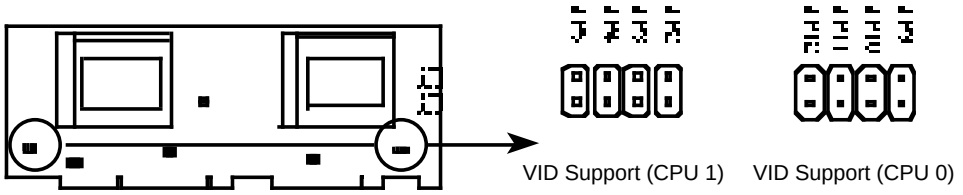
Set the jumpers by the Internal speed of the Intel Pentium Pro CPU as follows:

CPU	BUS	(CPU Card BUS Ratio)				Ext.	(Chipset Freq) (CPU Card)		(CPU Ext. Freq) (Baseboard)	
Internal	**Ratio**	**JP13**	**JP14**	**JP15**	**JP16**	**Freq.**	**JP6**	**JP7**	**JP3**	**JP2**
200MHz	3.0x	[ON]	[ON]	[OFF]	[ON]	66MHz	[ON]	[OFF]	[1-2]	[2-3]
180MHz	3.0x	[ON]	[ON]	[OFF]	[ON]	60MHz	[OFF]	[ON]	[2-3]	[1-2]
166MHz	2.5x	[ON]	[OFF]	[ON]	[ON]	66MHz	[ON]	[OFF]	[1-2]	[2-3]
150MHz	2.5x	[ON]	[OFF]	[ON]	[ON]	60MHz	[OFF]	[ON]	[2-3]	[1-2]

3. Voltage Regulator Output Selection (JP2-5, 9-12)

Pentium Pro Processors may require different voltages. Current processors (marked "Pentium Pro") support VID and will automatically adjust the voltage regulator so that no jumper settings are needed (leave these jumpers open in this case). Older processors without VID support require manual voltage ID setting. Use [S] for Short and [O] or Open.

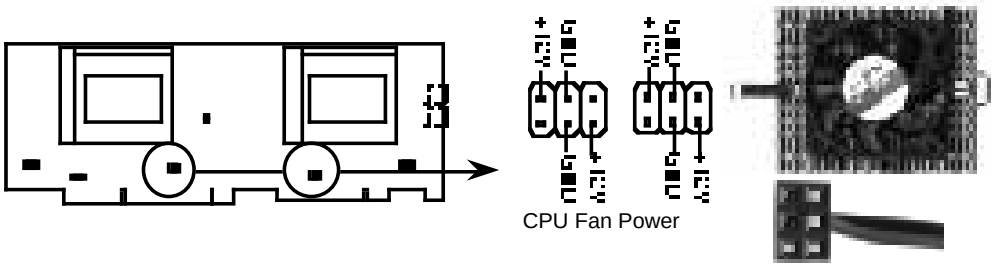
Selections	3.5	3.4	3.3	3.2	3.1	3.0	2.9	2.8	2.7	2.6	2.5	2.4	2.3	2.2	2.1
JP5/9 (VID 0)	[S]	[O]	[S]	[O]	[S]	[O]	[S]	[O]	[S]	[O]	[S]	[O]	[S]	[O]	[S]
JP4/10 (VID 1)	[S]	[S]	[O]	[O]	[S]	[S]	[O]	[O]	[S]	[S]	[O]	[O]	[S]	[S]	[O]
JP3/11 (VID 2)	[S]	[S]	[S]	[S]	[O]	[O]	[O]	[O]	[S]	[S]	[S]	[S]	[O]	[O]	[O]
JP2/12 (VID 3)	[S]	[S]	[S]	[S]	[S]	[S]	[S]	[S]	[O]	[O]	[O]	[O]	[O]	[O]	[O]



4. CPU cooling fan connector (JP1, JP8)

This connector supports a CPU cooling fan of 500mAMP (6WATT) or less. Depending on the fan manufacturer, the wiring may be different. The red wire should be positive, while the black should be ground. Connect the fan to the board taking into consideration the polarity of the connector.

WARNING: Damage may occur to the motherboard and/or the CPU fan if these pins are incorrectly used. These are not jumpers, do not place jumper caps over these pins.



III. INSTALLATION

Software BIOS

The BIOS on the two CPU cards are different. When adding a CPU card, find the BIOS chip that came with the CPU card and replace it with the one on the baseboard if one is present. Use the Flash Memory Writer utility to upgrade the BIOS version from the support diskette provided if necessary. You can find instruction on using the Flash memory Write utility at the end of the BIOS Software section IV.

Power Connection Procedures

1. After all jumpers and connections are made, close the system case cover.
2. Make sure that all switches are in the off position as marked by ○.
3. Connect the power supply cord into the power supply located on the back of your system case as instructed by your system user's manual.
4. Connect all power cords into a power strip that is equipped by a surge protector.
5. You may then turn on your devices in the following order:
   a. Your monitor
   b. External SCSI devices (starting with the last device on the chain)
   c. Your system power
6. The power LED on the front panel of the system case will light and the monitor LED as well. The system will then run power-on tests. While the tests are running, additional messages will appear on the screen. If you do not see anything within 30 seconds from the time you turn on the power, the system may have failed a power-on test. Recheck your jumper settings and connections or call your authorized dealer for assistance.
7. During power-on, hold down the <Delete> key to enter BIOS setup. Follow the next section "BIOS SOFTWARE" for instructions.

IV. BIOS SOFTWARE

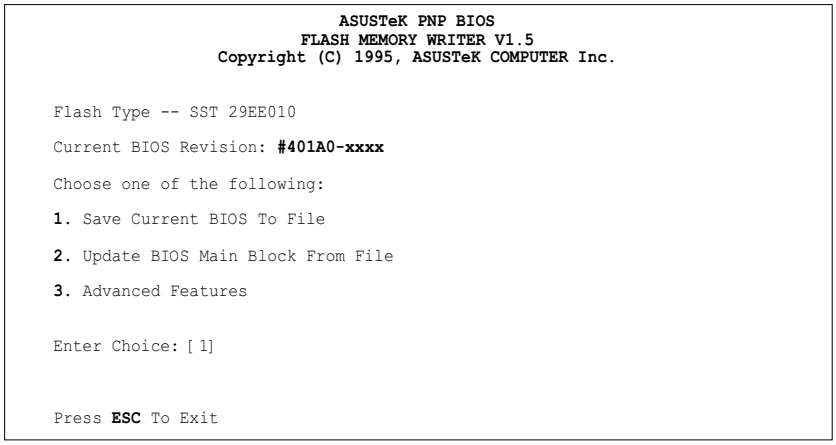
Support Software

FILELIST.TXT - View this file to see the files included in the support software.

