**GMB-486SG
High Performance
486
VLB Motherboard
User's Manual**

For
GMB-486sg v2

Manual Edition 6.03

This guide contains instructions for configuring and installing the mainboard.

- • Chapter 1, **Introduction**, acquaints user with the special features of the mainboard.
- • Chapter 2, **Hardware Configuration**, gives information on configuring memory and setting the mainboard's jumpers. Brief sections on installing memory.
- • Chapter 3, **Mainboard Installation**, is an overview of how to install the mainboard in a system.
- • Chapter 4, **BIOS Setup**, provides the BIOS information for system configuration.
- • Chapter 5, **BIOS POST Messages**, provides references for all POST error messages.
- • Chapter 6, **BIOS Default Drive Table**, provides a Default Drive Disk table contained in Setup.

WARNING

For the system to operate normally please make sure JP16 of the mainboard is set as below. Refer to Fig 2 in this manual for the location JP16.

JP16

If JP16 is open, no CMOS data can be retained.

UNPACKING THE MAINBOARD

The Mainboard comes packed in a sturdy cardboard shipping carton. The carton contains:

•   The Mainboard

•   This User's Guide

Note: Do not remove the mainboard from its original packing until ready to install.

The mainboard is easily damaged by static electricity. Observe the following precautions while unpacking and installing the mainboard.

1.   Touch an unpainted area of the system chassis before handling the mainboard or any component. Doing so, discharges the static charge the user's body may have built.

2.   Remove the mainboard from its anti-static wrapping and place it on a grounded surface, component side up.

3.   Inspect the mainboard for damage. Shipping may have loosened integrated circuits from their sockets. If any integrated circuit appears loose, press carefully to seat it firmly in this socket.

Do not apply power if the mainboard appears damaged. If there is damage to the board, or items are missing, contact dealer immediately.

CONTENTS

CHAPTER 1   INTRODUCTION

The mainboard is a 2/3 body AT size high-performance mainboard that provides with basic elements on which to build an advanced computer. The mainboard running from 25MHz to 133MHz, supports Normal 486 CPUs, Intel's SL-Enhanced 486, Cyrix Cx486S/DX/DX2, UMC U5SX-486, P24D/P24T; and optionally support P24C(486DX4), Am486DX2/DX4(3.45V), Enhanced Am486DX2/DX4 (3.45V), Cx486DX2-V66/V80, Cyrix DX4-100, Cx5x86-100, TI DX2-80, IBM486-4V3100GC/GIC and AMD-X5-133ADW CPUs.

1.1   KEY FEATURES

The advanced features of the mainboard include:

• Supports Intel's SL Enhanced 80486DX2/DX/SX,
  Cyrix's Cx486S/DX/DX2, UMC U5SX-486, normal 486, P24D/P24T;
  and optionally support P24C(486DX4), Am486DX2/DX4(3.45V),
  Enhanced Am486DX2/DX4 (3.45V), Cx486DX2-V66/V80, Cyrix
  DX4-100, Cx5x86-100, TI DX2-80, IBM 486-4V3100GC/GIC and
  AMD-X5-133ADW CPUs.

• Supports Cache Write back CPU (P24T/P24D/Cx486S/DX/DX2/DX2V),
  and Enhanced Am486DX2/DX4, Cyrix DX4/5x86, IBM 486 and
  AMD-X5 CPUs.

• 100% IBM PC-AT compatible, single chips 486 solution.

• Provides power saving features to allow a system, through the control of
  BIOS, to reduce the CPU clock frequency down to 0MHz
  (STOP CLOCK) when the system is idle.

• Supports Power Management Mode
  - Supports the SMM and the SMI
  - CPU Stop Clock Function
  - Long and Short System Timers
  - Supports the APM control

  - Supports Break Switch control
  - Power Saving also on non-SMI CPU
  - More System Event Monitoring and the Power saving Control

• Direct Mapped Cache Controller
  - Write-Back or Write-Through Schemes
  - Bank Interleave or Non-Interleave Cache
  - Flexible Cache Size: 128/256/512KB

• Memory size from 1MB to 128MB, possible using combinations of
  1M, 2M, 4M, 8M, 16M, 32M, or 64M 72-pin SIMM modules in
  four memory banks.

• Easy upgrade the system, just change CPU, or and alter jumper only.

• System & video Bios Shadow, optional caching of shadowed system &
  video BIOS.

- Hidden DRAM refresh support.

- Support KB control Turbo/Deturbo mode select.

- Support 7 Direct Memory Access channels and 16 Interrupt levels.

- Three 16-bit I/O slots, one 8-bit I/O slots, and three Standard VESA
  Local Bus master slot.

- Battery backup for CMOS configuration and real time clock/calendar.

- 8MHz AT Bus clock & speed changeable by hardware or keyboard, CPU
  clock adjustable by jumper.

- 2/3 Baby AT board size = 220mm(W) X 250mm(L).

1.2   MAINBOARD COMPONENTS

This section gives a brief description of key components on the mainboard. Refer to Fig 1 for component locations.
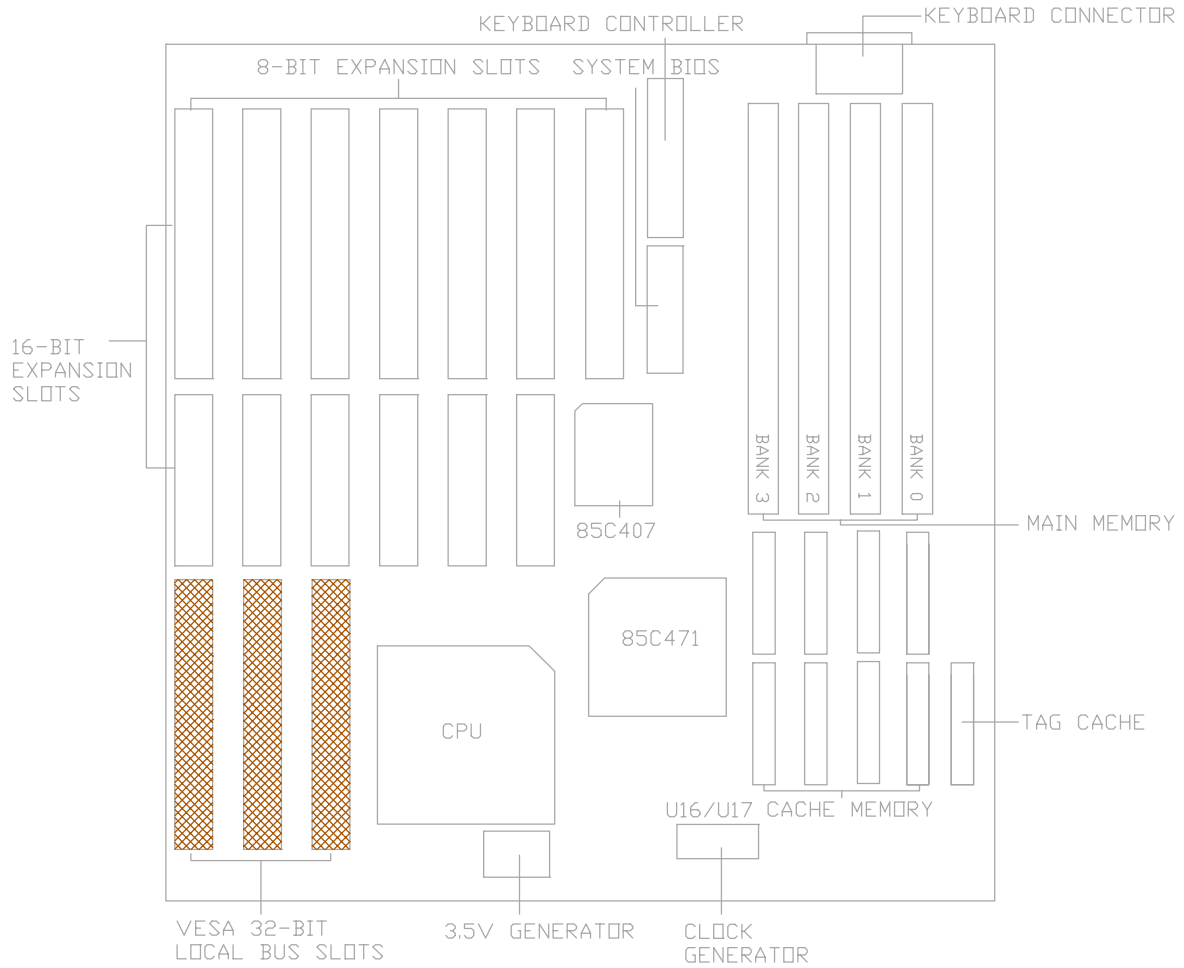
Fig 1 Key Components of the Mainboard

1.3 VESA LOCAL BUS SPECIAL FEATURES

• Three-bus master are supported on the VESA Local-Bus. The VESA Local-Bus connector type is a standard 32-bit Micro Channel type connector, and is located inline with a system I/O bus connector.

