Mainboard Layout

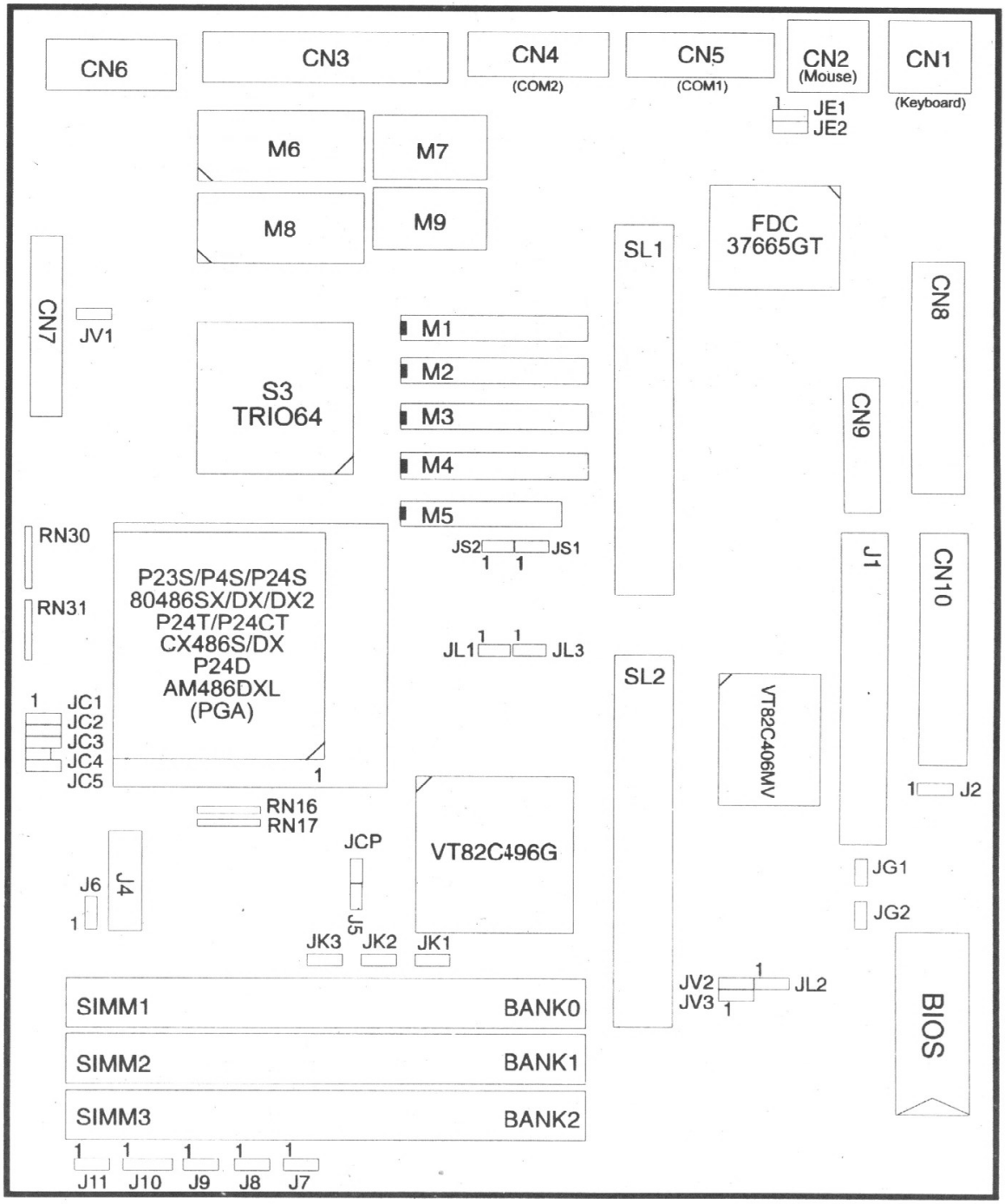


Figure 1-1. Mainboard Layout

Mainboard Settings

The 486-PAK-2 has several user-adjustable jumpers and connectors on the board that allow you to configure your system to suit your every need. This chapter contains information on the various jumper and connector settings you can make on your mainboard.

