

# DX-6900

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**True Green VESA Master  
486 System Board**



***User's Guide***  
*Version 1.73*

*Printed in U.S.A.*

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## System Features

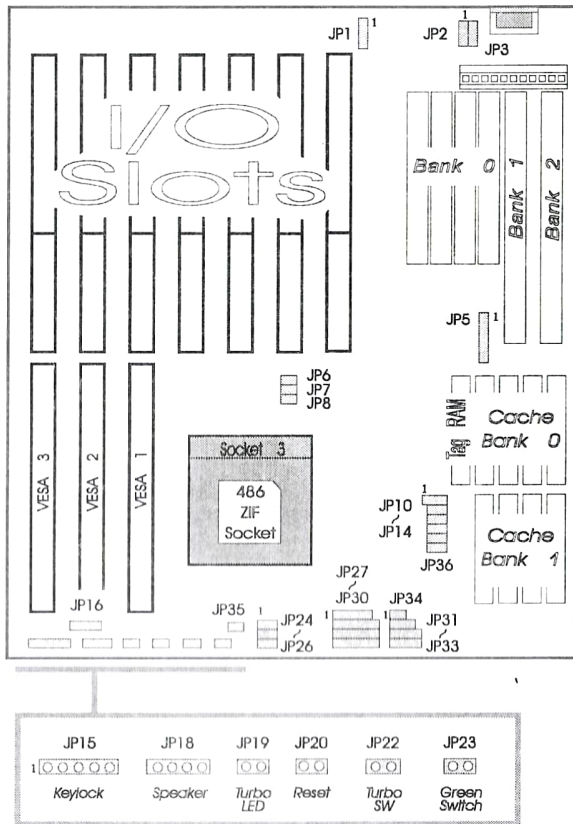
Congratulations on the purchase of your 486 VL-Bus system board. It is a high performance microcomputer system board that extends the capabilities of the ISA architecture with high performance VESA Local Bus. By implementing VL-Bus, the system board allows high speed VL Bus peripherals to communicate directly with CPU to achieve incredible performance boost. The standard IBM AT bus architecture uses an 8 MHz, 16 bit bus. However, the VL-Bus bring 32 bit bus and up to CPUCLK operational speed for the local bus peripherals for increased system performance to users.

In addition of supporting 486SX, 487SX, 486DX, and 486DX2 CPUs, this system board is also equipped to support the next generation of 486 microprocessor - the 486DX4(P24C). This microprocessor is capable of running triple clock within the CPU for up to 100MHz.

Moreover, this 486 VL-Bus system board is built with true green power saving features. The SMM/SMI system management protocol the chip set implemented gives you maximum power saving with SL enhanced CPUs from Intel, and Cyrix in a transparent manner regardless of operating system with full user control in BIOS.

- Intel 486DX4-100(33)MHz, DX/DX2-33/66MHz, 80486SX-33MHz; IBM, SGS and Cyrix 486DX2-66MHz, DX2-80MHz; and AMD AM486DX4-33/100MHz, 486DX/DX2-33/66MHz are supported.
- Built-in upgradability - The 237-pin, ZIF CPU socket allow easy upgrade in the future.
- SMM/SMI power management - detects video and IRQ status. Support CPU StopClock to 0MHz with SL enhanced CPUs and 8MHz clock down mode through chipset for other CPUs.
- APM(Advance Power Management) Mode is fully supported.
- VESA standard Local Bus with Bus Mastering for high speed VL Bus peripherals to communicate directly with CPU.
- Optional 64KB, 128KB, 256KB, 512KB or 1MB external write back, direct-mapped cache.
- 2 banks of 72 pin SIMM and 1 bank of 30 pins SIMM module memory on the system board allow flexible solution, and it is expendable from 1MB to 64MB.
- Timing option to support local bus device at high clock rate.
- System and video BIOS shadowing with caching options for enhanced performance.
- On board 3.3V voltage regulator for DX4(P24C) CPU.
- Three Master VESA Local Bus slots, seven 16-bit ISA I/O slots.

## Board Description



## Jumper Settings

This 486 VL-Bus system board has several jumper switches that must be set to define both the board and system configurations. They are turned on and off by placing or removing a cover cap over the pins. Placing the cover cap is called 'Shorting' the jumper.