• Three slots are provided on the mainboard. Either with one master or three master slots.

• The VESA Local-Bus can support high speed video controllers, and other peripherals, such as hard disk controllers, LAN adapters, and so on.

• Interface protocol depends on the CPU speed, but protocol selection and switching is invisible to all add-in boards, software, and end users. The VESA Local-Bus always remains totally transparent to all application software.

• 32-bits optimum data bus width

CHAPTER 2 HARDWARE CONFIGURATION

This chapter describes how to set the mainboard jumpers for cache memory and display type, and how to install memory modules.

Before beginning the configuration, user should take the following precautions:

- Turn off the power supply, and unplug the power cord before begin.
- Unplug all cables that connect the mainboard to any external devices.

2.1 JUMPER AND MEMORY BANK LOCATIONS
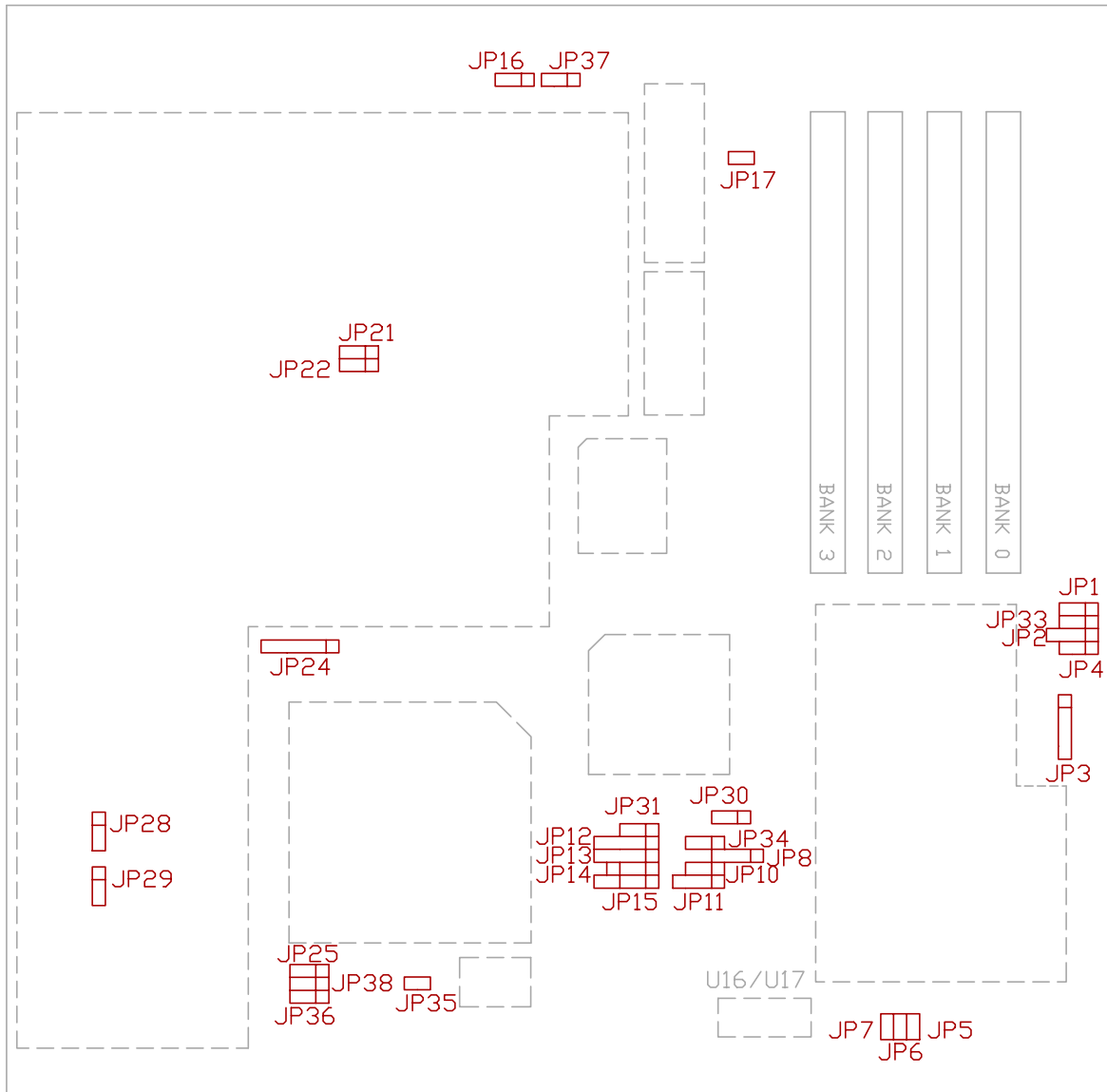
Fig 2 Jumper and Memory Bank Locations

2.2 JP8, JP10-JP15, JP21, JP22, JP24, JP25, JP30, JP31, JP34-JP36, JP38 - CPU TYPE CONFIGURATION

The mainboard can support processor at different speed. Various jumpers are required to setup for installing different CPU. Refer to Fig 2 for the jumpers' location, and set the jumper according to the following table:

JP8, JP10-JP15, JP21, JP22, JP24, JP25, JP30, JP31, JP34-JP36, JP38
--CPU Type Configuration
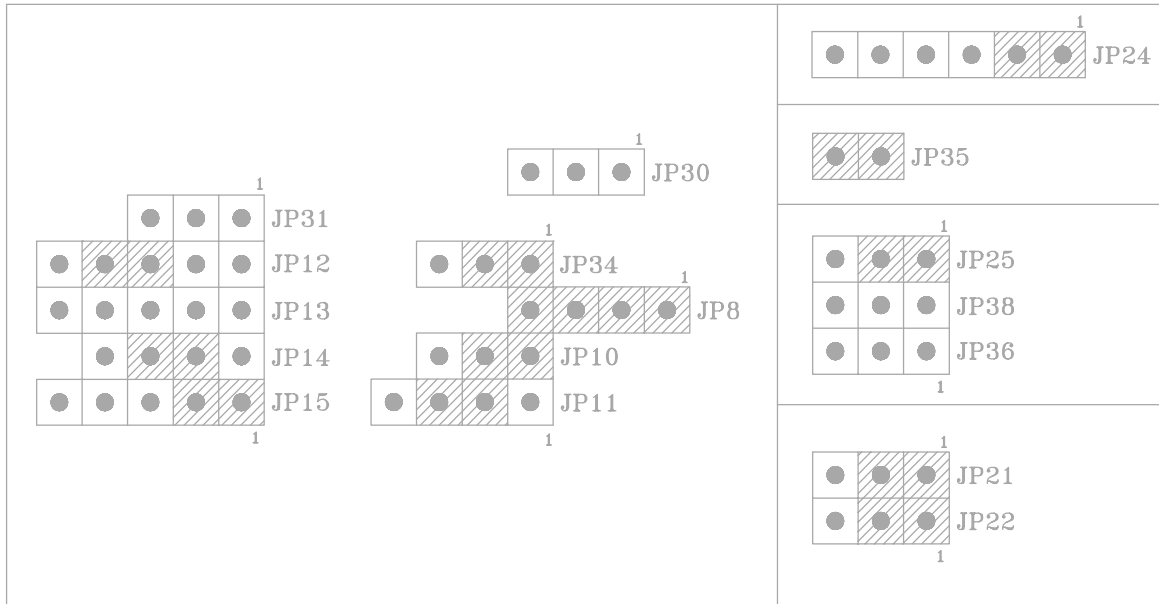
Table 1A: CPU Type: - P24T
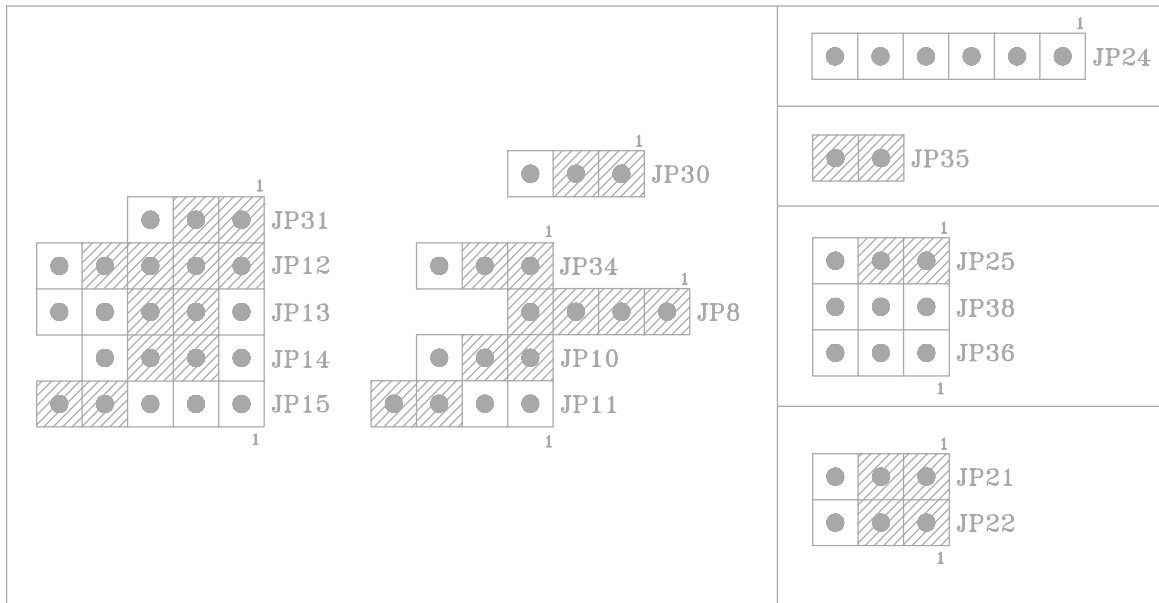
Table 1B: CPU Type: - P24D (DX2)
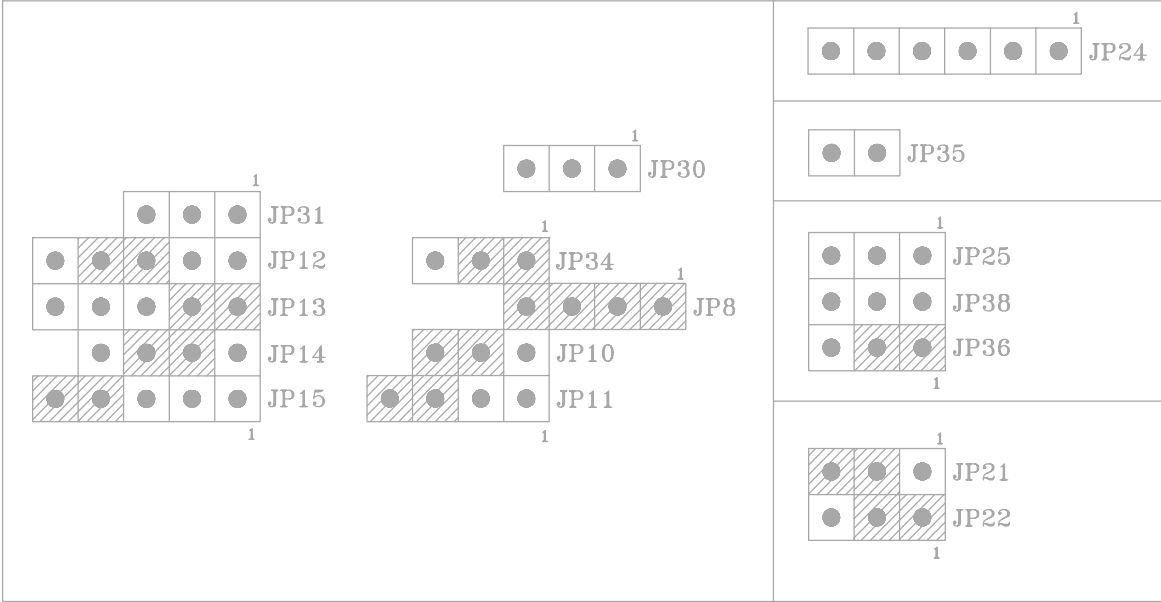
Table 1C: CPU Type: - P24C (DX4) (OPTIONAL)
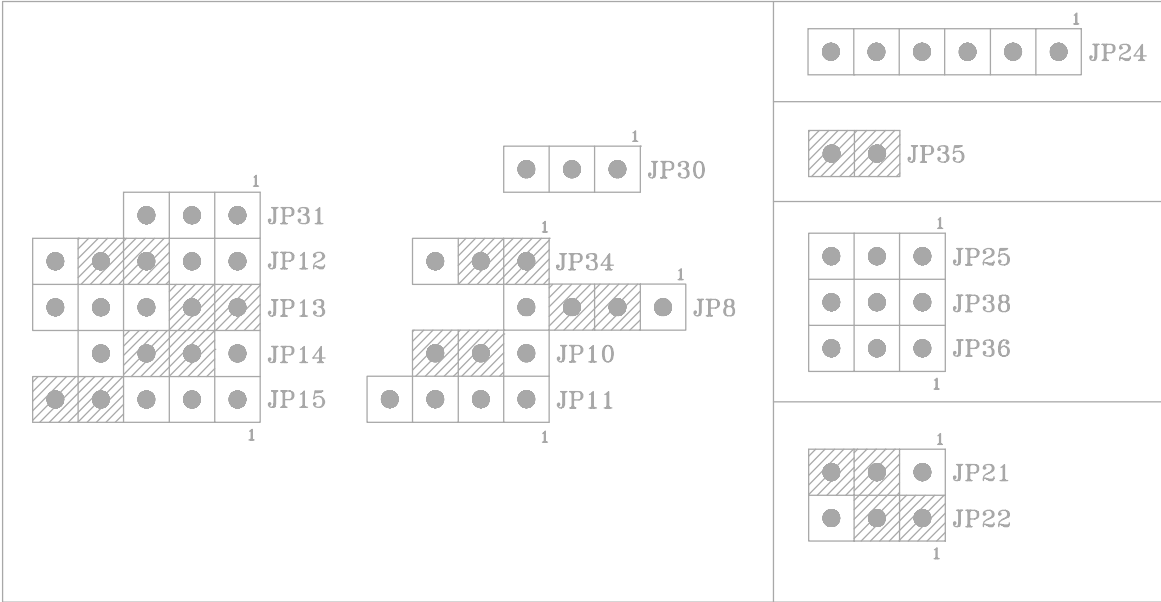
Table 1D: CPU Type: - 486SX/SLE 486SX
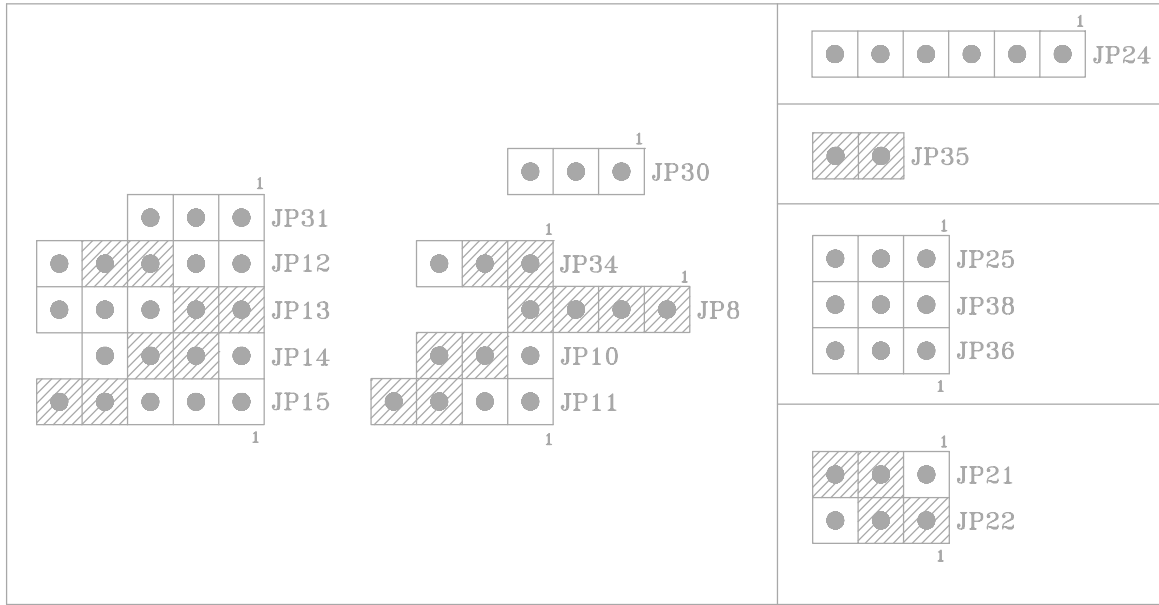