PFLASH.EXE - This is the Flash Memory Writer utility that updates the BIOS by uploading a new BIOS file to the programmable flash ROM chip on the motherboard. To determine the BIOS version, check the last four numbers of the code displayed on the upper left-hand corner of your screen during bootup. Larger numbers represent a newer BIOS file.

> **NOTE:** A binary BIOS file is no longer included with the support software. Save the motherboard's BIOS file to a floppy diskette as soon as your system is operational. See "Flash Memory Writer Utility" in this section to "Save Current BIOS to File."

Flash Memory Writer Utility



xxxx denotes the current BIOS version stored in the Flash EPROM

IMPORTANT: Flash Type may also be "INTEL 28F001BXT." If "unknown" is shown after "Flash type --," then this ROM chip is not programmable or not supported with the PnP BIOS and therefore cannot be programmed by the Flash Memory Writer.

Main Menu

1. Save Current BIOS to File (Perform as soon as system is operational)

This option allows you to copy the contents of the Flash memory chip onto a diskette. This gives you a backup copy of the original motherboard BIOS in case you need to re-install it.

Create a bootable system floppy diskette by typing [FORMAT A:/S] from the DOS environment without creating "AUTOEXEC.BAT" and "CONFIG.SYS" files, then save the PFLASH.EXE and the BIOS to the floppy diskette.

2. Update BIOS Main Block from File

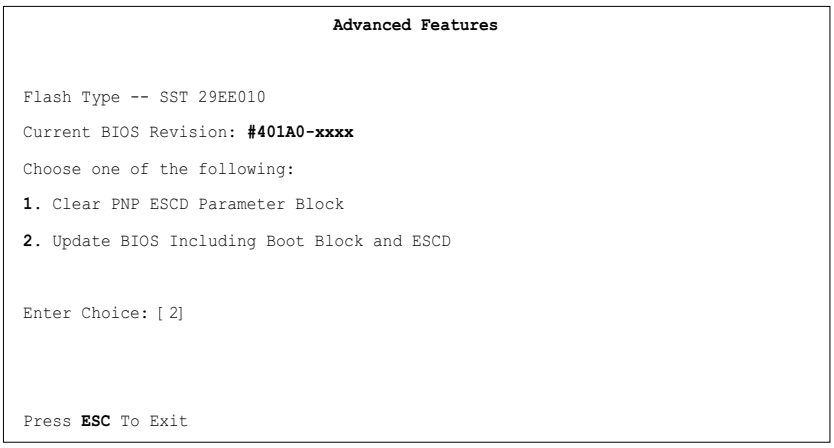
This option updates the BIOS from a file on the disk. This can either be a new file or a backup file created by the "Save Current BIOS to File" option. This will not update the Boot Block if the Boot Block is different. You will be prompted with the following if advanced features if necessary.

```
Boot Block of New BIOS is different from old one !!!
Please Use 'Advanced Feature' to flash whole bios !!!
```

3. Advanced Features

Selecting this option brings up the Advanced Features screen for clearing the PnP configuration record and updating the motherboard BIOS.

Advanced Features Menu



xxxx denotes the current BIOS version stored in the Flash EPROM

1. Clear PNP ESCD Parameter Block

This option erases the Plug-and-Play (PnP) configuration record.

2. Update BIOS Including Boot Block and ESCD

This option updates the Boot Block, the motherboard BIOS and the PnP ESCD Parameter Block from a new BIOS file.

NOTE: "Update BIOS Main Block from File" and "Update BIOS Including Boot Block and ESCD" requires that the system is running in real mode. This utility will not operate if the system is under protected mode or virtual mode. You should boot from a system floppy diskette without "AUTOEXEC.BAT" and "CONFIG.SYS" files.

IV. BIOS SOFTWARE

Updating your Motherboard's BIOS

1. Download an updated BIOS file from Bulletin Board Services (BBS) or the internet (WWW) and save to the diskette you created in step 1 of the Main Menu. See **ASUS CONTACT INFORMATION** on page II.
2. Turn off your computer and open the system cabinet to *Enable* "Boot Block Programming" jumper as shown in section III.
2. Boot from the floppy diskette you created in step 1 of the main menu.
3. At the "A:\" prompt, type: **PFLASH <Enter>**
4. Enter "2" from the Main Menu or "2" from the Advanced Features Menu.
5. The program displays a second screen prompting you for the name of the BIOS file. Type in the complete name of the file, including the file name extension, and then press the <Enter> key. The utility then uploads the BIOS file from disk. The following message will appear:

   DO NOT TURN OFF THE SYSTEM IF THERE IS A PROBLEM!

   If you encounter problems while downloading the new BIOS, DO NOT turn off your system since this might prevent your system from booting up. Just repeat the process, and if the problem still persists, upload the original BIOS file you saved to disk in step 1 of the Main Menu.

> **WARNING:** If the Flash Memory Writer utility was not able to successfully download a complete BIOS file, your system may not be able to boot up. If this happens, your system will require service from your vendor.

6. After successfully downloading the new BIOS file, exit the Flash Memory Writer utility and **then turn off your system**. Set the jumper back to its default setting of Programming "*Disabled*."

7. Turn on your computer and hold down <delete> to enter BIOS setup. **You must select "Setup Default" to affect the new BIOS, then you may set other items from the Main Menu.**

IV. BIOS SOFTWARE

BIOS Setup

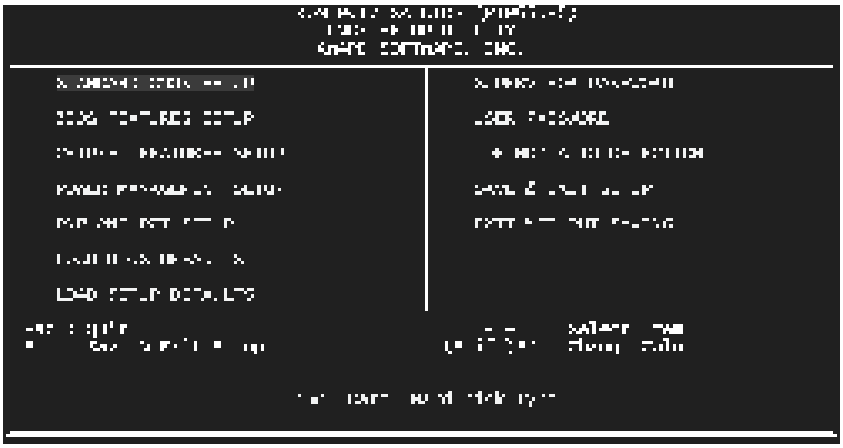
The motherboard supports two programmable Flash ROM chips: 5 Volt and 12 Volt. Either of these memory chips can be updated when BIOS upgrades are released. Use the Flash Memory Writer utility to download the new BIOS file into the ROM chip as described in detail in this section.