The locations of jumpers are detailed on the Board Configuration at the beginning of this chapter. The functions and their corresponding settings or pin assignments are described as follows:

### Misc. Configuration Jumpers

#### JP 1 - External Battery Connector / Clear CMOS

Pinout / Shorting	Assignment
1	Ext. Battery (+) Connector
4	Ext. Battery (-) Connector
2 ~ 3	On-Board Lithium Battery
3 ~ 4	Clear CMOS

**Important** - Please make sure the pins 2 ~ 3 are shorted before using the system board. The system board is shipped from the factory with the pin 3 ~ 4 shorted to prevent battery drain during storage. Failure to reset this jumper to pins 2 ~ 3 would disable the board from powering up.

#### JP 15 - Keylock & Power LED

Pinout	Assignment
1	LED Power
2	N/C
3	Ground
4	Keyboard Lock
5	Ground

#### JP 18 - Speaker

Pinout	Assignment
1	Speaker Data Out
4	+ 5V

## JP 19 - Turbo LED

Pinout	Assignment
1	LED (+)
2	LED (-)

## JP 20 - System Reset

Pinout	Assignment
1	Reset
2	Ground

## JP 22 - Turbo Switch

State	Shorting
Turbo	Open
Non-Turbo	1 ~ 2

## JP 2, JP 3 - Reserved

Reserved	Factory Default
JP 2	2 ~ 3
JP 3	Open

CPU Jumper Setting

## CPU Clock Selection Jumper

CPU Clock Input	CPU Freq.	JP 6	JP 7	JP 8
25MHz	SX - 25MHz DX2 - 50MHz	Open	Open	Short
33MHz	DX/SX - 33MHz DX2 - 66MHz DX4 - 100MHz	Short	Short	Short
40MHz	DX - 40MHz DX2 - 80MHz	Open	Short	Short
50MHz	DX - 50MHz	Short	Open	Open

## CPU Type Selection Jumper

	486 Non-SL Enhanced				486 SL Enhanced				
	Intel / AMD		AMD		Intel		Cyrix		
	SX	DX DX2	DX2	DX4	DX DX2	DX4	DX, DX2	DX2-V80	
Voltage	5V		3.3V		5V	3.3V	5V	3.3V	4V
JP 24	2 ~ 3		1 ~ 2		2 ~ 3	1 ~ 2	2 ~ 3	1 ~ 2	1 ~ 2
JP 25	2 ~ 3		1 ~ 2		2 ~ 3	1 ~ 2	2 ~ 3	1 ~ 2	1 ~ 2
JP 26	2 ~ 3		1 ~ 2		2 ~ 3	1 ~ 2	2 ~ 3	1 ~ 2	1 ~ 2
JP 27	Open		Open		1 ~ 2, 3 ~ 4		2 ~ 3		
JP 28	2 ~ 3		2 ~ 3		1 ~ 2		1 ~ 2, 3 ~ 4, 5 ~ 6		
JP 29	Open		Open		1 ~ 2		1 ~ 2, 3 ~ 4, 5 ~ 6		
JP 30	Open		Open		5 ~ 6		2 ~ 3, 4 ~ 5		
JP 31	Open - Factory Reserved Jumper, Must Remain Open.								
JP 32	Open	1 ~ 2	1 ~ 2		1 ~ 2		1 ~ 2		
JP 33	2 ~ 3	1 ~ 2 3 ~ 4	1 ~ 2 3 ~ 4		1 ~ 2 3 ~ 4		1 ~ 2 3 ~ 4		
JP 34	Short		Short	Open	Open		Open		
JP 35	Short		Short		Short		Short		Open

Please see next page for additional CPU(5x86, Cx486DX4, AMD DX4-120) configurations.

### CPU Type Selection Jumper (Cont...)

This system board is fully compatible with the new Cyrix and AMD microprocessors except the Green Mode for Cyrix DX4 CPU. If Cyrix DX4 CPU is installed, the "Power Management Mode Select" must be disabled in your BIOS' setting(see Power Management Setup in the User's Guide). However, there are two type of CxDX4 CPUs, they differ only on their pin assignment. The first type(GP4) follow the Intel P24D pin-out, the second type(GP) follow the Cx486DX(M7) pin-out. You need to be certain that you received this information when you acquired the CPU.

Before installation, you need to check the BIOS' Release Date(this Date is shown during the BIOS boot-up screen before the memory count). All three type of CPUs required new BIOS. If the Release Date is earlier then 7/2/95, it need to be upgraded with BIOS with Release Date 7/2/95 or later.

If the BIOS version is correct, the next step is to setup the jumpers according to the following table.

