OPTI-495SX
3/486 WB CACHE MOTHERBOARD
(VESA LOCAL BUS)
USER'S MANUAL

TABLE CONTENTS

Chapter 1 Introduction

Congratulations on the purchase of your New OPTI-495SX 3/486WB Cache Main Board.

The OPTI-495SX 3/486WB Cache motherboard is a Low-Cost three-chip solution offering optimal performance for low to mid range 386/486-based AT system. The OPTI-495SX 3/486WB Cache M/B is designed for 386 systems running from 25, 33 and 40MHz, or 486 systems running from 25, 33 and 50MHz. It supports 386DX, 486SX, 486DX, 486DX2 Cyrix 486DLC and Three 32-bit Local Bus.

The OPTI-495SX 3/486WB Cache motherboard also has an option to accommodate either 64K, 128K, 256K of external cache and support the 80387 numeric coprocessor.

Because of its unique memory subsystem design, the OPTI-495SX 3/486WB Cache M/B allows for 1 Megabyte to 32 Megabytes of 32-bit high speed memory by using 256K, 1M and 4M SIMM modules. The available memory configurations are 1MB, 2MB, 4MB, 5MB, 8MB, 16MB, 20MB, 32MB.

SPECIFICATION

Processor:	386DX, 486SX, 486DX, 486DX2, 486DLC
Coprocessor:	Intel ULSI, IIT, Cyrix 80387
CPU Clock:	33/40MHz for 386 M/B 25/33/50/DX2-66MHz for 486M/B
CPU Clock Source:	Oscillator/Clock gernerator
Memory:	Up to 32MB
Memory configuration:	1MB/2MB/4MB/5MB/8MB/16MB/20MB/32MB
Memory using:	256KB/1MB/4MB Module, memory up to 32MB on board
SRAM configuration:	64KB/128KB/256KB
BIOS Subsystem Type:	AMI ROM BIOS
Additional BIOS features:	Setup program resides in ROM.
1/O Subsystem No. of slots:	Six 16-bit & Two 8-bit ISA Slots, Three 32-bit Local Bus slots.
Dimension:	22x28 cm, 2/3 Baby AT size
Additional features	
Miscellanous connectors:	Reset buttom. Turbo speed indicator. Internal battery.
Board design:	Four layer implementation for low noise operation.

SYSTEM FEATURES

- Low cost, low power, 1.0μm CMOS technology.
- Bust-Line-Fill during cache-read-miss.
- Support 386DX(PGA), 386DX(PQFP), 486SX(PQFP) 486DLC/486DX/486DX2/486SX(PGA) CPU.
- Up to 10% performance enhancement from write-through cache scheme.
- Support VESA local bus to increasing video & IDE performance.
- Adjustable system speed clock by clock generator.
- 387 Coprocessor support for 386 mode.
- Hidden refresh support to enhance system performance.
- Copy-back Direct-mapped with size of 64KB, 128KB, 256KB.
- Up to 32MB of local high-speed, page-mode, DRAM memory space.
- Supports 1 through 2 banks of 256KX9, 1MX9, 4MX9 of SIMM.
- Turbo/slow speed selection.
- Support 2.1.1.1 or 3.1.1.1 cache cycles.
- 1X and 2X clock source, supporting systems running up to 50MHz.
- Shadow RAM support for system BIOS, video BIOS and adaptor card BIOS.
- Control of two non-cacheable regions.
- Integrated write-back cache controller with tag comparator.

OPTI-495SX 3/486WB Cache Motherboard Layout

4
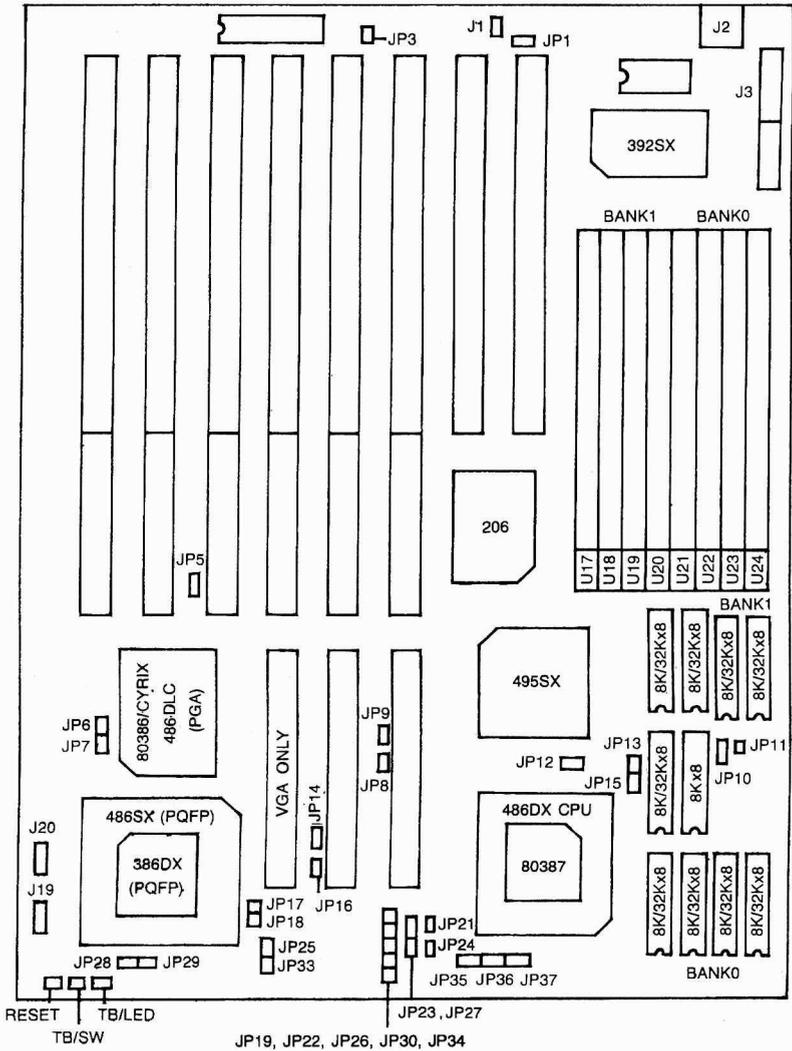
Chapter 2 Installation

> BEFORE TURNING ON THE SYSTEM POWER, PLEASE FOL-
> FOLLOW THE FOLLOWING INSTRUCTIONS CAREFULLY OR
> YOUR SYSTEM MAY NOT OPERATE CORRECTLY. THANK
> YOU!!

On Board SIMM Installation

The OPTI-495SX 3/486WB Cache motherboard memory can
be expanded memory from 1MB to 32MB. Either 256K or
1M or 4M SIM DRAM can be used on the OPTI-495SX 3/
486WB Cache motherboard. There are spacial BANK 0 and
BANK 1 SIMM of assembly available for the OPTI-495SX
3/486WB Cache motherboard. . They are:

■ SIMM Module Used: (256K, 1M, 4MX9 of SIMM 4 Pcs)

BANK 0	BANK 1	TOTAL MEMORY
256K X 9, 4 pcs	NONE	1M
256K X 9, 4 pcs	256K X 9, 4 pcs	2M
1M X 9, 4 pcs	NONE	4M
256K X 9, 4 pcs	1M X 9, 4 pcs	5M
1M X 9, 4 pcs	1M X 9, 4 pcs	8M
4M X 9, 4 pcs	NONE	16M
1M X 9, 4 pcs	4M X 9, 4 pcs	20M
4M X 9, 4 pcs	1M X 9, 4 pcs	20M
4M X 9, 4 pcs	4M X 9, 4 pcs	32M

SIMM MODULE DRAM on the motherboard consists of
BANK 0-1. When you install the DRAM on the motherboard,
first completely fill BANK 0, then fill BANK 1. The spaces of
BANK 0 should be fully occupied, otherwise the motherboard
will not work.

SIM RAM ON BOARD POSITION

Please refer to the table for the BANK 0 and BANK 1 position.

