MYLEX

MPXS486 System Board User's Guide

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2) The product must have been properly installed in accordance to the documentation provided.

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Important Note: Only the company (or individual) that purchased the product directly from Mylex may obtain an RMA number. If the Mylex product was purchased from a reseller or distributor, you must contact that company for service.

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2) Each returned unit will be inspected for damage or other irregularities. It a unit is shown to be modified, the customer will be notified before any action is taken.

3) Mylex will not be responsible for non-Mylex products shipped with an RMA unit. This includes memory, math co-processors and other internal and external peripherals.

Products must be shipped to Mylex with freight paid. Upon completion of service, Mylex will ship the product back UPS Ground or similar service, at no charge, unless prior arrangements have been made.

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End users are required to contact their suppliers.

Mylex Technical Support is available 6:00 a.m. to 6:00 p.m. Pacific Standard Time, Monday through Friday except holidays. Contact Mylex Technical Support by voice at (510) 796-6100 or by fax at **(510) 745-7715**. You can also contact Technical Support through their e-mail service at **tsup@mylex.com.**

Handling Precautions

This product contains electronic components that are highly sensitive to electrostatic discharge. Use extra caution when handling this product to ensure there is adequate grounding around the work area the board is being installed. ALWAYS wear a ground strap or ground your body by touching a grounded object such as an unpainted metal device connected to power ground.

This product has delicate crystal oscillators that can break if subjected to sudden shock such as being tossed on a table. Use care when moving it from point to point.

If Troubles Are Encountered

If this product displays improper operation during the course of installation or operation, make sure that all components are seated tightly and configured correctly. Pay particular attention to the jumper settings and the BIOS setup. If the product continues to operate improperly, contact your dealer or distributor for additional information.

Dealers and Distributors may contact Mylex's Technical Support Department at (510) 796-6100 after first completing the enclosed System Problem Report.

Package Contents

MPXS486 System Board
This User's Guide
Warranty Card
Any pertinent release notes available at the time of shipment
System Problem Report Form
Utility Diskette

Contents

1 – Introduction

2 – System Board Setup

3 – Memory Installation

4 – *BIOS* Setup

Appendix A – Flash ROM BIOS

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Chapter 1

Introduction

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About This User's Guide

This manual is arranged to help you set up and run the MPXS486 system board.

- Chapter 1, *Introduction,* describes the functions and features of the system board and specifications.
- Chapter 2, System Board Setup, includes detailed information on how to install and configure the MPXS486 system board.
- Chapter 3, Memory Installation, describes the size and configuration of the on-board memory and external cache memory, and gives instructions for installing the memory devices on the system board.
- Chapter 4, BIOS Setup, explains how to adjust the BIOS setup using the software utility to make use of the board's multiple features..

On-Board I/O

The MPXS486 system board includes the following built-in I/O features:

- Two Enhanced local bus IDE controllers
- Floppy disk controller
- Two serial ports (COM1 and COM2) and one parallel printer port.

The Green PC Function

The Power Management Unit (PMU) controls and dramatically reduces
overall system power consumption. This is accomplished by the activity
monitors, which detect the system inactivity timer time-out, and signals
the power-saving devices to slow down the clock frequency or remove
the power sources from various peripherals.

There are four power management modes: Normal, Doze, Standby, and
Suspend.

- **NORMAL mode:** This mode is the normal operation of the PC
  system. In this mode, the doze timer starts counting if no activity
  is taking place and the programmable time-out period has expired.

- **DOZE mode:** In this mode, the CPU clock frequency is slowed
  to one-half the normal frequency.

- **STANDBY mode:** This mode scales the CPU and system clock to
  a lower frequency (8MHz) and turns off the video signal to
  conserve power to the display monitor.

- SUSPEND **mode:** In this mode, the PMU stops the CPU clock,
  slows down the system clock, and powers down the external cache.

The power management setup is described under BIOS **Setup** in
Chapter 4.

Specifications

CPU Types Supported: Intel i486SX, DX, **DX2, DX4,** P24D, OverDrive, P24T
AMD AM486DX, DX2, DX4
Cyrix Cx486 DX, DX2, DX2V, **DX4,** M1SC
237-pin **ZIF** socket

System Clock: 25/33/40/50 MHz

Main Memory: Four SIMM sockets accept 72-pin (32- or 36-bit) 1, 2, 4, 8, 16, or 32 MB, 70/80 ns SIMM's
Maximum 128 MB on-board

Cache Memory Supports cache memory sizes 0, 128, 256, 512 KB (32Kx8, 64Kx8) and 1 MB (128 Kx8) DIP's
Maximum cache is 1 MB

Expansion Slots: Four 16-bit ISA slots; three PCI slots

Enhanced IDE Controller: Built-in primary and secondary IDE ports support up to four type-3 hard disk drives; ATA specifications compliant

On Board I/O: High-speed UMC8663 UART 16550 (50-115.2K baud) supports:
1 Floppy Disk drive port
2 Serial ports (16550 compatible)
1 Parallel printer port, supports SPP, EPP and ECP

Shadow RAM: System BIOS, video BIOS and other adapter ROM BIOS

BIOS: Award System BIOS
Flash ROM Optional (plug and play supported)

PCB Size: 220 x 250 mm

Turbo Speed: Software/hardware toggle controlled

Green PC: Meets EPA Green PC standard. Power consumption is under 30 W during the Doze, Standby or Suspend mode

Regulator: On-board

Jumpers and Connectors

The following is a list of the jumpers and connectors used on the MPXS486 system board. The referenced pages provide more details.

Jumper / Connector No.	Function	Ref Page
CN1	Floppy Disk Drive Connector	2-11
CN2	Serial Output (COM1) Port	2-11
CN3	Serial Output (COM2) port	2-11
CN4	Parallel Printer Port	2-11
J1	Keyboard Connector	2-7
J2-J7, JP31, JP39, JP40, JP42, JP43	CPU Type selection	2-3
JP1, JP2	DMA # 1 and DMA # 2 Connectors	2-5
JP12	External Battery Connector	2-7
JP13	CMOS Data Clear	2-5
JP14	Primary IDE LED Connector	2-8
JP15	Secondary IDE LED Connector	2-8
JP17-JP20, JP25, JP26	Cache Size selection	3-2
JP21	PCI Bus Clock Setting	2-5
JP22, JP23	System Clock Setting	2-3
JP27	Green LED Connector	2-8
JP29	Power Management Mode Control	2-8
JP32, JP38	CPU Voltage Setting	2-3
JP35	Turbo Switch Connector	2-9
JP36	Turbo LED Connector	2-9
JP37	Internal Speaker Connector	2-9
JP41	CPU Internal Clock	2-3
JP44	Reset Switch Connector	2-10
JP45	Keyboard Lock and Power On LED	2-10
PI	Power Supply Connector	2-6
TR2	Regulator socket (for 3.3V CPU)	2-13

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Chapter 2

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System Board Setup

This chapter describes the individual jumpers and connectors switches on the MPXS486 system board. If your system board has already been installed by the dealer, you should refer to this chapter if you plan to make any changes or upgrade your system.