All computer motherboards provide a Setup utility program for specifying the system configuration and settings. If your motherboard came in a computer system, the proper configuration entries may have already been made. If so, invoke the Setup utility, as described later, and take note of the configuration settings for future reference; in particular, the hard disk specifications.

If you are installing the motherboard, reconfiguring your system or you receive a Run Setup message, you will need to enter new setup information. This section describes how to configure your system using this utility.

The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the system provides you with the opportunity to run this program. This appears during the Power-On Self Test (POST). Press the <Delete> key to call up the Setup utility. If you are a little bit late pressing the mentioned key(s), POST will continue with its test routines, thus preventing you from calling up Setup. If you still need to call Setup, reset the system by simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys, or by pushing the Reset button on the system case. You can also restart by turning the system off and then back on again. But do so only if the first two methods fail.

When you invoke Setup, the CMOS SETUP UTILITY main program screen will appear with the following options:



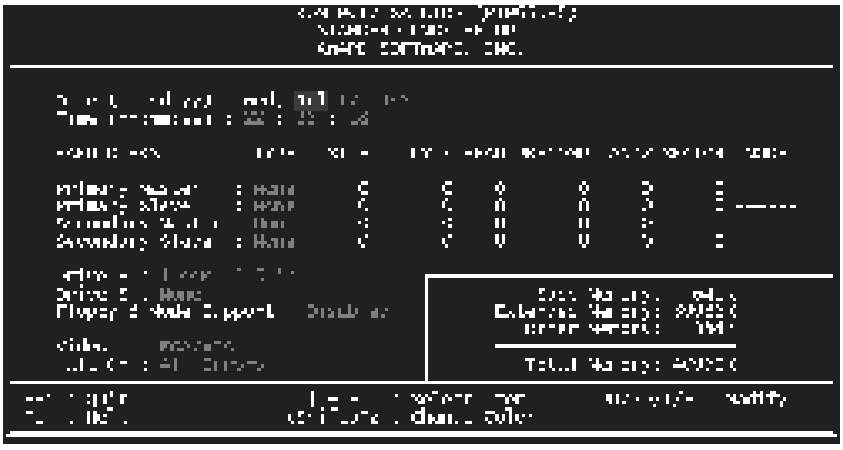
Load Defaults

The "Load BIOS Defaults" option loads the minimized settings for troubleshooting. "**Load Setup Defaults**", on the other hand, is for loading optimized defaults for regular use. Choosing defaults at this level, will modify all applicable settings.

A section at the bottom of the above screen displays the control keys for this screen. Take note of these keys and their respective uses. Another section just below the control keys section displays information on the currently highlighted item in the list.

Standard CMOS Setup

This "Standard CMOS Setup" option allows you to record some basic system hardware configuration and set the system clock and error handling. If the motherboard is already installed in a working system, you will not need to select this option anymore. However, if the configuration stored in the CMOS memory on the board gets lost or damaged, or if you change your system hardware configuration, you will need to respecify the configuration values. The configuration values usually get lost or corrupted when the power of the onboard CMOS battery weakens.



The above screen provides you with a list of options. At the bottom of this screen are the control keys for use on this screen. Take note of these keys and their respective uses.

User-configurable fields appear in a different color. If you need information on the selected field, press the <F1> key. The help menu will then appear to provide you with the information you need. The memory display at the lower right-hand side of the screen is read-only and automatically adjusts accordingly.

Details of Standard CMOS Setup:

Date

To set the date, highlight the "Date" field and then press the page up/page down or +/- keys to set the current date. Follow the month, day and year format. Valid values for month, day and year are:

Month:	**1 to 12**
Day:	**1 to 31**
Year:	**up to 2099**

Time

To set the time, highlight the "Time" field and then press the page up/page down or +/- keys to set the current time. Follow the hour, minute and second format. Valid values for hour, minute and second are:

Hour:	**00 to 23**
Minute:	**00 to 59**
Second:	**00 to 59**

You can bypass the date and time prompts by creating an AUTOEXEC.BAT file. For information on how to create this file, please refer to the MS-DOS manual.

Hard Disk Drives

This field records the specifications for all non-SCSI hard disk drives installed in your system. The onboard PCI IDE connectors provide Primary and Secondary channels for connecting up to four IDE hard disks or other IDE devices. Each channel can support up to two hard disks; the first of which is the "master" and the second is the "slave".

Specifications for SCSI hard disks need not to be entered here since they operate using device drivers and are not supported by any the BIOS. If you install the optional PCI-SC200 SCSI controller card into the motherboard (see section VI for instructions). If you install other vendor's SCSI controller card, please refer to their respective documentations on how to install the required SCSI drivers.

For IDE hard disk drive setup, you can:

- Use the *Auto* setting for detection during bootup.
- Use the IDE HDD AUTO DETECTION in the main menu to automatically enter the drive specifications.
- Enter the specifications yourself manually by using the "User" option.

The entries for specifying the hard disk type include **CYLS** (number of cylinders), **HEAD** (number of read/write heads), **PRECOMP** (write precompensation), **LANDZ** (landing zone), **SECTOR** (number of sectors) and **MODE**. The **SIZE** field automatically adjusts according to the configuration you specify. The documentation that comes with your hard disk should provide you with the information regarding the drive specifications.

The **MODE** entry is for IDE hard disks only, and can be ignored for MFM and ESDI drives. This entry provides three options: *Normal*, *Large*, *LBA*, or *Auto* (see below). Set **MODE** to the *Normal* for IDE hard disk drives smaller than 528MB; set it to *LBA* for drives over 528MB that support Logical Block Addressing (LBA) to allow larger IDE hard disks; set it to *Large* for drives over 528MB that do not support LBA. *Large* type of drive can only be used with MS-DOS and is very uncommon. Most IDE drives over 528MB support the *LBA* mode.

Auto detection of hard disks on bootup

For each field: Primary Master, Primary Slave, Secondary Master, and Secondary Slave, you can select *Auto* under the TYPE and MODE fields. This will enable auto detection of your IDE drives during bootup. This will allow you to change your hard drives (with the power off) and then power on without having to reconfigure your hard drive type. If you use older hard drives which do not support this feature, then you must configure the hard drive in the standard method as described above by the "User" option.