Table 1E: CPU Type: - 486DX/DX2, SLE 486DX/DX2
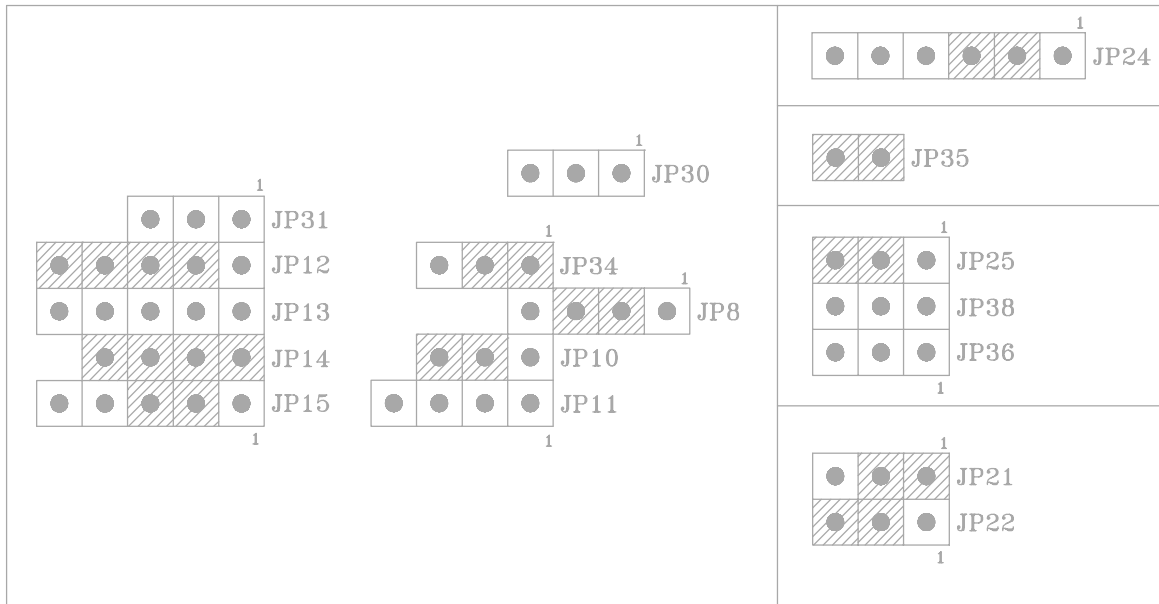
Table 1F: CPU Type: - Cyrix 486S
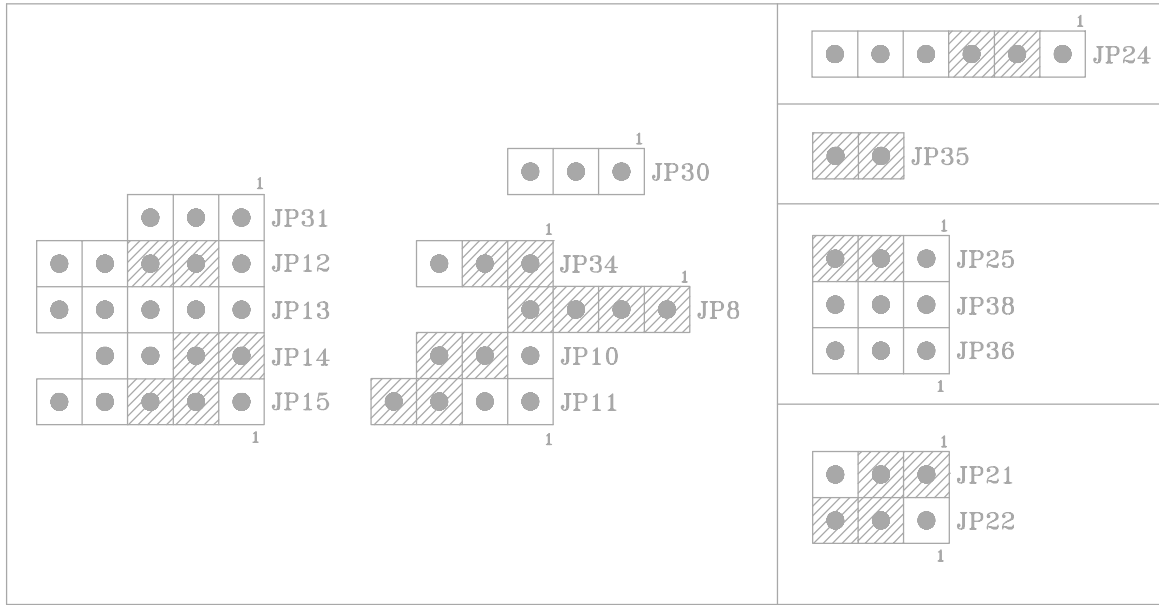
Table 1G: CPU Type: - Cyrix 486DX/DX2
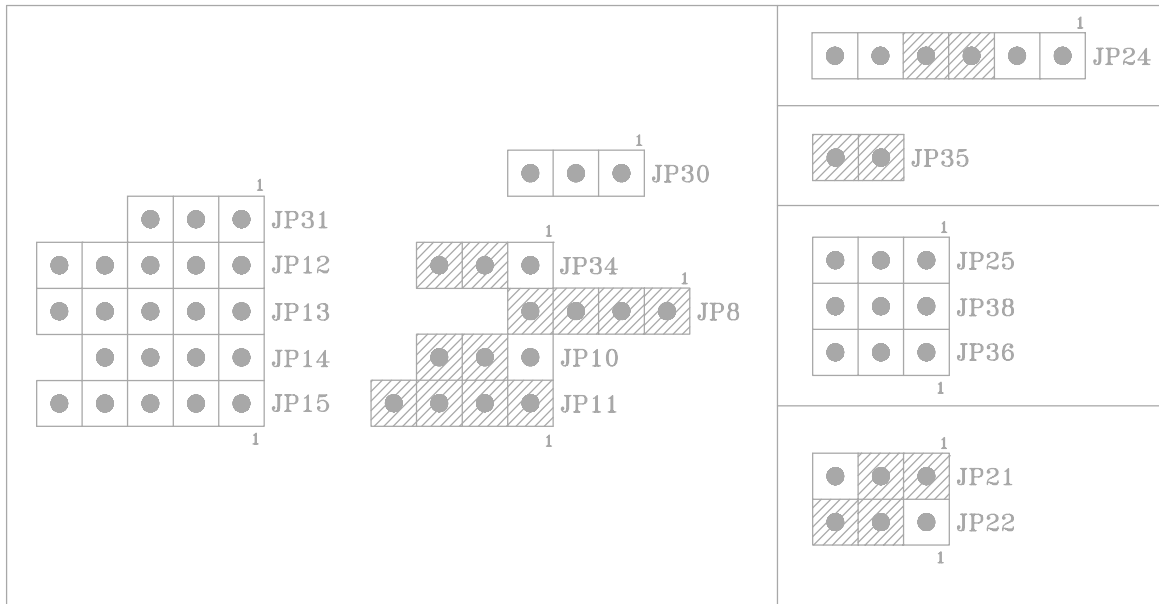
Table 1H: CPU Type: - UMC U5SX-486
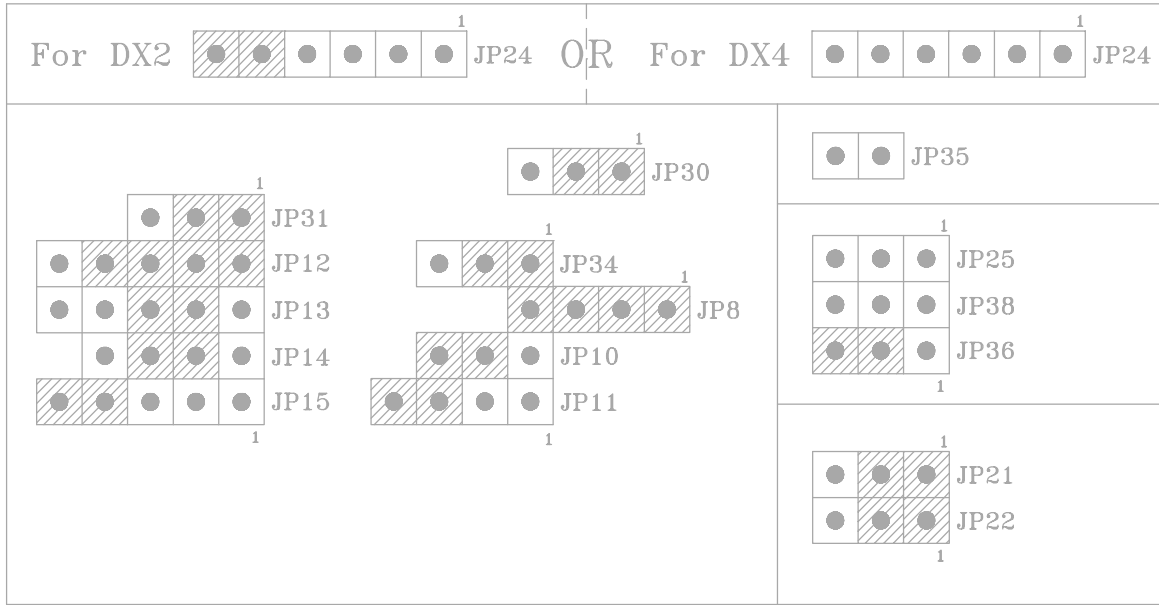
Table 1I: CPU Type: - Enhanced Am486DX2/DX4 (3.45V)
(A80486DX2-XXSV8B/A80486DX4-1XXSV8B)