A Jumpers and Connectors Quick Reference at the end of this chapter provides a system board layout to illustrate major components, jumpers and connectors.

System Board Jumpers

Jumpers are used to select between various operating modes or options. A jumper switch consists of two or three gold pins projecting from the system board. Placing the plastic jumper cap over two pins connects those pins and makes a particular selection. If the cap is not placed over two pins, the pins are open and a connection is not made. This is the general method for storing jumpers when a connection is not required.

For all of the following jumpers,

- 1 – 2 indicates that a jumper is to be installed between pins 1 and 2 (pin 1 is identified only on connectors with three or more pins).
- 2 – 3 indicates that a jumper is to be installed between pins 2 and 3.
- "Short" (S) indicates a jumper is installed on a connector with two or more pins.
- "Open" (0) or no entry indicates that a jumper is NOT to be installed (store the jumper on one pin only).

Figure 2-l illustrates the jumper pins and cap, and the schematic equivalent.

Jumper Pins   Jumper Cap   Setting

Pin 1

1

Layout Symbol
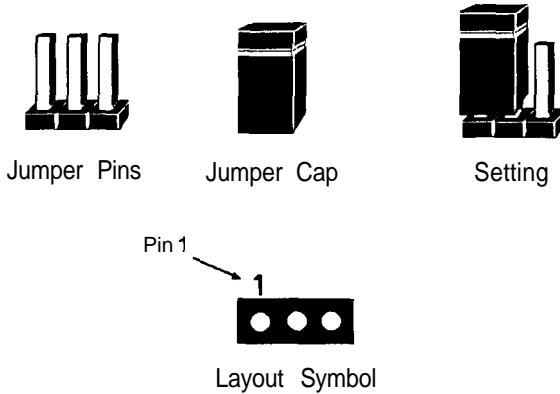
Figure 2-l. Jumper Pins, Cap and Layout

The Jumpers and Connectors Quick Reference located at the end of this chapter provides a layout of the system board to identify major components, jumpers and connectors.

CPU Type and System Clock

The MPXS486 system board supports all 486 serial microprocessors up to DX4 (P24C) running at system clock speeds up to 50 MHz.

When you install or upgrade the CPU, you must set the CPU voltage with JP32 and JP38 (JP32 has three sets of two pins each – all pins must be either short or open); the CPU internal clock with JP41(see page 2-4); the CPU Type with JP3 1, JP39, JP40 (these jumpers are always set with pins 1 & 2 shorted), JP42, JP43, and J2-J7; and the system clock generator (JP22 and JP23, shown on page 2-4) to match the speed rating of the microprocessor.

In the following table, l-2 = connect pins 1&2; 2-3 = connect pins 2&3; S = short, no entry = open.

CPU Type															
CPU Type	Volts	JP32	JP38	JP31	JP39	JP40	JP41	JP42	JP43	J2	J3	J4	J5	J6	J7
Intel 486SX	5	S	2-3	1-2	1-2	1-2	1-2	1-2	1-2	S				S	
Intel 486DX/DX2	5	S	2-3	1-2	1-2	1-2	1-2	1-2	1-2		S			S	
AMD 486DX/DX2	5	S	2-3	1-2	1-2	1-2	1-2	1-2	1-2		S			S	
Intel P24D 486DX2 Write Back	5	S	2-3	1-2	1-2	1-2	1-2	1-2	1-2			S			S
Intel DX4	3.45		1-2	1-2	1-2	1-2		1-2	1-2			S		S	
Intel DX4 Write Back	3.45		1-2	1-2	1-2	1-2		1-2	1-2			S			S
AMD DX4-NBVT	3.45		1-2	1-2	1-2	1-2		1-2	1-2			S		S	
AMD DX4-SV8B	3.45		1-2	1-2	1-2	1-2		1-2	1-2			S			S
Intel 486OPDR	5	S	2-3	1-2	1-2	1-2		1-2	2-3			S		S	
Intel P24T (Pentium OverDrive)	5	S	2-3	1-2	1-2	1-2		1-2	2-3			S			S
AMD DX2-80	3.45		1-2	1-2	1-2	1-2	2-3	2-3	1-2			S		S	
Cyrix DX/DX2	5	S	2-3	1-2	1-2	1-2	1-2	1-2	1-2		S		S		
Cyrix DX2V	4		2-3	1-2	1-2	1-2	1-2	1-2	1-2		S		S		
Cyrix DX4	3.45		1-2	1-2	1-2	1-2	1-2	1-2	1-2		S		S		
Cyrix 5x86 M1SC*	3.45		1-2	1-2	1-2	1-2		1-2	1-2			*			S

. See note on page 2-4.

NOTE For the Cyrix 5x86 CPU (MISC), write-back enable, short pins
1 & 2 on JP41, JP42, and all pins on J7. Individual jumpers
are furnished with the system board for jumping J4 for this
CPU. The center set of pins on J4 must be open while all
others are shorted as illustrated below.

Open ↓   J4
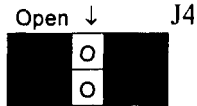
CPU Internal Clock	
CPU Speed	JP41
CPU clock = lx system clock	l-2
CPU clock = 2x system clock	2-3
CPU clock = 3x system clock	Open

Intel/AMD DX4 = 3x system clock

System Clock Generator			
System Clock	CPU Type	Clock Setting Jumper	
		JP22	JP23
25 MHz	486SX-25 486DX-25 486DX2-50 486DX4-75 P24T-63	2 - 3	2 - 3
33 MHz	486SX-33 486DX-33 486DX2-66 486DX4-100 P24T-83	l - 2	l - 2
40 MHz	486SX-40 486DX-40 486DX2-80 4860X4-1 20	l - 2	2 - 3
50 MHz	486DX-50	2 - 3	1 - 2

ECP DMA Channel (JP1, JP2)

Set these jumpers to select DMA Channel 1 or DMA Channel 3 for enhanced functions of the parallel port.

