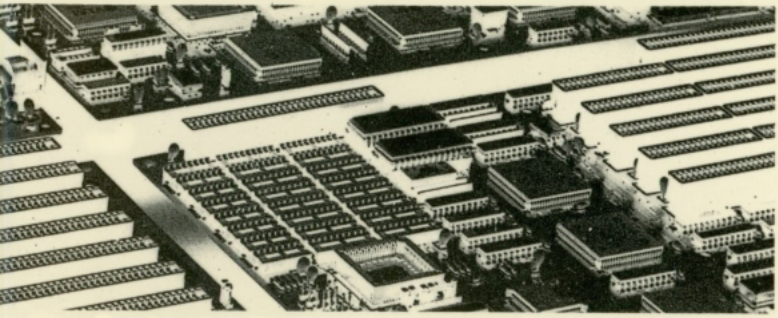
AL486



USER'S MANUAL

AL486
User's Manual

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Appendix A Setting the System Speed

1 Introduction

AL486 is a 486 VL-Bus mainboard based on the Acer M1429G and M1431 system chipset. Other on-board specifications include memory capacity of up 96MB, cache memory sizes of 64/128/256/512 KB, and the Green function support that complies to the standards of Energy Star.

1.1 General Specifications

Processor:	Traditional CPU (486SX/DX, 487SX, DX2), Intel S-Series, DX4, Cyrix M6, M7, AMD486 series
External Cache :	Supports 64/128/256/512 KB
Memory Size:	Four 30-pin and two 72-pin SIMM sockets supporting single density SIMMs only Memory size of 1MB up to 96MB
System BIOS:	Phoenix BIOS
Slots :	One 8-bit ISA slot Six 16-bit ISA slots Three VL-Bus slots (master)
Connectors:	Power Suspend/Resume Modem Ring-in Green Power Supply External Battery Hardware Reset External Speaker Turbo Switch Turbo LED Keylock/Power LED
Form Factor:	2/3 Baby-AT
PCB :	4 layers
Power Saving :	SMM (SMI), APM, stop clock for S-Series CPU and 4 system state

Features

- Internal Cache:
  - Supports L1 write-through feature of 486 systems
  - Supports L1 write-through/write-back feature of P24T/P24D/M6/M7 systems
  - Supports enable/disable on L1 write-back for entire local memory space of P24T/P24D/M6/M7 systems
  - Supports optional enable write-back in region > =16MB of P24T/P24D/M6/M7 (for ISA compatibility issue)
  - Cacheable to BIOS code Read with default of write-through by P24T/P24D/M6/M7, non-cacheable to BIOS data read/write to protect or write-through to BIOS data read/write
- External Cache :
  - L2 write-back or write-through, but no write-buffered for one-bank or two-bank, TAG bit and Modify bit in one SRAM
- Fast Local Bus:
  - Allows ISA master/DMA access to local device
  - Allows local master access to ISA device
- DRAM:
  - Supports 256K/512K/1M/4M/16M with at least 80ns DRAM specifications
  - Page Mode only
  - Hidden refresh/Slow refresh/Normal refresh

- SMM and PMU:
  - Supports CPU SMM Mode, SMI feature
  - STPCLK control with clock scaling & clock throttling feature
  - IO trap for IO restart feature
  - Supports the APM control
  - Supports the EXTSMI control for indicating the power saving state
  - 4 system state for power saving (1) ON (2) DOZE (3) STANDBY (4) SUSPEND
  - Programmable Flash LED
  - Peripheral devices activity monitoring of each state for power saving: KBD, VGA, HDD, LPT, COM, FDD, IRQS, DRQS, VESA master and 2 programmable regions
  - 7 timers from 1 second to 320 minutes to individually monitor the state, VGA, HDD, LPT, programming region 1, programming region 2, and standard input devices activity
  - External switch, RTC alarm, and modem ring-in wake up control
  - 5 power control signals for peripheral devices
- Built-in ISP controller and RTC
- Software AT clock programmable
- Supports Flash, EPROM
- Supports I/O Recovery
- Fast RC, Gate A20 emulation

2 Memory Configurations

- In this section, the AL486 DRAM and cache configurations are discussed. Users are recommended to read through this section before installing or removing memory.

2.1 System Memory

The AL486 DRAM provides tremendous flexibility to support a number of different on-board DRAM configurations. The on-board DRAM is installed with SIMM (Single-In-Line Memory Module). There are three memory banks capable of supporting 1MB up to 96MB. 72-pin SIMM modules must be installed when using Banks 0 (SIM1) and 1 (SIM2) whereas 4 pieces of 30-pin SIMM modules are required on bank 2 (SIM 3-6).

The following table lists all the possible DRAM module combinations and the total memory amount for each option.

Bank0 (SIM1)	Bank1 (SIM2)	Bank2 (SIM 3-6)	Total
0	0	1MB	1MB
0	1MB	1MB	2MB
1MB	0	1MB	2MB
1MB	1MB	1MB	3MB
0	0	4MB	4MB
0	1MB	4MB	5MB
0	4MB	1MB	5MB
1MB	0	4MB	5MB
4MB	0	1MB	5MB
1MB	1MB	4MB	6MB
1MB	4MB	1MB	6MB
4MB	1MB	1MB	6MB
0	4MB	4MB	8MB
4MB	0	4MB	8MB

Table 2-1. Memory Configurations and Requirements (Continued.....)

Bank0 (SIM1)	Bank1 (SIM2)	Bank2 (SIM 3-6)	Total
1MB	4MB	4MB	9MB
4MB	1MB	4MB	9MB
4MB	4MB	1MB	9MB
4MB	4MB	4MB	12MB
0	0	16MB	16MB
0	1MB	16MB	17MB
0	16MB	1MB	17MB
1MB	0	16MB	17MB
16MB	0	1MB	17MB
1MB	1MB	16MB	18MB
1MB	16MB	1MB	18MB
16MB	1MB	1MB	18MB
0	4MB	16MB	20MB
0	16MB	4MB	20MB
4MB	0	16MB	20MB
16MB	0	4MB	20MB
1MB	4MB	16MB	21MB
1MB	16MB	4MB	21MB
4MB	1MB	16MB	21MB
4MB	16MB	1MB	21MB
16MB	1MB	4MB	21MB
16MB	4MB	1MB	21MB
4MB	4MB	16MB	24MB
4MB	16MB	4MB	24MB
16MB	4MB	4MB	24MB
0	16MB	16MB	32MB
16MB	0	16MB	32MB
1MB	16MB	16MB	33MB

Table 2-1. Memory Configurations and Requirements (Continued.....)

