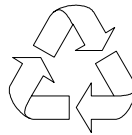# 486 System (A1G4)

User's Guide

100% Recycled Paper

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About this Manual

Purpose

This user's guide aims to give you all the information you need to operate the system properly.

Manual Structure

This user's guide consists of two chapters as follows:

Chapter 1   System Board

This chapter describes the system board and all its major components. It contains the system board layout, jumper settings, cache and memory configurations, and other internal devices.

Chapter 2   BIOS Utility

This chapter explains the system BIOS and tells how to configure the system by setting the BIOS parameters.

Conventions

The following conventions are used in this manual:

`Text entered by user`	Represents text input by the user.
`Screen messages`	Denotes actual messages that appear onscreen.
ALT , ENTER , F8 , etc.	Represent the actual keys that you have to press on the keyboard.

NOTE
Gives bits and pieces of additional information related to the current topic.

WARNING
Alerts you to any damage that might result from doing or not doing specific actions.

CAUTION
Suggests precautionary measures to avoid potential hardware or software problems.

IMPORTANT
Reminds you to take specific action relevant to the accomplishment of the procedure at hand.

TIP
Tells how to accomplish a procedure with minimum steps through little shortcuts.

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Chapter 2   BIOS Utility

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System Board

This high-performance, 32-bit personal computer system is based on the 486 series microprocessor. It features the single-chip upgrade technology which allows maximum ease and flexibility for upgrading the system. It is fully compatible with the IBM PC/AT and is suitable for use as a Windows workstation, CAD/CAE/CAM workstation, UNIX personal workstation or desktop PC.

The system board accommodates an ISA riser card slot and two 72-pin SIMM sockets that can hold a maximum memory of 36 MB. The system architecture is based on the VESA local bus featuring an onboard VGA. The VGA memory is expandable to 1 MB or 2 MB.

In a LAN environment, the system supports 16-bit Arcnet cards, Ethernet cards and Token Ring cards. It is fully compatible with Novell NetWare and Microsoft LAN Manager and also with SCO UNIX, XENIX and OS/2 operating systems.

The system has a number of software-controlled security features. These include power-on password, disk drive read/write control, diskette boot control, serial- and parallel-port control, and a system setup control.

Installing options such as memory modules, expansion boards and an upgrade CPU enhance system performance. This chapter gives step-by-step instructions on how to install these options.

1.1   System Board Layout

The system board has the following major components:

- 486SX, SX2, DX2, or DX4 series CPU

- 4-MB onboard RAM expandable to 36 MB

- Two 72-pin SIMM sockets for memory upgrade

- 128-KB ROM for system BIOS and VGA BIOS

- 120-pin connector for ISA riser card

- System clock/calendar

- Two 9-pin serial ports

- One 25-pin Centronics parallel port

- PS/2-compatible keyboard and mouse interface

- 512-KB or 1-MB DRAM for onboard local bus VGA interface; expandable to 1 MB (for GD-5424) or 2 MB (for GD5429)

- Embedded fixed disk interface

- Upgradable cache memory (128-KB or 256-KB)

- Optional enhanced IDE interface

- Optional power daughter board that enables the system to support the 3.3V microprocessors

Figure 1-1 shows the board layout and the locations of the important components.
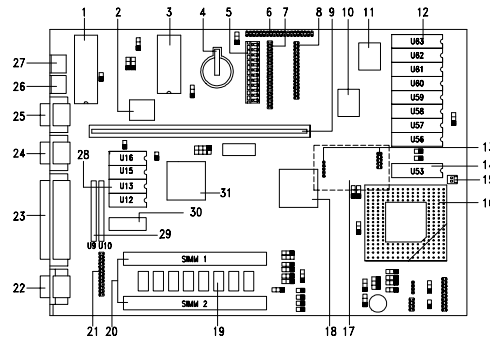
1. Keyboard controller
2. M5105 super I/O controller
3. System and VGA BIOS
4. RTC Battery
5. Power connector
6. IDE fixed disk connector #2*
7. IDE fixed disk connector #1
8. Diskette drive connector
9. ISA riser card connector
10. Local bus IDE controller*
11. M1431 system chip
12. Second-level cache*
13. Power daughter board connectors
14. TAG RAM
15. Fan power connector
16. 486 CPU socket
17. Power daughter board
18. M1429G system chip
19. Onboard memory (4 MB)
20. SIMM sockets
21. VGA feature connector
22. VGA connector
23. Parallel port
24. COM2 port
25. COM1 port
26. PS/2 mouse connector
27. PS/2 keyboard connector
28. VGA upgrade sockets (1 MB)
29. VGA upgrade sockets (2 MB)
30. Onboard VGA memory (512 KB)
31. VGA chip

Figure 1-1   System Board Layout

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* Optional

1.2   ESD Precautions

Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.

1. Do not remove a component from its protective packaging until you are ready to install it.

2. Wear a wrist grounding strap and attach it to a metal part of the system unit before handling components. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.

> *Integrated circuits are extremely susceptible to electrostatic discharge. Do not handle ICs unless you are a qualified service technician, using tools and techniques that conform to accepted industry practices.*

1.3   Pre-installation Instructions

Follow these steps before you install a system component:

1. Turn off the system power and all the peripheral devices connected to the unit before you open it.

2. Open the system according to the instructions in the housing installation manual.

3. Follow the ESD precautions in section 1.2 before handling a system component.

4. Remove any expansion boards or peripherals that block access to the SIMM sockets or CPU socket.

5. See the following sections for specific instructions on the component that you wish to install.

> *Do not attempt the procedures described in the following sections unless you are a qualified service technician.*

1.4   Jumper Settings

Figure 1-2 shows the jumper locations.
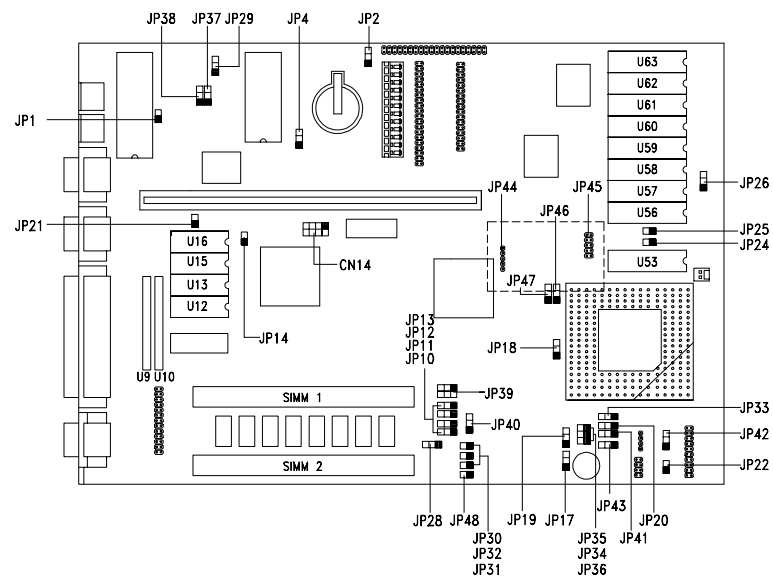
Figure 1-2   Jumper Locations

The following tables list the jumper settings and their correponding functions.