BANK 0 INSTALL:	U21	U22	U23	U24
BANK 1 INSTALL:	U17	U18	U19	U20

■ Please refer to the following figure for operating the SIM DRAM:
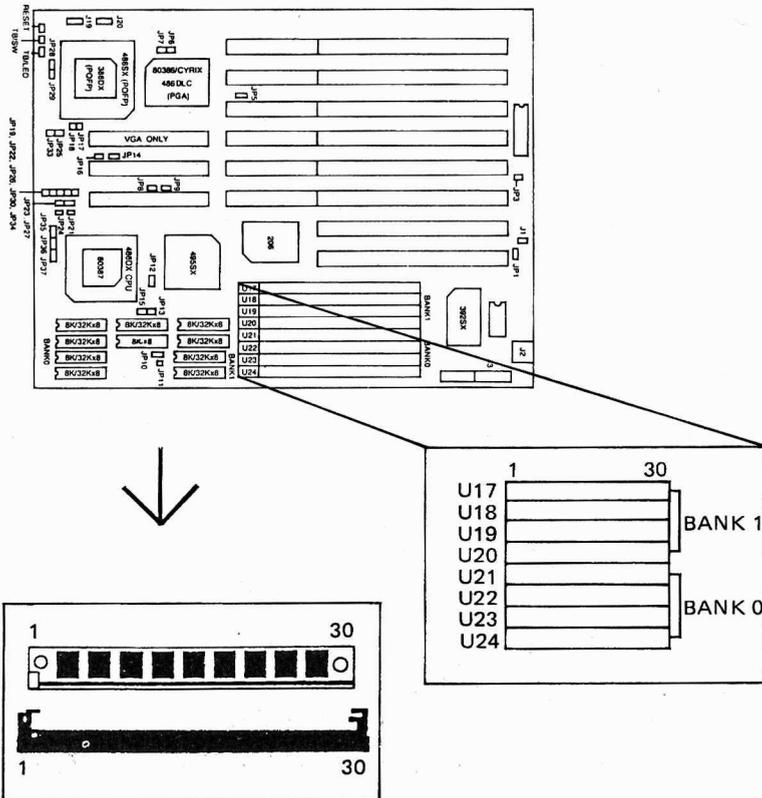
CACHE SRAM INSTALL SELECTION

CACHE SIZE JUMPER SETTING				CACHE SRAM		TAG RAM		CACHE SIZE
				BANK 0	BANK 1	U39	U40	
JP15	JP13	JP11	JP10	U49,U50,U51,U52	U31,U32,U33,U34	8KX8	X	
OPEN	OPEN	OPEN	2-3	8KX8, 4 pcs	8KX8, 4 pcs	8KX8	X	64K
OPEN	CLOSE	CLOSE	1-2	32KX8, 4 pcs	NONE	32KX8	X	128K
CLOSE	CLOSE	CLOSE	2-3	32KX8, 4 pcs	32KX8, 4 pcs	8KX8	8KX8	256K
CLOSE	CLOSE	CLOSE	2-3	32KX8, 4 pcs	32KX8, 4 pcs	32KX8	X	256K

■ Please refer to the following for setting up the JP15, JP13, JP11, JP10.

● THE ON BOARD JP15, JP13, JP11, JP10 POSITION

7

CPU ASSEMBLE OPERATION

1. A Type CPU Assemble (386DX(PQFP))/(386DX(PQFP) +80387) (386DX(PGA))/(386DX(PGA) + 80387) Operation

   STEP 1 SET 386 MODE (FOR PQFU, PGA)

CPU TYPE	JP5	JP12
386 MODE	2-3	OPEN

   STEP 2 386 CPU CLOCK SELECT JUMPER SETTING (FOR PQFP, PGA)

JUMPER	CPU TYPE	
	386DX-33(PQFP)	386DX-40(PQFP)
JP25	2-3	2-3
JP33	1-2	1-2
JP28	OPEN	OPEN
JP29	CLOSE	OPEN
JP3	CLOSE	OPEN

   STEP 3 Please refer to the figure for the 386DX(PQFP, PGA) CPU or 80387 position:

STEP 4   Please refer to the following figure for setting up
to JP5, JP12, JP25, JP28, JP29, JP33, JP3:

JP3   J1   JP1   J2

J3

392SX

BANK1   BANK0

JP5

U17 U18 U19 U20 U21 U22 U23 U24

BANK1

206

8K/32Kx8 8K/32Kx8 8K/32Kx8 8K/32Kx8 8K/32Kx8

495SX

80386/CYRIX 486DLC (PGA)

JP6
JP7

JP9

JP13   JP11
JP12   JP10
JP15

VGA ONLY

JP8

8K/32Kx8   8K x8

J20

486SX (PQFP)

JP14

486DX CPU

J19

386DX (PQFP)

80387

8K/32Kx8 8K/32Kx8 8K/32Kx8 8K/32Kx8

JP17   JP16
JP18

JP21
JP24

JP28   JP29

JP25
JP33

JP35 JP36 JP37

BANK0

RESET   TB/LED

JP23,JP27

TB/SW

JP19, JP22, JP26, JP30, JP34

9

CPU ASSEMBLE OPERATION

2. B Type CPU Assemble (Cyrix 486DLC) Operation

   STEP 1 SET 386 MODE

CPU TYPE	JP5	JP12	JP6	JP7	JP18
386 MODE	2-3	OPEN	CLOSE	CLOSE	CLOSE

   STEP 2 Cyrix 486DLC CPU CLOCK SELECT JUMPER SETTING

JUMPER	CPU TYPE	
	486DLC-33	486DLC-40
JP25	2-3	2-3
JP33	1-2	1-2
JP28	OPEN	OPEN
JP29	CLOSE	OPEN
JP3	CLOSE	OPEN

   STEP 3 Please refer to the figure for the 486DLC CPU or 80387 pusition:
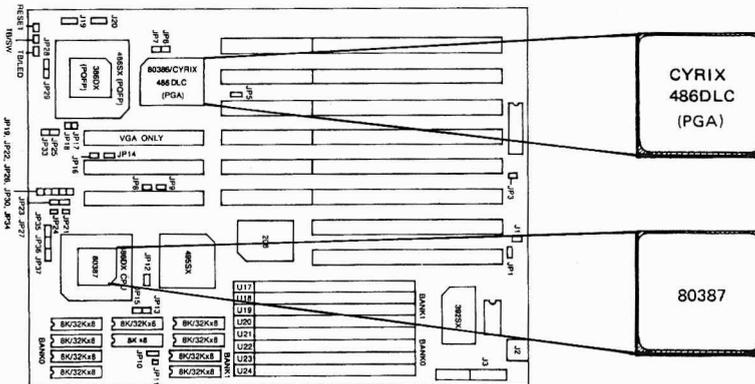
STEP 4   Please refer to the following figure for the setting
         up to JP5, JP12, JP25, JP28, JP29, JP33, JP6,
         JP7, JP18:
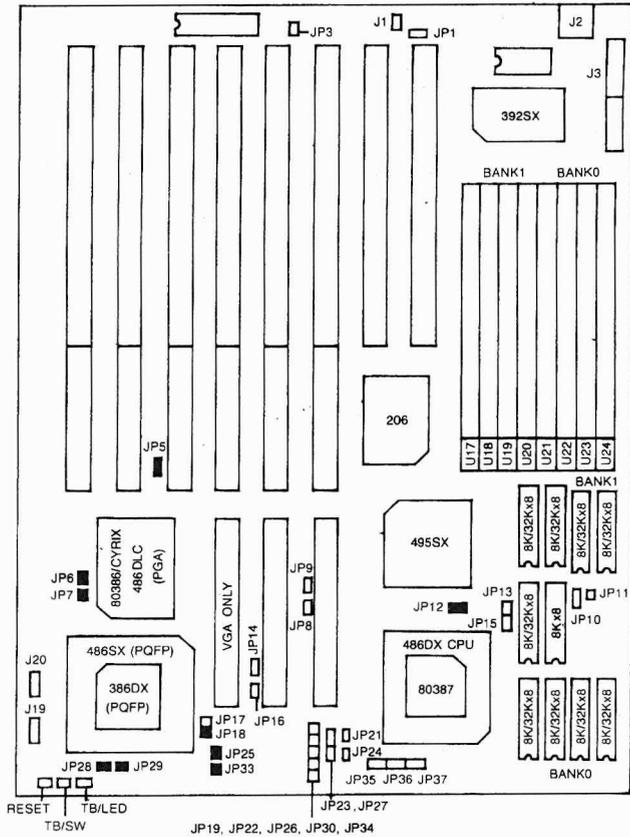
3. C Type CPU Assemble (386DX (PGA, PQFP)) $\xrightarrow{\text{Up Grade To}}$ 486 (PGA) CPU