Bank0 (SIM1)	Bank1 (SIM2)	Bank2 (SIM 3-6)	Total
16MB	1MB	16MB	33MB
16MB	16MB	1MB	33MB
4MB	16MB	16MB	36MB
16MB	4MB	16MB	36MB
16MB	16MB	4MB	36MB
16MB	16MB	16MB	48MB
0	0	64MB	64MB
1MB	1MB	64MB	66MB
1MB	4MB	64MB	69MB
1MB	16MB	64MB	81MB
4MB	4MB	64MB	72MB
4MB	16MB	64MB	84MB
16MB	16MB	64MB	96MB

Table 2-1. Memory Configurations and Requirements

2.2 Cache Memory Configuration

Cache Size	Cacheable Region	TAG RAM (U21)	Cache Bank0 (U16....U19)	Cache Bank1 (U22....U25)
64KB	8MB	8Kx8	8Kx8	8Kx8
128KB	16MB	8Kx8	32Kx8	None
256KB	32MB	32Kx8	32Kx8	32Kx8
512KB	64MB	32Kx8	64Kx8	64Kx8
512KB	64MB	32Kx8	128Kx8	None

Table 2-2. Secondary Cache Memory Configuration

3 Jumper Settings and Connectors

3.1 Setting the Jumpers

The table below summarizes the functions and appropriate jumper settings on the AL486.

Function		Jumper Settings
CPU Type	486SX	**JP25** open **JP31** open **JP32** open **JP35** open **JP37** open **JP38** short 1-2 **JP45** short 2-3 **JP49** open **JP52** short 2-3 **JP60** short 2-3
	486DX	**JP18** short (for DX-50 only) **JP25** open **JP31** open **JP32** open **JP35** open **JP37** short 2-3 **JP38** short 1-2 **JP45** short 2-3 **JP49** open **JP52** short 1-2, 3-4 **JP60** short 2-3
	487SX	**JP25** open **JP31** open **JP32** open **JP35** open **JP37** short 1-2 **JP38** short 1-2 **JP45** short 2-3 **JP49** open **JP52** short 1-2, 3-4 **JP60** short 2-3

Table 3-1. Jumper Settings (Continued . . . . .)

Function		Jumper Settings
CPU Type	P4S/P24S	**JP25** short **JP31** open **JP32** short 1-2 **JP35** short 1-2 **JP37** short 2-3 **JP38** short 1-2 **JP45** short 2-3 **JP49** open **JP52** short 1-2, 3-4 **JP60** short 1-2
	P23S	**JP25** short **JP31** open **JP32** short 1-2 **JP35** short 1-2 **JP37** open **JP38** short 1-2 **JP45** short 2-3 **JP49** open **JP52** short 2-3 **JP60** short 1-2
	P24C	**JP25** short **JP31** open **JP32** short 1-2 **JP35** short 1-2 **JP37** short 2-3 **JP38** short 1-2 **JP45** short 1-2 **JP48** open : 3XCPUCLK short : 2XCPUCLK **JP49** open **JP52** short 1-2, 3-4 **JP60** short 1-2
	AMD486DXL	**JP25** open **JP31** open **JP32** short 5-6 **JP35** short 5-6 **JP37** short 2-3 **JP38** short 1-2 **JP45** short 2-3 **JP49** short 1-2 **JP52** short 1-2, 3-4 **JP60** short 1-2

Table 3-1. Jumper Settings (Continued . . . . .)

Function		Jumper Settings
CPU Type	M6	**JP25** open **JP31** short 2-3 **JP32** short 3-4 **JP35** short 3-4 **JP36** open **JP37** open **JP38** short 1-2 **JP45** short 2-3 **JP49** short 2-3 **JP52** short 2-3 **JP60** short 1-2
	M7	**JP25** open **JP31** short 2-3 **JP32** short 3-4 **JP35** short 3-4 **JP36** open : 1XCPUCLK short : 2XCPUCLK (for OEM CPU only) **JP37** short 2-3 **JP38** short 1-2 **JP45** short 2-3 **JP49** short 2-3 **JP52** short 1-2, 3-4 **JP60** short 1-2
CPU Voltage	+5V (from standard power supply unit)	**JP46** short 1-2 **JP62** don't care
	LT1085 +3.45V/+3.3V (from regulator on-board; adjustable)	**JP46** short 2-3 **JP62** short 1-2 : +3.45V short 2-3 : +3.3V
	+3.3V Power (from special power supply unit)	**JP46** open **JP62** don't care
CPU Speed Select	40/50 MHz (1X)	**JP12** short 2-3 **JP20** short 2-3 **JP21** short 2-3
	25/33 MHz (2X)	**JP12** short 1-2 **JP20** short 1-2 **JP21** short 1-2

Table 3-1. Jumper Settings (Continued . . . . .)

Function		Jumper Settings
CPU Clock Speed Select	40MHz	**JP11** short 1-2, 5-6 **JP11** open 3-4
	50MHz	**JP11** short 3-4, 5-6 **JP11** open 1-2
	66MHz	**JP11** short 1-2, 3-4 **JP11** open 5-6
Flash ROM	+12V	**JP2** short 1-2
	+5V	**JP2** short 2-3
Local Ready Select	< = 33MHz	**JP39** short 1-2
	> 33MHz	**JP39** short 2-3
CPU Type Set for the System Controller	M6 System	**JP13** short **JP14** open **JP15** short
	486 & Upgradable 486 Systems	**JP13** open **JP14** open **JP15** open
	M7 System	**JP13** short **JP14** open **JP15** open
VESA Wait State	0 Wait	**JP23** short 1-2
	1 Wait	**JP23** short 2-3
VESA Clock Speed	< = 33MHz	**JP22** short 1-2
	> 33MHz	**JP22** short 2-3
Default Settings		**JP24** open **JP26** open

Table 3-1. Jumper Settings (Continued . . . . .)