	Cyrix		AMD
	Cx486DX4-GP (M7 Pin-out)	5x86(M1sc) Cx486DX4-GP4 (P24D Pin-out)	486DX4-120
JP 24			
JP 25	1 ~ 2		1 ~ 2
JP 26			
JP 27	2 ~ 3		1 ~ 2, 3 ~ 4
JP 28	1 ~ 2, 3 ~ 4, 5 ~ 6		1 ~ 2, 4 ~ 5
JP 29	1 ~ 2, 3 ~ 4, 5 ~ 6		1 ~ 2, 4 ~ 5
JP 30	2 ~ 3, 4 ~ 5		3 ~ 4, 5 ~ 6
JP 31	Open		Open
JP 32	1 ~ 2		1 ~ 2
JP 33	1 ~ 2, 3 ~ 4		1 ~ 2, 3 ~ 4
JP 34	Open		Open
JP 35	Short		Short

### VL-Bus Configuration

#### JP 16, JP 17 - VL-Bus Wait State

	Normal ( < or = 33MHz )	Extra Wait State ( > 33MHz )	Description
JP 16	Open	Short	VESA Clock
JP 17	Open	Short	VESA Wait State

### Green Function Jumper

#### JP 23 - Forced Green Mode Trigger Switch

Shorting	State
Trigger once	Forces system into green mode immediately
Trigger again	Normal operation

This jumper may be connected to the Reset Button on the computer case if the case does not has a separated button for this function, you may then use the power-off to reset the system when it is needed.

**WARNING - This is a trigger switch, do not keep this jumper short or the system will have problem waking up or boot after reset. For this reason, do not use the Turbo Button on the system chassis for this switch since one may forget to release the button after it triggered the system into the green mode.**

## Memory Sub-System

There are 2 banks of 72 pins SIMM socket and 1 bank of 30 pins SIMM socket on this board, each bank of 72 pins SIMM consists of only one SIMM socket as denoted as Bank 1, Bank 2; Bank 0 is the sockets for the 30 pins' SIMMs. These three banks are not required to be filled in sequence as in Bank 0 first and Bank 3 last. The system board has auto-detection circuitry to sense which bank or banks are filled. Any SIMM modules listed below with Fast Page Mode, single(S) or double(D) side can be used.

There are certain restrictions in term of the combination of SIMM modules you may use for the 3 banks. Please refer to the table below for all usable combinations, the Bank 0 has to be filled fully(4 pcs.) with same type of SIMMs if Bank 0 is to be used.

**Note : The total size of any combination of the SIMM modules installed can NOT exceed 64MB.**

	SIMM Type		
	Bank 0 (30 Pins x 4)	Bank 1 (72 Pins - U 17)	Bank 2 (72 Pins - U 18)
First Possible Combination	256K x 9/8 - 1MB 1M x 9/8 - 4MB 4M x 9/8 - 16MB 16M x 9/8 - 64MB	None - 0MB 256Kx36/32 S - 1MB 1Mx36/32 S - 4MB 4Mx36/32 S - 16MB 16Mx36/32 S - 64MB	None - 0MB 256Kx36/32 S - 1MB 1Mx36/32 S - 4MB 4Mx36/32 S - 16MB 16Mx36/32 S - 64MB
Second Possible Combination	None	None - 0MB 256Kx36/32 S - 1MB 512Kx36/32 D - 2MB 1Mx36/32 S - 4MB 2Mx36/32 D - 8MB 4Mx36/32 S - 16MB 8Mx36/32 D - 32MB 16Mx36/32 S - 64MB	None - 0MB 256Kx36/32 S - 1MB 512Kx36/32 D - 2MB 1Mx36/32 S - 4MB 2Mx36/32 D - 8MB 4Mx36/32 S - 16MB 8Mx36/32 D - 32MB 16Mx36/32 S - 64MB

One easy rule to follow is that if the Bank 0 is populated, than Bank 1 and Bank 2 can not be used for any double side SIMM module.

Note - "Double Side SIMM" also refer to as "Double RAS" or "Double Density".

## Cache Sub-system

### Cache Memory Configuration

Please refer to the "Board Description" at the beginning of this chapter for their physical locations. Since single bank installations - the high lighted Conf. Types, prevent the cache sub-system from using interleaving access, the "Auto Configuration" in the Advanced Chipset Setup must be disabled and the "Cache Read Wait State" must also be set to "3-2-2-2" to ensure proper operation.