STEP 1 SET 486 MODE (FOR PGA)

CPU TYPE	JP5	JP12	JP18	JP17
486 MODE	1-2	CLOSE	CLOSE	OPEN

STEP 2 SET 486 CPU TYPE SELECTION JUMPER SETTING

JP36	JP37	JP35	USAGE
CLOSE	1-2	1-2	486DX, 486DX2
OPEN	2-3	OPEN	486SX
CLOSE	1-2	2-3	487SX, OVERDRIVE
CLOSE	2-3	OPEN	486SX(PQFP)

STEP 3 486 CPU CLOCK SELECT JUMPER SETTING (FOR PGA)

JUMPER	CPU TYPE		
	486DX2-50/ OVERDRIVE-25	486DX2-66/ OVERDRIVE-33	486DX-50
	486DX-25/486SX-25	486DX-33/486SX-33	
JP25	2-3	2-3	1-2
JP33	2-3	2-3	1-2
JP28	CLOSE	OPEN	CLOSE
JP29	OPEN	CLOSE	OPEN

12

STEP 4 Please refer to the following figure for setting up
to JP5, JP12, JP17, JP18, JP35, JP36, JP37,
JP25, JP33, JP28, JP29 & 386DX (PGA, PQFP)
& 80486 CPU (PGA) position:

13
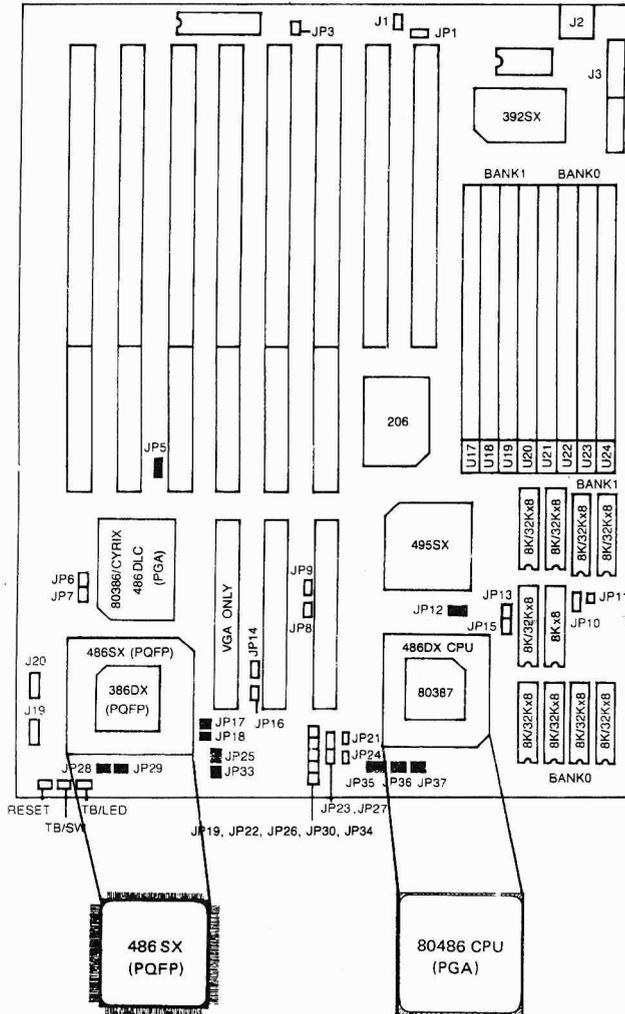
4. D Type CPU Assemble (486SX(PQFP)) Operation

STEP 1 SET 486 MODE (FOR PQFP)

	JP5	JP12	JP18	JP36	JP17
486 MODE	1-2	CLOSE	CLOSE	CLOSE	OPEN

STEP 2 486 CPU CLOCK SELECT JUMPER SETTING (FOR PQFP)

JUMPER	CPU TYPE	
	486SX-25 (PQFP)	486SX-33 (PQFP)
JP25	2-3	2-3
JP33	2-3	2-3
JP28	CLOSE	OPEN
JP29	OPEN	CLOSE

STEP 3 Please refer to the figure for the 80486SX(PQFP) CPU position:

14

STEP 4 Please refer to the figure for setting up to JP5, JP12, JP18, JP19, JP25, JP33, JP28, JP29:

15
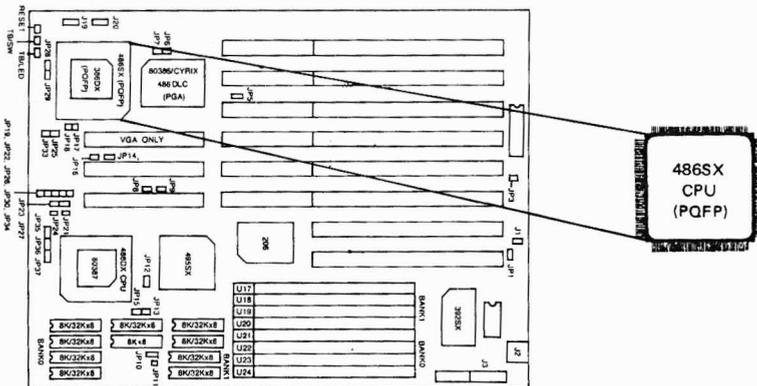
5. E Type CPU Assemble (486SX(PQFP)) $\xrightarrow{\text{Up Grade To}}$ 486(PGA) CPU or F Type CPU Assemble (486 CPU (PGA) Operation

STEP 1 SET 486 MODE (FOR PGA)

CPU TYPE	JP5	JP12	JP17
486 MODE	1-2	CLOSE	CLOSE

STEP 2 SET 486 CPU TYPE SELECTION JUMPER SETTING (FOR PGA)

JP36	JP37	JP35	USAGE
CLOSE	1-2	1-2	486DX, 486DX2
OPEN	2-3	OPEN	486SX
CLOSE	1-2	2-3	487SX, OVERDRIVE

STEP 3 486 CPU CLOCK SELECT JUMPER SETTING (FOR PGA)

JUMPER	CPU TYPE		
	486DX2-50/ OVERDRIVE-25	486DX2-66/ OVERDRIVE-33	486DX-50
	486DX-25/486SX-25	486DX-33/486SX-33	
JP25	2-3	2-3	1-2
JP33	2-3	2-3	1-2
JP28	CLOSE	OPEN	CLOSE
JP29	OPEN	SHORT	OPEN

16

STEP 4 Please refer to the following figure for setting up
to JP5, JP12, JP17, JP35, JP36, JP37, JP25,
JP33, JP28, JP29 & 486SX CPU (PQFP) & 80486
CPU (PGA) position:

17
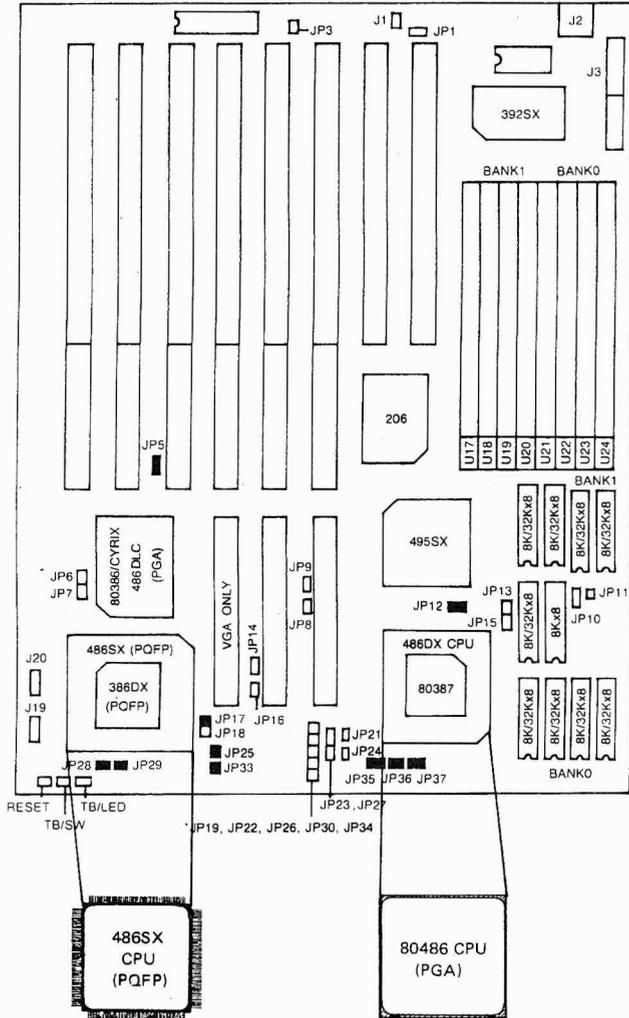
OPTI-495SX 3/486WB VL-BUS JUMPER SETTING DESCRIPTION

STEP 1 BL-BUS JUMPER SETTING FOR PAL

PAL	JP9	JP8	JP23	JP27	JP19	JP21	JP14
USE PAL	OPEN	OPEN	1-2	1-2	OPEN	OPEN	OPEN
NO USE	CLOSE	CLOSE	2-3	2-3	CLOSE	CLOSE	CLOSE

STEP 2 VL-BUS SPEED JUMPER SETTING

VL-Bus		JP26	JP22
CPU	$<= 33$MHz	X	OPEN
SPEED	> 33MHz	X	CLOSE
HIGH SPEED	ϕ WS	OPEN	X
WRITE	1 WS	CLOSE	X

STEP 3 VL-BUS MODE SETTING

VL-BUS	JP34	JP30
386	OPEN	CLOSE
486	CLOSE	OPEN

18

STEP 4 Please refer to the following figure for setting up
to JP9, JP8, JP23, JP27, JP19, JP21, JP14, JP26,
JP22, JP34, JP30.

19
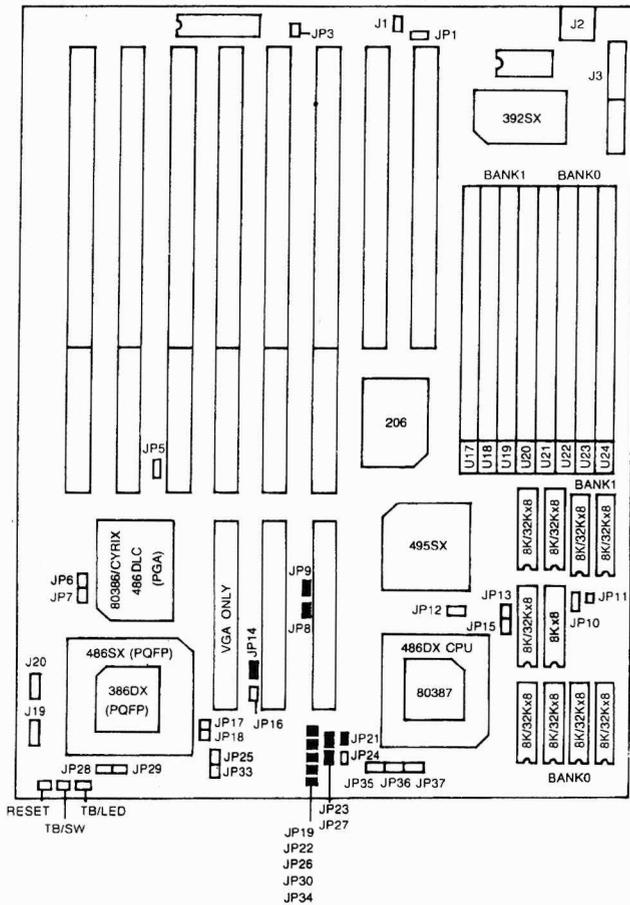
OPTI-495SX 3/486WB JUMPER SETTING DESCRIPTION

◆ JP3: DISPLAY ADAPTER SET UP

JUMPER	MEANING	SETTING	USAGE
JP3	DISPLAY TYPE	PIN 1. 2	
		OPEN	MONOCHROME
		SHORT	COLOR

◆ J19: KEYLOCK & POWER LED CONNECTOR

CONNECTOR	USAGE	PIN DESCRIPTION
J19	KEYLOCK & POWER LED	1 LED power
		2 not used
		3 GROUND
		4 keyboard inhibiter
		5 GROUND

◆ J20: SPEAKER CONNECTOR

CONNECTOR	USAGE	PIN DESCRIPTION
J20	SPEAKER	1 data out
		2 not used
		3 GROUND
		4 + 5V

◆ JP31: TURBO SW CONNECTOR

CONNECTOR	USAGE	PIN DESCRIPTION
JP31	TURBO SW	1 GROUND
		2 Select pin

When JP31 is open and it's on the turbo mode.
When JP31 is short and it's on the normal mode.

◆ JP32: TURBO LED CONNECTOR

CONNECTOR	USAGE	PIN	DESCRIPTION
JP32	TURBO LED	1	+ ANODE
		2	- CATHODE

◆ SW1: RESET

CONNECTOR	USAGE	PIN	DESCRIPTION
SW1	Reset	1	GROUND
		2	Reset in

◆ JP1: EXTERNAL BATTERY CONNECTOR

PIN	DESCRIPTION
1-2	BATTERY DISCHARGE.
2-3	short is internal battery 3. 6V by used

JP1: 2-3 Normal Operation (Default)

JP1: 1-2 Clear CMOS Memory (206 Setup of Data)

NOTE: Must put on 2-3 location just can operating the system

◆ KB: KEYBOARD CONNECTOR

PIN	DESCRIPTION
1	keyboard clock
2	keyboard data
3	space
4	GROUND
5	+ 5V dc

21

◆ J3: POWER SUPPLY CONNECTOR

CONNECTOR	PIN	DESCRIPTION
J3	1	power good
J3	2	+ 4V dc
J3	3	+ 12V dc
J3	4	- 12V dc
J3	5	GROUND
J3	6	GROUND
J3	7	GROUND
J3	8	GROUND
J3	9	- 5V dc
J3	10	+ 5V dc
J3	11	+ 5V dc
J3	12	+ 5V dc
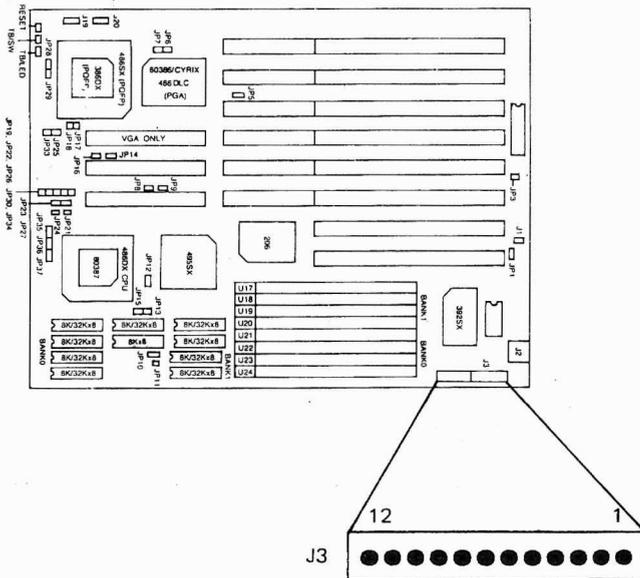
Chapter 3 AMI BIOS Setup

AMI BIOS System Configuration Setup

This section will tell you how to set up the system configurations (CMOS) under the AMI BIOS. After booting the system and testing the memory.