Function		Jumper Settings
Cache Size	64KB	**JP16** open **JP33** open **JP34** open **JP40** short 1-2 **JP41** open **JP42** open
	128KB	**JP16** short **JP33** open **JP34** short **JP40** short 2-3 **JP41** open **JP42** open
	256KB	**JP16** short **JP33** open **JP34** short **JP40** short 1-2 **JP41** short **JP42** open
	512KB	**JP16** short **JP33** short **JP34** short **JP40** short 1-2 : when using 64Kx8 SRAMs on Banks 0 and 1 short 2-3 : when using 128Kx8 SRAMs on Bank 0 **JP41** short **JP42** short

Table 3-1. Jumper Settings

3.2 Connectors

There are several connectors located on the AL486. They are used to connect some peripheral devices to enhance the operating performance of the system. Refer to Figure 3.1 for the positions of all the connectors on the mainboard. The following table lists the connectors on the AL486.

Connector	Function
J1	Keyboard Connector
J2	Turbo Switch
J3	Turbo LED
J4	Hardware Reset
J5	External Speaker Connector
J6 (1-3)	Power LED
J6 (4-5)	Keylock Connector
JP1	External Battery Connector
JP4	Green Power Supply Connector - active low to turn-off Pin 1 : Control Signal Pin 2 : Ground (GND)
JP17	Modem Ring-in Connector
JP61	Green "Suspend/Resume" External Switch

Table 3-2. Mainboard Connectors

3.3 Board Layout

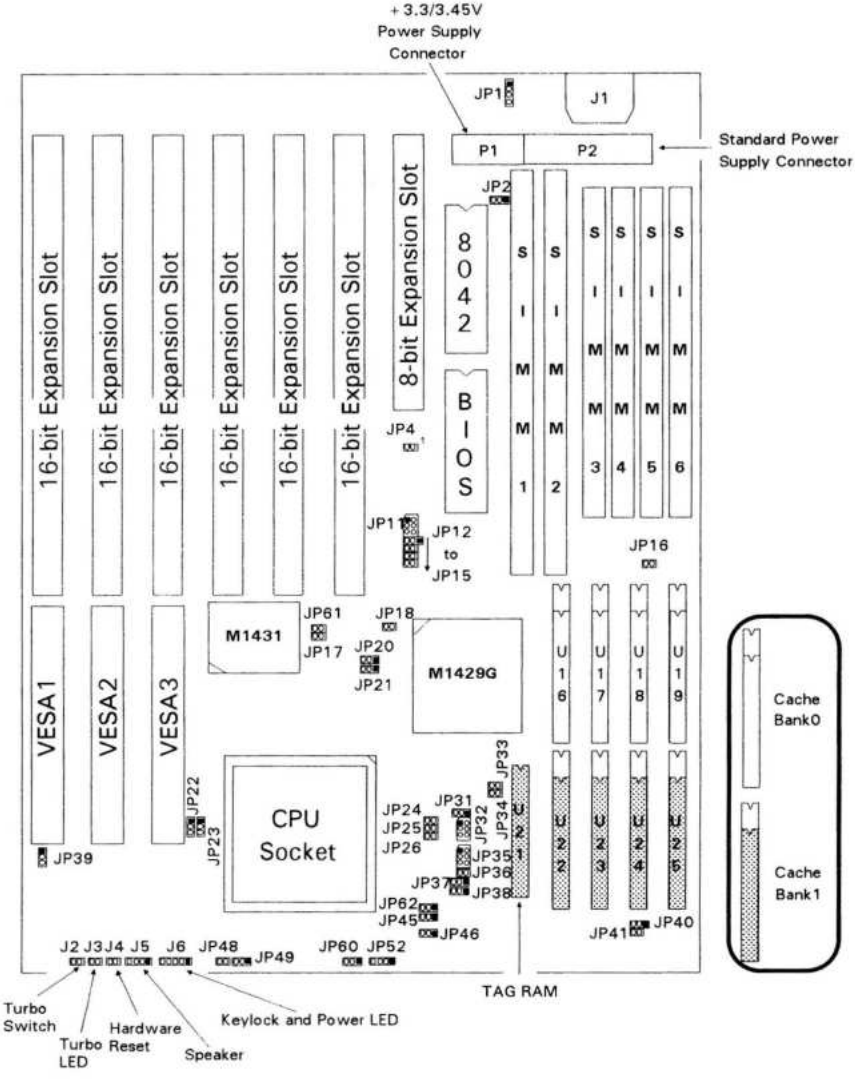


Figure 3-1. AL486 Mainboard Layout

4 Built-in BIOS Setup Program

4.1 Setup Program

Use the BIOS for AL486 to record changes in your hardware and to control its special features. The Setup program uses a number of menus in which you can specify changes to your hardware and turn the special features to on or off.

To enter the BIOS Setup program, turn on or reboot the system. Press the <DEL> key when the system displays the following message:

Press <DEL> to enter Setup. The following screen will then be displayed.

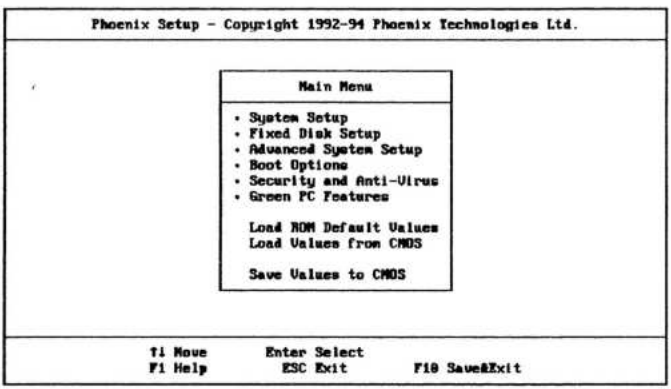


Figure 4-1. Setup Main Menu

It is highly recommended that you list down all the values of the Setup program before making any changes. Doing so will save a lot of time restoring the system back in the event of a configuration memory loss.

Note: *On-screen instructions at the bottom of each screen explain how to use the program.*

- System Setup - allows checking or modification of general configuration information.