Jumpers

Jumpers are used to select the operation modes for your system. Some jumpers on the board have three metal pins with each pin representing a different function. To "set" a jumper, a black cap containing metal contacts is placed over the jumper pin/s according to the required configuration. A jumper is said to be "shorted" when the black cap has been placed on one or two of its pins, as shown in the figure below:

Figure 2 - 1. Jumper with Pins Shorted

CPU Selector Jumpers

To allow your system to be used with a variety of CPUs, 486-PAK-2 provides jumpers that can be set according to the CPU you want installed. Follow the diagrams found in the lower-middle area of the board to determine the proper arrangement for the CPU you are using.

The next three tables summarize the settings of the CPU Selector jumpers:

JUMPER	Intel 486SX 486SL	Intel 486 DX/DX2/ P24S/P4S/ Am486DX/DX2/DX4	Intel P24T*/ P24CT*	Cyrix Cx486S (M6)	Cyrix Cx486DX (M7)	Intel P24C*	Intel P24D
JC1	2-3	1-2 (default)	1-2	2-3	1-2	1-2	1-2
JC2	2-3	1-2 (default)	1-2	2-3	1-2	1-2	1-2

* A regulator board may be needed when using this CPU. Refer to p2-9 for its installation.

JUMPER (RP 0Ω 8p4R)	486SX/DX/DX2 486 SL-Series Am486DX/DX2/DX4	M6/M7	P24C/P24D/ P24CT/P24T	Am486DXL
RN16	empty (default)	empty	inserted	empty
RN17	empty (default)	inserted	empty	empty
RN30	empty (default)	empty	empty	inserted
RN31	inserted (default)	empty	inserted	empty

JUMPER	PIN DEFINITION
J2	short HDD_BALE enabled open diabled (default)
JCP	short CMOS clear on open CMOS clear off (default)
J4	Regulator board socket 1-2 & 15-16 all open for regulator board 1-2 & 15-16 short for no regulator board (default)
J5	short VGA open Mono/EGA (default)
JV1	short VGA IRQ 9 open (default)
JC3	1-2 Other CPUs (default) 2-3 P24T/P24D only
JC4	Write-back/write-through select for P24D/P24T short write-back level 1 for P24D/P24T open write-through level 1 for P24T (default)
JC5	AMD CPU clock mode select 1-2 short for speed-double for AMD 486DX2-80V/DX4 2-3 short for speed-double for AMD 486DX2 Plus
	AMD CPU clock mode select 1-2 short for speed-triple for AMD 486DX2 Plus 2-3 short for speed-triple for AMD 486DX2-80V/DX4
JL1, JL2	1-2 PCICLK = CPUCLK (default) 2-3 PCICLK = CPUCLK/2
JL3	1-2 with optional 505 riser card 2-3 without optional 505 riser card
JG1	short green LED (Suspend Mode LED) open (default)
JG2	short disable outlet open (default)

Table 2-1. Jumper Settings for CPU Selector

JUMPER	DMA1	DMA3	DISABLED
JE1	1-2	2-3	off (default)
JE2	1-2	2-3	off (default)

Table 2-2. SMC 665GT ECP Mode DMA Channel Selection

CPU Clock Jumper JK1-JK3

JUMPER	50 MHz	40 MHz	33.3 MHz	25 MHz
JK1	1-2	1-2	2-3 (default)	2-3
JK2	2-3	1-2	2-3 (default)	1-2
JK3	1-2	2-3	1-2 (default)	2-3

Table 2-3. CPU Clock Jumper Selection JK1-JK3

Connectors

The connectors allow the mainboard to connect electronically with other parts of the system. Some connectors have two pins, others have four or five pins. Some malfunction problems encountered with your system may be caused by loose or improper connections. Ensure that all connections are in place and firmly attached.