For DX4-100 CPU Frequency: 33MHz
For DX4-120 CPU Frequency: 40MHz
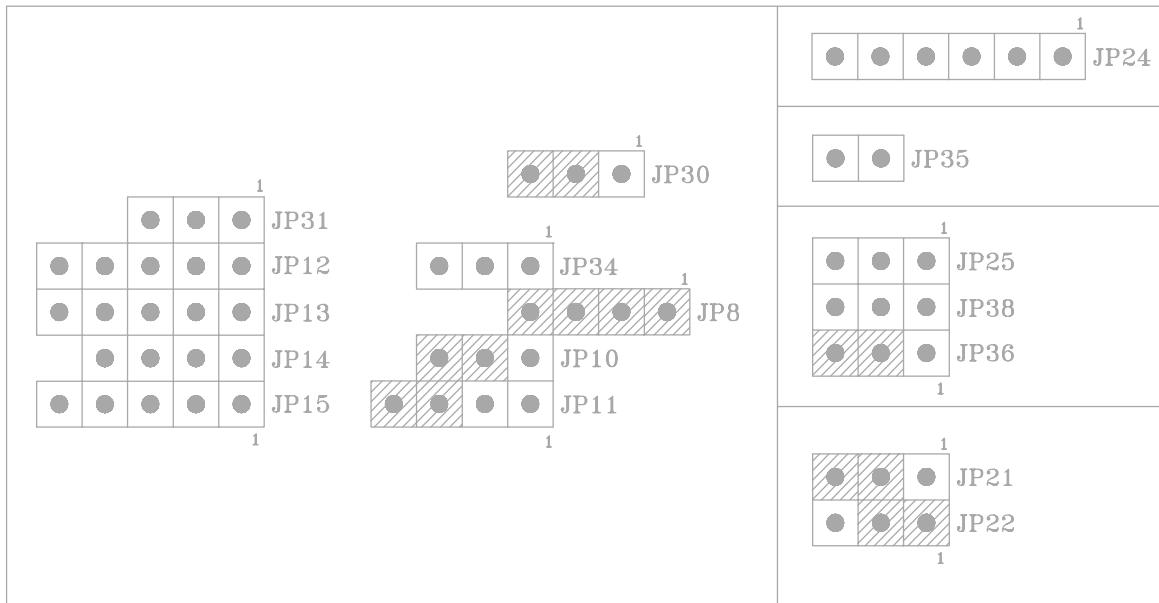
Table 1J: CPU Type: - Am486DX2 (3.45V) (Optional)
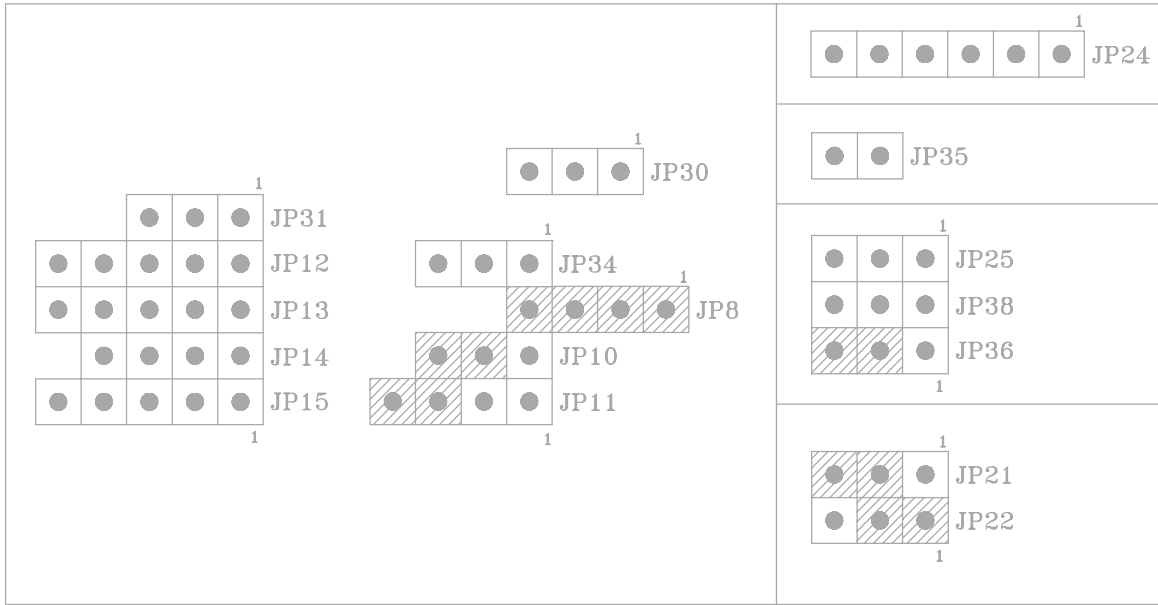
Table 1K: CPU Type: - Am486DX4 (3.45V) (Optional)
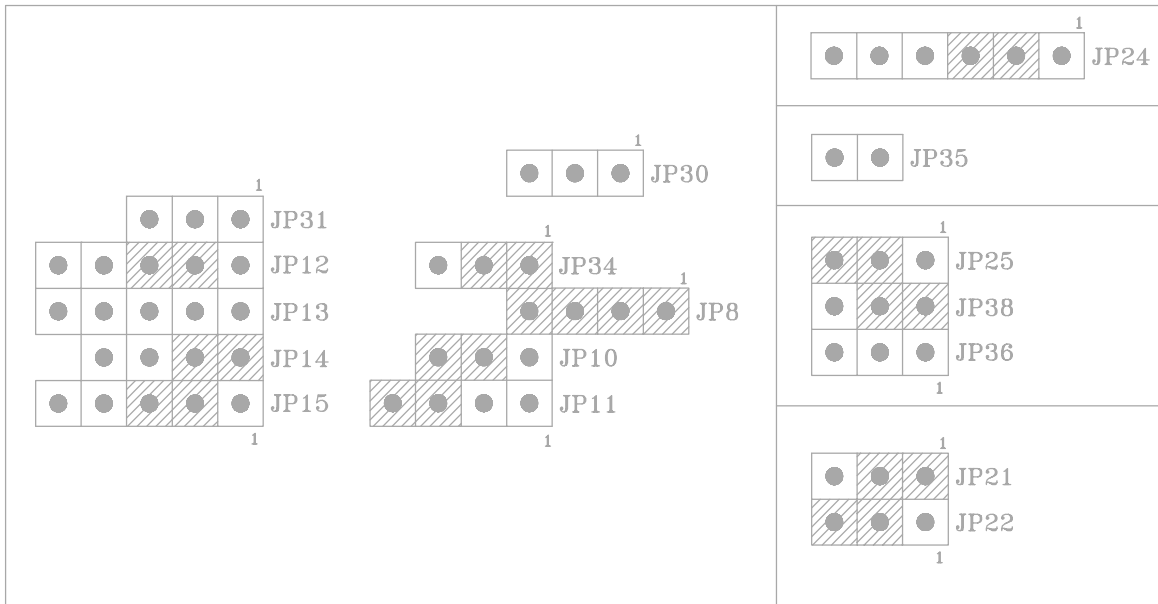
Table 1L: CPU Type: - Cx486DX2-V66 (3.6V) (Optional)
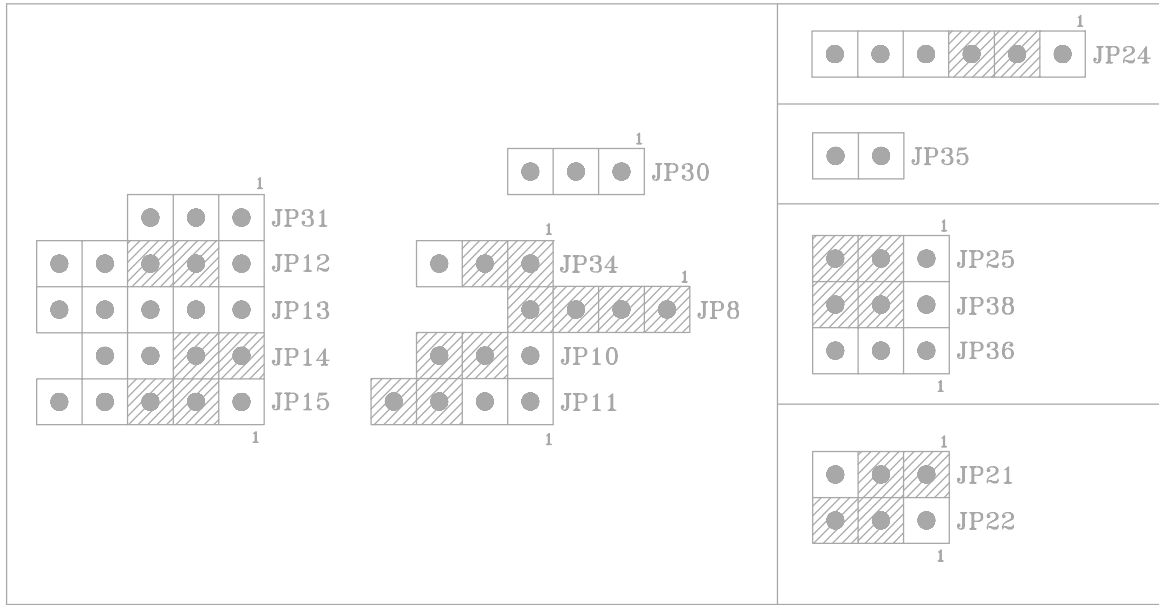
Table 1M: CPU Type: - Cx486DX2-V80 (4.0V) (Optional)