Conf. Type	Total Cache Size	SRAM Type		Tag RAM	Pcs. Required
		Bank 0 (U21, 22, 23, 24)	Bank 1 (U28, 29, 30, 31)	U 20	
A	64K	8K x 8	8K x 8	8K x 8	9
B	128K	32K x 8		8K x 8	5
C	256K	32K x 8	32K x 8	32K x 8	9
D	256K	64K x 8		32K x 8	5
E	512K	64K x 8	64K x 8	32K x 8	9
F	512K	128K x 8		32K x 8	5
G	1024K	128K x 8	128K x 8	64K x 8	9

### Cache Configuration - Jumper Setting

Conf. Type	Size	JP 5	JP 10	JP 11	JP 12	JP 13	JP 14
A	64K	2 ~ 3	2 ~ 3	Open	Open	Open	Open
B	128K	1 ~ 2	1 ~ 2	Open	Open	Open	Short
C	256K	2 ~ 3	2 ~ 3	Open	Open	Short	Short
D	256K	1 ~ 2, 3 ~ 4	1 ~ 2	Open	Open	Short	Short
E	512K	2 ~ 3, 4 ~ 5	2 ~ 3	Open	Short	Short	Short
F	512K	1 ~ 2, 3 ~ 4, 5 ~ 6	1 ~ 2	Open	Short	Short	Short
G	1024K	2 ~ 3, 4 ~ 5, 6 ~ 7	2 ~ 3	Short	Short	Short	Short

### JP36 - Factory Reserved Jumper

Reserved	Factory Default
JP 36	Short

## System BIOS Setup

After you have configured the system board and assembled all the components, you need to enter the system configuration information to the system BIOS through the AMI WinBIOS Setup programs. This AMI WinBIOS Setup program and the system configuration information are embedded in the system board and it is backup by the on-board battery.

This system board is equipped with the latest AMI WinBIOS for easy configuration where mouse is enabled if you have a mouse attached. You may either use the keyboard or use the mouse to pick and change configuration options.

### Entering BIOS Setup Program

Turn on or Reboot the system. After the system finished testing the on-board memory, the message "Hit DEL if you want to run SETUP" will appear. Press "DEL" key at this time will bring you into the BIOS Setup program.

Use keyboard "Tab" key to choose different group windows, "Arrow" keys to high-light items, and use the "Enter" key to select option or you may use the mouse to "Click" on item you want to select and change. Press "ALT + H" keys will bring up the Help Screen.

After the BIOS Setup program in entered, you may want to do choose the "Standard" icon in the "SETUP" group window for date, time, and all disk drives information. If you have IDE Hard Drive(s) installed, the "Detect C" and "Detect D" icons in the "Utility" group window can be use to automatically enter your hard drive(s) information.

At any time you may press "ESC" key to exit the window, and choose the "Do not save and exit" option to keep the original configuration.

## Standard Setup Option

### Date, and Time Options

If you would like to set Date, and Time option, move cursor to highlight the items and use PgUp/PgDn to modify the data.

### Hard Disk C & D Types

According to your actual equipment, you can select the type of hard disks for C, D, E, & F from 'Not Installed' to type 46 for standard hard disks. As for type 47, user may define by himself.

### Floppy Drives A & B

According to your actual equipment, set floppy drive A & B whose five options are as highlighted.

## Load BIOS and Setup Defaults

There are three sets of BIOS values stored in the ROM files :

The "Original" default values

The "Optimal" default values

The "Fail-Save" default values

The "Original" default values are those original options you have changed in the current session. You may use this option to restore the original values you changed in the current session if you changed your mind before they are saved. Once the changes are saved, this option does not restore the original values.

The "Optimal" default values are those settings which should provide optimum performance for the system. They are the best case default values.

The "Fail-Save" default values, which are the most conservative case defaults, but also are the most stable default values for the system. They are to be used if the system is performing erratically because of the hardware problems.



## Advanced Setup

Due to frequent update of system BIOS, the actual options available in your system board BIOS setups may vary comparing with this manual. If technically necessary, we would provide a special insert for instruction for the difference in regard to any changes of the BIOS setup option.

### Typematic Rate Programming

By enabling this option, the user can select the rate at which a keystroke is repeated by adjusting options "Typematic Rate Delay" and "Typematic Rate".

### Typematic Rate Delay & Typematic Rate

When a key is pressed and held down, the character appears on the screen and after a delay set by the "Typematic Rate Delay", it keeps on repeating at a rate set by the "Typematic Rate" value. Usually, these options are adjusted for Network, OS/2 or other similar type of operating system when keyboard reaction become comparatively slow. By using these options, the typematic rate can be adjusted to suit individual preference.