CONNECTOR	PIN-OUTS	SIGNAL NAME
CN1 PS/2 Keyboard Connector	1 2, 6 3 4 5	Keyboard data NC Ground +5V Keyboard clock
CN2 PS/2 Mouse Connector	1 2 3, 6 4 5	Mouse data NC Ground + 5V Mouse clock

Table 2-4. Connector Pin Definitions (Continued)

CONNECTOR	PIN-OUTS	SIGNAL NAME
CN3 Parallel Port 2 Connector	1 2-9 10 11 12 13 14 15 16 17 18-25	LPT strobe Data bit 0 - Data bit 7 LPT acknowledge LPT busy Paper end Selected status Auto line feed LPT error Initiate printer Select printer Ground
CN4 Serial Port 2 Connector CN5 Serial Port 1 Connector	1 2 3 4 5 6 7 8 9	Data carrier detect Receive data Transmit data Data transmit ready Signal ground Ready to receive data Request to send data Clear to send Ring indicator
CN6 VGA Connector	1 2 3 4, 9, 11, 12, 15 5-8, 10 13 14	Red Green Blue NC Ground Horizontal sync Vertical sync
CN7 Feature Connector	1 2, 4, 6, 16, 18, 20, 22, 25 3 5 7 8 9 10 11 12 13 14, 24, 26 15 17 19 21 23	VP0 Ground VP1 VP2 VP3 Enable video data VP4 Enable sync signal VP5 Enable video dot clock VP6 NC VP7 Video dot clock Blanking Horizontal sync Horizontal sync Veritcal sync
CN8 Power Connector	1 2, 10, 11, 12 3 4 5, 6, 7, 8 9	Power good + 5V + 12V - 12V Ground - 5V

Table 2-4. Connector Pin Definitions (Continued)

CONNECTOR	PIN-OUTS	SIGNAL NAME
CN9 Game Port Connector	1, 2, 14, 15 7, 8, 9 4, 6, 10, 12, 16 5 11 3 13	VCC Ground NC SD0 SD1 SD4 SD5
CN11 FDD Connector	2 4, 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33	Density selection NC Index detection Select motor A Select drive A Select drive B Select motor B Direction control Step pulse Write data Write enabled Track 0 Write protect Read data Head select Disk change Ground
J1 HDD IDE Connector	1 2, 19, 22, 24, 26, 30, 40 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 20, 21, 29, 34 23 25 27 28 31 32 33 35 36 37 38 39	Reset hard disk Ground HDD7 HDD8 HDD6 HDD9 HDD5 HDD10 HDD4 HDD11 HDD3 HDD12 HDD2 HDD13 HDD1 HDD14 HDD0 HDD15 NC HDD I/O write HDD I/O read IOCHRDY HDD address latch IRQ14 IOCS16 HDD A1 HDD A0 HDD A2 HDD chip select 0 HDD chip select 1 HDD active

Table 2-4. Connector Pin Definitions

→ **NOTE : Users are not encouraged to change the jumper settings not listed in this manual. Changing the jumper settings improperly may adversely affect system performance.**

ISA/VESA Bus Connector

The mainboard utilizes two VESA connectors to provide high-performance ISA/VESA bus path, SL1 and SL2, for use with ISA/VESA peripherals. The latter VESA bus connector, SL 2, can be utilized for one Local Bus Master or one Local Bus Slave. The two connectors supports one optional riser card with 2 PCI, 1 VESA and 1 ISA bus slots on it.

The following tables give the pin assignments for SL1 and SL2. Side A of the connector are pin-outs on the board's component side while Side B are pin-outs on the board's solder side. Jumpers JL1 and JL2 give more information on settings on the mainboard and the VL-bus controller.