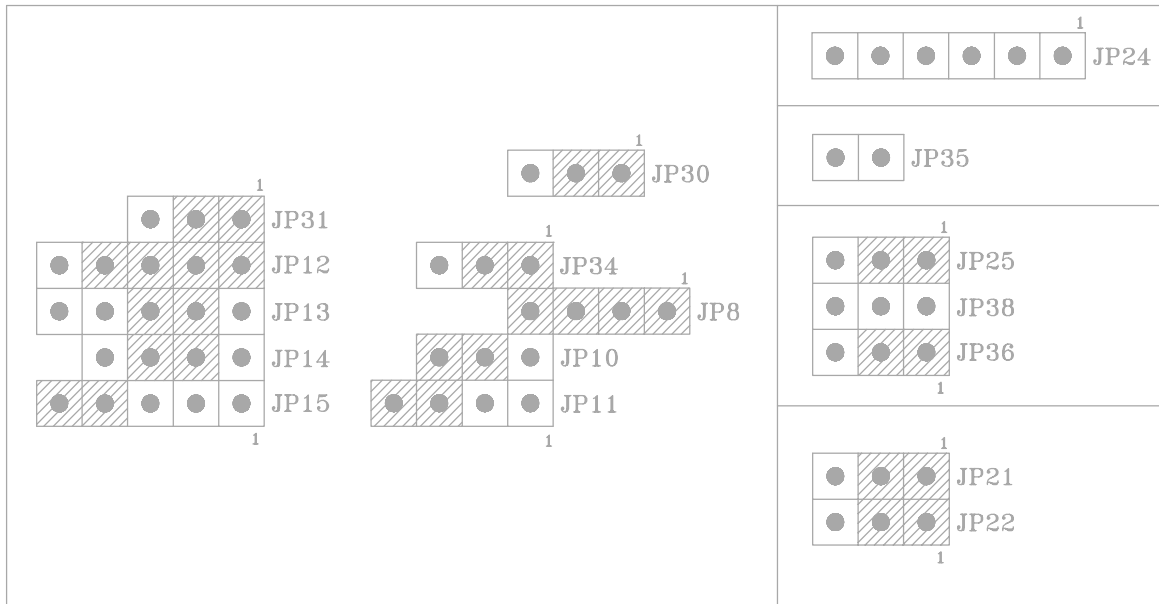
Table 1N: CPU Type: - Cx5x86/IBM 486-4V3100GIC (3.3V)
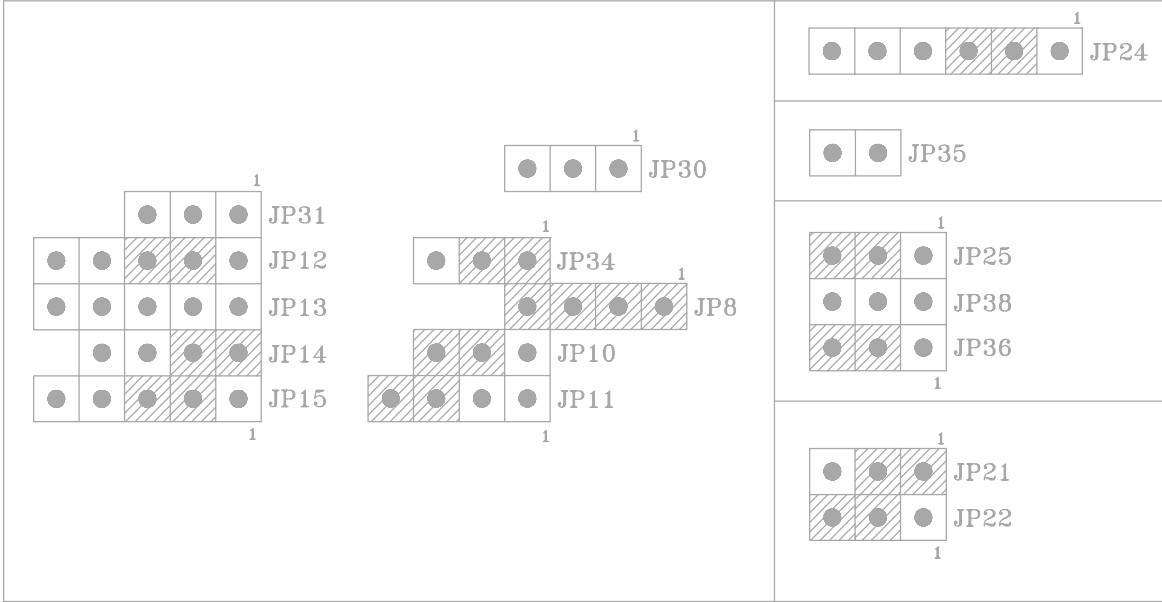
Table 1O: CPU Type: - Cx486DX4-100/TI486DX2-80/
IBM 486-4V3100GC (3.45V)
(Cyrix Cx486DX4-100GP)
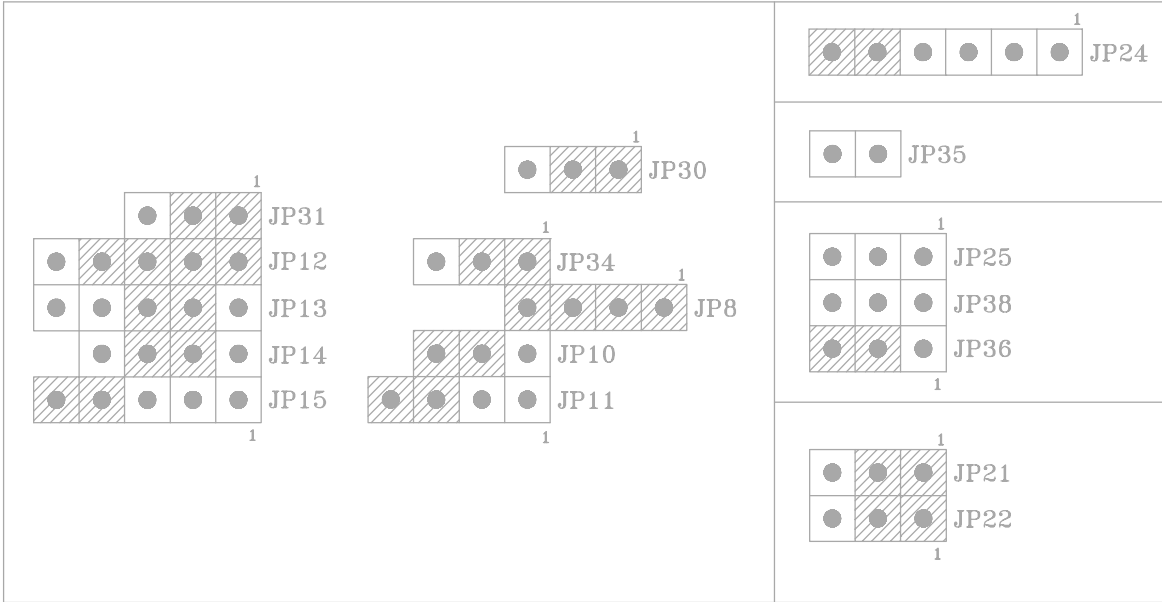
Table 1P: CPU Type: - Am5x86™-P75 (3.45)(Optional)
(AMD-X5-133ADW)
For 133MHz CPU, CPU Frequency: 33MHz
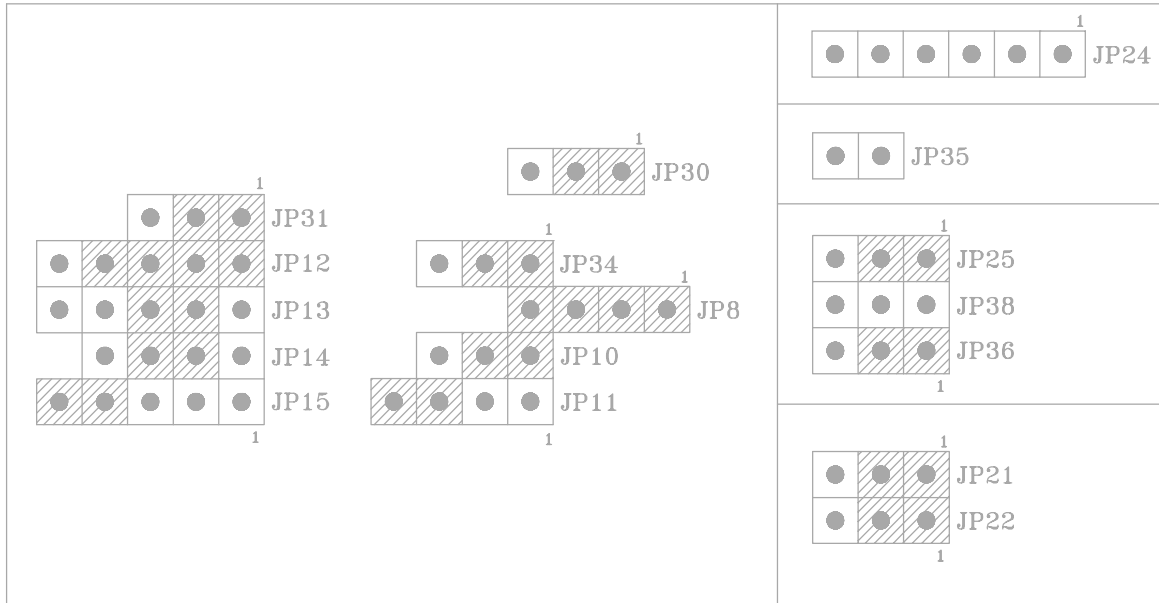
Table 1Q: CPU Type: - P24D (DX4)