NOTE: After the IDE hard disk drive information has been entered into BIOS, new IDE hard disk drives must be partitioned (such as with FDISK) and then formatted before data can be read from and write on. Primary IDE hard disk drives must have its partition set to *active* (also possible with FDISK).

Drive A, Drive B
These fields record the types of floppy disk drives installed in your system. The available options for drives A and B are:

360KB, 5.25 in.
1.2MB, 5.25 in.
720KB, 3.5 in.
1.44MB, 3.5 in.
2.88MB, 3.5 in.
None

To enter the configuration value for a particular drive, highlight its corresponding field and then select the drive type using the left- or right-arrow key.

Floppy 3 Mode Support
This is the Japanese standard floppy drive. The standard stores 1.2MB in a 3.5" diskette. This is normally disabled but you may choose from either:

Drive A
Drive B
Both
Disabled (Default)

Video
Set this field to the type of video display card installed in your system. The options are:

EGA/VGA (Default)
Mono (for Hercules or MDA)
CGA 40
CGA 80

If you are using a VGA or any higher resolution card, choose the "EGA/VGA" option.

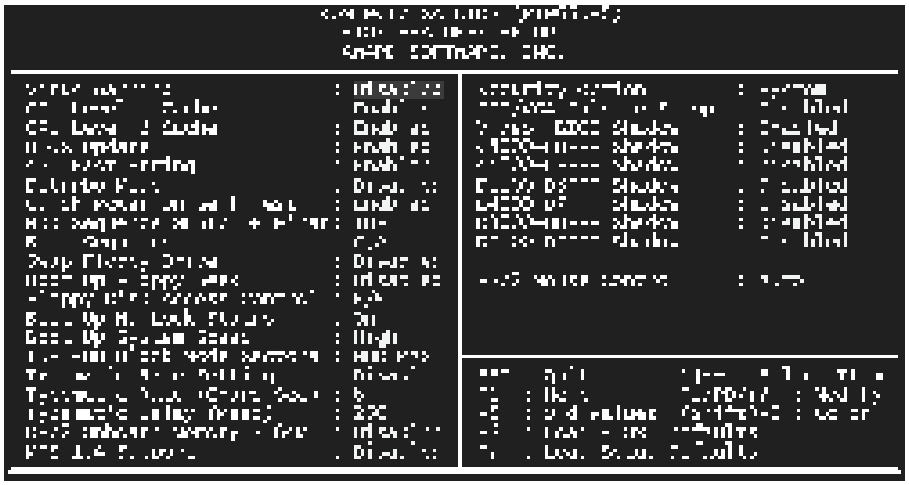
Halt On
This field determines which types of errors will cause the system to halt.

All Errors (Default)
No Errors
All, But Keyboard
All, But Diskette
All, But Disk/Key

IV. BIOS SOFTWARE

BIOS Features Setup

This "BIOS Features Setup" option consists of configuration entries that allow you to improve your system performance, or let you set up some system features according to your preference. Some entries here are required by the motherboard's design to remain in their default settings.



A section at the lower right of the screen displays the control keys you can use. Take note of these keys and their respective uses. If you need information on a particular entry, highlight it and then press the <F1> key. A pop-up help menu will appear to provide you with the information you need. To load the last set values, press the <F5> key. <F6> and <F7> load the BIOS default values and Setup default values, respectively.

Details of BIOS Features Setup:

Virus Warning

This field protects the boot sector and partition table of your hard disk against accidental modifications. Any attempt to write to them will cause the system to halt and display a warning message. If this occurs, you can either allow the operation to continue or use a bootable virus-free floppy disk to reboot and investigate your system. The default setting is ***Disabled***. This setting is recommended because conflicts with new operating systems. Installation of new operating systems require that you disable this to prevent write errors.

CPU Level 1 Cache / CPU Level 2 Cache

These fields allow you to choose from the default of ***Enable*** or choose *Disable* to turn on or off the CPU's Level 1 and Level 2 built-in cache.

BIOS Update

This functions as an update loader integrated into the BIOS to correct specific versions of the Pentium Pro processor. The BIOS will load the update on all processors during system bootup in the default position of ***Enabled***.

CPU Fast String
Leave on default setting of ***Enabled*** for best performance.

Deturbo Mode
When *Enabled*, FLUSH# signal is held asserted to disable caching and the P6 bus pipeline will be stalled. This allows software to run at a reduced-speed. The default is set to ***Disabled*** to allow maximum processing speed.

Quick Power On Self Test
This field speeds up the Power-On Self Test (POST) routine by skipping retesting a second, third, and forth time. Setup default setting for this field is ***Enabled***. A complete test of the system is done on each test.

HDD Sequence SCSI/IDE First (New Feature!)
When using both SCSI and IDE hard disk drives, IDE is always the boot disk using drive letter C (default setting of ***IDE***). This new feature allows a SCSI hard disk drive to be the boot disk when set to *SCSI*. This allows multiple operating systems to be used on both IDE and SCSI drives or the primary operating system to boot using a SCSI hard disk drive.

Boot Sequence
This field determines where the system looks first for an operating system. Options are *C,CDROM,A*; *CDROM,C,A*; *A,C*; *C,A* The setup default setting is to check first the hard disk and then the floppy drive; that is, ***C, A***.

Swap Floppy Drive
When enabled, the BIOS swaps floppy drive assignments so that Drive A becomes Drive B, and Drive B becomes Drive A under DOS. By setup default, this field is set to ***Disabled***.

Boot Up Floppy Seek
When enabled, the BIOS will seek the floppy "A" drive one time. By setup default, this field is set to ***Disabled***.

Floppy Disk Access Control
This allows protection of files from the computer system to be copied to floppy drives by allowing the setting of *Read Only* to only allow reads from the floppy but not writes. The setup default ***R/W*** allows both reads and writes.

Boot Up NumLock Status
This field enables users to activate the Number Lock function upon system boot. The setup default setting for this field is ***On***.

Boot Up System Speed
This has not function and should be left at the setup default of ***High***.

IDE HDD Block Mode Sectors
This field enhances hard disk performance by making multi-sector transfers instead of one sector per transfer. Most IDE drives, except older versions, can utilize this feature. By setup default, this field is set to ***HDD MAX***, other selections are *Disabled 2, 4, 8, 16,* and *32*.

Typematic Rate (Chars/Sec)
This field controls the speed at which the system registers repeated keystrokes. Options range from 6 to 30 characters per second. Setup default setting is ***6;*** other settings are ***8, 10, 12, 15, 20, 24,*** and ***30***. O

Typematic Delay (Msec)
This field sets the time interval for displaying the first and second characters. Four delay rate options are available: 250ms, 500ms, 750ms and 1000ms. Setup default value is ***250ms***.