Table 1-1   System Board Jumpers

Jumper	Setting	Function
JP2	1-2 2-3	Enable password check Bypass password
JP14	Closed Open	Enable onboard VGA Disable onboard VGA
JP16	Open Closed	Enable onboard local bus IDE Disable onboard local bus IDE
JP21	Closed Open	Enable onboard super I/O chip Disable onboard syper I/O chip
JP28	1-2 2-3	Enable onboard memory Disable onboard memory
JP37-38	1-2 2-3	Enable Reset button Enable Suspend/Resume button

Table 1-2   CPU Clock Selection

JP10	JP17	JP19	CN14	CPU Clock
2-3	2-3	2-3	3-7	33 MHz (for SX/33, DX2/66 or DX4/100)
2-3	2-3	2-3	4-8	25 MHz (for SX2/50 or DX2/50)

Table 1-3   CPU Type Selection

	486[1]	486 WB[2]	Pentium OverDrive	AMD 486/DX2	AMD 486/DX4	Cyrix IBM	TI
JP11	1-2	1-2	1-2	1-2	1-2	2-3	2-3
JP12	1-2	2-3	2-3	1-2	1-2	1-2	2-3
JP13	1-2	1-2	1-2	1-2	1-2	1-2	2-3
JP18	2-3	1-2	1-2	2-3	2-3	2-3	2-3
JP20	2-3	2-3	2-3	2-3	2-3	1-2	2-3
JP30-32	Open	Open	Open	Open	Open	Closed	Open
JP33	1-2	1-2	1-2	1-2	1-2	2-3	1-2
JP34-36	Closed	Closed	Closed	Open	Open	Open	Open
JP39	1-2, 4-5	1-2, 4-5	1-2, 4-5	1-2, 4-5	1-2, 4-5	1-2, 4-5	2-3, 5-6
JP40-41	2-3	2-3	2-3	1-2	1-2	2-3	2-3
JP42	2-3	2-3	2-3	2-3	2-3	2-3	1-2
JP43	Open	Open	Open	Open	Open	Open	Open
JP46	1-2	2-3	2-3	1-2	1-2	1-2	1-2
JP47	1-2	1-2	1-2	1-2	1-2	2-3	1-2
JP48	Open	Open	Open	Closed	Open	Open	Open

Table 1-4   Cache RAM Size Selection

JP24	JP25	JP26	Cache Size
Open	Closed	1-2	128 KB
Closed	Closed	2-3	256 KB

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[1] Intel 486SX, SX2, DX, DX2 and DX4
[2] Intel 486DX2 and DX4 with write-back internal cache

1.5   Installing Memory

The system board has two 72-pin SIMM sockets that accept 1-MB, 2-MB, 4-MB, 8-MB, or 16-MB memory modules with 80 ns (or less) DRAM speed. The maximum system memory size is 36 MB.

When installing additional memory, choose one of the SIMM configurations listed in Table 1-5.

Table 1-5   Memory Configurations

Onboard	Socket 1	Socket 2	Total
4 MB			4 MB
4 MB	1 MB		5 MB
4 MB	1 MB	1 MB	6 MB
4 MB	1 MB	2 MB	7 MB
4 MB	4 MB		8 MB
4 MB	4 MB	1 MB	9 MB
4 MB	4 MB	2 MB	10 MB
4 MB	4 MB	4 MB	12 MB
4 MB	4 MB	8 MB	16 MB
4 MB	16 MB		20 MB
4 MB	16 MB	1 MB	21 MB
4 MB	16 MB	2 MB	22 MB
4 MB	16 MB	4 MB	24 MB
4 MB	16 MB	8 MB	28 MB
4 MB	16 MB	16 MB	36 MB

1.5.1   Installing a SIMM

> ⚠ *Observe ESD precautions when installing SIMMs. See section 1.2.*

Follow these steps to install a SIMM:

1. Insert the SIMM into the socket at a slight angle, making sure that the cut edge of the SIMM touches the base of the circle mark on the SIMM socket.

2. Gently press the SIMM back against the holding clips on both ends of the socket until the peg slips into the holes on the SIMM, and the holding clips lock the SIMM into position. See Figure 1-3.

3. Check that the SIMM is securely seated in its slot and that both ends are locked to the socket.
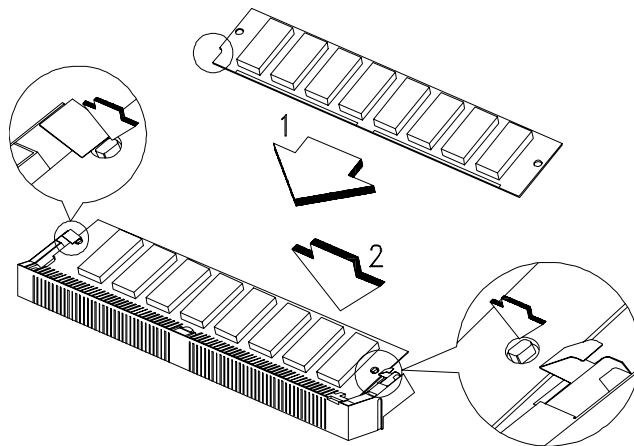
Figure 1-3   Installing a SIMM

1.5.2   Removing a SIMM

> ⚠ *Observe ESD precautions when removing SIMMs. See section 1.2.*

1. Press the holding clips on both sides of the SIMM outward to release it.

2. Push the SIMM upward.

3. Gently pull the SIMM out of the socket.
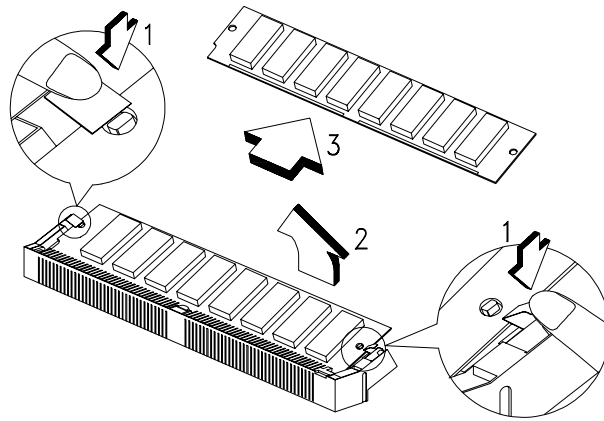
Figure 1-4   Removing a SIMM

1.5.3   Reconfiguring the System

The system automatically detects the amount of memory installed. Run Setup to view the new value for total system memory and make a note of it.

1.6 Upgrading the CPU

Conventional technology places the CPU on the same board as the ISA bus logic, system memory and I/O interface. The entire system board must be replaced to upgrade the CPU. Single-chip upgrade technology gives you the flexibility to upgrade the CPU by simply inserting a new CPU without replacing the entire system board.

1.6.1 Unpacking the Upgrade CPU

Unpack all items and inspect the contents. If any of the following items are damaged or missing, contact your dealer immediately.

- Upgrade CPU with heat sink

- Electrostatic discharge (ESD) gloves

1.6.2 Installing an Upgrade CPU

> *Observe ESD precautions when installing components. See section 1.2.*

Before installing an upgrade CPU, check the following:

- The heat sink is not oily

- The heat sink is well attached to the CPU

The heat sink protects the CPU against excessive heat.

Follow these steps to install an upgrade CPU:

1. Turn off the system power.

2. Open the system and locate the CPU socket on the system board. Refer to Figure 1-1 for location of the CPU socket.

3. Remove the CPU installed in the upgrade socket, if any.

4. Insert the upgrade CPU (with the heatsink) into the upgrade socket. Make sure that pin 1 of the CPU corresponds to hole 1 of the upgrade socket (see Figure 1-6). The flat corner on the CPU indicates pin 1. Insert the CPU pins into the socket pinholes gently but firmly. Be careful not to bend any pins.