### System Keyboard

When keyboard is installed, POST routine test keyboard; otherwise, it does not.

### Primary Display

Select the primary display. If you chose "Not Install", the system will ignore the primary display while doing the POST test.

### Extended BIOS RAM Area

The AMI BIOS Setup features one user-definable hard disk type. Normally, the data for these disk types are stored at the 0:300 in the lower system RAM.

If a problem occurs with software like Netware or OS/2 or similar that uses lower system RAM, this data can be loaded at the upper limit of the DOS shell(640K). If the option is set to DOS 1K, the DOS memory is shortened to 639KB, and the top 1KB is used for the hard disk type storage.

### Floppy Drive Seek at Boot

You may set this option to "Disabled" to allow a fast boot and to reduce the possibility of damage to the drives' heads.

### System Boot Up Sequence

The system may be set to seek the operating system during power up either from the floppy drive A: or from the hard drive C: by using this option.

### External & Internal Cache Memory

These options allows user to enable or disable the on-board (External) and the on-chip(Internal) cache memories (SRAM) when special peripheral or software implemented

indicate such requirement. System over all speed will slow down considerably if these options are disabled.

### Password Checking

This option allow a password be set up so that a password will be needed to enter the CMOS Setup or to boot the system including entering CMOS Setup. After this option is enabled, you must use the PASSWORD icon in the security group to setup your password. If in any case the password is lost or forgotten, the jumper JP 1 - Clear CMOS can be used to clear the configuration. WARNING - "JP 1" will clear and reset ALL and EVERY configuration parameters. Make sure you know what you are doing or ask someone who do to help you.

### Virus Warning

This function, If enabled, will detects boot sector viruses and warning will be given when a program attempted to change boot sector information.

### Video & Adapter ROM Shadows

Video and/or adapters ROM shadowing is a procedure in which BIOS codes from peripheral(s) adapter(s) ROM when present are copied from slower ROM to faster RAM. The BIOS are then executed from the faster RAM. Each option allows for a segment of 16 KB to be shadowed from ROM to RAM. If one of these options is enabled, and there is BIOS present in that particular 16 KB segment, the BIOS will be shadowed.

### IDE Block Mode

IDE HDD block mode transfer allows data to be transferred to and from the IDE hard drive in multiple sectors at a time. Most new hard drive and HD controller support this function, be sure to check with the hard drive and hard drive controller manufacturers before using this option.

### IDE LBA Mode and IDE 32 Bit Mode

These 2 options, if enabled with the use of the on-board IDE controller, would enhance you disk sub-system performance. Most new hard drives should support these functions, be sure to check with the hard drive manufacturer before using these options.

### Video Shadow Before Video Init

Enabling this option may speed up the boot up process due to the graphic nature of the WinBIOS. This option may be disabled if video problem is encountered and it should not have any impact on the system performance after boot-up.

## Chipset Features Setup

Due to frequent update of system BIOS, the actual options available in your system board BIOS setups may vary comparing with this manual. If technically necessary, we would provide a special insert for instruction for the difference in regard to any changes of the BIOS setup option.

**Most of the options in this group have major influence to the system. If options are not set properly, it may not only the performance will be greatly affected, but also it may bring the system down unexpectedly in most cases. Therefore, it is only wise to leave the defaults alone unless there are specific reason to do any change.**

### Auto Config Functions

When this item is enabled, the system BIOS will detect CPU type and board frequency and automatically set the option on the items indicated below to the optimum setting. The system will ignore the setting entered manually. If this option is disabled, the items below it must be set manually according to CPU type and speed. The following table is the auto-configuration default settings for the different operation frequency.

### Cache Read Hit Wait State

This option allows you to choose the cache read operation mode during burst read. The 3-1-1-1 can be used for 33MHz system or less with 2 banks of cache memory installed. The 3-2-2-2 should be used for system faster than 33MHz or only one bank of cache installed.

### Cache Write Hit Wait State

The 0 can be used for 33MHz system or less with 2 banks of cache memory installed. The 1 should be used for system faster than 33MHz or only one bank of cache installed.

### DRAM Wait State Select

The 1 can be used for 33MHz system or less. The 2 should be used for system faster than 33MHz.

### DRAM Page Mode

Select "Fast" for this option if the SIMM modules installed support Fast Page Mode.