Channel	JP1	JP2
DMA Channel 1	1 - 2	I - 2
DMA Channel 3	2 - 3	2 - 3

Clear CMOS Data (JP13)

This jumper clears the system configuration data currently stored in the CMOS RAM, and reloads the default system configuration setting (this function will be useful if you forget the user's password for the system).

JP13-	Description
I - 2	Default
2 - 3	Clears CMOS data.

PCI-BUS Clock (JP21)

The maximum clock speed for PCI devices is 33 MHz. Use jumper JP21 to set the CPU clock to match the type of PCI device used.

JP21-	Description
I - 2	Use when the CPU-BUS is 133 MHz.
2 - 3	Use when the CPU-BUS is 240 MHz.

System Board Connectors

Connectors interface the system board to other parts of the system, including the power supply, keyboard and various controls on the front panel of the system case. Some connectors are polarized and require specific alignment during installation. Polarized connectors are shown with a plus (+) sign to denote the positive pin.

Power Supply (PI)

Most power supplies have two 6-wire plugs that must be connected to the system board. There are two black wires on each plug. Align the plugs so that the two black wires on each plug are positioned in the middle of the P1 connector as illustrated **below.**

Before connecting to the power supply, make sure it is not connected to the AC power source.

P1-	Description	Wire Color
1	Power Good	Orange
2	+5V	Red
3	+12V	Yellow
4	–12V	Blue
5	Ground	Black
6	Ground	Black
7	Ground	Black
8	Ground	Black
9	–5V	White
10	+5V	Red
11	+5V	Red
12	+5V	Red

Keyboard (J1)

This 5-pin DIN connector interfaces the keyboard to the system board.
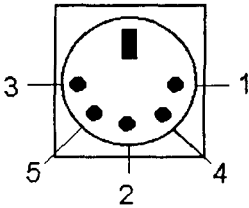
J1-	Description
1	Keyboard Clock
2	Keyboard Data
3	No Connection
4	Ground
5	+5Vdc

External Battery (JP1 2)

This connector may be used for an external 4.5V to 6V battery to back up or replace the on-board battery. When connecting the external battery, it is very important that the connecting wire be oriented correctly. Pin 1 (positive) is printed on the system board near JP12.

JP12-	Description
1	Battery Positive (4.5-6Vdc)
2	No connection
3	Battery Negative (ground)
4	Battery Negative (ground)

IDE Hard Disk Activity LED (JP14, JP15)

Each of these connectors interface an LED to the front panel of the system case to indicate the activity status of the IDE hard disk drive. Each connector has two sets of pins (1-2 and 3-4); either set may be used for the respective LED (pins 1 and 4 are positive on JP14 and JP1 5). Observe the correct polarity when connecting the LED's.

Connect an LED between pins 1 and 2, or pins 3 and 4 of JP14 to indicate the activity status of the *primary* IDE drive.

Connect an LED between pins 1 and 2, or pins 3 and 4 to of JP1 5 indicate the activity status of the *secondary* IDE drive.

Power Management Mode Control (JP27, JP29)

There are four power management modes in the system board:

- Normal
- Doze
- Standby
- Suspend

By connecting JP29 to a control switch on the front panel of the system case, you can directly trigger the system into the Suspend mode. This will reduce the CPU clock to zero MHz and power down the external cache. The system can be resumed by again pressing the power saving control switch or by using the auto-wake-up feature (pressing any key or moving the mouse).

Connect an LED to JP27 to function as a mode indicator. Observe the correct polarity when connecting the LED. The LED will turn on when the unit is in the Suspend mode, and turn off when running in the Normal mode.

Turbo Switch (JP35)

The connector interfaces the system board to a hardware turbo switch on the front panel of the system unit. The turbo switch toggles the turbo (high speed) mode on or off. The turbo function is disabled when the hardware switch is not connected (default)

JP35-	Description
Open	Low speed
Short	High speed (default)

If a hardware turbo switch is not available on the system unit, the following keyboard commands can be used to simulate the switch:
"CTRL-ALT-(Minus)": Set to Low speed   (Turbo off)
"CTRL-ALT-(Plus)": Set to High speed   (Turbo on)

Turbo LED (JP36)

This connects to an LED on the front panel of the system case to indicate the state of the turbo mode. The LED will turn on whenever the system is running in the turbo (high-speed) mode. Observe the correct polarity when connecting the LED.

Speaker (JP37)

A speaker mounted inside the case is interfaced to the system board through this connector. Pin 1 is located on the bottom and pin 4 is on the top when viewing the board as shown in the Quick Reference at the end of this chapter.

JP37-	Description
1	Speaker Signal
2	Ground
3	Ground
4	+5Vdc

System Reset Switch (JP44)

This connector interfaces the system reset switch on the front panel of the case. The switch causes the system board to perform a cold start from the power-on self test without turning off power to components, such as the hard disk drive.

JP44-	Description
1	Ground (GND)
2	System Reset

Keyboard Lock Switch and Power-On LED (JP45)

When connected to a key switch on the front panel of the system case, turning and removing the key will disable the keyboard to prevent other users from operating your computer when you are not present. Orient the cable correctly when connecting the key switch to the main board; pin 1 is located on the bottom and pin 5 is on the top when viewing the board as shown in the Quick Reference at the end of this chapter.

JP45-	Description
1	+5Vdc (Power-On LED)
2	Ground
3	Ground
4	Keylock Switch
5	Ground

On board I/O Connectors

IDE HDD Connectors

The primary and secondary IDE hard disk drive connectors are embedded IDE ports designed on a local VESA bus interface. The ports will always use IRQ14 even if the BIOS is set up for PCI (IRQ is set for PCI). See also IDE Hard Disk Activity LED on page 2-8.

- IDE 1 is the Primary IDE with its activity indicator (LED) connected to JP14.

- IDE 2 is the Secondary IDE with its activity indicator (LED) connected to JP15.

Floppy Disk Drive Connector (CN1)

Standard data and control interface for 5.25" or 3.5" floppy disk drive.