Security Option
This field determines when the system prompts for the password. The default setting is ***System***, where the system prompts for the User Password every time you boot up. The other option is *Setup*, where the system always boots up, and prompts for the Supervisor Password only when the Setup utility is called up. You can specify a password by using the *Supervisor Password* or *User Password* option from the main screen as explained later in this section.

OS/2 Onboard Memory > 64M
When using OS/2 operating systems with installed DRAM of greater than 64MB, you need to *Enable* this option otherwise leave this on the setup default of ***Disabled***.

MPS 1.4 Support
MPS 1.4 is Intel's new Multi-Processor Specification. Some MP operating system still cannot support it. If your MP operating system cannot support MPS 1.4, you must leave this feature on the default of ***Disabled***.

PCI/VGA Palette Snoop
Some display cards that are non-standard VGA such as graphics accelerators or MPEG Video Cards may not show colors properly. The setting *Enabled* should correct this problem. Otherwise leave this on the setup default setting of ***Disabled***.

Video BIOS Shadow
This field allows you to change the video BIOS location from ROM to RAM. Relocating to RAM enhances system performance, as information access is faster than the ROM. Setup default setting is ***Enabled***.

C8000-CBFFF to DC000-DFFFF
These fields are used for shadowing other expansion card ROMs. If you install other expansion cards with ROMs on them, you will need to know which addresses the ROMs use to shadow them specifically. Shadowing a ROM reduces the memory available between 640KB and 1024KB by the amount used for this purpose. Leave on default setting of ***Disabled***.

PS/2 Mouse Control
The default of ***Auto*** allows the system to detect a PS/2 Mouse on bootup. If detected, IRQ12 will be used for the PS/2 Mouse. IRQ12 will be reserved for expansion cards if a PS/2 Mouse is not detected. *Disabled* will reserve IRQ12 for expansion cards and therefore the PS/2 Mouse will not function.

Chipset Features Setup

This "Chipset Features Setup" option controls the configuration of the board's Chipset. Control keys for this screen are the same as for the previous screen.

Auto Configuration
The default setting of ***60ns DRAM*** sets the optimal timings for items 2 through 6 for 60ns DRAM modules. If you are using 70ns DRAM modules, you must change this item to *70ns DRAM*. Select *Disabled* to change items 2 through 6. See pages 12-13 for DRAM installation information.

DRAM Refresh Type
Leave on default setting of ***RAS Only*** as this is the current DRAM standard (otherwise CBR).

CPU-to-PCI IDE Posting
Leave on default setting of ***Enabled*** so that the CPU to PCI IDE posting cycles are treated as normal I/O write transactions.

USWC Write Posting
Leave on default setting of ***Enabled*** to allow USWC write posting during I/O bridge access.

CPU-to-PCI Write Post
The default setting of ***Enabled*** will increase the efficiency of the PCI bus and speed up the execution in the processor.

PCI-to-DRAM Pipeline
The default of ***Enabled*** will increase the bandwidth of the path between the PCI and the DRAM to enhance the PCI bus efficiency and DRAM accessing.

PCI Burst Write Combining
The default setting of ***Enabled*** will increase the efficiency of PCI bus by combining several CPU to PCI write cycles into one. VGA performance is increased by this action.

Read-Around-Write
The default setting of ***Enabled*** will increase the execution efficiency of the processor. It allows the processor to execute read commands out of order if there is no dependence between these read and other write commands.

16-bit I/O Recovery Time
Timing for 16-bit ISA cards (leave on default setting of ***1 BUSCLK***)

8-bit I/O Recovery Time
Timing for 8-bit ISA cards (leave on default setting of ***1 BUSCLK***)

Video Memory Cache Mode
USWC (uncacheable, speculative write combining) is a new cache technology for the video memory of the Pentium Pro processor. It can greatly improve the display speed by caching the display data. You must leave this on the default setting of ***UC*** (uncacheable) if your display card cannot support this feature or else your system may not boot.

Memory Hole at 15M - 16M
Enabling this features reserves 15MB to 16MB memory address space to ISA expansion cards that specifically require this setting. This makes the memory from 15MB and up unavailable to the system. Expansion cards can only access memory up to 16MB. The default is ***Disabled***.

[DRAM and ECC]
If all your DRAM modules have parity chips (e.g. 8 chips + 4 parity chips), they are considered 36bits. This motherboard sums the memory per bank and therefore two modules will give 72bits and the following will be displayed:

If your DRAM modules do not have parity chips (e.g. 8 chips), they are considered 32bits and the following will be displayed instead:

The default of ***Disabled*** for **Data Integrity** will not show memory errors on your monitor. When using parity DRAM modules, you can select *ECC* (Error Checking and Correcting) to correct 1 bit memory errors that may occur in the memory, otherwise ***Parity*** is the default. (See pages 12-13 for more information on DRAM memory modules.)

Onboard FDC Controller
When enabled, this field allows you to connect your floppy disk drives to the onboard floppy drive connector instead of a separate controller card. If you want to use a different controller card to connect the floppy drives, set this field to "Disabled". Default setting is ***Enabled***.

Onboard FDC Swap A: B:
This field reverses the drive letter assignments of your floppy disk drives in the *Swap AB* setting, otherwise leave on the default setting of ***No Swap***. This works separately from the BIOS Features floppy disk swap feature. It is functionally the same as physically interchanging the connectors of the floppy disk drives.

Onboard Serial Port 1
Settings are ***3F8H/IRQ4*** (default), *2F8H/IRQ3, 3E8H/IRQ4, 2E8H/IRQ10,* and *Disabled* for the onboard serial connector.

Onboard Serial Port 2
Settings are *3F8H/IRQ4,* ***2F8H/IRQ3*** (default), *3E8H/IRQ4, 2E8H/IRQ10,* and *Disabled* for the onboard serial connector.

Onboard Parallel Port
This field sets the address of the onboard parallel port connector. You can select either: *3BCH / IRQ 7,* ***378H / IRQ 7*** (default), *278H / IRQ 5, Disabled.* If you install an I/O card with a parallel port, ensure that there is no conflict in the address assignments. The PC can support up to three parallel ports as long as there are no conflicts for each port.

Parallel Port Mode
This field allows you to set the operation mode of the parallel port. The setting *Normal*, allows normal-speed operation but in one direction only; *EPP* allows bidirectional parallel port operation at maximum speed; *ECP* allows the parallel port to operate in bidirectional mode and at a speed faster than the maximum data transfer rate; ***ECP+EPP*** (default) allows normal speed operation in a two-way mode.