2.3   CPU INSTALLATION

The mainboard has a socket that can support 486 CPU. See Fig 1 in Chapter 1 for the socket's location.

Install the 486 CPU as follows:
Caution: Static electricity can damage the processor.
1.   Plug the 486 CPU into the socket, with the notch corner aligned.
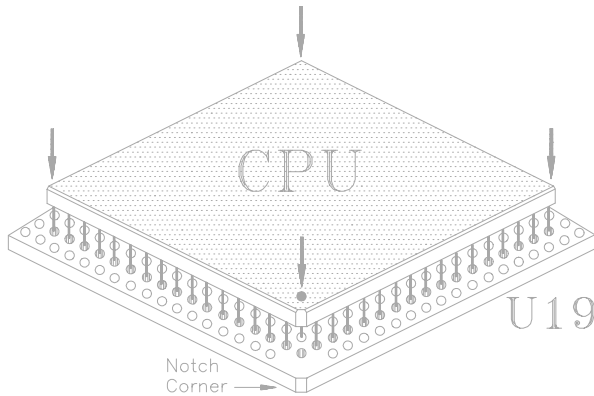
Fig 3 Installing a CPU

2.   Change the CPU type jumper setting according to the CPU Jumper Setting table on the previous pages.

2.4   CACHE CONFIGURATION

The special feature of the mainboard is a built-in direct-mapped cache controller with optional write-back or write-through operation that supports 128KB, 256KB or 512KB cache memory.

The mainboard has a built-in cache controller. It requires external SRAM as tag and cache memory. The caching Scheme is direct mapping with selectable write-back or write-through operation. The mainboard allows 128KB, 256KB, and 512KB cache configurations. Memory size is selected by the hardware jumpers and the BIOS setup program.

2.4.1   UPGRADING CACHE

The mainboard is available with an optional 128KB, 256KB or 512KB cache memory on-board. User can upgrade cache memory by installing additional SRAM (Static Random Access Memory) chips in sockets U1, U2, U3, U4, U5, U6, U7, U8; U11.

The speed of the SRAM chips needed depends on the clock speed of the microprocessor:

25MHz clock requires **25ns (tag)** and **25ns (data)** SRAM chips.
33MHz, 40MHz, or 50MHz clock CPU requires **20ns (tag)** and **20ns (data)** SRAM chips.

2.4.2   CACHE SIZE AND MEMORY LOCATIONS
The table below describes the chip capacity and socket location required for each cache size configuration. User can use 32Kx8-bit or 128Kx8-bit SRAM chips in banks 0 and 1, and in the Tag RAM socket. Please note that; do not combine different chip capacities in banks 0 and 1.

	BANK 0				BANK 1				TAG RAM
Cache Size	U1	U2	U3	U4	U5	U6	U7	U8	U11
128K	32Kx8	32Kx8	32Kx8	32Kx8	NONE	NONE	NONE	NONE	8Kx8
256K	32Kx8	32Kx8	32Kx8	32Kx8	32Kx8	32Kx8	32Kx8	32Kx8	16Kx8/ 32Kx8
256K	64Kx8	64Kx8	64Kx8	64Kx8	NONE	NONE	NONE	NONE	16Kx8/ 32Kx8
512K	128Kx8	128Kx8	128Kx8	128Kx8	NONE	NONE	NONE	NONE	32Kx8

Table 2: Cache Size Configuration

2.4.3   CACHE CHIP SOCKETS AND JUMPER LOCATIONS

The diagram below describes the location of the cache chip sockets and cache jumpers.
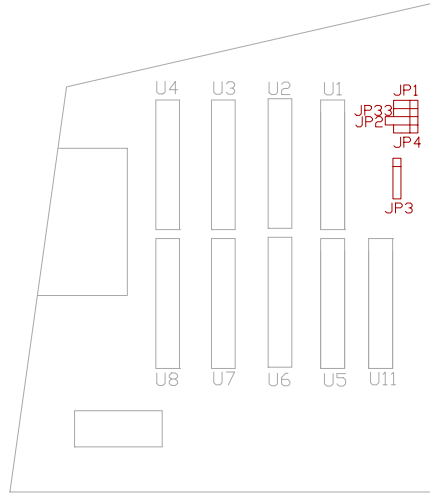
Fig 4 Cache Jumper and Socket Locati

2.4.4　JP1-JP4, JP33 - CACHE & TAG RAM JUMPER SETTING

Cache memory is configured using jumpers, JP1, JP3, & JP33; while Tag RAM setting is configured using jumpers JP2, JP4. The following tables summarize the possible configuration.