COM1 Serial Port (CN2)

Standard serial I/O (RS-232C compatible) interface for miscellaneous devices such as mouse, modem, etc.

COM2 Serial Port (CN3)

Standard serial I/O (RS-232C compatible) interface for miscellaneous devices such as mouse, modem, etc.

Parallel Printer Port (CN4)

This I/O port supports SPP/EPP/ECP protocols. SPP (Standard Parallel Port) and EPP (Enhanced Parallel Port) are IEEE standards; ECP (Extended Capabilities Parallel port) is a protocol developed by Microsoft and Hewlett-Packard to provide high performance and standard solution for devices such as a CD-ROM drive, HDD, or parallel printer.

JP14: Primary IDE HDD Activity LED
JP15: Secondary IDE HDD Activity LED

P1: Power Connector

J1: Keyboard Connector

CN1: FDD Connector

CN2: COM1 Serial Port
CN3: COM2 Serial Port
CN4: Printer Port

JP1, JP2: ECP DMA Ch.
  1-2:   DMA Ch. 1
  2-3:   DMA Ch. 3

JP27: Green LED Conn.
JP29: Power Saving
       Toggle Switch
       Conn.

JP12: External Battery

JP13: CMOS Data Clear
  1-2: Default
  2-3: Clear CMOS
       data

Power Conn P1
J1
K/B conn
Battery
K/B Controller
CN1
Primary IDE — JP14
Secondary IDE — JP15
PCI 1 Slot
UM 8663
JP1
PCI 2 Slot
85C496
PCI 3 Slot
CN2   CN3
CN4
BIOS
JP2
ISA Slot
JP27   JP29
ISA Slot
JP12   JP13
M104
85C497
ISA Slot
ISA Slot

U19
U20
U21   Bank0
U22
U23
U24
U25   Bank1
U26
U27   TAG

JP17
JP18
JP19
JP20
JP21
JP22   JP23

JP31
JP32 A B C
JP35
TR2   JP36
JP38–JP43
JP37
JP45
JP44
J2 J5
J3 J6
J4 J7

JP17-JP20:   Data RAM
JP25-JP26:   Tag RAM

Cache Size	Tag RAM (U27)	Data RAM		JP25	JP26	JP17	JP18	JP19	JP20
		U19-U22	U21-U26						
128K	8K x 8	32K x 8	—	1-2	1-2	1-2	2-3	2-3	1-2
256K	32K x 8	32K x 8	32K x 8	2-3	1-2	2-3	2-3	2-3	2-3
		64K x 8	—			1-2	2-3	1-2	1-2
512K	32K x 8	64K x 8	64K x 8	2-3	2-3	2-3	2-3	2-3	2-3
		128K x 8	—			1-2	1-2	2-3	1-2
1MB	64K x 8	128K x 8	128K x 8	2-3	2-3	2-3	2-3	2-3	2-3

JP21: PCI Bus Clock
  1-2: PCI Clock = ≤ 33MHz
  2-3: PCI Clock = ≥ 40MHz

JP22, JP23:   System Clock Generator

Clock Freq	JP22	JP23
25MHz	2-3	2-3
33MHz	1-2	1-2
40MHz	1-2	2-3
50MHz	2-3	1-2

JP32, JP38: CPU Voltage Setting

CPU Voltage	JP32-			JP38
	A	B	C	
3.45V (such as Intel DX4 and AMD DX2/DX4)	Open	Open	Open	1-2
4V (such as Cyrix DX2V)	Open	Open	Open	2-3
5V (Default)	Short	Short	Short	2-3

JP35:   Turbo Switch Connector
JP36:   Turbo LED Connector

JP37:   Speaker Connector

JP45:   Keyboard Lock & Power On LED

JP44:   Reset Switch Connector

JP41:   CPU Internal Clock
  1-2:   CPU Int. Clock = 1x Sys Clk
  2-3:   CPU Int. Clock = 2 x Sys Clk
  Open: CPU Int. Clock = 3 x Sys Clk
  NOTE: Intel/AMD DX4 = 3x Sys Clk

CPU Type

CPU Type	Volts	JP31	JP39	JP40	JP41	JP42	JP43	J2	J3	J4	J5	J6	J7
Intel 486SX	5	1-2	1-2	1-2	1-2	1-2	1-2	S				S	
Intel 486DX/DX2	5	1-2	1-2	1-2	1-2	1-2	1-2		S			S	
AMD 486DX/DX2	5	1-2	1-2	1-2	1-2	1-2	1-2		S			S	
Intel P24D 486 DX2 Write Back	5	1-2	1-2	1-2	1-2	1-2	1-2		S				S
Intel DX4	3.3	1-2	1-2	1-2		1-2	1-2		S			S	
Intel DX4 Write Back	3.3	1-2	1-2	1-2		1-2	1-2		S				S
AMD DX4-NBVT	3.3	1-2	1-2	1-2		1-2	1-2		S			S	
AMD DX4-SV8B	3.3	1-2	1-2	1-2		1-2	1-2		S				S
Intel 486OPDR (OverDrive)	5	1-2	1-2	1-2		1-2	2-3	S				S	
Intel P24T (Pent OverDrive)	5	1-2	1-2	1-2		1-2	2-3	S					S
AMD DX2-80	3.3	1-2	1-2	1-2	2-3	2-3	1-2	S				S	
Cyrix DX/DX2	5	1-2	1-2	1-2	1-2	1-2	1-2	S		S			
Cyrix DX2V	4	1-2	1-2	1-2	1-2	1-2	1-2	S		S			
Cyrix DX4	3.3	1-2	1-2	1-2	1-2	1-2	1-2	S		S			
Cyrix M1SC*	3.3	1-2	1-2	1-2		1-2	1-2	*					S

1-2 = Connect pins 1 & 2
2-3 = Connect pins 2 & 3
S = Short
No entry = Open
* See text page 2-4

Mylex MPXS486 System Board
Manual No: 771947-D02
November 1995

2-13

Chapter 3
Memory Installation

The MPXS486 system board provides SIMM installation slots for 1MB to 128MB of system memory. There is also an external cache memory on the system board that can be installed with OKB or up to IMB in size.

This chapter describes the types of memory devices that should be used with the system board and explains how to install the memory.