Pin 1 Indicator

Pin 1 Indicator
(flat corner)

CPU Socket

CPU
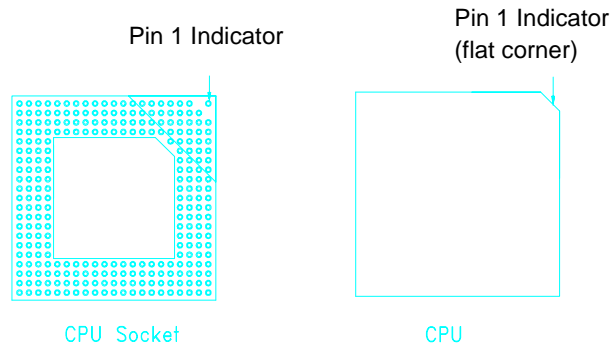
Figure 1-5   Pin 1 Indicator on the Upgrade CPU and Socket

CPU Pin 1

Hole 1
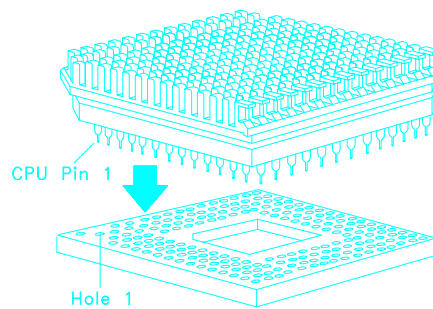
Figure 1-6   Installing an Upgrade CPU

5. Set the required jumpers on the system board. Refer to section 1.4 for the jumper settings.

1.7   Power Daughter Board

The power daughter board enables the system to support a 3.3V microprocessor. Without this board, your system can only support a 5V CPU.

Follow these steps to install the power daughter board:

> *Before installing, you must check first the voltage requirement of your upgrade CPU.*

1. Locate the power daughter board connectors marked as JP44 and JP45 on the system board. See Figure 1-1.

2. If your system board comes with a 5V CPU, then you will find JP45 closed. Remove the jumper cap of JP45 and insert the board into the connectors.

1.8   Upgrading VGA Memory

> ⚠ *Observe ESD precautions when installing components. See section 1.2.*

The VGA memory is upgradable to 1 or 2 MB depending on your onboard VGA chip. The system board may come with either a GD-5424 or a GD-5429 VGA chip. If your board has a GD-5424, then your VGA memory is expandable to 1 MB only. If your system board has a GD-5429 VGA chip, then you can further expand your VGA memory to 2 MB. The additional memory allows your VGA to display higher resolutions and more colors when the appropriate VGA driver is used.

Follow these steps to upgrade the VGA RAM to 1 MB:

1. Locate the VGA memory expansion sockets on the system board labeled U12, U13, U15 and U16. See Figure 1-7.

2. Gently but firmly insert a 44256 DRAM (256 Kb x 4, 70 ns DIP) chip into each of the VGA memory expansion sockets.

To upgrade the VGA RAM to 2 MB:

1. Locate sockets U9 and U10 on the system board.

2. Insert a 512460 (256 Kb x 16, 70 ns ZIP) DRAM chip into each socket. See Figure 1-7.
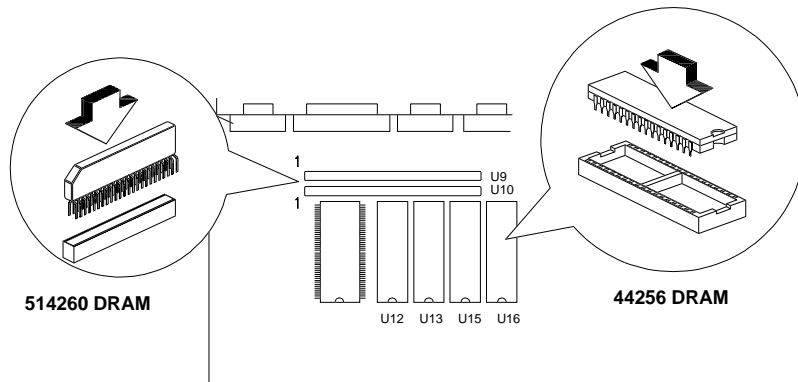
Figure 1-7   Installing VGA RAM

> *You do not need to change any jumper settings when upgrading the VGA memory.*

1.9   Upgrading Cache Memory

To install cache chips, do the following:

1. Locate the cache sockets on the system board. See Figure 1-1.

2. Align the cut edge of the chip with the cut edge of the cache sockets. See Figure 1-8.
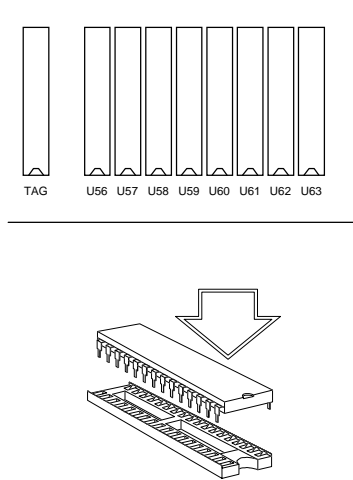
Figure 1-8   Installing Cache

3. Gently but firmly insert a 32 Kb x 8, 15 ns SRAM chip into each of the sockets. Be careful not to bend any pins. Table 1-6 lists the cache size options and the corresponding chip configuration.

Table 1-6   Cache Size Options and Chip Locations

Cache Size	SRAM Type	Location
128 KB	32 Kb x 8 x 5 pcs	TAG, U56, U58, U60, U62
256 KB	32 Kb x 8 x 9 pcs	TAG, U56 to U63

The SRAM must have an access speed of 15 nanoseconds.

Make sure that you set the jumpers properly. See section 1.4.

1.10   Post-installation Instructions

Always observe the following:

1.   See to it that the components are installed according to the step-by-step instructions in their respective sections.

2.   Make sure you have set all the required jumpers before you proceed. See section 1.4 for the correct jumper settings.

3.   Replace any expansion boards or peripherals that you removed earlier.

4.   Replace the system cover.

5.   Connect the necessary cables and turn on the system.

1.11   Power-Management Feature

The mainboard incorporates the latest power-conservation technology. However, to take advantage of its energy-saving capabilities, the mainboard must have an Intel SL-Enhanced or a power-saving CPU.

The Power-Management feature allows you to monitor system activity. System activity refers to any action involving one or more of the following devices: keyboard, mouse, diskette drives, fixed disk drives, connected peripherals, or video memory. If no activity is detected within a specified period of time (the inactivity time-out), the system switches to one of the power-saving modes to conserve energy.

> *The Setup utility allows you to specify the inactivity time-out. Refer to Section 2.4 for more information on the power-saving configuration.*
>
> *The power-management function does not work when the cursor is emulated by software such as Winword, ETU 3.1 (Chinese system), DOSV (Japanese system), etc.*

The system supports four power-management modes:

- Monitor power-saving mode
- IDE fixed disk standby mode
- Standby mode
- Suspend mode

MONITOR POWER-SAVING MODE

The Monitor Power-Saving Mode offers a quick-resume power-saving mode for VESA DPMS-compliant VGA monitors. It allows temporary power saving during operation.

Set the independent power-management timers for the VESA DPMS monitor. Valid values are from 1 to 15 minutes. Any video or I/O action returns the system to full power.

IDE FIXED DISK STANDBY MODE

The IDE Fixed Disk Standby Mode offers a quick-resume power-saving mode for ATA-compliant IDE fixed disks. It is allows temporary power saving during operation.

Set the independent power-management timers for the fixed disk. Valid values are from 1 to 15 minutes. In this mode, the fixed disk spin motor is shut off. Any fixed disk activity returns the fixed disk to normal speed within 3 to 5 seconds (depending on the fixed disk in use).