- Fixed Disk Setup - allows for automatic detection of the hard disk drive type including the number of cylinders and heads, write pre-compensation time, read/write head landing zone, and number of sectors per track.
- Advanced System Setup - sets the various system options for the user, including the internal/external cache memory functions, ISA features, video and system shadowing etc..
- Boot Options - determines the sequence with which the system will proceed when booting the operating system.
- Security and Anti-Virus - provides special access for the user to enter the operating system and Setup program, and restricts unauthorized access to the floppy disk drives.
- Green PC Features - allows the timer settings for the DOZE, STANDBY and SUSPEND modes. It also lists the SMI events by which the system wakes up from STANDBY or SUSPEND modes. If the device is not active, Power Management Function will slow down the CPU speed and both IDE and monitor will be put into doze, standby, or suspend mode.
- Load ROM Default Values - allows for automatic configuration of all the above options using the values in the ROM BIOS table.
- Load Values from CMOS - allows for automatic configuration of all the above options using the previous values saved in the CMOS SRAM.
- Save Values to CMOS - saves the changes you have made in the Setup program, then quits and reboots the system.

To choose an item from the Setup main menu, move the cursor to appropriate line using the Up<↑> and Down<↓> arrow keys and press <Enter>. The screen will display a warning message as shown on the following page.

4.2 System Setup

```
Phoenix Setup - Copyright 1992-94 Phoenix Technologies Ltd.

                    System Setup
                System Time:          [11:58:59]
                System Date:          [04/01/1994]

                Video System:         [EGA / VGA]

                System Memory:           640 KB
                Extended Memory:       31744 KB

                Diskette Drive A:     [1.2 MB, 5¼"]
                Diskette Drive B:     [Not Installed]

↑↓ Move    ESC Exit    PgUp Previous Value    F5 Previous Configuration
           F1 Help     PgDn Next Value        F6 Default Configuration
```

Figure 4-2. System Setup

System Time - includes hour, minutes, seconds but only the values of hour and minute can be set.

System Date - allows manual setting of the electronic calendar on the mainboard.

Video System - specifies the display adapter installed.

Hard Disk C: and Hard Disk D: - specify the physical and electronic properties of the standard hard disk drives installed. Relevant specifications include the number of cylinders, heads, write pre-compensation time, read/write head landing zone, and number of sectors per track.

System Memory and Extended Memory - displays important information about your system which includes the conventional and extended memory sizes. They are updated automatically by the Setup program according to the status detected by the BIOS self-test. This section of the System Setup screen is for viewing purpose only and manual modifications are not allowed.

Diskette Drives A: and B: - specify the capacity and format of the floppy drives installed in your system.

4.3 Fixed Disk Setup

The Fixed Disk Setup provides auto configuration of the hard drive installed in the system. After pressing the <Enter> key on this item on the main menu, the screen will display the following screen.

```
Phoenix Setup - Copyright 1992-94 Phoenix Technologies Ltd.

                    Fixed Disk Setup
                    • Fixed Disk 0 Control
                    • Fixed Disk 1 Control

↑↓ Move    ESC Exit    PgUp Previous Value    F5 Previous Configuration
           F1 Help     PgDn Next Value        F6 Default Configuration
```

Figure 4-3. Fixed Disk Setup Screen 1

Once the program detects the type of hard disk 0 and/or 1 installed, it will display the relative information such as the type, cylinders, heads, write precompensation, landing zone, and number of sectors per track.

```
Phoenix Setup - Copyright 1992-94 Phoenix Technologies Ltd.

                 Fixed Disk 0 Control
Autotype Fixed Disk: [Press Enter]

Type:                [User]  425 MB
Cylinders:           [ 989]
Heads:               [  15]
Sectors/Track:       [  56]
Landing zone:        [ 989]
Write precomp:       [None]

↑↓ Move      Enter Select
F1 Help        ESC Exit        F10 Save&Exit
```

Figure 4-4. Fixed Disk Setup Screen 2

If the program fails to detect the hard disk(s) or the < Enter > key was not pressed in the Autotype Fixed Disk option, manual setting **of the values is recommended.**

Autotype Fixed Disk - detects the type of fixed disk 0 and/or 1 installed. If successful, it fills the remaining fields on this menu.

Type - 1 to 45 fills in remaining fields with values for **predefined** disk drives. "User" allows the user to fill in the remaining fields.

Cylinders - specifies the number of cylinders of the hard disk drive. The range of this option is from 1 to 1024.

Heads - specifies the number of read/write heads **of the** hard disk drive. The range of this option is from 1 to 16.

Sectors/Track - provides the number of sectors per track defined for the hard disk drive. The range is from 1 to 64.

Landing Zone - refers to the cylinder number where the disk drive heads (read/write) are positioned to when the disk drive is parked. The range of this option **is from 1 to 1024.**

Write Precomp - refers the cylinder number, above which, disk drive op**erations require reduced write current.** Also specifies the number of **cylin**der at which to change the write timing. The available options are from **1** to 1024 and None.

4.4 Advanced System Setup

The Advanced System Setup allows the user to program three main groups of parameters under the Advanced System Setup namely the System Timing, the Memory Shadow, and the Advanced chipset Control. This BIOS Setup parameter is designed for programmers who wish to fine tune the on-board chipset.

Figure 4-5. ***Advanced System Setup Screen***

Integrated Peripherals

Selecting System Timing from the Advanced System Setup main menu display the following screen. The actual features displayed depend on the capabilities of your system's hardware.

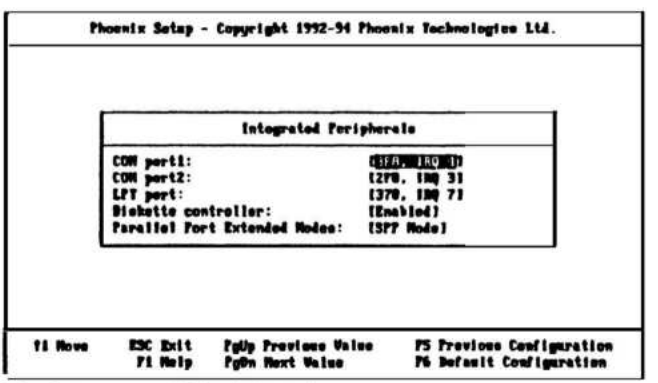


Figure 4-6. Integrated Peripherals

Auto Configuration - *Disabling* (default) this option allows the values for the other parameters to be changed. *Enabling* it will restrict you from making any changes.