The SETUP program is contained in the system's Read-Only-Memory Rather than on a diskette.

To enter SETUP, press the "DEL" key. The following menu appears:

```
AMIBIOS SETUP PROGRAM-AM AMI BIOS SETUP UTILITIES
(C) 1992 American Megatrends Inc., All Rights Reserved

              STANDARD CMOS SETUP
              ADBANCED CMOS SETUP
            ADVANCED CHIPSET SETUP
      AUTO CONFIGURATION WITH BIOS DEFAULTS
    AUTO CONFIGURATION WITH POWER-ON DEFAULTS
               CHANGE PASSWORD
               HARD DISK UTILITY
             WRITE TO CMOS AND EXIT
           DO NOT WRITE TO CMOS AND EXIT

Standard CMOS Setup for changing Time, Date, Hard Disk Type, etc.

  ESC: EXIT ↓ → ↑ : Sel   F2/F3: Color   F10: Save & Exit
```

Please enter "STANDARD CMOS SETUP" to enter the next screen.

The following pages show simple charts and instructions for the CMOS setup.

```
AMIBIOS SETUP PROGRAM-WARNING INFORMATION
(C) 1992 American Megatrends Inc., All Rights Reserved

                             ⚠
         Improper Use of Setup may Cause Problems!!

If System Hangs, Reboot System and Enter Setup by Pressing the <DEL> key

             Do any of the following After Entering Setup
             (i)   Alter Options to make System Work
             (ii)  Load BIOS Setup Defaults
             (iii) Load Power-on Defaults
         Hit "ESC" to Stop now, Any other Key to Continue
         Hit "ESC" to Stop now, Any other Key to Continue
```

```
              AMIBIOS SETUP PROGRAM-STANDARD CMOS SETUP
             (C) 1992 American Megatrends Inc., All Rights Reserved
```

| Date (mm/date/year) : Wed, Jul 01 1992 | Base memory size: 640 KB |
| Time (hour/min/sec) : 19 : 35 : 25 | Ext. memory size: 3072 KB |

		Cyln	Head	WPcom	LZone	Sect	Size
Hard disk C:type	: 37	615	8	128	615	17	41MB
Hard disk D:type	: Not Installed						
Floppy drive A:	: 1. 2 MB, 5 1/4"						
Floppy drive B:	: Not Installed						
Primary display	: Monochrome						
Keyboard	: Installed						

Sat	Mon	Tue	Wed	Thu	Fri	Sat
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
2	3	4	5	6	7	8

Month	: Jan, Feb..............Dec
Date	: 01 02 03,..............31
Year	: 1901, 1902,......2099

```
    ESC: Exit   ↓ → ↑: Select    F2/F3: Color    PU/PD: Modify
```

24

```
AMIBIOS SETUP PROGRAM-AMI BIOS SETUP UTILITIES
(C) 1992 American Megatrends Inc., All Rights Reserved

              STANDARD CMOS SETUP
            ┌──────────────────────────┐
            │ ADVANCED CMOS SETUP      │
            └──────────────────────────┘
            ADVANCED CHIPSET SETUP
      AUTO CONFIGURATION WITH BIOS DEFAULTS
    AUTO CONFIGURATION WITH POWER-ON DEFAULTS
               CHANGE PASSWORD
               HARD DISK UTILITY
             WRITE TO CMOS AND EXIT
          DO NOT WRITE TO CMOS AND EXIT

  ┌──────────────────────────────────────────────┐
  │ Advanced CMOS Setup for configuring System Options │
  └──────────────────────────────────────────────┘

  ESC: EXIT ↓ → ↑ : Sel    F2/F3: Color    F10: Save & Exit
```

```
         AMIBIOS SETUP PROGRAM-WARNING INFORMATION
         (C) 1992 American Megatrends Inc., All Rights Reserved

            Improper Use of Setup may Cause Problems!!

If System Hangs, Reboot System and Enter Setup by Pressing the <DEL> key

            Do any of the following After Entering Setup
              (i)   Alter Options to make System Work
              (ii)  Load BIOS Setup Defaults
              (iii) Load Power-on Defaults

            Hit "ESC" to Stop now, Any other Key to Continue
```

```
┌─────────────────────────────────────────────────────────────────────────────┐
│              AMIBIOS SETUP PROGRAM — ADVANCED CMOS SETUP                       │
│              (C) 1992 American Megatrends Inc., All Rights Reserved            │
├─────────────────────────────────────────────────────────────────────────────┤
│  Typematic Rate Programming    : Disabled   System ROM Shadow E000, 64K : Disabled │
│  Typematic Rate Delay (msec)   : 500        System ROM Shadow F000, 64K : Enabled  │
│  Typematic Rate (Chars/Sec)    : 15                                           │
│  Above 1 MB Memory Test        : Disabled                                     │
│  Hard Disk Type 47 RAM Area    : 0:300                                        │
│  Floppy Drive Seek At Boot     : Enabled                                      │
│  System Boot Up Sequence       : A:, C:                                       │
│  External Cache Memory         : Enabled                                      │
│  Internal (Cyrix) Cache Memory : Enabled - - →Not: If use 386DX CPU Then Set Disable │
│  Password Checking Option      : Setup                                        │
│  Video ROM Shadow C000,16K     : Enabled                                      │
│  Video ROM Shadow C400, 16K    : Enabled                                      │
│  Adaptor ROM Shadow C800, 16K  : Disabled                                     │
│  Adaptor ROM Shadow CC00, 16K  : Disabled                                     │
│  Adaptor ROM Shadow D000, 16K  : Disabled                                     │
│  Adaptor ROM Shadow D400, 16K  : Disabled                                     │
│  Adaptor ROM Shadow D800, 16K  : Disabled                                     │
│  Adaptor ROM Shadow DC00, 16K  : Disabled                                     │
├─────────────────────────────────────────────────────────────────────────────┤
│      Esc: Exit    ↓→↑ : Sel   (Ctrl) Pu/Pd: Modify    F1: Help   F2/F3: Color │
│      F5: Old Values         F6: BIOS Setup Defaults       F7: Power-On Defaults │
└─────────────────────────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────────────────────┐
│           AMIBIOS SETUP PROGRAM-AMI BIOS SETUP UTILITIES                       │
│           (C) 1992 American Megatrends Inc., All Rights Reserved               │
├─────────────────────────────────────────────────────────────────────────────┤
│                        STANDARD CMOS SETUP                                     │
│                        ADVANCED CMOS SETUP                                     │
│                     ┌──────────────────────────┐                              │
│                     │  ADVANCED CHIPSET SETUP   │                             │
│                     └──────────────────────────┘                              │
│                AUTO CONFIGURATION WITH BIOS DEFAULTS                           │
│             AUTO CONFIGURATION WITH POWER-ON DEFAULTS                          │
│                        CHANGE PASSWORD                                         │
│                        HARD DISK UTILITY                                       │
│                      WRITE TO CMOS AND EXIT                                    │
│                    DO NOT WRITE TO CMOS AND EXIT                               │
│  ┌─────────────────────────────────────────────────────────────────────────┐ │
│  │ Advance Chipset Setup for Configure and CHIPSET Registering              │ │
│  └─────────────────────────────────────────────────────────────────────────┘ │
├─────────────────────────────────────────────────────────────────────────────┤
│      ESC: EXIT   ↓→↑ : Sel   F2/F3: Color   F10: Save & Exit                  │
└─────────────────────────────────────────────────────────────────────────────┘
```

```
AMIBIOS SETUP PROGRAM-WARNING INFORMATION
(C) 1992 American Megatrends Inc., All Rights Reserved

Improper Use of Setup may Casuse Problems!!

If System Hangs, Reboot System and Enter Setup by Pressing the <DEL> key

Do any of the following After Entering Setup
    (i)   Alter Options to make System Work
    (ii)  Load BIOS Setup Defaults
    (iii) Load Power-on Defaults

Hit "ESC" to Stop now, Any other Key to Continue
```