SYSTEM STANDBY MODE

This is a fast-on power-saving mode that allows quick-resume response time and at the same time lowers power-consumption. It is most suitable for users who want power-saving features but need the PC to resume normal operation quickly.

Set the Standby Mode timer to a value from 2 to 120 minutes. When the system enters Standby mode, the turbo LED light on the front panel starts to blink. Any mouse/keyboard or I/O action enables the system to exit Standby mode and return quickly to normal operation.

SUSPEND MODE

This mode sends the CPU and all peripherals into the lowest power-consumption mode possible. However, it takes a longer time for the system to resume normal operation depending on the fixed disk drive and monitor type in use.

Set the Suspend Mode timer to a value from 2 to 120 minutes, or activate the Suspend/Resume button. In Suspend mode, the turbo LED light on the front panel blinks at a rate slower than when the system is in the Standby mode. Activating the Suspend/Resume button produces two beeps as the system enters the suspend mode. Any keyboard/mouse or I/O action resumes full power.

Power-Management Modes

Table 1-7   Power-Management Modes

	Monitor Power-Saving Mode	IDE Fixed Disk Standby Mode	System Standby Mode	System Suspend Mode
Monitor Mode	Suspend	No effect	Off	On
IDE HDD Status	No effect	Standby mode Spindle motor off	Standby mode Spindle motor off	Standby mode Spindle motor off
CPU/System Status	Normal	Normal	Normal	CPU clock stopped
Entry Mode	Device idle timer time-out (1 - 15 min)	Device idle timer time-out (1 - 15 min)	System standby timer time-out (2 - 120 min)	System Suspend timer time-out (2 - 120 min) or Suspend button pushed
Resume Mode	Device activated	Any fixed disk access	Any system event	Keyboard/ mouse or Resume button pushed
Resume Recovery Time	3 - 5 sec	3 - 5 sec	7 - 10 sec	7 - 10 sec

Application Condition

You must disable the Suspend mode for LAN workstations. Since the CPU is stopped in Suspend mode, this prevents the workstation from responding to LAN requests. Thus, the system is considered disconnected from the network.

1.12   Advanced Power Management (APM)

This system features the APM standard designed to further reduce system power consumption. APM is a power-management approach developed jointly by Microsoft and Intel. An increasing number of software applications support APM to take advantage of the power-saving features and offer greater system availability without affecting performance.

To use the APM feature under the Windows environment, run the Windows Setup and select the MS-DOS System with APM as your computer type in the System Information menu. Refer to the Windows manual for more information.

You can use the APM feature under the DOS environment by including the POWER.EXE commmand in the CONFIG.SYS file. See the MS-DOS manual for more instructions on how to edit the CONFIG.SYS file. For more information about APM, type HELP POWER.EXE.

> *If you enable the Power-Saving mode in Setup without installing the APM under DOS or Windows, the system time and date do not display the correct settings after the system returns to normal operation from Standby or Suspend mode.   To update the time and date, reboot the system. Connect the APM to avoid this problem.*

1.13   Intel SL-Enhanced CPU

The Intel SL-Enhanced microprocessors support the System Management Mode (SMM). In SMM mode, the CPU saves the current status to the memory and shuts down the CPU internal clock after a specified period of inactivity.   This reduces the system power consumption from 10 watts to 0.02 watts.

1.14 VESA DPMS

The Video Electronics Standard Association (VESA) proposed the Display Power-Management Signaling (DPMS) standard combinations of horizontal and vertical synchronization signals for the PC-VGA monitor. Its purpose is to comply with the U.S. Environmental Protection Agency (EPA) requirements.

Table 1-8 lists the different VESA DPMS modes and their functions.

Table 1-8   VESA DPMS Modes

H-Sync	V-Sync	Monitor Mode	Function
Off	Off	Off	No operation
On	Off	Suspend	Power-saving
Off	On	Standby	Screen-saving
On	On	On	Normal operation

1.15   Error Messages

In the event that you receive an error message, do not continue using the computer. Note the message and take corrective action at once. This section describes the different types of error messages and suggests corrective measures.

There are two general types of error messages:

* Software
* System

1.15.1   Software Error Messages

Software error messages are returned by your operating system or application. These messages typically appear after you boot the operating system or when you run your applications. If you receive this type of message, consult your application or operating system manual for help.

1.15.2   System Error Messages

A system error message indicates a problem with the computer itself. These messages normally appear during the power-on self-test, before the operating system prompt appears. Table 1-9 lists the system error messages in alphabetical order.

Table 1-9   System Error Messages

Error Message	Corrective Action
Bad CMOS Battery	Replace battery. Contact your dealer.
CMOS Checksum Error	Run Setup.
Diskette Drive Controller Error	Check and connect the cable to the diskette drive or controller.
Diskette Drive Error	Diskette may be bad. If not, check the diskette drive and replace if necessary.
DRAM Configuration Error	Check and modify DRAM configuration to agree with Table 1-5.
Equipment Configuration Error	Run Setup.
Fixed Disk Controller Error	Check and connect the cable to the fixed disk drive or controller.
Fixed Disk 0 Error	Check all cable connections. Check the fixed disk and replace if necessary.
Fixed Disk 1 Error	Check all cable connections. Check the fixed disk and replace if necessary.
Fixed Disk 0 Extended Type Error	Run Setup.
Fixed Disk 1 Extended Type Error	Run Setup.
I/O Parity Error	Contact your dealer.
Keyboard Error or No Keyboard Connected	Check and connect the keyboard to the system unit.
Keyboard Interface Error	Contact your dealer.
Keyboard Locked	Unlock the keyboard.

Table 1-9   System Error Messages (continued)

Error Message	Corrective Action
Memory Error	Check SIMMs on the system board. Contact your dealer.
Memory Size Mismatch	Run Setup.
Serial 1 Conflict	Run Setup. Disable onboard serial 1.
Serial 2 Conflict	Run Setup. Disable onboard serial 2.
Parallel Conflict	Run Setup. Disable onboard parallel port.
Pointing Device Error	Check and connect the pointing device. Contact your dealer.
Pointing Device Interface Error	Contact your dealer.
Press F1 key to continue or Ctrl-Alt-Esc for Setup	Press F1 or Ctrl-Alt-Esc.
Press F1 to Setup or other key to continue	Press F1 and reconfigure the system.
Press Esc to turn off NMI, any key to reboot	Press Esc to disregard NMI error. Press any key to reboot the system.
Protected Mode Test Fail	Contact your dealer.
RAM BIOS Error	Contact your dealer.
RAM Parity Error	Check SIMMs on system board or contact your dealer.
Real Time Clock Error	Run Setup.
Shadow RAM Fail	Contact your dealer.
System Memory Address Error	Check SIMMs on system board or contact your dealer.

1.15.3   Correcting Error Conditions

As a general rule, the "Press F1 to continue" error message is caused by a configuration problem which can be easily corrected.   An equipment malfunction is more likely to cause a fatal error, i.e., an error that causes complete system failure.

Here are some corrective measures for error conditions:

1.   Run Setup. You must know the correct configuration values for your system before you enter Setup, which is why you should write these values down when the system is correctly configured. An incorrect Setup configuration is a major cause of power-on error messages, especially for a new system.

2.   Remove the system cover, following the directions in the system housing installation guide. Check that the system board and any expansion boards are set correctly.

3.   If you cannot access a new disk, it may be because your disk is not physically formatted. Physically format the disk using the FDISK and FORMAT commands.

4.   Check that all connectors and boards are secure. Consult the system housing installation guide for assistance.

If you follow the corrective steps above and still receive an error message, the cause may be an equipment malfunction.