SRAM read - determines the number of cycle times to be inserted when CPU reads data to cache. The setting depends on the speed of the CPU and SRAM. If the CPU is of high speed, the time required by SRAM to process data will need an extension, with the exception of some SRAMs that are fast enough to catch up with the speed of the CPU. Fewer wait states are recommended to improve the system performance. The available options are:

- 0 WS
- 1 WS (default)

SRAM write - setting of this parameter makes no difference from that of the SRAM Read. This option sets the number of wait states to be added on writes to cache memory. Fewer wait states are recommended to improve the system performance. Check the CPU speed and SRAM before changing the default value. The available options are listed below.

- 0 WS
- 1 WS (default)

DRAM read - determines the number of wait states to be inserted when the CPU reads data into the local DRAM. Fewer wait states are recommended to improve the system performance. The following are the available options.

- Slow (default)
- Normal
- Fast

DRAM write - determines the number of wait states to be inserted when the CPU writes data into the local DRAM. Fewer wait states are recommended to improve the system performance. The following are the available options.

- Slow (default)
- Normal
- Fast

Cache cycle check - allows you to select the rate for check point to determine whether it is a "hit" or a "miss" of the SRAM TAG. The available options are:

- Slow
- Normal
- Fast (default)

AT Bus Clock Select - specifies the speed of the AT Bus clock of the system. The only available option and default value is 7.19MHz

Memory Shadow

Selecting Memory Shadow from the Advanced System Setup main menu displays the following screen. The actual features displayed depend on the capabilities of your system's hardware.

```
Phoenix Setup - Copyright 1992-94 Phoenix Technologies Ltd.

                    Memory Shadow
System shadow:              Enabled
Video shadow:               [Enabled]

Shadow Memory Regions
    C000 - CFFF:            [Disabled]
    D000 - D7FF:            [Disabled]
    D800 - DFFF:            [Disabled]

↑↓ Move    ESC Exit    PgUp Previous Value    F5 Previous Configuration
           F1 Help     PgDn Next Value        F6 Default Configuration
```

Figure 4-7. Memory Shadow Screen

System shadow - allows shadowing of the system BIOS and improves the system performance. This option is always set as *Enabled*.

Video shadow - sets the mode of the system's video BIOS shadowing mode. The available options are:

- Enabled (default)
- Disabled

Shadow Memory Regions - shadows the option ROM located in the specified blocks of memory, and can improve the system performance.

Note: *Some option ROMs do not work properly when shadowed.*

Advanced Chipset Control

Selecting Advanced Chipset Control from the Advanced System Setup main menu displays the following screen. Technicians use this menu when changing values in the chipset register and optimizing the system's performance.

```
Phoenix Setup - Copyright 1992-94 Phoenix Technologies Ltd.

                    Advanced Chipset Control

Internal cache feature:          [Write through]
External cache:                  [Enabled]
  External cache feature:        [Write back]
  Shadow cacheable:              [Disabled]
Hidden refresh:                  [Enabled]
Parity check:                    [Disabled]
HITMJ timing:                    [6t]
RAS to CAS delay:                [4t]
VESA master cycle:               [Delay ADSJ]
I/O recovery:                    [Disabled]
On-chip I/O recovery:            [Disabled]
ISA write insert w/s:            [Disabled]
ISA I/O wait state:              [Normal]

↑↓ Move    ESC Exit    PgUp Previous Value    F5 Previous Configuration
           F1 Help     PgDn Next Value        F6 Default Configuration
```

Figure 4-8. Advanced Chipset Control Screen 1

```
Phoenix Setup - Copyright 1992-94 Phoenix Technologies Ltd.

                    Advanced Chipset Control

ISA memory wait state:           [Normal]
Refresh period:                  [15 us]
W/S in 32-bit ISA:               [0t]
Local Device Syn. Mode:          [Syn.]
Delay Internal ADSJ:             [Disabled]
Delay ISA/LDEVJ check in CLK2:   [3]

↑↓ Move    ESC Exit    PgUp Previous Value    F5 Previous Configuration
           F1 Help     PgDn Next Value        F6 Default Configuration
```

Figure 4-9. Advanced Chipset Control Screen 2

Note: *The contents of this menu depends on the chipset installed on your mainboard, and chipsets vary widely. Consult your dealer or the <F1> help screens before changing the items on this menu. Incorrect settings can cause your system to malfunction.*

Internal cache feature - sets the internal code/data memory of the CPU to either *Write back* or *Write through* (default).

External cache - sets the function of the second level cache on-board. If *Enabled* (default), the settings of the following options can be set. *Disabling* this option will deem the following options useless.

External cache feature - sets the external secondary cache memory to either *Write back* (default) or *Write through*.

Shadow cacheable - must be enabled when shadowing for both system and video BIOS is present. Otherwise, set this option to off or *Disabled* (default).

Hidden Refresh - enables or disables the hidden refresh mode for the on-board memory. The available options are:

- Enabled (default)
- Disabled

Parity Check - During a local memory read cycle, the M1429G not only monitors bus steering, but also checks the parity bit for each data byte from DRAM to ensure that the correct data is read. The available options are:

- Enabled
- Disabled (default)

HITMJ timing - indicates the timing pulse width when a hit to a modified data cache is set to occur. The available options are:

- 2t
- 3t
- 4t
- 6t (default)

RAS to CAS delay - specifies the timing pulse width where the row address strobe (RAS) will be on the falling edge and followed by the column address strobe signal (CAS). The available options are:

- 2t
- 4t (default)
- 6t

VESA master cycle - sets the delay for chipset to check ADSJ after VL Master cycle check point. The available options are:

- Non-delay ADSJ
- Delay ADSJ (default)

I/O recovery - enables or disables the I/O command recovery function. The default setting for this option is *Disabled.*

On-chip I/O recovery - enables or disables the on-chip I/O command recovery feature. The default setting for this option is *Disabled.*

ISA write insert w/s - sets the mode of the ISA write cycle end insert wait state for slot data hold timing issue. The available options are:

- Enabled
- Disabled (default)

ISA I/O wait state - determines the wait states setting to be inserted to the ISA I/O command. The available options are:

- Normal (default)
- 1 wait state
- 2 wait states
- 3 wait states

ISA memory wait state - determines the wait states setting to be inserted to the ISA memory command. The available options are:

- Normal (default)
- 1 wait state
- 2 wait states
- 3 wait states

Refresh period - sets the refresh period of the ISA Bus. The available options are:

- 15μs default)
- 30μs
- 60μs
- 120μs

W/S in 32-bit ISA - sets the second 16-bit access wait timing in 32-bit ISA cycle. The available options are:

- 2t
- 4t
- 6t
- 8t (default)

Local Device Syn. Mode - sets the ready synchronous mode of the local device. The options are:

- Syn. (default)
- Bypass

Delay Internal ADSJ - indicates the mode setting of the delay internal ADSJ timing. The available options are:

- Enabled
- Disabled (default)

Delay ISA/LDEVJ check in CLK2 - specifies the delay for the chipset to check LDEVJ after the ISA cycle check point. The options are:

- 1
- 2
- 3 (default)

4.5 Boot Options

```
Phoenix Setup - Copyright 1992-94 Phoenix Technologies Ltd.

                    Boot Options
                    Disk drive boot sequence: [A: then C:]

↑↓ Move    ESC Exit    PgUp Previous Value    F5 Previous Configuration
           F1 Help     PgDn Next Value        F6 Default Configuration
```

Figure 4-10. Boot Options Screen

Disk drive boot sequence - sets the sequence from where the BIOS will attempt to load the operating system. The options are:

- A: then C: (default)
- C: then A:

4.6 Security and Anti-Virus

```
Phoenix Setup - Copyright 1992-94 Phoenix Technologies Ltd.

                Security and Anti-Virus

Supervisor Password is    Disabled
User Password is          Disabled
Set Supervisor Password   [Enter Password]
Set User Password         Press Enter

Password on boot:         [Disabled]

Diskette access:          [User]

↑↓ Move    Enter Set/Change Password    F5 Previous Configuration
F1 Help    ESC Exit                     F6 Default Configuration
```

Figure 4-11. Security and Anti-Virus Screen

Supervisor Password is - shows whether the supervisor password is *enabled* or *disabled* (default).

User Password is - shows whether the user password is *enabled* or *disabled* (default).

Set Supervisor Password - requires a password when entering Setup. the passwords are not case sensitive. Pressing the <Enter> key will display a message requiring for the supervisor password which can be up to seven alphanumeric characters. This option also gives full access to the Setup menus.

Set User Password - Pressing the <Enter> key will display a message requiring for the user password which can be up to seven alphanumeric characters. This option also gives restricted access to the Setup menus and requires the setting of the Supervisor Password first.

Password on boot - determines whether the password is required on boot. The option needs the setting of the Supervisor Password. If Supervisor Password is set and this option is *disabled* (default), BIOS assumes that the user is booting.

Diskette access - restricts the use of floppy drives only to the supervisor when set as *Supervisor* (default). Also, choosing *Supervisor* for this option will require the setting of the Supervisor Password. Setting it as *User* allows access to the floppy drives at any time.

4.7 Green PC Features

```
Phoenix Setup - Copyright 1992-94 Phoenix Technologies Ltd.

                    Green PC Features

Power Saving Mode:                          [Disabled]
  System Doze    Timer:                     [10 sec]
  System Standby Timer:                     [ 5 min]
  System Suspend Timer:                     [10 min]
    Wakeup system during suspend:           [Disabled]
      Wakeup time at (hour):                [AM 12 :]
      Wakeup time at (minute):              [ 0 min]

  VGA with Power Down feature:              [None]

          Advanced Power Management Setup
       System enters power down/wakeup modes by:

↑↓ Move    ESC Exit    PgUp Previous Value    F5 Previous Configuration
           F1 Help     PgDn Next Value        F6 Default Configuration
```

Figure 4-12. Green PC Features Screen 1

```
Phoenix Setup - Copyright 1992-94 Phoenix Technologies Ltd.

                    Green PC Features

IRQ3  (COM2):                          [Off]
IRQ4  (COM1):                          [On]
IRQ5  (Alt. printer):                  [Off]
IRQ6  (Diskette):                      [On]
IRQ7  (Printer):                       [Off]
IRQ9  (IRQ2 Redir):                    [Off]
IRQ10 (User Define):                   [Off]
IRQ11 (User Define):                   [On]
IRQ14 (Fixed Disk):                    [On]
IRQ15 (User Define):                   [Off]
DMA1  (LAN card):                      [On]
DMA3  (LAN card):                      [On]
LPT   IO address:                      [On]

↑↓ Move    ESC Exit    PgUp Previous Value    F5 Previous Configuration
           F1 Help     PgDn Next Value        F6 Default Configuration
```

Figure 4-13. Green PC Features Screen 2

```
Phoenix Setup - Copyright 1992-94 Phoenix Technologies Ltd.

                    Green PC Features

Serial IO address:                     [On]
VESA  master event:                    [On]

↑↓ Move    ESC Exit    PgUp Previous Value    F5 Previous Configuration
           F1 Help     PgDn Next Value        F6 Default Configuration
```

Figure 4-14. Green PC Features Screen 3

Power Saving Mode - enables (default) or disables the power saving mode feature of the chipset. Once enabled, the values of the following options can be set.

System Doze Timer - sets the time interval after system inactivity when the system enters DOZE mode. The available options are:

- 10 sec (default)
- 20/30/90 sec
- 1/2 mins
- Disabled

System Standby Timer - sets the time interval after system inactivity when the system events enters STANDBY mode. The options are:

- 10/30 sec
- 5 mins (default)
- 1/2/3/8/10/15/30 mins
- Disabled

System Suspend Timer - sets the time interval after system inactivity when the system enters SUSPEND mode. The available options are:

- 10/30 sec
- 10 mins (default)
- 1/5/30/40/50 mins
- 1/2 hrs
- Disabled

Wakeup system during suspend - sets the time when *Enabled,* in the options Wakeup time at (hour) and Wakeup time at (minute), after which the system will return from SUSPEND mode back to RESUME mode. The default setting for this option is *Disabled.*

VGA with Power Down features - sets the method by which the VGA chip enters SLEEP mode. The options are:

- None (default)
- Standard
- Cirrus 5426
- S3 805 (VESA DPMS)

The menu also lists the System Management Interrupt (SMI) events by which the system wakes up from STANDBY or SUSPEND modes. Switch the following parameters to on or off.