Main Memory

The system board supports any combination of 72-pin (32- or 36-bits) SIMM's x 4 up to 128MB. The DRAM installation is without jumpers, which allows SIMM's to be installed in any combination into any SIMM socket. The on-board SIMM sockets are illustrated in the Jumpers and Connectors Quick Reference fold-out page at the end of Chapter 2. The socket pin arrangements are shown below:

72	1
SIMM 1	
SIMM 2	
SIMM 3	
SIMM 4	

External Cache Memory

When you first install the cache memory on your system board or each time you upgrade or modify it, you will need to adjust the cache memory size setting for the appropriate memory level. The cache memory size for the system is set with jumpers JP17-JP20, JP25 and JP26, as illustrated in the following table.

Cache Size	Tag RAM (U27)	Data RAM		JP17	JP18	JP19	JP20	JP25	JP26
		U19/22	U23/26						
128K	8Kx8	32Kx8	–	1 - 2	2 - 3	2 - 3	I - 2	1 – 2	I - 2
256K	32Kx8	32Kx8	32Kx8	2 - 3	2 - 3	2 - 3	2 - 3	2 - 3	I - 2
		64Kx8	–	I - 2	2 - 3	1 - 2	I - 2		
512K	32Kx8	64Kx8	64Kx8	2 - 3	2 - 3	2 - 3	2 - 3	2 - 3	2 - 3
		128Kx8	–	I - 2	I - 2	2 - 3	I - 2		
1MB	64Kx8	128Kx8	128Kx8	2 – 3	2 - 3	2 - 3	2 - 3	2 - 3	2 - 3

BIOS Setup

Award's BIOS ROM has a setup program that allows you to modify your basic system configuration. The BIOS data are stored in CMOS RAM so that the setup configuration will be retained when the power is turned off. Once the setup configuration is completed, you should need to access the BIOS Setup program only when you plan to change the setup, reset the date or time, etc.

CMOS Setup Utility

Power on the computer and press Del immediately to enter the Setup program. The CMOS Setup Utility (Initial) menu is shown in Figure 4-I.

```
          ROM PCI/ISA BIOS (2A4IBC3I)
             CMOS SETUP UTILITY
            AWARD SOFTWARE, INC.

STANDARD CMOS SETUP            SUPERVISOR PASSWORD

BIOS FEATURES SETUP            USER PASSWORD

CHIPSET FEATURES SETUP         IDE HDD AUTO DETECTION

POWER MANAGEMENT SETUP         SAVE & EXIT SETUP

PCI / IDE CONFIGURATION SETUP  EXIT WITHOUT SAVING

LOAD SETUP DEFAULTS


ESC    Quit                    ↑↓→←          Select Item
F10    Save & Exit Setup       (Shift) F2    Change Color
                Time, Date, Hard Disk Type
```

Figure 4-1. BIOS Setup Program Initial Menu

Standard CMOS Setup

Choose the **Standard CMOS Setup** option from the CMOS Setup Utility menu. The menu in Figure 4-2 allows you to configure date, time, hard disk drive, floppy disk drive, display and memory. When a field is highlighted, on-line help information is displayed in the left bottom of the Menu screen. Cursor movement directions are at the bottom of the screen.

```
                    ROM PCI/ISA BIOS (2A4IBC3I)
                       STANDARD CMOS SETUP
                      AWARD SOFTWARE, INC.

 Date      (mm:dd:yy) : Mon, Oct. 30 1995
 Time  (hh:mm:ss)     : 15:05:00
 Hard  Disk              Type   Size  Cyls  Heads  PreComp LandZone Sec  Mode
 Primary  Master      :  User   30    936   16     65535   935      17   Normal
 Primary  Slave       :  None   0     0     0      0       0        0    ——
 Secondary  Master    :  None   0     0     0      0       0        0    ——
 Secondary  Slave     :  None   0     0     0      0       0        0    ——


 Drive A    : 1.44M                    Base Memory          640K
 Drive B    : None                     Extended  Memory     7168K
                                       Other  Memory        385K
 Video      : EGANGA                        Total           8192K
 Halt On    : All Errors

 Esc : Quit            ↑↓→← : Select Item   PU/PD/++/-:Modify
 F1  : Help            (Shift) F2: Change Color
```

Figure 4-2. Standard CMOS Setup Menu

Specifications for hard disk drives such as MFM, ESDI, or IDE, must be recorded here. SCSI drives operate with device drivers and are not supported directly by BIOS. The BIOS provides three modes to support IDE hard disks:

- Normal - for IDE drives smaller than 528MB, or as defined by your controller or HDD specifications.
- LBA - for drives larger than 528MB and up to 8.4GB that use Logic Block Addressing (LBA) mode.
- Large - for drives larger than 528MB that do not use LBA mode. The Large mode is a new specification which may not be fully supported by all operation systems. Presently, it can only be used with MS-DOS.

BIOS Features Setup

Select the **BIOS Features Setup** option from the CMOS Setup Utility menu to display the screen in Figure 4-3. This menu contains the system board's default values. The values shown are manufacturer's defaults; they can be changed as needed for your system.

```
┌─────────────────────────────────────────────────────────────────────┐
│                   ROM PCI/ISA BIOS (2A4IBC3I)                         │
│                      BIOS FEATURES SETUP                              │
│                      AWARD SOFTWARE, INC.                             │
├───────────────────────────────────┬─────────────────────────────────┤
│ Virus  Warning          : Disabled│ Video BIOS Shadow      : Enabled │
│ CPU  Internal  Cache    : Enabled │ C8000-CFFFF  Shadow    : Disabled│
│ External  Cache         : Enabled │ D0000-D7FFF  Shadow    : Disabled│
│                                   │ D8000-DFFFF  Shadow    : Disabled│
│ Boot  Sequence          : A, C    │                                  │
│ Swap  Floppy  Drive     : Disabled│                                  │
│ Boot  Up  Floppy  Seek  : Enabled │                                  │
│ Boot  Up  NumLock  Status : On    │                                  │
│ Boot  Up  System  Speed : High    │                                  │
│                                   ├──────────────────────────────────┤
│ Typematic  Rate  Setting : Disabled│ Esc  Quit       ↑↓→←   Selection│
│ Typematic Rate (Chars/Sec) : 6     │ F1   Help     PU/PD/+/-  Modify │
│ Typematic  Delay        : 250     │ F5   Old Values  (Shift) F2  Color│
│ Security  Option        : Setup   │ F6   Load BIOS Defaults          │
│                                   │ F7   Load Setup Defaults         │
└───────────────────────────────────┴──────────────────────────────────┘
```

Figure 4-3. Standard CMOS Setup Screen

Virus Warning

■ **Disabled** ☐ **Enabled**

When enabled, this feature protects the boot sector and partition table of your hard disk. Any attempt to write to them will halt the system and cause a warning message to appear. If this happens, you can either allow the operation to continue or stop it.