If you are sure that your configuration values are correct and your battery is in good condition, the problem may lie in a damaged or defective chip. Contact an authorized service center for assistance.

BIOS Utility

Most systems are configured by the manufacturer or the dealer. There is no need to run Setup when starting the computer unless you get a Run Setup message.

The Setup program loads configuration values into the battery-backed, nonvolatile memory called CMOS RAM. This memory area is not part of the system RAM.

> *If you repeatedly receive Run Setup error messages, check the computer's internal battery. If the battery is dead or not properly connected, the system cannot retain configuration values in CMOS RAM.*

Before running, have the following information ready:

- **Diskette drive type** The standard diskette drive type is either 5.25-inch, 1.2 MB or 3.5-inch, 1.44 MB.

- **Fixed disk drive type** To determine your drive type, compare the information on the label pasted to your fixed disk (or supplied in vendor documentation) with the disk types listed in Table 2-6**.**

2.1   Entering Setup

> *Close all open files and leave your application program before entering Setup. You cannot exit back into an application. The system*

automatically reboots when you leave Setup.

Press the key combination ⌜CTRL⌝ ⌜ALT⌝ ⌜ESC⌝ to enter Setup. You do not need to insert a diskette or load an operating system. Just press the key combination.

The following screen shows the Setup main menu:

```
┌──────────────────────────────────────────────────────────────────┐
│                         BIOS  Utility                             │
├──────────────────────────────────────────────────────────────────┤
│                                                                    │
│                  Basic System Configuration                        │
│                Advanced System Configuration                       │
│                  Power-Saving Configuration                        │
│                        System Security                             │
│                  Load Setup Default Settings                       │
│                                                                    │
│                                                                    │
│                                                                    │
│                                                                    │
│                                                                    │
├──────────────────────────────────────────────────────────────────┤
│  ↑↓ = Move Highlight Bar, ← = Select, Esc = Exit and Reboot        │
└──────────────────────────────────────────────────────────────────┘
```
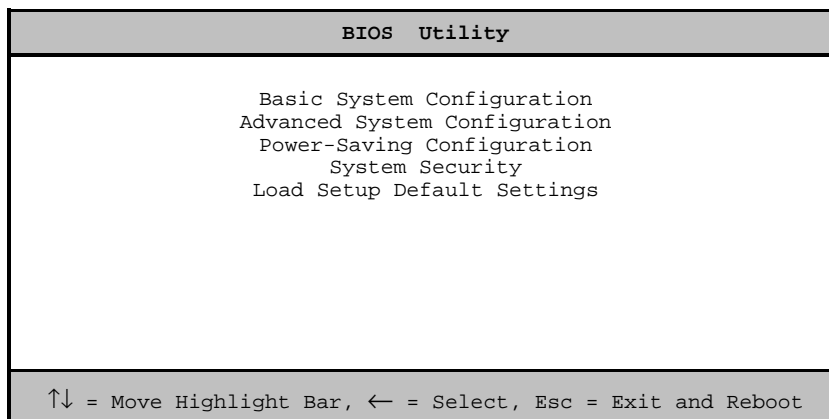
> Use the ⌜CTRL⌝ ⌜ALT⌝ ⌜ESC⌝ combination under DOS environment only.
>
> *Some BIOS parameters are non-configurable if your system does not support the Power-Management feature.*

2.2   Basic System Configuration

Select Basic System Configuration to input configuration values such as date, time and disk type.

The screen below shows the Basic System Configuration Setup menu:

```
┌─────────────────────────────────────────────────────────┐
│        Basic System Configuration        Page 1/2        │
├─────────────────────────────────────────────────────────┤
│                                                           │
│ Date  ---------------------------------- [01/01/95]       │
│ Time  ---------------------------------- [10:40:30]       │
│ Diskette Drive A  ---------------------- [  None  ]       │
│ Diskette Drive B  ---------------------- [  None  ]       │
│                                                           │
│                           Cylinder      Head      Sector  │
│                                                           │
│ Fixed Disk 0 (81 MB)--[Auto]   1024        7         17   │
│ Fixed Disk 1 ( 0 MB)--[Auto]                              │
│ Fixed Disk 2----------[None]                              │
│ Fixed Disk 3----------[None]                              │
│                                                           │
│                                                           │
│ Base Memory------------------------------ [  640 ] KB     │
│ Extended Memory-------------------------- [  256 ] KB     │
│ Total Memory----------------------------- [  896 ] KB     │
│ Math Coprocessor------------------------- [Installed]     │
│ Video Display---------------------------- [VGA/EGA]       │
│                                                           │
├─────────────────────────────────────────────────────────┤
│      ↑ ↓ = Move Highlight Bar,  → ← = Change Setting      │
│        PgDn/PgUp = Move Screen, F1 = Help, Esc = Exit     │
└─────────────────────────────────────────────────────────┘
```

The command line at the bottom of the display has three functions. It tells you how to view the configuration options for each parameter, how to move the highlight bar from one parameter to the next, and how to change the value for each parameter.

1. Press ⬆ or ⬇ to highlight the desired parameter.

2. Press PG DN to turn to the next page, or press PG UP to return to the previous page.

3. After you select the desired option for a parameter, press the appropriate arrow key to highlight the next parameter. This option is now set as the configuration value.

The screen below shows page 2 of the Basic System Configuration menu:

```
╔══════════════════════════════════════════════════════════════╗
║            Basic System Configuration          Page 2/2       ║
╠══════════════════════════════════════════════════════════════╣
║                                                                ║
║ Communication Settings                                         ║
║   Baud Rate----------------------------- [9600] BPS            ║
║   Parity-------------------------------- [ Odd]                ║
║   Stop Bits----------------------------- [ 1 ] Bit(s)          ║
║   Data Length--------------------------- [ 7 ] Bits            ║
║                                                                ║
║ Enhanced IDE Features                                          ║
║   Fixed Disk Block Mode----------------- [Disabled]           ║
║   Fixed Disk PIO Mode 3----------------- [Disabled]           ║
║   Fixed Disk Size > 504 MB-------------- [Disabled]           ║
║   Fixed Disk 32 Bit Access-------------- [Disabled]           ║
║                                                                ║
║ Num Lock After Boot--------------------- [Enabled]            ║
║ Memory Test ---------------------------- [Disabled]           ║
║ Auto Configuration Mode----------------- [Enabled]            ║
║ Fast Boot Mode-------------------------- [Enabled]            ║
║                                                                ║
╠══════════════════════════════════════════════════════════════╣
║      ↑ ↓ = Move Highlight Bar, → ← = Change Setting           ║
║        PgDn/PgUp = Move Screen, F1 = Help, Esc = Exit         ║
╚══════════════════════════════════════════════════════════════╝
```

To use the Help option, press [F1]. A window appears onscreen with a brief description of the currently highlighted parameter.

The following sections explain the different parameters and their settings.

2.2.1   Date and Time

Date

To set the date, highlight the Date parameter. Press ⇨ or ⇦ to set the current date, following the month, day, and year format.

Valid values for month, day, and year are:

Month	1 to 12
Day	1 to 31
Year	00 to 99

Time

To set the time, highlight the Time parameter. Press ⇨ or ⇦ to set the current time in 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

After setting the date and time, you need not set them again. As long as the internal battery remains good and is connected, the clock continues to keep the date and time accurately. When the operating system asks for the date and time, press ENTER twice if you do not want to change the values of these parameters.

You can bypass the date and time prompts by creating an AUTOEXEC.BAT file. Refer to the MS-DOS manual.