* THE SETUP FOR OPERATION 486DX-50MHz CPU SYSTEM M/B

```
AMIBIOS SETUP PROGRAM—ADVANCED CHIPSET SETUP
(C)1992 American Megatrends Inc., All Rights Reserved

Hidden Refresh              : Enabled—-→Note: If Non-Cache Then Set Disabled
486 AT BUS Clock Sleection  : CLKI/6
Non-Cache Read Wait State   : Disabled—-→Note: If Non-Cache Then Set Enabled
Non-Cache Write Wait State  : Disabled—-→Note: If Non-Cache Then Set Enabled
Cache Read Wait State       : 3-1-1-1
Non-Cacheable Block-1 Size  : Disabled
Non-Cacheable Block-1 Base  : 0 KB
Non-Cacheable Block-2 Size  : Disabled
Non-Cacheable Block-2 Base  : 0 KB
Cacheable RAM Address Renge : 64 KB
Video BIOS Ares Cacheable   : Yes

ESC: Exit              (Ctrl) Pu/Pd: Modify      F1: Help      F2/F3: Color
F5: Old Values         F6: BIOS Setup Defaults   F7: Power-On Defaults
```

27

```
AMIBIOS SETUP PROGRAM-WARNING INFORMATION
(C) 1992 American Megatrends Inc., All Rights Reserved

Improper Use of Setup may Casuse Problemsll

If System Hangs, Reboot System and Enter Setup by Pressing the <DEL> key

            Do any of the following After Entering Setup
              (i)   Alter Options to make System Work
              (ii)  Load BIOS Setup Defaults
              (iii) Load Power-on Defaults

        Hit "ESC" to Stop now, Any other Key to Continue
```

* THE SETUP OPERATION 486DX-33/486DX2-66/ OVERDRIVE-33/486SX-33MHz CPU SYSTEM M/B

```
AMIBIOS SETUP PROGRAM—ADVANCED CHIPSET SETUP
(C)1992 American Megatrends Inc., All Rights Reserved

Hidden Refresh              : Enabled--→ Note: If Non-Cache Then Set Disabled
486 AT BUS Clock Sleection  : CLKI/4   |
Non-Cache Read Wait State   : Disabled- -→ Note: If Non-Cache Then Set Enabled
Non-Cache Write Wait State  : Disabled--→ Note: If Non-Cache Then Set Enabled
Cache Read Wait State       : 3-1-1-1
Non-Cacheable Block-1 Size  : Disabled
Non-Cacheable Block-1 Base  : 0 KB
Non-Cacheable Block-2 Size  : Disabled
Non-Cacheable Block-2 Base  : 0 KB
Cacheable RAM Address Renge: 64 KB
Video BIOS Ares Cacheable   : Yes


ESC: Exit            (Ctrl) Pu/Pd: Modify      F1: Help      F2/F3: Color
F5: Old Values       F6: BIOS Setup Defaults   F7: Power-On Defaults
```

```
AMIBIOS SETUP PROGRAM—WARNING INFORMATION
(C) 1992 American Megatrends Inc., All Rights Reserved

Improper Use of Setup may Cause Problems!!

If System Hangs, Reboot System and Enter Setup by Pressing the <DEL> key

Do any of the following After Entering Setup
   (i)   Alter Options to make System Work
   (ii)  Load BIOS Setup Defaults
   (iii) Load Power-on Defaults

Hit "ESC" to Stop now, Any other Key to Continue
```

● THE SETUP FOR OPERATION 486DX2-50/OVER-DRIVE-25/486SX-25MHz CPU SYSTEM

```
AMIBIOS SETUP PROGRAM—ADVANCED CHIPSET SETUP
(C) 1992 American Megatrends Inc., All Rights Reserved

Hidden Refresh              : Enabled── →Not: If Non-Cache Then Set Disabled
486 AT BUS Clock Selection  : CLKI/3         |
Non-Cache Read Wait State   : Disabled─ └→Note: If Non-Cache Then Set Enabled
Non-Cache Write Wait State  : Disabled── →Note: If Non-Cache Then Set Enabled
Cache Read Wait State       : 3-1-1-1
Non-Cacheable Block-1 Size  : Disabled
Non-Cacheable Block-1 Base  : 0 KB
Non-Cacheable Block-2 Size  : Disabled
Non-Cacheable Block-2 Base  : 0 KB
Cacheable RAM Address Renge : 64 MB
Video BIOS Ares Cacheable   : Yes


ESC: Exit              (Ctrl) Pu/Pd: Modify      F1: Help    F2/F3: Color
F5: Old Values         F6: BIOS Setup Defaults   F7: Power-ON Defaults
```

29

```
┌─────────────────────────────────────────────────────────────┐
│      AMIBIOS SETUP PROGRAM—WARNING INFORMATION                │
│      (C) 1992 American Megatrends Inc., All Rights Reserved   │
├─────────────────────────────────────────────────────────────┤
│                                                               │
│        Improper Use of Setup may Cause Problems!!             │
│                                                               │
│ If System Hangs, Reboot System and Enter Setup by Pressing    │
│                                 the <DEL> key                 │
│                                                               │
│        Do any of the following After Entering Setup           │
│            (i)   Alter Options to make System Work            │
│            (ii)  Load BIOS Setup Defaults                     │
│            (iii) Load Power-on Defaults                       │
│                                                               │
│        Hit "ESC" to Stop now, Any other Key to Continue       │
│                                                               │
└─────────────────────────────────────────────────────────────┘
```

* THE SETUP FOR OPERATION Cyrix 486DLC-33/ 486DLC- 40MHz 386DX-33/386DX-40MHz CPU SYSTEM M/B

```
┌─────────────────────────────────────────────────────────────┐
│      AMIBIOS SETUP PROGRAM—ADVANCED CHIPSET SETUP             │
│      (C) 1992 American Megatrends Inc., All Rights Reserved   │
├─────────────────────────────────────────────────────────────┤
│ Hidden Refresh               : Enabled                        │
│ 486 AT BUS Clock Selection   : CLKI/6                          │
│ Non-Cache Read Wait State    : Disabled                       │
│ Non-Cache Write Wait State   : Disabled                       │
│ Cache Read Wait State        : 2-1-1-1                         │
│ Non-Cacheable Block-1 Size   : Disabled                       │
│ Non-Cacheable Block-1 Base   : 0 KB                           │
│ Non-Cacheable Block-2 Size   : Disabled                       │
│ Non-Cacheable Block-2 Base   : 0 KB                           │
│ Cacheable RAM Address Renge: 64 MB                            │
│ Video BIOS Ares Cacheable    : Yes                            │
│                                                               │
├─────────────────────────────────────────────────────────────┤
│ ESC: Exit         (Ctrl) Pu/Pd: Modify    F1: Help  F2/F3: Color │
│ F5: Old Values    F6: BIOS Setup Defaults F7: Power-ON Defaults │
└─────────────────────────────────────────────────────────────┘
```