CPU Internal Cache

☐ Disabled ■ Enabled

This option enables or disables the CPU internal cache.

External Cache

☐ Disabled ■ Enabled

This option enables or disables the cache system that is external to the CPU. The cache system must be installed for this option.

Boot Sequence

■ A,C ☐ C,A

This selects the drive for the system to search first for boot data. If your system boots from the hard disk, you should select to search it first and eliminate the time spent searching for the data in drive A.

Swap Floppy Drive

■ Disabled ☐ Enabled

Enabling this feature swaps the floppy drive assignment so that drive A will function as drive B, and drive B will function as drive A.

Boot Up Floppy Seek

■ Enabled ☐ Disabled

During POST Procedure, the BIOS will determine if the installed floppy disk drive is 40 or 80 tracks (360KB is 40 tracks; 760KB, 1.2MB and 1.44MB are all 80 tracks). If this function is enabled, there will be a warning message when a 360K floppy drive is installed.

Boot Up NumLock Status

■ On ❑ Off

ON: Keypad is set to number-mode keys following.
Off: Keypad is set to arrow-mode Keys.

Boot Up System Speed

■ High ❑ Low

If set to high speed, the system will run at high speed immediately after power on.

Typematic Rate Setting

■ Disabled ❑ Enabled

This feature defines the keyboard's Typematic Rate and Typematic Delay. When disabled, the default values of 6 characters/sec and 250ms delay are used.

Typematic Rate (Chars/Sec): The values are 6, 8, 10, 12, 15, 20, 24, and 30 characters per second.

Typematic Delay (key repeat rate): The values are 250, 500, 750, and 1000 milliseconds

Security Option

☐ **System** ■ **Setup**

When set for Setup, the system will boot but access to BIOS Setup will be denied until the correct password is entered at the prompt.

When set for System, the system will not boot until the correct user password is entered at the prompt.

If a password is totally lost, you will need to reinstall the operating system in order to circumvent the password requirement.

System BIOS Shadow

Enables the system shadow to achieve the best performance of the system.

Video BIOS Shadow: ☐ **Disabled** ■ **Enabled**
C8000-CFFFF: ■ **Disabled** ☐ **Enabled**
D0000-D7FFF: ■ **Disabled** ☐ **Enabled**
D8000-DFFFF: ■ **Disabled** ☐ **Enabled**

If you shadow the BIOS at any of the above segments, you can set the appropriate memory cacheable function to **Enabled**

Chipset Features Setup

Choose **Chipset Features Setup** from the CMOS Setup Utility menu to display the screen in Figure 4-4. This sample screen contains the manufacturer's default values for the system board.

```
             ROM PCI/ISA BIOS (2A4IBC3I)
             CHIPSET FEATURES SETUP
             AWARD SOFTWARE, INC.

Auto  Configuration      Enabled    ISA  Memory  Hole (15M-16M) : Disable `
ISA Bus Clock          : 1/4 PCLK
LBD# Sample Point      : End of T2  Onboard FDD Controller      : Enabled
Cache Write Cycle      : 2 CCLK     Onboard Parallel Mode       : ECP Mode
Cache Burst Read Cycle : 1 CCLK     Onboard Parallel Port       : 378H
L2 Cache/DRAM Cycle WS : 2 CCLK     Onboard Serial Port 1       : COMI
DRAM RAS to CAS Delay  : 3 CCLK     Onboard Serial Port 2       : COM2
DRAM Write Cycle       : 1WS
DRAM Write CAS Pulse   : 2 CCLK
DRAM CAS Precharge Time : 1 CCLK
DRAM RAS to MA Delay   : 1 CCLK
DRAM Speed             : Faster
CPU internal Cache     : Write Back  Esc  Quit        ↑↓→←)      Select Item
CPU Burst Write          Disable     F1   Help        PU/PD/+/-  Modify
                                     F5   Old Values  (Shift) F2 Color
                                     F6   Load  BIOS Defaults
                                     F7   Load Setup Defaults
```

Figure 4-4. Chipset Features Setup Menu

By enabling **Auto Configuration,** the BIOS will automatically detect the CPU speed and auto-configure the bus frequency, DRAM speed, cache and read/write cycle.

All the entries shown in this menu are optimal settings for the system board's chipset; the entries should not be changed. The BIOS does not support a turbo function while the internal cache is enabled to write back.

NOTE: The P24T Internal Cache (Write-Back) option will display only when a write-back CPU is installed, such as a P24T CPU.

Power Management Setup

Choose **Power Management Setup** from the CMOS Setup Utility menu
to display the screen in Figure 4-5. This menu provides the Green PC
power management features.

```
╔══════════════════════════════════════════════════════════════════╗
║               ROM PCI/ISA BIOS (2A4IBC3I)                          ║
║               POWER MANAGEMENT SETUP                               ║
║               AWARD SOFTWARE, INC.                                 ║
╠══════════════════════════════════════════════════════════════════╣
║ Power Management    : User Define    IRQ3   (COM2)        : Enable ║
║ PM Control by APM   : Yes            IRQ4   (COM1)        : Enable ║
║ Video Off Option    :Susp,Stby-> Off IRQ5   (LPT2)        : Enable ║
║ Video Off Method    : V/H SYNC+Blank IRQ6   (Floppy Disk) : Enable ║
║                                      IRQ7   (LPT1)        : Enable ║
║          **PM Timers**               IRQ8   (RTC OS2)     : Disable║
║ HDD Off After       : 10 Min         IRQ9   (IRQ 2 Redir) : Enable ║
║ Doze Mode           : 5 Min          IRQ10  (Reserved)    : Enable ║
║ Standby Mode        : 5 Min          IRQ11  (Reserved)    · Enable ║
║ Suspend Mode        : 5 Min          IRQ12  (PS/2 Mouse)    Enable ║
║                                      IRQ13  (Coprocessor)   Enable ║
║          '*PM Events**               IRQ14  (Hard Disk)     Enable ║
║ PCI Master  Activity  : Enable       IRQ15  (Reserved)      Enable ║
║ COM Ports  Activity   : Enable                                     ║
║ LPT Ports Activity    : Enable                                     ║
║ HDD Ports Activity    : Enable   ┌──────────────────────────────── ║
║ DMA Ports Activity    : Enable   │ Esc   Quit    ↑↓→←) Select Item ║
║ VGA Activity          : Enable   │ F1    Help    PU/PD/+/-  Modify  ║
║                                  │ F5    Old Values (Shift) F2 Color║
║                                  │ F6    Load BIOS Defaults         ║
║                                  │ F7    Load Setup Defaults        ║
╚══════════════════════════════════════════════════════════════════╝
```