ECP DMA Select
This selection is available only if you select *ECP* or *ECP+EPP* in the **Parallel Port Mode**. Select either DMA Channel *1,* ***3*** (default), or *Disable*.

UART2 Use Infrared
When enabled, this field activates the onboard infrared feature and sets the second serial UART to support the infrared module connector on the motherboard. If your system already has a second serial port connected to the onboard COM2 connector, it will no longer work if you enable the infrared feature. By default, this field is set to ***Disabled***, which leaves the second serial port UART to support the COM2 serial port connector. See section III of the baseboard manual for the **IrDA-compliant infrared module connector.**

Onboard PCI IDE Enable
You can select to enable the *primary* IDE channel, *secondary* IDE channel, ***both*** (default), or *disable* both channels (for systems with only SCSI drives).

IDE 0 Master/Slave Mode, IDE 1 Master/Slave Mode
Each channel (0 and 1) has both a master and a slave making four IDE devices possible. Because each IDE device may have a different Mode timing (*0, 1, 2, 3, 4*), it is necessary for these to be independent. The default setting of ***Auto*** will allow auto-detection to ensure the optimal performance.

Power Management Setup

This "Power Management Setup" option allows you to reduce power consumption. This feature turns off the video display and shuts down the hard disk after a period of inactivity.

Details of Power Management Setup:

Power Management

This field acts as the master control for the power management modes. There are four options: *Max Saving, Min Saving, Disabled,* and ***User Defined***. *Max Saving* puts the system into power saving mode after a brief period of system inactivity; *Min Saving* is almost the same as *Max Saving* except that this time the system inactivity period is longer; *Disabled* disables the power saving features; ***User Defined*** allows you to set power saving options according to your preference.

IMPORTANT: Advanced Power Management (APM) should be installed to keep the system time updated when the computer enters suspend mode activated by the BIOS Power Management. For DOS environments, you need to add DEVICE=C:\DOS\POWER.EXE in you CONFIG.SYS. For Windows 3.1x and Windows 95, you need to install Windows including the APM feature. A battery and power cord icon labeled "Power" will appear in the "Control Panel." Choose "Advanced" in the Power Management Field.

Video Off Option

This field determines when to activate the video off feature for monitor power management. The settings are ***Susp, Stby->Off*** *(default), Suspend->Off, Always on,* and *All modes->off.*

Video Off Method
This field defines the video off features. Three options are available: ***V/H SYNC + Blank***, *DPMS*, and *Blank Only*. The first option, which is the default setting, blanks the screen and turns off vertical and horizontal scanning; *DPMS* (acronym for Display Power Management System) allows the BIOS to control the video display card if it supports the DPMS feature; *Blank Screen* only blanks the screen. Use the latter for monitors that do not support the "Green" (no power management) feature.

Take note that a screen saver software does not work with this feature. While the monitor is shut off, this software cannot display.

Suspend Switch
This field enables or disables the SMI connector on the motherboard. This connector connects to the lead from the Suspend switch mounted on the system case. Default setting for this field is ***Enabled***.

Doze Speed, Stdby Speed
These two fields set the CPU speed during each mode. The number indicates what the normal CPU speed is divided by.

PM Timers
This section controls the time-out settings for the Power Management scheme. The fields included in this section are "HDD Power Down", which places the hard disk into its lowest power consumption mode, and the Doze, Standby and Suspend system inactivation modes.

The system automatically "wakes up" from any power saving mode when there is system activity such as when a key is pressed from the keyboard, or when there is activity detected from the enabled IRQ channels.

"HDD Power Down" shuts down any IDE hard disk drives in the system after a period of inactivity. This time period is user-configurable to "1-15 Mins or "Disable." This feature does not affect SCSI hard drives.

The "Doze Mode", "Standby Mode" and "Suspend Mode" fields set the period of time after which each of these modes activate. At "Max Saving", these modes activate sequentially (in the given order) after one minute; at "Min Saving" after one hour.

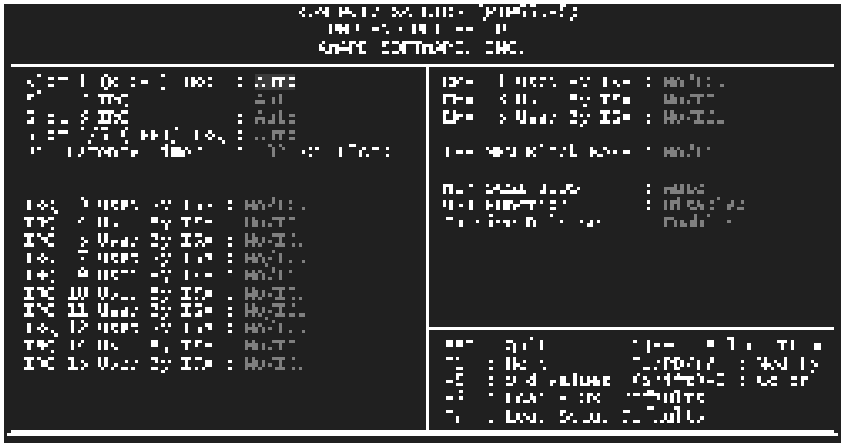
PM Events
This section sets the wake-up call of the system. If activity is detected from any enabled IRQ channels in the left-hand group, the system wakes up from suspended mode. You can enable power management for IRQs 3 ~ 15 individually in the list at the right of the screen. The power management feature will work on the enabled IRQ channels.

Take note that a Microsoft serial mouse or compatible will use either COM1 (IRQ4) or COM2 (IRQ3), and a PS/2 mouse will use IRQ12. If you know which IRQ your mouse is using, you can enable the Wake-up Event for that IRQ here and the system will wake up when you move the mouse or click its button.

IRQ3 to IRQ15
You can set IRQs 3 ~ 15 individually. Activity detected from any enabled IRQ channel will wake up the system.

PNP and PCI Setup

This "PNP and PCI Setup" option configures the PCI bus slots. All PCI bus slots on the system use INTA#, thus all installed PCI cards must be set to this value.



The first four fields on the screen set how IRQ is assigned for each PCI slot. The default setting for each field is "Auto", which uses auto-routing to determine IRQ use. The other options are manual settings of "9", "10", "11", "12", "14" or "15" for each slot.

PCI Latency Timer
The default setting of "32 PCI Clock" enables maximum PCI performance for this motherboard.