2.2.2   Diskette Drives

To enter the configuration value for the first diskette drive (drive A), highlight Diskette Drive A. Press ⏩ or ⏪ to view the options and select the appropriate value.

The Diskette Drive parameters have the following options:

- None
- 360 KB, 5.25-inch
- 1.2 MB, 5.25-inch
- 720 KB, 3.5-inch
- 1.44 MB, 3.5-inch
- 2.88 MB, 3.5-inch

Follow the same procedure to enter the value for the Diskette Drive B parameter. Choose None if you do not have a second diskette drive.

2.2.3   IDE Fixed Disk Drives

To set a value for this parameter, you must know the type of fixed disk(s) your system has. Refer to the label pasted on the fixed disk, or see Table 2-6 for the fixed disk types.

See the table below for the IDE fixed disk configurations.

Table 2-1   IDE Fixed Disk Configurations

Connector	Master	Slave
Connector 1	Fixed Disk 0	Fixed Disk 1
Connector 2	Fixed Disk 2	Fixed Disk 3

First Fixed Disk Drive

To configure the first fixed disk drive (drive C), move the highlight bar to the Fixed Disk 0 parameter:

```
Fixed Disk 0 ------------ [None]
```

Press ▣ or ▣ to view the options and select the value that corresponds to your fixed disk type.

Second Fixed Disk Drive

If your system has two fixed disks installed, highlight the Fixed Disk 1 parameter and follow the same procedure to set a value for the second fixed disk drive.

If your system does not have a second fixed disk drive, set the value to None.

```
Fixed Disk 1 ------------ [None]
```

> *If you cannot find the exact type of your fixed disk among the options, use the* ▣ *or* ▣ *key to set the value to* Auto, CD, *or* User. *If you select* User, *press* ENTER *and type the exact values of the disk parameters. Select* Auto *to automatically configure your fixed disk parameters.*
>
> *If you install a device that is not a fixed disk such as CD-ROM, set the Fixed Disk parameters to* CD.

Third and Fourth Fixed Disk Drives

These parameters are optional. If your system offers the enhanced local bus IDE, then it can support up to four IDE devices. The onboard IDE fixed disk connector #2 is reserved for the third and fourth IDE devices.

If your system has more than two fixed disks installed, highlight the parameter Fixed Disk 2 to configure the third fixed disk. Select Auto to automatically configure your fixed disk.

Highlight the parameter Fixed Disk 3 and follow the same procedure to configure your fourth fixed disk.. Set both parameters to None if you want to bypass the feature.

These parameters are non-configurable if your system does not support the enhanced IDE feature.

```
         Fixed Disk 2 ------------ [None]
         Fixed Disk 3 ------------ [None]
```

The third and fourth IDE devices are supported under DOS/Windows environment only.

BIOS automatically configures the additional disk(s). However, if your system cannot recognize the fixed disk type, connect your additional fixed disk(s) to the IDE fixed disk connector #1. Configure the fixed disk either as Fixed Disk 0 or Fixed Disk 1. To configure, set the value to User. *Press* ENTER *and type the value of the disk parameters.*

2.2.4   System Memory

The system automatically detects the total amount of onboard memory and sets the corresponding value in the Setup program. This information is not adjustable by the user and is for display only. If you install additional memory, the system automatically updates the Total Memory parameter to show the new memory size.

```
Base Memory ---------------[  640 ] KB
Extended Memory -------- --[ 3328 ] KB
Total Memory -------------[ 3968 ] KB
```

2.2.5   Math Coprocessor

This parameter is for display only. The option set by the system is:

```
Math Coprocessor ------- [Not Installed]
```

If you install a coprocessor, the power-on self-test routine detects its presence and automatically sets this parameter to:

```
Math Coprocessor ------- [Installed   ]
```

2.2.6   Video Display

The video display is the monitor on which the operating system prompt appears when you boot the system. The system automatically detects the video mode of your primary display and sets the configuration value accordingly.

```
              Video Display --------- [VGA/EGA   ]
```

2.2.7   Communication Status

The Communication Status parameters let you set the baud rate, parity, stop bit, and data length for the first serial port (COM 1).

- Baud rate: 110 to 9600 bits per second (BPS)

- Parity: odd, even, or none

- Stop bit: 1 or 2 stop bits

- Data length: 7- or 8-bit data word

There is only one restriction on the available options. If your data length parameter is an 8-bit data word, you must select one of the following combinations:

- 1 stop bit and odd (or even) parity

- 2 stop bits and no parity

Default values are 9600 BPS, 1 parity, 1 stop bit, and 7-bit data word.

> *The RS232 on the system board can support up to 56000 BPS (bits per second). Use your application program to set the serial port to this baud rate.*

2.2.8   Enhanced IDE Features

Fixed Disk Block Mode

This function enhances disk performance depending on the fixed disk in use. If enabled, it allows data transfers in block (multiple sectors) by increasing the data transfer rate to 256 bytes/cycle. However, if your system does not boot after enabling this parameter or if your fixed disk does not support this function, change the setting to Disabled.

Fixed Disk PIO Mode 3

Enabling this parameter improves system performance by allowing the use of faster fixed drives. If your fixed disk does not support this function, set this parameter to Disabled.

Fixed Disk Size > 504 MB

This enhanced IDE feature only works under the DOS and Windows 3.x environments. If enabled, it allows you to use a fixed disk with a capacity of more than 504 MB. This is made possible through the Logical Block Address (LBA) mode translation. Other operating systems require this parameter be set to Disabled.

Fixed Disk 32-Bit Access

Enabling this parameter improves system performance by allowing the use of the 32-bit fixed disk access. This enhanced IDE feature only works under DOS, Windows 3.x and Novell NetWare. If your software or fixed disk does not support this function, set this parameter to Disabled.

2.2.9   Num Lock After Boot

This parameter enables users to activate the Num Lock function upon system boot.

2.2.10   Memory Test

The system performs a RAM test during POST. Set this parameter to
`Disabled` to bypass this test. The default setting is `Enabled`.

2.2.11   Auto-Configuration Mode

Set this parameter to `Enabled` if you do not know the fixed disk drive
type parameters and the onboard communication port configuration.
When enabled, this parameter sets the fixed disk drive type to `Auto`
and the System Speed to `High`. It also enables the system and video
RAM, as well as the first- and second-level cache. The default setting
is `Disabled`.

2.2.12   Fast Boot Mode

This parameter allows the system to boot faster by skipping some
POST routines. If enabled, it sets the System Speed to `High` and
enables Shadow RAM, as well as the primary- and second-level
cache. The default setting is `Disabled`.

2.3   Advanced System Configuration

Select Advanced System Configuration from the main menu to configure the system memory.   The screen below shows the Advanced System Configuration menu.

```
Advanced System Configuration        Page 1/1


Shadow RAM
  F0000h - FFFFFh (System BIOS)---------- [Enabled]
  C0000h - C7FFFh (Video BIOS)----------- [Enabled]
  C8000h - CFFFFh ---------------------- [Disabled]
  D0000h - D7FFFh ---------------------- [Disabled]
  D8000h - DFFFFh ---------------------- [Disabled]
  E0000h - E7FFFh ---------------------- [Disabled]
  E8000h - EFFFFh ---------------------- [Disabled]

System Cache --------------------------- [Enabled]
System Speed --------------------------- [High]
Memory at 15MB - 16MB Reserved for ------ [System] Use


        ↑ ↓ = Move Highlight Bar, → ← = Change Setting
        PgDn/PgUp = Move Screen, F1 = Help, Esc = Exit
```

2.3.1   Shadow RAM

The Shadow RAM parameter allows you to change the system BIOS and video BIOS locations from ROM to RAM.   When the system boots, the BIOS routines are copied into the RAM area. Relocating to RAM enhances system performance, as information access is faster than ROM.