Figure 4-5. Power Management Setup Menu

Power Management Timers

The four Power Management timer modes are set by pressing the directional arrow keys (↑↓→←). The four modes are:

- Disabled
- Max. Saving
- Min. Saving
- User Define

Disabled

This mode disables the power management function; the system will be in the non-green operation mode.

Max. Saving

When you select this mode, you will be presented the system default values of four related timers (HDD power Down Timer at 10 Min; system Doze Timer at 20 Sec;, system Standby Timer at 20 Sec, and system Suspend Timer at 20 Sec) to facilitate the minimized power management function.

Min. Saving

When you select this mode, you will be presented the system default values of four related timers (HDD power Down Timer at 10 Min; system Doze Timer at 40 Min; system Standby Timer at 40 Min; and system Suspend at 40 Min) to facilitate the minimized power management function.

User Define

You can define your own required power management delay values by setting up the following four related timers:

HDD **Off Timer:** The entry period of this flexible HDD Off timer is 1 to 15 minutes. Once the system stops reading from or writing to the HDD, the standby timer starts counting. If there is no activity and

the defined timeout period expires, the system will shut off the HDD
power. The HDD will not resume its function until a read/write
command is executed.

Doze Timer select: The Doze Timer starts counting at the end of
each activity, If there is no further activity during the defined period,
the timer will scale the CPU and system clock at the lower frequency
(8MHz), and motivate the enabled PM Events. When you press any
keyboard key or move the mouse, the CPU and system clock will
auto-wake-up to a normal operation.

The range of this standby mode timer is 10 seconds to 3 hours.

System Standby Timer: The Suspend timer starts counting at the
end of each activity. If there's no further activity during the defined
period, the system will scale the CPU and system clock at the lower
frequency (8MHz) and motivate the enabled PM Events. It will
enable the monitor to enter an inactive mode with a blank screen.
The monitor will not display again until you press any key or move
the mouse.

The range of the Suspend mode timer is 10 seconds to 3 hours.

System Suspend Timer: The Suspend timer will be functional only
if your system uses the Intel SL-Enhanced series CPU. The Suspend
timer starts counting at the end of each activity. If there's no further
activity during the defined period, the system will shut off the CPU,
HDD, and monitor power to enter the Suspend mode.The power
consumption in this mode is even lower than that of the Standby
mode.

The range of the Suspend mode timer is 10 seconds to 3 hours.

Power Management Events

Power Management Events include:

- Local Master
- Local Device
- Video Activities
- DMA Activities
- IRQ1 through IRQ15

The IRQ8 (RTC, OS2) default setting is disabled in order to make **sure that** the Power Management mode can be executed under OS2. You can customize a combination of PM Events by selecting "Enable", which will be checked whether or not the related function is still working before the respective defined power management mode is asked to be motivated.

PM Control by APM

■ **Yes** ☐ **No**

If APM (Advanced Power Management) is installed, the system BIOS will wait for APM's prompt before entering any PM mode (Doze, Standby, Suspend, User Defined).

Video Off

☐ **Always On** ☐ **Suspend —> Off**
■ **Susp, Stby —> Off** ☐ **All Modes —> Off**

Always On: The system BIOS will never turn off the screen.
Suspend Off: Screen will turn off in the Suspend mode.
Susp, Stby Off: Screen will turn off in the Standby or Suspend mode.

PCI / IDE Configuration Setup

This section provides information for configuring the PCI bus features and the on-board IDE Controller. Choose the **PCI/IDE Configuration Setup** option from the CMOS Setup Utility to display the menu shown in Figure 4-6.

Set ail Slot INT#'s to **Auto.** All PCI adapters should use INTA. The BIOS will route each INTA to correspond to the IRQ automatically. Set the PCI IRQ Activated By: option to the **Level** mode.

Enable the IDE HDD Block Mode and 32-bit Transfer Mode when using the on-board IDE feature and the hard disk drive supports the options.

```
ROM PCI/ISA BIOS (2A4IBC3I)
PCI / IDE CONFIGURATION SETUP
AWARD SOFTWARE, INC.

Slot 1 Using INT#          : AUTO      Onboard 4968 IDE Port        : Enable
Slot 2 Using INT#            AUTO      IDE 0 Master Mode            : Auto
Slot 3 Using INT#            AUTO      IDE 0 Slave Mode             : Auto
                                       IDE 1 Master Mode            : Auto
1st Available IRQ            9          IDE 1 Slave Mode             : Auto
2nd Available IRQ           10          IDE Prefetch Read Buffer     : Disable
3rd Available IRQ           11          IDE HDD Block Mode           : Disable
4th Available IRQ           12          IDE 32-bit Transfer Mode     : Disable
PCI IRQ Activated By        Edge
PCI IDE 2nd Channel         Enable
PCI IDE IRQ Map To          ISA
                                       ESC   Quit         ↑↓→←)     Select Item
Master Arbitration Protocol  Weak      F1    Help        PU/PD/+/-  Modify
CPU-PCI Mem Post Write Buf   Disabled  F5    Old Values  (Shift) F2 Color
PCI Master Burst Read/Write  Disabled  F6    Load BIOS Defaults
                                       F7    Load Setup Defaults
```

Figure 4-6. PCI/ IDE Configuration Setup Menu

Load Setup Defaults

Select the **Load Setup Defaults** option from the CMOS Setup Utility menu to configure the BIOS to load the system defaults directly from CMOS. If the configured setup record created by the Setup program becomes corrupted (and therefore unusable), the system defaults will be loaded automatically when you turn the computer on. When you select the option, you will be prompted to "Load Setup Defaults". Respond with Y or N as appropriate.