### Keyboard Clock Select

The Keyboard Clock should be maintained at around 8MHz to conform to the AT standard.

### AT Bus Clock

The AT bus clock should be maintained at around 8MHz to conform to the AT standard.

### Alt Bit in Tag SRAM

The default "7+1" setting would give better performance and should always be set as such.

### Local Ready Delay Setting

Local Bus Setting, unless otherwise required, do not change the default setting.

### Signal LDEV# Sample Time

Local Bus Setting, unless otherwise required, do not change the default setting.

### CPU ADS# Delay 1T or Not

Local Bus Setting, unless otherwise required, do not change the default setting.

### ISA Bus Refresh Disable Bit

"Fast" setting provides better performance.

### Divider for Refresh

Memory refresh setting, unless otherwise required, do not change the default setting.

### System Memory Remap or Not

Enabled this option will allow the system to remap the unused upper memory to the extended addresses.

### Video, Adapter & System ROMs Cache

The video, adapter and system shadows can also be cached for improved performance.

### LowA20# Select, & RC Reset Select

The GateA20 and the Real Time Clock should always be set to "Chipset" for better performance under protected mode operation.

### IO Recovery Time

AT Bus I/O Recovery Time, unless otherwise required, do not change the default setting.

## Power Management Setup

This system board is designed to fully support the SMM/SMI power management protocol. When the Power Management Mode option is enabled, the system will enter into Standby and then suspend(Inactive) mode after the length of time set at the Timer options when no system activities are detected.

### IDE Standby Power Down Mode

This option is a BIOS's built-in function that does not require SMI to operate, however, if this option is enabled and you experience erratic hard drive behavior, this option must be disabled. It means that your harddisk does not support this BIOS function

### Power Management Mode Select

This option served as a master switch to turn-on the power management mode.

### Standby Timer Value

This is the first stage when the system entered into the power management mode. You select the number of minutes after which the system will enter the power saving Standby Mode when no activities as defined under the monitors options listed below are detected. You may also use the option "Clock Out On Standby Mode" to select the specific system speed in this mode.

### Inactive Timer Value

This is the second stage when the system entered into the power management mode. You select the number of minutes after which the system will enter the power saving Inactive(Suspend) Mode when no activities as defined under the monitors options listed below are detected. This mode only function if a SL-Enhanced CPU is installed, since only a SL-Enhanced CPU can support Stop-Clock (0 MHz) operation.

### Sampling Activity Delay, & SMI Pulse Width

Unless otherwise required, do not change the default setting.

### Monitor ... Port Activity

These options allow you to specify what activities the system should monitor which will either prevent the system from enter into power saving mode or wake-up the system from power saving mode when activity is detected as defined in here.

### Suspend / Resume Switch

If this option is enabled, you may use the JP23 to force the system into Inactive Mode immediately.

### Clock Out On Standby Mode

Define the system speed after the system entered into Standby Mode. The PCLK equal to the CPU Clock - if you are using DX2-66MHz, you CPU CLK is 33MHz, setting this option

to "PCLK/4" make the Standby Mode clock to 8MHz.

### VGA Power Control

The "Normal" setting will work for most of the VESA compliance VGA controllers. This option will enable the system to blank the monitor screen when power saving mode is entered.

### IDE Power Control

The IDE Power Control supports hard drive that has such a feature, however, if this option is enabled and you experience erratic hard drive behavior, this option must be disabled. This option uses the SMM/SMI specification for hard drive power saving control.

### APM Function

APM Function allows application that uses Advance Power Management interface to control the system power management features when the system is installed with a SL-enhanced CPU.

## Password Setting

Please refer to Section "Advance Setup", Subject "PassWord Checking" for detail information to setup password.

## Exiting Setup Utility

At this point, you can either choose to confirm your setup entries and exit by using "ESC" key and taking the "Save Changes & Exit" or the "Do Not Save & Exit" option to restore the original setup parameters and exit.

After you highlight the desired option and press <<ENTER>>, the system will reset itself. The new or original setup parameters, depend on the option which you have chosen, will become the current setting.

## Keyboard Turbo Switch

After booting the system, you can select processor clock speed (Turbo or non-Turbo) by using keyboard command in addition to use the front-panel switch.

Your system board has speed switching circuitry allowing it to change speed during operation, even while you are running a program. To change the processor speed, use the following keyboard combinations :

High Speed : <Ctrl> + <Alt> + <+>

Low Speed : <Ctrl> + <Alt> + <->