To change the BIOS location from ROM to RAM, select Enabled. If you select Disabled, the BIOS information remains in ROM. The default setting for all RAM shadowing is Disabled.

2.3.2   System Cache

This parameter enables or disables the second-level cache memory. The first-level cache memory (CPU internal cache) is always enabled.

The system supports both the write-back and write-through modes, depending on the CPU in use. For Cyrix CPU, the system cache supports the write-back mode.

```
System Cache --------------- [Enabled]
```

2.3.3   System Speed

This parameter allows you to set the system speed according to the microprocessor installed. Press ☐ or ☐ key to view the available options and select the appropriate value.

```
System Speed --------- [High ]
```

The microprocessor runs at high or low speed. Some software may require a slower operating speed. If your software does not run properly, try setting the system to low speed and disabling the cache memory. The system speed automatically adjusts to low speed when reading from or writing to diskettes.

You can also use the key combination CTRL ALT + to toggle between high and low speed.

2.3.4   Memory at 15MB-16MB

To prevent memory address conflicts between the system and expansion boards, reserve this memory range for the use of either the system or an expansion board.

2.4   Power-Saving Configuration

This parameter is configurable only if the system supports the Power-Management feature.

The following screens appear if you select the Power-saving Configuration option:

```
┌─────────────────────────────────────────────────────────────────┐
│         Power-Saving Configuration              Page 1/2          │
├─────────────────────────────────────────────────────────────────┤
│                                                                   │
│ Power-Management Mode-------------------- [Disabled]              │
│   Monitor Power-Saving Timer------------- [Off]                   │
│   IDE Fixed Disk Standby Mode------------ [ 1 ] Minute(s)         │
│   System Standby Mode-------------------- [20 ] Minutes           │
│   System Suspend Timer------------------- [20 ] Minutes           │
│                                                                   │
│                                                                   │
│                                                                   │
│                                                                   │
│                                                                   │
├─────────────────────────────────────────────────────────────────┤
│     ↑ ↓ = Move Highlight Bar, → ← = Change Setting               │
│    PgDn/PgUp = Move Screen, F1 = Help, Esc = Exit                │
└─────────────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────┐
│         Power-Saving Configuration          Page 2/2         │
├─────────────────────────────────────────────────────────────┤
│                                                              │
│ Monitored Activities --------------------------- [Enabled]   │
│                                                              │
│   IRQ 2/IRQ 9------- [Enabled]    DRQ 0 ---------- [Enabled]  │
│   IRQ 3------------- [Enabled]    DRQ 1 ---------- [Enabled]  │
│   IRQ 4------------- [Enabled]    DRQ 3 ---------- [Enabled]  │
│   IRQ 5------------- [Enabled]    DRQ 4 ---------- [Enabled]  │
│   IRQ 6------------- [Enabled]    DRQ 5 ---------- [Enabled]  │
│   IRQ 7------------- [Enabled]    DRQ 6 ---------- [Enabled]  │
│   IRQ 10------------ [Enabled]    IRQ 7 ---------- [Enabled]  │
│   IRQ 11------------ [Enabled]                               │
│   IRQ 15------------ [Enabled]                               │
│                                                              │
│                                                              │
├─────────────────────────────────────────────────────────────┤
│     ↑ ↓ = Move Highlight Bar, → ← = Change Setting          │
│       PgDn/PgUp = Move Screen, F1 = Help, Esc = Exit         │
└─────────────────────────────────────────────────────────────┘
```

The DRQ can also be referred to as DMA.

2.4.1   Power-Management Mode

This mode allows you to reduce power consumption. If enabled, you
can set the following parameters:

Monitor Power-saving Timer

This parameter sets the VESA DPMS-compatible display monitor into
Suspend mode. Any keyboard or mouse action returns the monitor to
full power.

```
Monitor Power-saving Timer--[1/2/3/4../15 min]
```

IDE Fixed Disk Standby Timer

This parameter allows you to set the fixed disk to go into Standby mode after inactivity of 1 ~ 15 minutes. When the fixed disk is accessed again, allow 3 ~ 5 seconds (depending on the fixed disk in use) for the fixed disk to return to normal speed. Set this function to Off if your fixed disk does not support this function.

```
IDE Fixed Disk Standby Timer--[1/2/3/4./15 min]
```

System Standby Timer

This parameter provides a fast-on power-saving mode by setting the monitor to Suspend mode and the HDD to Standby mode. If the system is idle for a specified period of time, it automatically enters the Suspend mode. Any keyboard or mouse action returns the system to full power.

```
System Standby Timer---[10/20/30/40../150 min]
```

System Suspend Timer

This parameter supports the lowest power-saving mode. When the system enters the Suspend mode, the CPU clock stops. To resume the system, you can either activate the keyboard or mouse, or press the Suspend/Resume button.

```
System Suspend Timer--[10/20/30/40../150 min ]
```

2.4.2   Monitored Activities

This parameter allows the user to configure the power-management mode by checking the activities of the IRQ and DRQ ports. If your system is using LAN network cards, determine the type of IRQ and DRQ used and set it to Disabled. You need to disable these ports so that the system can enter into the power-saving mode.

> *Disable the Suspend mode if your system is using LAN network cards. Otherwise, the network considers your system disconnected.*

2.5   System Security Setup

The Setup program has a number of security features to prevent unauthorized access to the system and its data.

Enter the Setup program and select System Security Setup.   The following screen appears:

```
              System Security           Page 1/1

Diskette Drive Control
  Diskette Drive --------------- [Normal]
  Fixed Disk Drive ------------- [Normal]
  System Boot Drive ----------- [Drive A then C]

Onboard Communication Ports
  Serial Port 1 Base Address --- [Disabled]
  Serial Port 2 Base Address --- [Disabled]
  Parallel Port Base Address --- [ 378h ]

Setup Password ----------------- [ None ]
Power On Password -------------- [ None ]


       ↑ ↓ = Move Highlight Bar, → ← = Change Setting
      PgDn/PgUp = Move Screen, F1 = Help, Esc = Exit
```

Press 🔼 or 🔼 to move the highlight from one parameter to the next. Press ▶ or ◀ to change the setting.

2.5.1   Disk Drive Control

The disk drive control features allow you to enable or disable the read/write functions of a disk drive.   These features can also control the diskette drive or fixed disk drive boot function to prevent loading operating systems or other programs from a certain drive while the other drives remain operational.

Table 2-2 summarizes the functions of the drive control parameters.

Table 2-2   Drive Control Parameters

Diskette Drive Parameter	Function
Normal	Diskette drive functions normally
Write Protect All Sectors	Disables the write functions on all sectors
Write Protect Boot Sector	Disables the write function only on boot sector
Disabled	Disables all diskette functions
Fixed Disk Drive Parameter	**Function**
Normal	Fixed disk drive functions normally
Write Protect All Sectors	Disables the write function on all sectors
Write Protect Boot Sector	Disables the write function only on boot sector
Disabled	Disables all fixed disk functions
System Boot Drive Parameter	**Function**
Drive A then C	System boots from A to C
Drive C then A	System boots from C to A
C	System always boots from drive C
A	System always boots from drive A

The drive control settings that you specify take effect only if the diskette and fixed disk controllers are not disabled through jumper settings.

2.5.2 Onboard Communication Ports

Serial Port 1 Base Address

This parameter enables the onboard serial port 1 and sets its address.