- IRQ3 (COM2)
- IRQ4 (COM1)
- IRQ5 (Alt. printer)
- IRQ6 (Diskette)
- IRQ7 (Printer)
- IRQ9 (IRQ2 Redir)
- IRQ10 (User Define)
- IRQ11 (User Define)
- IRQ14 (Fixed Disk)
- IRQ15 (User Define)
- DMA1 (LAN card)

- DMA3 (LAN card)
- LPT IO address
- Serial IO address
- VESA master event

4.8 Load ROM Default Values

If, during bootup, the BIOS program detects a problem in the integrity of the CMOS, it will display a message asking you to either press the <DEL> key to run Setup or the <F1> key to resume booting. This probably means that the CMOS values have been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS.

Press the <F1> key to resume the boot or <DEL> to run Setup with the ROM default values already loaded in the menus. You can make other changes before saving the values to CMOS.

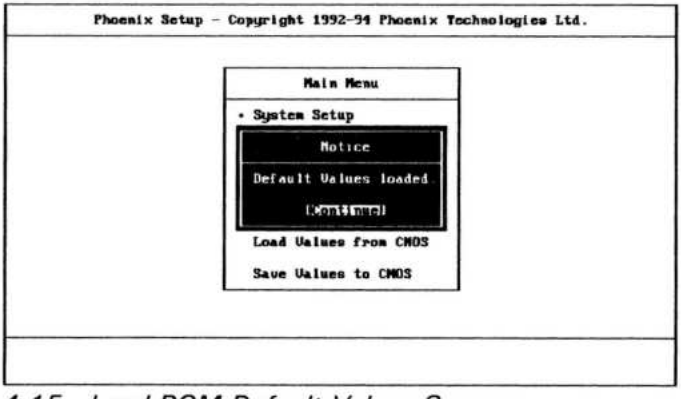


Figure 4-15. Load ROM Default Values Screen

4.9 Load Values from CMOS

If, during a Setup session, you change your mind about your selections and have not yet saved the values to CMOS, you can restore the values you previously saved to CMOS.

Select Load Values from CMOS on the Main Menu and the program will display the following screen.

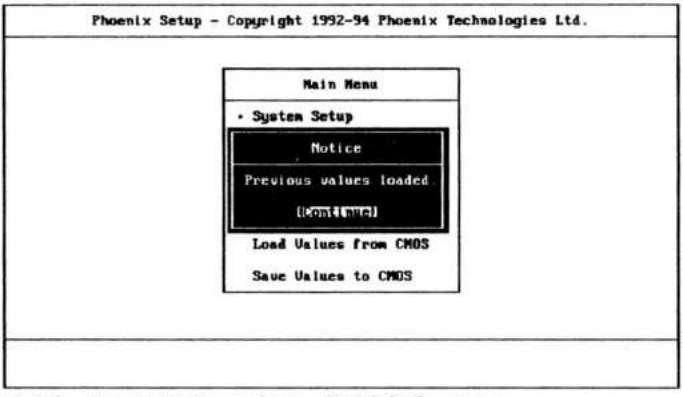


Figure 4-16. Load Values from CMOS Screen

4.10 Save Values to CMOS

After making your selections on the Setup menus, always select Save Values to CMOS in order to make them operative. Unlike standard RAM memory, CMOS RAM is sustained by an on-board battery and stays on after you turn your system off.

After you save your selections, the program will display the following screen.

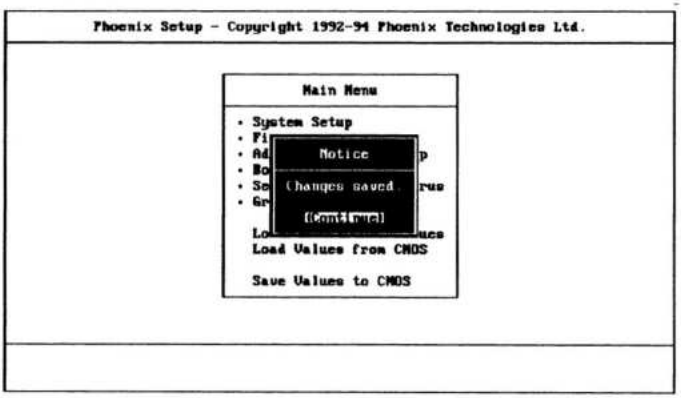


Figure 4-17. Save Values to CMOS Screen

If you attempt to exit without saving, the program will ask you if you would like to save the changes made before exiting.

During bootup, BIOS for the chipset attempts to load the values you saved in the CMOS RAM. If the values saved in the CMOS cause the system boot to fail, reboot and press the <DEL> key to enter Setup. In Setup, you may load the ROM default values (as described in the section 4.8) or try to change the values that caused the boot to fail.

4.11 Quitting Setup

After making all modifications in the Setup program, go to the option "Save Values to CMOS" then press the <Enter> key or simply press the <F10> key. The screen will then display a message asking you whether you would like to *save and exit* or not.

Use the arrow keys or press <Y> for Yes then the <Enter> key to save your settings before exiting. Press <N> for No then the <Enter> key to exit without saving.

If you made changes to the CMOS values and then press the <ESC> key, the program will prompt you whether you would like to *Quit without saving* or not.

Press <Y> for Yes then the <Enter> key to quit without saving, or press <N> then the <Enter> key to save your settings first before exiting Setup.

4.12 BIOS Errors and Messages

After entering the Setup choices, the system will reboot. The Setup summary and system information will appear on screen along with messages. These may include ERROR messages concerning the system or Setup.

Phoenix BIOS performs various diagnostic tests at the time the system is turned on. Whenever an error is encountered during these tests, error messages will be displayed on the monitor.