IRQ xx Used By ISA

These fields indicate whether or not the displayed IRQ for each field is being used by a Legacy (non-PnP) ISA card. Two options are available: ***No/ICU*** and *Yes*. The first option, the default value, indicates either that the displayed IRQ is not used or an ISA Configuration Utility (ICU) is being used to determine if an ISA card is using that IRQ. If you install a Legacy ISA card that requires a unique IRQ, and you are not using an ICU, you must set the field for that IRQ to *Yes*.

For example: If you install a Legacy ISA card that requires IRQ 10, then set **IRQ10 Used By ISA** to *Yes*.

DMA x Used By ISA

These fields indicate whether or not the displayed DMA channel for each field is being used by a Legacy (non-PnP) ISA card. Available options include: ***No/ICU*** and *Yes*. The first option, the default setting, indicates either that the displayed DMA channel is not used or an ICU is being used to determine if an ISA card is using that channel. If you install a Legacy ISA card that requires a unique DMA channel, and you are not using an ICU, you must set the field for that channel to *Yes*.

ISA MEM Block BASE

This field allows you to set the base address and block size of a Legacy ISA card that uses any memory segment within the C800H and DFFFH address range. If you have such a card, and you are not using an ICU to specify its address range, select a base address from the six available options; the **ISA MEM Block SIZE** field will then appear for selecting the block size. If you have more than one Legacy ISA card in your system that requires to use this address range, you can increase the block size to either 8K, 16K, 36K, or 64K.

If you are using an ICU to accomplish this task, leave **ISA MEM Block BASE** to its default setting of ***No/ICU***.

NCR SCSI BIOS

The default uses ***Auto*** settings for the onboard NCR SCSI BIOS (see section VI). If you wish not to use the onboard NCR SCSI BIOS, choose *Disabled*

USB Function

This motherboard supports Universal Serial Bus (USB) devices but current operating systems do not. The default is set to ***Disabled*** until support disks and USB devices are available in which time you can set this function to *Enabled*.

Passive Release

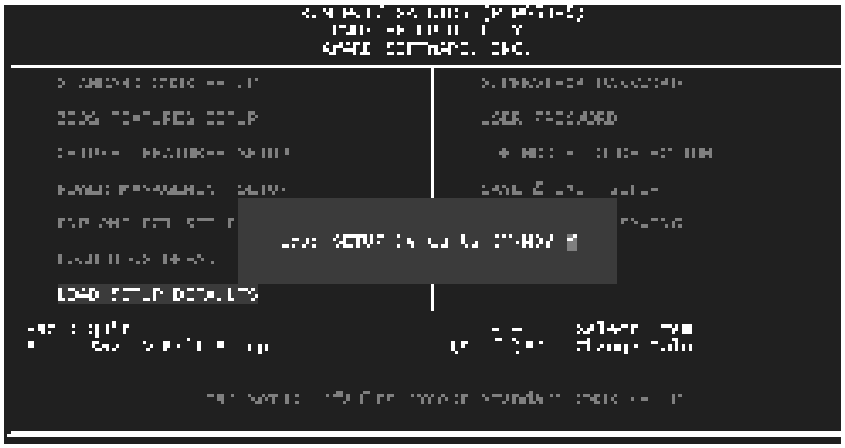
This function allows the passive release to be ***Enabled*** or *Disabled*. The default setting of ***Enabled*** allows better performance.

Load BIOS Defaults

This "Load BIOS Defaults" option allows you to load the troubleshooting default values permanently stored in the BIOS ROM. These default settings are non-optimal and disable all high performance features. To load these default settings, highlight "Load BIOS Defaults" on the main screen and then press the <Enter> key. The system displays a confirmation message on the screen. Press the <Y> key and then the <Enter> key to confirm. Press the <N> key and then the <Enter> key to abort. This feature does not affect the fields on the Standard CMOS Setup screen.

Load Setup Defaults

This "Load Setup Defaults" option allows you to load the default values to the system configuration fields. These default values are the optimized configuration settings for the system. To load these default values, highlight "Load Setup Defaults" on the main screen and then press the <Enter> key. The system displays a confirmation message on the screen. Press the <Y> key and then the <Enter> key to confirm. Press the <N> key and then the <Enter> key to abort. This feature does not affect the fields on the Standard CMOS Setup screen.



Supervisor Password and User Password

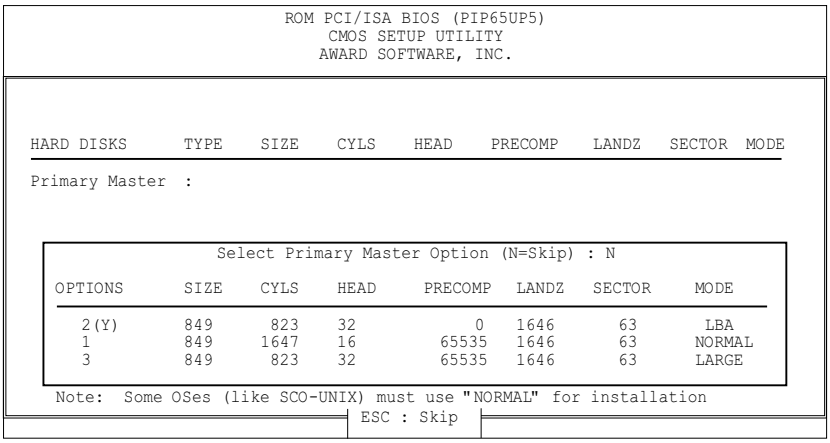
These two options set the system passwords. "Supervisor Password" sets a password that will be used to protect the system and the Setup utility; "User Password" sets a password that will be used exclusively on the system. By default, the system comes without any passwords. To specify a password, highlight the type you want and then press the <Enter> key. A password prompt appears on the screen. Taking note that the password is case sensitive, and can be up to 8 alphanumeric characters long, type in your password and then press the <Enter> key. The system confirms your password by asking you to type it again. After setting a password, the screen automatically reverts to the main screen.

To implement the password protection, specify in the "Security Option" field of the BIOS Features Setup screen when the system will prompt for the password. If you want to disable either password, press the <Enter> key instead of entering a new password when the "Enter Password" prompt appears. A message confirms the password has been disabled.

NOTE: If you forget the password, see "CMOS RAM" jumper in baseboard manual for procedures on clearing the CMOS.

IDE HDD Auto Detection

This "IDE HDD Auto Detection" option detects the parameters of an IDE hard disk drive, and automatically enters them into the Standard CMOS Setup screen.



Up to four IDE drives can be detected, with parameters for each listed inside the box. To accept the optimal entries, press the <Y> key or else select from the numbers displayed under the OPTIONS field (2, 1, 3 in this case); to skip to the next drive, press the <N> key. If you accept the values, the parameters will appear listed beside the drive letter on the screen. The process then proceeds to the next drive letter. Pressing the <N> key to skip rather than to accept a set of parameters causes the program to enter zeros after that drive letter.