JUMPER	PIN DEFINITION
JV2	High Speed Write Select 1-2 Zero wait write (default) 2-3 One wait write
JV3	CPU Speed Select 1-2 Less than or equal to 33MHz (default) 2-3 Greater than 33MHz

Table 2-5. Jumper Settings of SL1, SL2

CONNECTOR	SIDE A : PINS & PIN-OUTS		SIDE B : PINS & PIN-OUTS	
SL1 ISA Bus Slot	01	+12V	01	-12V
	02, 03	Ground	02	+5V
	04	IOCHCK#	03, 04	Ground
	05	SD7	05	RES_DRV
	06	SD6	06	+5V
	07	SD5	07	IRQ9
	08	SD4	08	-5V
	09	SD3	09	DREQ2
	10	SD2	10	-12V
	11	SD1	11	0WS#
	12	SD0	12	+12V
	13	IOCHRDY	13	Ground
	14	AEN	14	SMEMW#
	15	LA19	15	SMEMR#
	16	LA18	16	IOW#
	17	LA17	17	IOR#
	18	SA16	18	DACK3#
	19	SA15	19	DREQ3
	20	SA14	20	DACK1#
	21	SA13	21	DREQ1
	22	SA12	22	REFRESH#
	23	SA11	23	SYS_CLK
	24	SA10	24	IRQ7
	25	SA9	25	IRQ6
	26	SA8	26	IRQ5
	27	SA7	27	IRQ4
	28	SA6	28	IRQ3
	29	SA5	29	DACK2#
	30	SA4	30	TC
	31	SA3	31	BALE
	32	SA2	32	+5V
	33	SA1	33	OSC
	34	SA0	34	Ground
	35	GND	35	Ground
	36	LDEVIN#	36	-LDEV1
	37	TRDY#	37	HADDR
	38	PCIERR	38	NC
	39	SBHE#	39	MEMCS16#
	40	LA23	40	IOCS16#
	41	LA22	41	IRQ10
	42	LA21	42	IRQ11
	43	LA20	43	IRQ12
	44	LA19	44	IRQ15
	45	LA18	45	IRQ14
	48	LA17	48	DACK0#
	49	MEMR#	49	DREQ0
	50	MEMW#	50	DACK5#
	51	SD8	51	DREQ5
	52	SD9	52	DACK6#
	53	SD10	53	DREQ6
	54	SD11	54	DACK7#
	55	SD12	55	DREQ7
	56	SD13	56	+5V
	57	SD14	57	MASTER#
	58	SD15	58	Ground

Table 2-6. SL1 ISA Bus Slot Pin Assignments

CONNECTOR	SIDE A : PINS & PIN-OUTS		SIDE B : PINS & PIN-OUTS	
SL2 VESA Bus Slot	01	DAT01	01	DAT00
	02	DAT03	02	DAT02
	03	Ground	03	DAT04
	04	DAT05	04	DAT06
	05	DAT07	05	DAT08
	06	DAT09	06	Ground
	07	DAT11	07	DAT10
	08	DAT13	08	DAT12
	09	DAT15	09	VCC
	10	Ground	10	DAT14
	11	DAT17	11	DAT16
	12	VCC	12	DAT18
	13	DAT19	13	DAT20
	14	DAT21	14	Ground
	15	DAT23	15	DAT22
	16	DAT25	16	DAT24
	17	Ground	17	DAT26
	18	DAT27	18	DAT28
	19	DAT29	19	DAT30
	20	DAT31	20	VCC
	21	ADR30	21	ADR31
	22	ADR28	22	Ground
	23	ADR26	23	ADR29
	24	Ground	24	ADR27
	25	ADR24	25	ADR25
	26	ADR22	26	ADR23
	27	VCC	27	ADR21
	28	ADR20	28	ADR19
	29	ADR18	29	Ground
	30	ADR16	30	ADR17
	31	ADR14	31	ADR15
	32	ADR12	32	VCC
	33	ADR10	33	ADR13
	34	ADR08	34	ADR11
	35	Ground	35	ADR09
	36	ADR06	36	ADR07
	37	ADR04	37	ADR05
	38	HITM#	38	Ground
	39	BE0#	39	ADR03
	40	VCC	40	ADR02
	41	BE1#	41	NC
	42	BE2#	42	RESET#
	43	Ground	43	D/C#
	44	BE3#	44	M/IO#
	45	ADS#	45	W/R#
	48	LRDY#	48	READY#
	49	LDEV0#	49	Ground
	50	LREQ#	50	IRQ9
	51	Ground	51	BRDY#
	52	LGNT#	52	BLAST#
	53	VCC	53	LID0
	54	LID2	54	LID1
	55	LID3	55	LCLK0
	56	LID4	56	Ground
	57	KEN#	57	LCLK1
	58	EADS#	58	LBS16#