Supervisor/User Password

Select the **Supervisor** or **User Password** from the CMOS Setup Utility menu when you want to initially set the password, and when you want to change or delete an existing password. When you use this option to initially set a password, you will be prompted to "Enter Password". Press Enter (this is the ROM default password) and continue to set up the initial password. At other times, the prompt will require the valid password to be entered.

After the ROM password (Enter) or valid password has been entered, you can either accept the existing password, set up a new one, or delete the password entirely. The password can be three to eight digits in length.

You may need to set the "Security Option" in the BIOS Features menu to either "User" so that the password will be required to run the system or "Supervisor" or to access the BIOS setup only.

IDE HDD Auto Detection

This utility automatically detects the IDE hard disk type; use this to confirm your hard disk data when it is unknown. Select the **IDE HDD Auto Detection** from the CMOS Setup Utility menu. Upon detection, the HDD type and peripheral data will be displayed. Enter this information in the Standard CMOS Setup menu.

```
┌─────────────────────────────────────────────────────────────────┐
│               ROM PCI/ISA BIOS (2A4IBC3I)                        │
│               IDE HDD AUTO DETECTION                             │
│               AWARD SOFTWARE, INC.                              │
├─────────────────────────────────────────────────────────────────┤
│ Hard Disk       Type Size Cyls  Heads PreComp  LandZone Sector  Mode   │
│ Primary Master       130  936   17    65535    935      17      Normal │
│ Primary Slave                                                          │
│ Secondary Master                                                       │
│ Secondary Slave                                                        │
├─────────────────────────────────────────────────────────────────┤
│          Select Secondary Slave Option (N=Skip) : Y             │
│                                                                  │
│   Options      Size      CYLS    Heads   PreComp   LandZone   SectorMode │
│   1(Y)         0         0       0       0         0          0   Normal │
│                                                                  │
│                        ESC : Skip                               │
└─────────────────────────────────────────────────────────────────┘
```

Figure 4-7. IDE HDD Auto Detection Menu

HDD Low Level Format Utility

This utility is the drive setup software used for low-level format before DOS FDISK and FORMAT or similar utilities. You can use this utility on MFM encoded hard disk drives if they require formatting but have not been low-level formatted by the manufacturer. IDE, ESDI and SCSI drives do not need this utility; you should not use it on these types of drives.

```
╔════════════════════════════════════════════╦═══════════════════════╗
║        ROM PCI/ISA BIOS (2A4IBC3I)         ║ Bad Tracks Table      ║
║   Hard Disk Low Level Format Utility       ║ No. CYLS  HEAD        ║
║             SELECT DRIVE                    ║ ───────────────────── ║
║            BAD TRACK LIST                   ║                       ║
║             PREFORMAT                       ║                       ║
╠════════════════════════════════════════════╣                       ║
║        Current selected drive is : C        ║                       ║
║   Drive C      CYLINDER : 0      HEAD : 0    ║                       ║
╠═════════════════════════════════════════════╩═══════════════════════╣
```

	Size	Cyls	Heads	Precomp	Landzone	Sectors	Mode
Primary Master	: 130	936	16	65535	935	17	Normal
Primary Slave	: o	0	0	0	0	0	Normal
Secondary Master	: o	0	0	0	0	0	Normal
Secondary **Slave**	**: o**	**0**	**0**	**0**	**0**	**0**	Normal

```
╔═════════════════════════════════════════════════════════════════════╗
║  Up / Down      : Select Item Enter : Accept ESC : Exit / Abort      ║
║  Copyright (c) Award Software, Inc. 1992-94 All Rights Reserved      ║
╚═════════════════════════════════════════════════════════════════════╝
```

Figure 4-8. Hard Disk Drive Low Level Format Menu

Save and Exit Setup

Select this option from the CMOS Setup Utility after you have completed your BIOS setup and want to save all changes. Press **Enter** after selecting the option and all changes will be written in the CMOS memory of the chipset. The microprocessor will check this data whenever you turn on your system, and compare it to what it finds in the system.

You can alternately press the **F10** key to select his option without highlighting it in the menu.

Press **Esc** after selecting this option and you do not want to save & exit. The initial screen will again display for you to select the option of your choice.

Exit Without Saving

Select this option from the CMOS Setup Utility and press **Enter** to exit the Setup program without saving any changes.

Flash ROM BIOS

Updating the System BIOS

This appendix provides instructions on how to update the system BIOS using the FLASH ROM BIOS feature, which permits you to update the BIOS without exchanging EPROM chips. Upon receipt of a manufacturer's or dealer's diskette containing the BIOS update data, perform the following to update the BIOS:

1. Insert the BIOS data diskette in drive A or B. Make that drive active and type "FLASH" at the DOS command line and press **Enter.** The following screen will be displayed.

```
        FLASH MEMORY WRITER V1.2
    Copyright (C) 1993, Award Software, Inc.

For SIS-496-497/A/B-2AIBC32C            Date:     07/14/95
Flash Type -
File Name to Program :4SPM.Bin

Error Message:
```

2. Type in the BIOS file name to program, which will be furnished by your dealer when a new BIOS update is released. In the screen above, the file name **4SPM.BIN** is shown already typed in. As soon as you enter the file name and press **Enter,** a message will appear at the bottom of the screen to prompt if you want to save the (current) BIOS data.

---

3. Press Y if you want to save the previous BIOS to the BIOS data diskette. Press N if you do not want to save the previous BIOS data. Press **Enter.** A prompt will display the Error Message window to confirm that you want to proceed with the update ("Are you sure to program (Y/N)")

4. Press Y for Yes if you want to continue the BIOS update. Press N for No if you want to quit without programming the BIOS update. The following screen will display to show the status of the update routine:

FLASH MEMORY WRITER V1.2
Copyright (C) 1993, Award Software, Inc.

For SIS-496-497/A/B-2AIBC32C   Date: 07/14/95

Flash Type - SST-28EEOIO & 26EEOII /5V

File Name to Program: 4SPM.Bin

        Program Flash Memory - OOOOOK

Warning : Don't Turn off Power or Reset System

---

5. Following successful update, the computer will auto-Restart.

6. Enter the CMOS Setup and load setup defaults.