Table 2-3   Serial Port 1 Parameters

Parameter	Function
Serial 1 (3F8h)	COM 1 with address 3F8h
Serial 2 (2F8h)	COM 2 with address 2F8h
Serial 3 (3E8h)	COM 3 with address 3E8h
Serial 4 (2E8h)	COM 4 with address 2E8h
Disabled	Disables serial port 1

Serial Port 2 Base Address

This parameter enables the onboard serial port 2 and sets its address.

Table 2-4   Serial Port 2 Parameters

Parameter	Function
Serial 1 (3F8h)	COM 1 with address 3F8h
Serial 2 (2F8h)	COM 2 with address 2F8h
Serial 3 (3E8h)	COM 3 with address 3E8h
Serial 4 (2E8h)	COM 4 with address 2E8h
Disabled	Disables serial port 2

Parallel Port Base Address

The system has one parallel port. Table 2-5 lists the options for selecting the parallel port address. You also have the option to disable the parallel port.

Table 2-5   Parallel Port Control Parameters

Parameter	Function
3BCh	Corresponds to the parallel port with address 3BCh.
378h	Corresponds to the parallel port with address 378h.
278h	Corresponds to the parallel port with address 278h.
Disabled	Disables the parallel port.

To deactivate the parallel port, select `Disabled`. If you install an add-on card that has a parallel port whose address conflicts with the onboard parallel port, the system automatically disables the onboard functions.
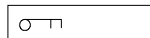
Check the parallel port address on the add-on card and change the address to one that does not conflict.

2.5.3   Setup Password

This option lets you set a password for running the Setup program. Highlight Setup Password and press → or ←. The screen displays a key pattern and requests you to enter a password as shown in the following sample screen:

```
○⌐
```

```
Type your password (up to 7 characters), then
press ENTER. ESC=Cancel
```

To ensure accuracy, the system requests you to retype the password before it stores the value. If the second password does not match the first one, the following message appears:

```
○⌐        ▭                ○⌐
```

```
Incorrect password specified.   Please try
again.          ESC=Cancel
```

After you have specified the Setup password, this parameter changes to Present automatically.

2.5.4   Power-On Password

This option enables you to set the system password. Select None to disable the password feature. Select Present and the screen displays a key pattern and requests you to enter a password as shown in the following screen:

```
┌─────────────┐
│ o─┐┐        │
└─────────────┘
```
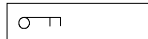
```
┌──────────────────────────────────────────────┐
│ Type your password (up to 7 characters), then │
│ press ENTER. ESC=Cancel                        │
└──────────────────────────────────────────────┘
```

The maximum password length is seven characters. These must be ASCII characters. Type your password carefully, as the characters do not appear onscreen. To ensure accuracy, the system requests you to retype the password before it stores the value.

If the two passwords entered are not identical, the following screen appears:

```
┌─────────────┐        ┌─────────────┐
│ o─┐┐   �  │        │ o─┐┐        │
└─────────────┘        └─────────────┘
```

```
┌──────────────────────────────────────────────┐
│ Incorrect password specified.   Please try    │
│ again.       ESC=Cancel                        │
└──────────────────────────────────────────────┘
```

The password you choose initially can be easily changed or removed at a later date.

The password prompt appears each time the system boots if the Password Type parameter is set as Power-on. To disable this option enter the current system password at the password prompt followed by a slash (/).

To change the existing password, enter the current password at the prompt when you boot the system, followed by a slash (/) and the new password that you wish to specify. Again, be careful when typing the password as it does not appear onscreen when you enter it.

2.6   Load Setup Default Settings

This parameter loads the default values to the system configuration parameters. The default values are the optimized configuration settings for the system. If you select this option, the following prompt appears:

```
┌──────────────────────────────────────────────────────────────┐
│                        BIOS Utility                          │
├──────────────────────────────────────────────────────────────┤
│                                                              │
│              Basic System Configuration                      │
│            Advanced System Configuration                     │
│             Power-Saving Configuration                       │
│                   System Security                            │
│              Load Setup Default Settings                     │
│                                                              │
│                                                              │
├──────────────────────────────────────────────────────────────┤
│                                                              │
│                 Load Default Settings                        │
│                   Are you sure ?                             │
│                   [Yes]   [No]                               │
│                                                              │
├──────────────────────────────────────────────────────────────┤
│ ↑↓ = Move Highlight Bar, ← = Select, Esc = Exit and Reboot   │
└──────────────────────────────────────────────────────────────┘
```

> *If the battery loses power or the CMOS chip is damaged, select* Load Default Settings *from the Setup main menu. This automatically re-loads the default settings and configures the system.*

2.7   Leaving Setup

Examine the system configuration values. When you are satisfied that all the values are correct, write them down. Store the recorded values in a safe place, such as in this manual.

Press `ESC` to leave the system configuration setup. If there is any change in the configuration values and security setup, the following screen appears:

```
Do you want to save CMOS data?

      [Yes]          [No]
```

Use the arrow keys to select your response. Select Yes to store the new data in CMOS RAM. Select No to retain the old configuration values. Then press `ENTER`.

2.8   Fixed Disk Types

The following table lists the fixed disk types.

Table 2-6   *Fixed Disk Types*

Type	Cylinders	Heads	Sectors per Track
0	(indicates SCSI or no fixed disk)		
1	306	4	17
2	615	4	17
3	615	6	17
4	940	8	17
5	940	6	17
6	615	4	17
7	462	8	17
8	733	5	17
9	900	15	17
10	820	3	17
11	855	5	17
12	855	7	17
13	306	8	17
14	733	7	17
15	(reserved)		
16	612	4	17
17	977	5	17
18	977	7	17
19	1024	7	17
20	733	5	17
21	733	7	17
22	733	5	17
23	306	4	17

Table 2-6   Fixed Disk Types (continued)

Type	Cylinders	Heads	Sectors per Track
24	612	4	17
25	306	4	17
26	612	4	17
27	698	7	17
28	976	5	17
29	306	4	17
30	611	4	17
31	732	7	17
32	1023	5	17
33	751	8	17
34	755	16	17
35	731	13	26
36	980	15	17
37	936	16	17
38	981	5	17
39	981	10	17
40	762	8	39
41	980	5	17
42	832	8	33
43	683	12	38
44	513	16	38
45	776	8	33
46	683	16	38
47	832	6	33
48	615	2	34
49	989	16	63
50	823	4	38
51	1001	5	17
52	1024	17	22

Table 2-6   Fixed Disk Types (continued)

Type	Cylinders	Heads	Sectors per Track
53	723	13	51
54	548	8	38
55	1013	4	41
56	929	15	17
57	817	14	36
58	723	13	81
59	802	4	39
60	1024	9	17
61	895	5	55
62	(reserved)		
63	966	10	34
64	1024	8	17
65	1024	11	17
66	918	11	17
67	905	9	17
68	1024	10	17
69	1024	12	17
70	1024	13	17
71	1024	14	17
72	1024	2	17
73	1024	16	17
74	918	15	17
75	820	6	17
76	1024	5	17
77	1024	8	17
78	(reserved)		
79	1001	15	32
80	1024	16	63

Table 2-6   Fixed Disk Types (continued)

Type	Cylinders	Heads	Sectors per Track
81	1024	10	17
82	1024	11	17
83	1024	15	17
84	776	8	33
85	926	13	17
86	805	4	26
87	976	5	17
88	745	4	28
89	747	2	28
90	782	2	1Bh
91	985	13	32
92	816	15	32
93	968	5	17
94	903	8	46
95	966	5	34
96	535	10	50
97	715	10	50
98 ~ 100	(reserved)		
Auto or User	(User-defined)		