Table 2-7. SL2 VESA Bus Slot Pin Assignments

Regulator Board Installation

This section describes the installation of a regulator board on the mainboard, depending on the S-series CPU to be used.

If an onboard regulator is not present, a regulator may need to be installed before using any S-series processor. Please refer to the instructions below on how to install a regulator. Please also refer to page 2-2 for the correct CPU jumper selection.

→ **NOTE : If you do not intend to install a regulator on the mainboard, place jumper caps onto pins 1-2, 3-4, 13-14 and 15-16 of the J4 connector.**

1. Remove jumpers from connector J4.
2. Place the regulator board as shown on the figure below with the correct pin orientation.

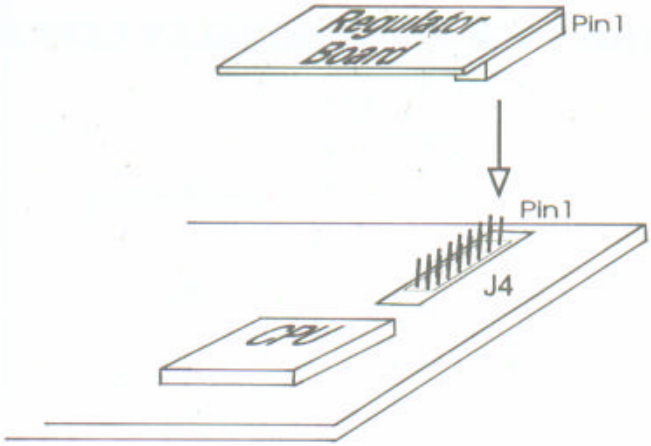


Figure 2-2. Regulator Board Installation

Memory Subsystem

The 486-PAK-2 is equipped with the memory necessary for running all your applications. Memory comes in the form of DRAM (SIMMs) and cache SRAM. This chapter describes these two kinds of memory and gives instructions on how to install each kind on the mainboard.

Memory Locations

The board layout below shows the locations of the DRAM memory banks and the cache SRAM:

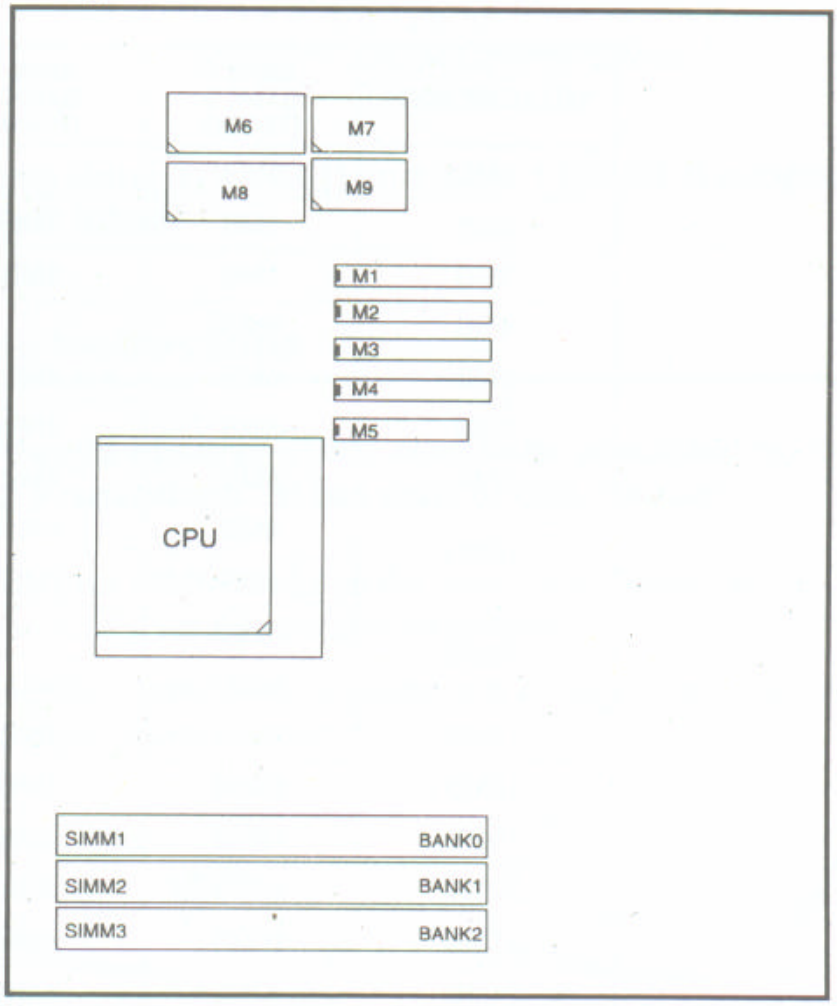


Figure 3-1. Cache and Memory Locations

Installing DRAM

SIMM Banks

The 486-PAK-2 can accommodate onboard memory from 1 to 64MB using SIMMs (Single-In-Line Memory Modules). The mainboard has four memory banks — Bank 0, 1, 2. Each bank can accept either a lMB, 4MB, or 16MB SIMM in each socket.

DRAM Configuration

Memory can be installed in a variety of configurations, as shown in the next table:

TOTAL MEMORY	SIMM 1 BANK 0 (72-PIN)	SIMM 2 BANK 1 (72-PIN)	SIMM 3 BANK 2 (72-PIN)
1MB	1MB		
2MB	1MB	1MB	
3MB	1MB	1MB	1MB
4MB	4MB		
5MB	4MB	1MB	
6MB	4MB	1MB	1MB
8MB	4MB	4MB	
12MB	4MB	4MB	4MB
	4MB	8MB*	
16MB	16MB		
	8MB *	8MB *	
17MB	16MB	1MB	
18MB	16MB	1MB	1MB
19MB	16MB	1MB	1MB
20MB	16MB	4MB	
21MB	16MB	4MB	1MB
24MB	4MB	4MB	16MB

* Double-RAS SIMM

Table 3-1. DRAM Configurations (Continued)

TOTAL MEMORY	SIMM 1 BANK 0 (72-PIN)	SIMM 2 BANK 1 (72-PIN)	SIMM 3 BANK 2 (72-PIN)
32MB	16MB	16MB	
	32MB*		
33MB	16MB	16MB	1MB
36MB	16MB	16MB	4MB
48MB	16MB	16MB	16MB
	16MB	32MB*	
64MB	16MB	32MB*	16MB
	32MB*	32MB*	

* Double-RAS SIMM

Table 3-1. DRAM Configurations

→ **NOTE : Only Bank 0 (SIMM 1) and Bank 1 (SIMM 2) supports Double-RAS SIMM.**

Installation Instructions

→ **NOTE : Always observe static electricity precautions. See "Handling Precautions" at the start of this manual.**

1. Locate the SIMM banks on the mainboard. Determine your desired configuration to be installed.
2. Insert the SIMM edge connector at a 75-degree angle onto the angle onto the socket.