Select this option and press "ENTER" key after CMOS setup is done to activate the changes. User is prompted "Write to CMOS and EXIT(Y/N)? "N". Press "Y" to save the changes and System reboot. Press "N" to go back to the setup program.

```
┌─────────────────────────────────────────────────────────────┐
│       AMIBIOS SETUP PROGRAM—AMI BIOS SETUP UTILITIES         │
│       (C) 1992 American Megatrends Inc., All Rights Reserved │
├─────────────────────────────────────────────────────────────┤
│                  STANDARD CMOS SETUP                         │
│                  ADVANCED CMOS SETUP                         │
│                  ADVANCED CHIPSET SETUP                      │
│            AUTO CONFIGURATION WITH BIOS DEFAULTS             │
│          AUTO CONFIGURATION WITH POWER-ON DEFAULTS           │
│                   CHANGE PASSWORD                            │
│                   HARD DISK UTILITY                          │
│             ┌─────────────────────────────┐                 │
│             │   WRITE TO CMOS AND EXIT     │                 │
│             └─────────────────────────────┘                 │
│              DO NOT WRITE TO CMOS AND EXIT                   │
│                                                             │
│         ┌────────────────────────────────────┐              │
│         │ Write the settings to the CMOS and Exit │         │
│         └────────────────────────────────────┘              │
├─────────────────────────────────────────────────────────────┤
│    ESC: EXIT ↓→↑ : Sel   F2/F3: Color   F10: Save & Exit    │
└─────────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────┐
│       AMIBIOS SETUP PROGRAM—AMI BIOS SETUP UTILITIES         │
│       (C) 1992 American Megatrends Inc., All Rights Reserved │
├─────────────────────────────────────────────────────────────┤
│                  STANDARD CMOS SETUP                         │
│                  ADVANCED CMOS SETUP                         │
│                  ADVANCED CHIPSET SETUP                      │
│            AUTO CONFIGURATION WITH BIOS DEFAULTS             │
│          AUTO CONFIGURATION WITH POWER-ON DEFAULTS           │
│                                                             │
│             ┌─────────────────────────────┐                 │
│             │  Write to CMOS and Exit (Y/N)? Y │             │
│             └─────────────────────────────┘                 │
├─────────────────────────────────────────────────────────────┤
│         ┌────────────────────────────────────┐              │
│         │ Write the settings to the CMOS and Exit │         │
│         └────────────────────────────────────┘              │
├─────────────────────────────────────────────────────────────┤
│    ESC: EXIT ↓→↑ : Sel   F2/F3: Color   F10: Save & Exit    │
└─────────────────────────────────────────────────────────────┘
```

31

ALTERNATIVE SYSTEM SPEED

SOFTWARE SWITCH:

FOR AMI BIOS:

After booting the system. Press "CTRL" + "ALT" + "+" at the same time to select low-speed, Press "CTRL" + "ALT" + "−" at the same time to select high-speed.

Please review the following configuration:

CPU SPEED	KEYBOARD	CPU SPEED
NORMAL	"CTRL" + "ALT" + "+"	TURBO
CPU SPEED		CPU SPEED
TURBO	"CTRL" + "ALT" + "−"	NORMAL

NOTE: IF YOU WANT TO CHANGE CPU SPEED BY KEYBOARD, MUST PRESS TURBO SWITCH IN HIGH SPEED (SWI IS OPEN) !!

SHADOW RAM

For efficient execution of BIOS, it is prefer able to execute BIOS code through RAM rather than through slower EPROMs. The OPTI-495SX provides the shadow RAM feature which if enabled allows the BIOS code to be executed from address like BIOS EPROM. The software should transfer code stored in the BIOS EPROMs to the system RAM, before enabling the shadow RAM feature. This feature significantly improves the performance of BIOS-call intensive applications. Performance improvements as high as 300 to 400% have been observed in benchmark tests on the shadow RAM. The shadow RAM feature is invoked by enabling the corresponding bits in the ROM enable register and the RAM mapping register.

When the Shadow RAM feature is being utilized, then the RAM is mapped as shown in Figure 1, overlapping or Shadowing the EPROM area. In both cases, for accesses beyond the 1 Mbyte address range, the processor is switched from real to protected mode from BIOS.

- FIGURE 1 RAM MAPPING WITH SHADOW RAM (MORE THAN 1MB OF RAM)

- **FIGURE 1 RAM MAPPING WITH SHADOW RAM (MORE THAN 1MB OF RAM)**

SYSTEM		MAPPING	ADDRESS
4MB	→ ←	RAM	3FFFFFFH
3MB			300000H
	→ ←	RAM	2FFFFFH
2MB			200000H
	→ ←	RAM	1FFFFFH
		ROM	
1MB			100000H
		SHADOW RAM	0FFFFFH
640KB			010000H
	→ ←	RAM	09FFFFH
0KB			000000H

APPENDIX

NOTICE : PLEASE REMEMBER YOUR PASSWORD OF
SETTED CHARACTERS! IF KEY IN ERROR
PASSWORD THE SYSTEM CAN'T BOOT ON
ANY MORE!!

```
AMIBIOS SETUP PROGRAM—AMI BIOS SETUP UTILITIES
(C) 1992 American Megatrends Inc., All Rights Reserved

            STANDARD CMOS SETUP
            ADVANCED CMOS SETUP
            ADVANCED CHIPSET SETUP
    AUTO CONFIGURATION WITH BIOS DEFAULTS
 AUTO CONFIGURATION WITH POWER-ON DEFAULTS
            | CHANGE PASSWORD |
            HARD DISK UTILITY
         WRITE TO CMOS AND EXIT
      DO NOT WRITE TO CMOS AND EXIT

    | Change the User Password Stored in the CMOS |

  ESC: EXIT ↓→↑: Sel   F2/F3: Color   F10: Save & Exit
```

- (1) PLEASE KEY IN DEFAULT PASSWORD DEFAULT
  IS "AMI" (FIRST TIME)
  (2) IF YOU HAVE SET OWN PASSWORD ALREADY,
  KEY IN YOUR PASSWORD..........

```
AMIBIOS SETUP PROGRAM—CHANGE PASSWORD
(C) 1992 American Megatrends Inc., All Rights Reserved

       | Enter CURRENT Password: AMI |

    USE Maximum 6 ASCII Characters, ESC : Exit
```

35

■ IF YOU WANT TO CHANGE NEW PASSWORD GO TO NEXT SETUP!

```
┌──────────────────────────────────────────────────────────┐
│        AMIBIOS SETUP PROGRAM—CHANGE PASSWORD              │
│   (C) 1992 American Megatrends Inc., All Rights Reserved  │
├──────────────────────────────────────────────────────────┤
│                                                          │
│              ┌──────────────────────┐                    │
│              │ Enter NEW Password :  │                    │
│              └──────────────────────┘                    │
│                                                          │
├──────────────────────────────────────────────────────────┤
│       USE Maximum 6 ASCII Characters, ESC : Exit         │
└──────────────────────────────────────────────────────────┘
```

```
┌──────────────────────────────────────────────────────────┐
│        AMIBIOS SETUP PROGRAM—CHANGE PASSWORD             │
│   (C) 1992 American Megatrends Inc., All Rights Reserved  │
├──────────────────────────────────────────────────────────┤
│                                                          │
│              ┌──────────────────────┐                    │
│              │ Re-Enter NEW Password:│                    │
│              └──────────────────────┘                    │
│                                                          │
├──────────────────────────────────────────────────────────┤
│       USE Maximum 6 ASCII Characters, ESC : Exit         │
└──────────────────────────────────────────────────────────┘
```