The following is a list of all the BIOS error and messages and their corresponding meanings.

nnnn Cache SRAM Passed

Diskette drive A error

Diskette drive B error

Entering SETUP ...

Extended RAM Failed at offset: *nnnn**

Extended RAM Passed

Failing Bits: *nnnn**

Fixed Disk 0 Failure

Fixed Disk 1 Failure

Fixed Disk Controller Failure*

Incorrect Drive A type - run SETUP

Incorrect Drive B type - run SETUP

Invalid NVRAM media type*

Keyboard controller error*

Keyboard error

Keyboard locked - Unlock key switch

Monitor type does not match CMOS - Run SETUP

Operating system not found

Parity Check 1*

Parity Check 2*

Press <F1> to resume, <F2> to Setup

Press <F2> to enter SETUP

Real time clock error*

Shadow Ram Failed at offset: *nnnn**

nnnn Shadow RAM Passed

System battery is dead - Replace and run SETUP

System BIOS shadowed

System cache error - Cache disabled*

System CMOS checksum bad - run SETUP

System RAM Failed at offset: *nnnn**

nnnn System RAM Passed

System timer error*

UMB upper limit segment address: *nnnn*

Video BIOS shadowed

* *If your system displays this message, write down the message and contact your dealer. If your system fails after you made changes in the Setup menus, you may be able to correct the problem by entering Setup and restoring the original values.*

nnnn Cache SRAM Passed

- Where *nnnn* is the amount of system cache in kilobytes successfully tested.

Diskette drive A error or Diskette drive B error

- Drive A: or Drive B: is present but fails the BIOS Power-On-Self-Test (POST) diskette tests. Check to see that the drive is defined with the proper diskette type in Setup and that the diskette drive is installed correctly.

Entering SETUP ...

- Starting Setup program

Extended RAM Failed at offset: _nnnn_*

- Extended memory not working or not configured properly.

nnnn Extended RAM Passed

- Where *nnnn* is the amount of RAM in kilobytes successfully tested.

Failing Bits: *nnnn**

- The hex number *nnnn* is a map of the bits at the RAM address (in System, Extended, or Shadow memory) which failed thee memory test. Each 1 (one) in the map indicates a failed bit.

Fixed Disk 0 Failure, Fixed Disk 1 Failure, Fixed Disk Controller Failure*

- Fixed disk is not working or not configured properly. Run Setup and ensure that the fixed disk type is correctly identified.

Incorrect Drive A type - run Setup

- Type of floppy drive A: is not correctly identified in Setup.

Incorrect Drive B type - run Setup

- Type of floppy drive B: is not correctly identified in Setup.

Invalid NVRAM media type*

- Problem with NVRAM access

Keyboard controller error*

- The keyboard controller failed test. You may have to replace the keyboard or the controller.

Keyboard error

- Keyboard is not working.

Keyboard error *nn*

- BIOS discovered a stuck key and displays the scan code *nn* for the stuck key.

Keyboard locked - Unlock key switch

- Unlock the system to proceed.

Monitor type does not match CMOS - Run SETUP

- Monitor type is not correctly identified in Setup.

Operating system not found

- Operating system can not be located on either drive A: or drive C:. Enter Setup and see if fixed disk and drive A: are properly identified.

Parity Check 1*

- Parity error found in the system bus. BIOS attempts to locate the address and display it on the screen. If it can not locate the address, it displays ????.

Parity Check 2*

- Parity error found in the I/O bus. BIOS attempts to locate the address and display it on the screen. If it can not locate the address, it displays ????.

Press <F1> to resume, <F2> to Setup

- Displayed after any recoverable error message. Press <F1> to start the boot process or <F2> to enter Setup and change any settings.

Press <F2> to enter SETUP

- Optional message displayed during POST. Can be turned off in Setup.

Real time clock error*

- Real time clock fails BIOS test. May require board repair.

Shadow Ram Failed at offset: *nnnn**

- Shadow RAM failed at offset *nnnn* of the 64K block at which the error was detected.

***nnnn* Shadow RAM Passed**

- Where *nnnn* is the amount of shadow RAM in kilobytes successfully tested.

System battery is dead - Replace and run SETUP

- The CMOS clock battery indicator shows the battery is dead. Replace the battery and run Setup to reconfigure the system.

System BIOS shadowed

- System BIOS copied to shadow RAM.

System cache error - Cache disabled*

- RAM cache failed the BIOS test. BIOS disabled the cache.

System CMOS checksum bad - run SETUP

- System CMOS has been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. Run Setup and reconfigure the system.

System RAM Failed at offset: *nnnn**

- System RAM failed at offset *nnnn* of the 64K block in which the error was detected.

***nnnn* System RAM Passed**

- Where *nnnn* is the amount of system RAM in kilobytes successfully tested.

System timer error*

- The timer test failed. Requires repair of system board.

UMB upper limit segment address: *nnnn*

- Displays the address of the upper limit of Upper Memory Blocks, indicating released segments of the BIOS that a virtual memory manager can reclaim.

Video BIOS shadowed

- Video BIOS successfully copied to shadow RAM.

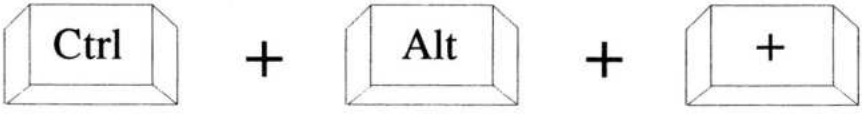
Appendix A

Setting the System Speed

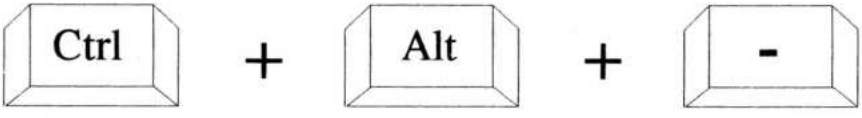
There are two methods in changing the system processing speed of your AL486. The first method is implemented through the hardware turbo switch J2. The second method, software setting, requires the simultaneous pressing of several keys on the keyboard known as hot-keys. You may change the speed during normal operation while working with your application program.

The hot-key combinations for setting the system speed on your AL486 are shown on the following diagrams.

■ High Speed



■ Low Speed



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