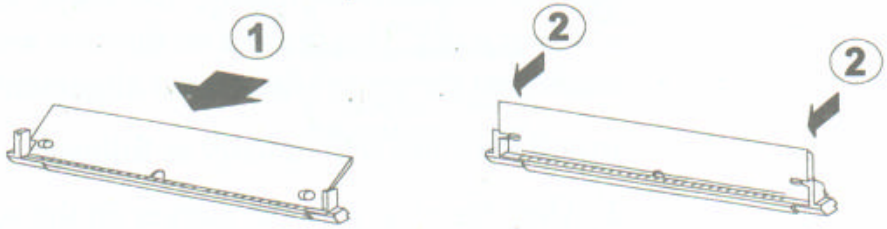


Figure 3-2. Installing a SIMM Module

3. Carefully push the SIMM down and back into the socket until the retaining clips of the socket snap, holding the SIMM in place. The holes in the SIMM should match the pins on the socket's retaining clips.

To remove the SIMM/s, pull the retaining latch on both ends of the socket and reverse the procedure above.

Cache Memory

The 486-PAK-2 can accept cache memory of 128KB, 256KB or 512KB.

→ **NOTE : Be sure to use the correct chips for the amount of cache memory you want to add. You must install both the correct Cache and Tag SRAM.**
Alter RAM type is always the same as Tag RAM.

Installing Cache Memory

→ **NOTE : Always observe static electricity precautions. See "Handling Precautions" at the beginning of this manual.**

If you do not have the confidence to make the installation, better consult a service technician for assistance.

1. Locate the cache memory on the mainboard.
   See Figure 3-1 again.
2. Be guided by the Cache SRAM settings depending on your desired SRAM configuration.

Correct orientation of the chips is necessary for the cache to operate properly. Normally, the chips have either a curved notch or a dot. This marker on the chip must be matched to the marker on the socket for correct alignment.

Install the chips individually as follows:

3. Align the chip with the marker on the socket.
   Press the chip onto the socket, ensuring that the pins on the chip are aligned with the corresponding connections on the socket.

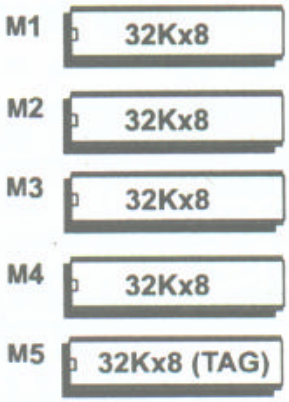
4. Carefully apply enough pressure to partially seat the chip into the socket.

Ensure that all pins are properly aligned with the connectors and that there are no bent pins. If there are any bent pins, remove the chip, straighten the pin and repeat the process.

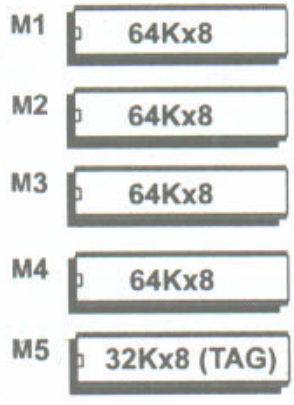
5. Press the chip completely into the socket so that the pins are properly seated.

Cache SRAM Specifications and Settings

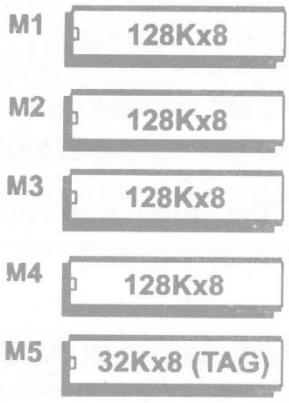
128K Cache SRAM



256K Cache SRAM



512K Cache SRAM



The cache size is jumper selectable. Below lists the jumper settings according to the onboard cache size.

	128K	256K	512K
SRAM (M1-M4)	32Kx8	64Kx8 (default)	128Kx8
Tag RAM (M5)	32K x 8	32K x 8 (default)	32K x 8

Table 3-2. Cache Configuration Size

JUMPER	128K	256K	512K
JS1 (Jumper)	1-2	2-3 (default)	2-3
JS2 (Jumper)	1-2	1-2 (default)	2-3

Table 3-3. Cache Configuration Jumpers

→ **NOTE : To upgrade onboard VGA DRAM size to 2MB, insert two 256Kx16bit-7 (ZIP-type) DRAM at locations M6, M8.**