Remember that if you are using another IDE controller that does not feature Enhanced IDE support for four devices, you can only install two IDE hard disk drives. Your IDE controller must support the Enhanced IDE features in order to use Drive E and Drive F. The onboard PCI IDE controller supports Enhanced IDE, with two connectors for connecting up to four IDE devices. If you want to use another controller that supports four drives, you must disable the onboard IDE controller in the Chipset Features Setup screen.

When auto-detection is completed, the program automatically enters all entries you accepted on the field for that drive in the Standard CMOS Setup screen. Skipped entries are ignored and are not entered in the screen.

If you are auto-detecting a hard disk that supports the LBA mode, three lines will appear in the parameter box. Choose the line that lists LBA for an LBA drive. Do not select Large or Normal.

The auto-detection feature can only detect one set of parameters for a particular IDE hard drive. Some IDE drives can use more than one set. This is not a problem if the drive is new and there is nothing on it. However, if the drive is already formatted when you install it and different parameters than those detected were used, you will need to enter them manually yourself.

If the parameters listed differ from the ones used when the drive was formatted, the drive will not be readable. If the auto-detected parameters do not match the ones that should be used for your drive, do not accept them. Press the <N> key to reject the presented settings and enter the correct ones manually from the Standard CMOS Setup screen.

Save and Exit Setup

Select this option to save into the CMOS memory all modifications you specify during the current session. To save the configuration changes, highlight the "Save & Exit Setup" option on the main screen and then press the <Enter> key.

Exit Without Saving

Select this option to exit the Setup utility without saving the modifications you specify during the current session. To exit without saving, highlight the "Exit Without Saving" option on the main screen and then press the <Enter> key.

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V. DESKTOP MANAGEMENT

Desktop Management Interface (DMI)

Introducing the ASUS DMI Configuration Utility

This motherboard supports DMI within the BIOS level and provides a DMI Configuration Utility to maintain the Management Information Format Database (MIFD). DMI is able to auto-detect and record information pertinent to a computer's system such as the CPU type, CPU speed, and internal/external frequencies, and memory size. The onboard BIOS will detect as many system information as possible and store those collected information in a 4KB block in the motherboard's Flash EPROM and allow the DMI to retrieve data from this database. Unlike other BIOS software, the BIOS on this motherboard uses the same technology implemented for Plug and Play to allow dynamic real-time updating of DMI information versus creating a new BIOS image file and requiring the user to update the whole BIOS. This DMI Configuration Utility also allows the system integrator or end user to add additional information into the MIFD such as serial numbers, housing configurations, and vendor information. Those information not detected by the motherboard BIOS and has to be manually entered through the DMI Configuration Utility and updated into the MIFD. This DMI Configuration Utility provides the same reliability as PnP updating and will prevent the refreshing failures associated with updating the entire BIOS.

System Requirements

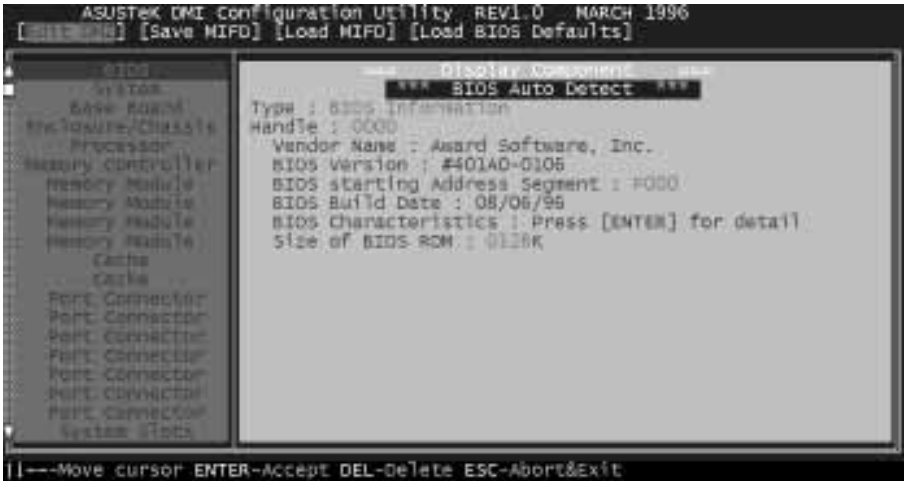
The motherboard BIOS must support DMI. The following motherboards do not support DMI:

- P/I-P6RP4 (not supported)
- PCI/E-P54NP4 (not supported)
- PCI/I-P54NP4D (not supported)

The DMI Configuration Utility (DMICFG.EXE) must be ran in real mode in order for the program to run, the base memory must be at least 180K. Memory managers like HIMEM.SYS (required by windows) must not be installed. You can boot up from a system diskette without AUTOEXEC.BAT and CONFIG.SYS files, "REM" HIMEM.SYS in the CONFIG.SYS, or press <F5> during bootup to bypass your AUTOEXEC.BAT and CONFIG.SYS files.

Using the ASUS DMI Configuration Utility

Edit DMI (or delete)



Use the ←→ (left-right) cursors to move the top menu items and the ↑↓ (up-down) cursor to move between the left hand menu items. The bottom of the screen will show the available keys for each screen. Press enter at the menu item to enter the right hand screen for editing. "Edit component" appears on top. The reversed color field is the current cursor position and the blue text are available for editing. The orange text shows auto-detected information and are not available for editing. The blue text "Press [ENTER] for detail" contains a second pop-up menu is available, use the + - (plus-minus) keys to change the settings. Enter to exit *and save*, ESC to exit *and not save*.

If the user has made changes, ESC will prompt you to answer Y or N. Enter Y to go back to the left-hand screen *and save*, enter N to go back to left-hand screen and *not save*. If editing has not been made, ESC will send you back to the left hand menu without any messages.

Notes:

A heading, *** BIOS Auto Detect *** appears on the right for each menu item on the left side that has been auto detected by the system BIOS.

A heading, *** User Modified *** will appear on the right for menu items that has been modified by the user.

Save MIFD

You can save the MIFD (normally only saved to flash ROM) to a file by entering the drive and path here. If you want to cancel save, you may press ESC and a message "Bad File Name" appears here to show it was not saved.

Load MIFD

You can load the disk file to memory by entering a drive and path and file name here.

Load BIOS Defaults

You can load the BIOS defaults from a MIFD file and can clear all user modified and added data. You must reboot your computer in order for the defaults to be saved back into the Flash BIOS.

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