■ NEXT SCREEN OF MEANING IS YOU HAVE FINISH-ED PASSWORD SETTINGS! PRESS "ENTER" TO FINAL!

```
┌──────────────────────────────────────────────────────────┐
│        AMIBIOS SETUP PROGRAM—CHANGE PASSWORD             │
│   (C) 1992 American Megatrends Inc., All Rights Reserved  │
├──────────────────────────────────────────────────────────┤
│                                                          │
│              ┌──────────────────────┐                    │
│              │ NEW Password Installed:│                   │
│              └──────────────────────┘                    │
│                                                          │
├──────────────────────────────────────────────────────────┤
│       USE Maximum 6 ASCII Characters, ESC : Exit         │
└──────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────────────┐
│           AMIBIOS SETUP PROGRAM—AMI BIOS SETUP UTILITIES              │
│           (C) 1992 American Megatrends Inc., All Rights Reserved      │
├─────────────────────────────────────────────────────────────────────┤
│                     STANDARD CMOS SETUP                               │
│                     ADVANCED CMOS SETUP                               │
│                     ADVANCED CHIPSET SETUP                            │
│              AUTO CONFIGURATION WITH BIOS DEFAULTS                    │
│            AUTO CONFIGURATION WITH POWER-ON DEFAULTS                  │
│                     CHANGE PASSWORD                                   │
│                   ┌─────────────────────┐                            │
│                   │ HARD DISK UTILITY   │                            │
│                   └─────────────────────┘                            │
│                 WRITE TO CMOS AND EXIT                                │
│               DO NOT WRITE TO CMOS AND EXIT                           │
├─────────────────────────────────────────────────────────────────────┤
│ ┌───────────────────────────────────────────────────────────────────┐│
│ │Format the Hard Disk, Auto interleave Detection and Media Analysis ││
│ └───────────────────────────────────────────────────────────────────┘│
├─────────────────────────────────────────────────────────────────────┤
│      ESC: EXIT  ↓→↑ : Sel   F2/F3: Color   F10: Save & Exit           │
└─────────────────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────────────┐
│            AMIBIOS SETUP PROGRAM—HARD DISK UTILITY                    │
│            (C) 1992 American Megatrends Inc., All Rights Reserved     │
├─────────────────────────────────────────────────────────────────────┤
│                          Cyln Head WPcom LZone Sect Size(MB)         │
│ Hard Disk C: Type  : 33   1024 5    1023  1024  17   43              │
│ Hard Disk D: Type  : Not Installed                                   │
│ Ha                                                                   │
│ ┌───────────────────────────────────────────────────────────────────┐│
│ │Hard Disk Type can be changed from the STANDARD CMOS SETUP option in││
│ │Main Menu                                                          ││
│ └───────────────────────────────────────────────────────────────────┘│
├─────────────────────────────────────────────────────────────────────┤
│                      ┌─────────────────┐                            │
│                      │ Hard Disk Format│                            │
│                      └─────────────────┘                            │
│                        Auto Interleave                               │
│                        Media Analysis                                │
├─────────────────────────────────────────────────────────────────────┤
│      ESC: EXIT  ↓→↑ : Sel   F2/F3: Color   F10: Save & Exit           │
└─────────────────────────────────────────────────────────────────────┘
```

37

```
┌────────────────────────────────────────────────────────────────────┐
│          AMIBIOS SETUP PROGRAM—HARD DISK UTILITY                     │
│       (C) 1992 American Megatrends Inc., All Rights Reserved         │
├────────────────────────────────────────────────────────────────────┤
│                           Cyln  Head  WPcom  LZone Sect Size(MB)     │
│  Hard Disk C: Type  : 33   1024   5    1024    1024  17   43         │
│  Hard Disk D: Type  : Not Installed                                  │
│                                                                      │
│                                                                      │
│     ┌──────────────────────────────────┐                            │
│     │      Hard Disk Format            │                            │
│     ├──────────────────────────────────┤                            │
│     │  Disk Drive (C/D)        ?C       │                            │
│     │  Disk Drive Type         ?33      │                            │
│     │  Interleave (1-16)       ?1       │                            │
│     │  Mark Bad Tracks (Y/N) ?N         │                            │
│     │  Proceed (Y/N)           ?Y       │                            │
│     └──────────────────────────────────┘                            │
│                                                                      │
├────────────────────────────────────────────────────────────────────┤
│    ESC: EXIT  ↓ → ↑ : Sel   F2/F3: Color   F10: Save & Exit          │
└────────────────────────────────────────────────────────────────────┘
```

VESA Local Bus 3/486 Cache Motherboard JUMPER SETTING QUICK Reference:
(80386DX & 486DLC CPU JUMPER SETTING)

Cache RAM

Jumper	256K	128K
JP10	2-3	1-2
JP11	close	close
JP13	close	close
JP15	close	open

Jumper	PGA 386DX-33	PQFP 386DX-40	PGA 386DX-40	PGA 486DX33-2/66	PGA Cyrix/TLDLC-33	PGA Cyrix DLC-40
JP01	2-3	2-3	2-3	2-3	2-3	2-3
JP02	open	open	open	open	open	open
JP03	close	open	open	open	close	open
JP04	open	open	open	open	open	open
JP05	2-3	2-3	2-3	1-2	2-3	2-3
JP06	open	open	open	open	close	close
JP07	open	open	open	open	close	close
JP12	open	open	open	close	open	open
JP17	close	close	close	close	close	close
JP18	close	open	close	close	close	close
JP19	open	open	open	open	open	open
JP21	open	open	open	open	open	open
JP22	open	close	close	open	open	close
JP23	1-2	1-2	1-2	1-2	1-2	1-2
JP24	open	open	open	open	open	open
JP25	2-3	2-3	2-3	2-3	2-3	2-3
JP26	open	open	open	open	open	open
JP27	1-2	1-2	1-2	1-2	1-2	1-2
JP28	open	open	open	open	open	open
JP29	close	open	open	close	close	open
JP30	close	close	close	open	close	close
JP33	1-2	1-2	1-2	2-3	1-2	1-2
JP34	open	open	open	close	open	open
JP35	1-2	1-2	1-2	1-2	1-2	1-2
JP36	close	close	close	close	close	close
JP37	1-2	1-2	1-2	1-2	1-2	1-2

CMOS Setup

Load BIOS defualt first (AUTO CONFIGURATION WITH BIOS DEFAULT)
Then change the following settings in CMOS

486 AT Bus Clock Selection	CLKI/4	CLKI/5	CLKI/5	CLKI/4	CLKI/4	CLKI/5
Cache Read Wait State	2-1-1-1	2-1-1-1	2-1-1-1	3-1-1-1	2-1-1-1	2-1-1-1
External Cache Memory	Enable	Enable	Enable	Enable	Enable	Enable
Internal Cache Memory	Disable	Disable	Disable	Enable	Enable	Enable

Note:
JP17 close = disable 486PQFP
JP18 close = disable 386PQFP

39

VESA Local Bus 3/486 Cache Motherboard JUMPER SETTING QUICK Reference
(486DX/SX CPU JUMPER SETTING)

Cache RAM

Jumper	256K	128K
JP10	2-3	1-2
JP11	close	close
JP13	close	close
JP15	close	open

Jumper	PGA 486DX-2/50	PGA 486DX-50	PGA 486SX-33	PQFP 486SX-33	PGA 486SX-25	PQFP 486SX-25
JP01	2-3	2-3	2-3	2-3	2-3	2-3
JP02	open	open	open	open	open	open
JP03	open	open	open	open	open	open
JP04	open	open	open	open	open	open
JP05	1-2	1-2	1-2	1-2	1-2	1-2
JP06	open	open	open	open	open	open
JP07	open	open	open	open	open	open
JP12	close	close	close	close	close	close
JP17	close	close	close	open	close	open
JP18	close	close	close	close	close	close
JP19	open	open	open	open	open	open
JP21	open	open	open	open	open	open
JP22	open	close	open	open	open	open
JP23	1-2	1-2	1-2	1-2	1-2	1-2
JP24	open	open	open	open	open	open
JP25	2-3	1-2	2-3	2-3	2-3	2-3
JP26	open	open	open	open	open	open
JP27	1-2	1-2	1-2	1-2	1-2	1-2
JP28	close	close	open	open	close	close
JP29	open	open	close	close	open	open
JP30	open	open	open	open	open	open
JP33	2-3	1-2	2-3	2-3	2-3	2-3
JP34	close	close	close	close	close	close
JP35	1-2	1-2	open	open	open	open
JP36	close	close	open	close	open	close
JP37	1-2	1-2	2-3	2-3	2-3	2-3

CMOS Setup

Load BIOS default first (AUTO CONFIGURATION WITH BIOS DEFAULT)
Then change the following settings in CMOS

486 AT Bus Clock Selection	CLKI/3	CLKI/6	CLKI/4	CLKI/4	CLKI/3	CLKI/3
Cache Read Wait State	3-1-1-1	3-1-1-1	3-1-1-1	3-1-1-1	3-1-1-1	3-1-1-1
External Cache Memory	Enable	Enable	Enable	Enable	Enable	Enable
Internal Cache Memory	Enable	Enable	Enable	Enable	Enable	Enable

Note:
JP17 close = disable 486PQFP
JP18 close = disable 386PQFP

40