JP1, JP3, JP33 -- Cache Jumper Setting
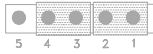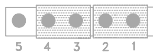
Cache Size	JP1	JP3	JP33
128KB			
256KB (D)			
256KB (S)			
512KB			

Table 3A: Cache Jumper Setting

JP2, JP4 -- Tag RAM Jumper Setting

Cache Size	Tag RAM	JP2	JP4
128KB	8Kx8		
256KB (D,S)	Other 16Kx8		OPEN
256KB (D,S)	32Kx8/ Winbond 16Kx8		
512KB	32Kx8		

Table 3B: Tag RAM Jumper Sett

Note:　D = Double Bank;
　　　　　　S = Single Bank

2.4.5   INSTALLING CACHE CHIPS

Install cache chips on the mainboard as follows:
Caution: Static electricity can damage a cache chip.

1.   Review the section on static electricity precautions at the beginning of this manual, and make sure that power to the mainboard is off.

2.   Align the chip so that the notched corner of the chip matches the notched corner of the socket.

3.   Align the pins with the socket holes.

4.   Carefully press the chip into the socket.
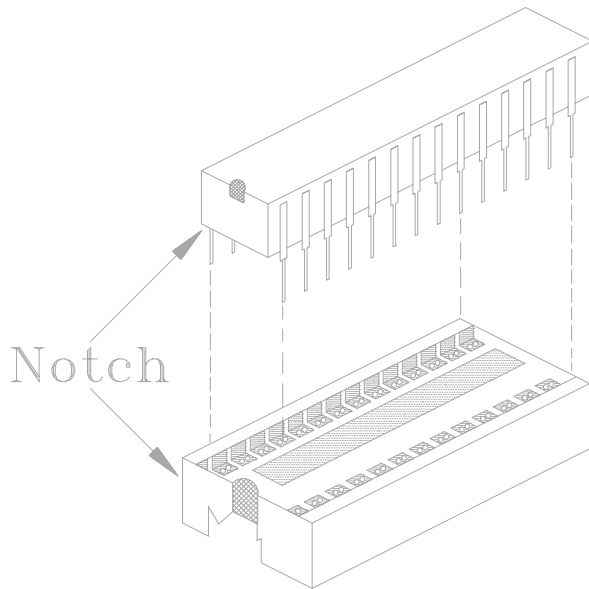
Fig 5 Installing a Cache Chip

2.5   JP28, JP29 - VL-BUS IDENTIFY PINS

Set the jumpers, JP28 & JP29 to configure the VL-Bus Clock Speed. Refer to Fig 2 for their location. Set the jumper as below.

JP28, JP29 -- VL-Bus Clock Speed
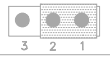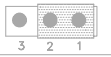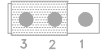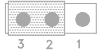
VL-BUS WAIT STATE	JP28	VL-BUS CLOCK SPEED SELECTION	JP29
0 WS	● ● ● 3 2 1	<= 33MHz	● ● ● 3 2 1
1 WS (Default)	● ● ● 3 2 1	> 33MHz (Default)	● ● ● 3 2 1

Table 4

2.6   JP16 - CMOS RAM BATTERY SETTING

Please set JP16 is for CMOS RAM battery as below. Refer to Fig 2 for the location of JP16.

JP16 -- CMOS RAM Battery Setting
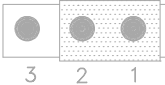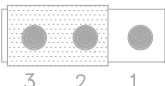
CMOS RAM BATTERY SETTING	JP16
Normal Operation (Default)	● ● ● 3 2 1
Discharge CMOS	● ● ● 3 2 1

Table 5

2.7   JP17 - MONITOR SETTING

Set the jumper, JP17, to configure the mainboard for either CGA, monochrome, OR VGA/EGA display. Refer to Fig 2 for the location of JP17. Set the jumper as below.

JP17 -- Monitor Setting
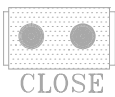
MONITOR SETTING	JP17
EGA Display	● ● CLOSE
Mono, VGA/EGA Display (Default)	● ● OPEN

Table 6

2.8 JP20 - CPU CLOCK DELAY

JP20 is for the CPU Clock Delay setting. Refer to Fig 2 for JP20 location.

JP20 -- CPU Clock Delay
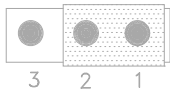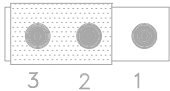
CPU CLOCK DELAY	JP20
CLKIN and CPUCLK same phase	3 2 1
CLKIN delay for CPUCLK (Default)	3 2 1

Table 7

2.9 JP5, JP6, JP7 - CPU FREQUENCY CONFIGURATION

JP5, JP6, & JP7 are for the CPU Frequency Configuration. Two different settings are provided for different Clock Generator that is used at U16 or U17. Refer to Fig 2 for the location of U16/U17 and jumpers.

JP5, JP6, JP7-- CPU Frequency Configuration

AV9107-03/KTS 0147C IS AT U16				MX-8315 IS AT U17			
CLOCK FREQUENCY	JP5	JP6	JP7	CLOCK FREQUENCY	JP5	JP6	JP7
20MHz	CLOSE	OPEN	CLOSE	20MHz	OPEN	OPEN	OPEN
25MHz	CLOSE	CLOSE	OPEN	25MHz	OPEN	CLOSE	OPEN
33MHz	OPEN	CLOSE	CLOSE	33MHz	CLOSE	CLOSE	CLOSE
40MHz	CLOSE	OPEN	OPEN	40MHz	OPEN	CLOSE	CLOSE
50MHz	OPEN	OPEN	CLOSE	50MHz	CLOSE	OPEN	OPEN

Table 8

Note: Winbond W83C17 and UMC U59515-01 are pin to pin compatible to MX-8315 and PhaseLink PLL52C08-01 is pin to pin compatible to AV9107-03.

2.10 JP37 - FLASH ROM JUMPER

JP37 is for Flash ROM selection. Refer to Fig 2 for its location.

JP37 -- Flash ROM Jumpers
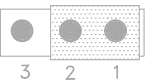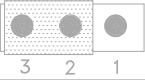
FLASH ROM SELECT	JP37
12V FLASH ROM	● [● ●] 3 2 1
5V FLASH ROM	[● ●] ● 3 2 1
NORMAL EPROM (DEFAULT)	● ● ● OPEN

Table 9

2.11 MEMORY INSTALLATION

Four 72pin SIMM sockets are provided in 4 Banks. User can install 256Kx36, 512Kx36, 1Mx36, 2Mx36, 4Mx36, 8Mx36, or 16Mx36 SIMMs. Note that all SIMM modules in a bank must be same capacity and follow combination showed below. For best performance 70ns SIMMs are required.

BANK 0	BANK 1	BANK 2	BANK 3	MEMORY SIZE
1MB	NONE	NONE	NONE	1MB
1MB	1MB	NONE	NONE	2MB
2MB	NONE	NONE	NONE	2MB
1MB	1MB	2MB	NONE	4MB
2MB	2MB	NONE	NONE	4MB
4MB	NONE	NONE	NONE	4MB
1MB	4MB	NONE	NONE	5MB
1MB	1MB	4MB	NONE	6MB
2MB	4MB	NONE	NONE	6MB
1MB	1MB	2MB	4MB	8MB
2MB	2MB	4MB	NONE	8MB
4MB	4MB	NONE	NONE	8MB
8MB	NONE	NONE	NONE	8MB
1MB	1MB	4MB	4MB	10MB
2MB	2MB	4MB	4MB	12MB
4MB	4MB	4MB	NONE	12MB
TO BE CONTINUED ...				

BANK 0	BANK 1	BANK 2	BANK 3	MEMORY SIZE
4MB	8MB	NONE	NONE	12MB
4MB	4MB	4MB	4MB	16MB
8MB	8MB	NONE	NONE	16MB
16MB	NONE	NONE	NONE	16MB
4MB	4MB	8MB	NONE	16MB
1MB	16MB	NONE	NONE	17MB
1MB	1MB	16MB	NONE	18MB
2MB	16MB	NONE	NONE	18MB
2MB	2MB	16MB	NONE	20MB
4MB	16MB	NONE	NONE	20MB
4MB	8MB	8MB	NONE	20MB
2MB	2MB	4MB	16MB	24MB
4MB	4MB	16MB	NONE	24MB
8MB	8MB	8MB	NONE	24MB
4MB	4MB	8MB	8MB	24MB
8MB	16MB	NONE	NONE	24MB
4MB	8MB	8MB	8MB	28MB
16MB	16MB	NONE	NONE	32MB
32MB	NONE	NONE	NONE	32MB
8MB	8MB	16MB	NONE	32MB
8MB	8MB	8MB	8MB	32MB
TO BE CONTINUED ...				

BANK 0	BANK 1	BANK 2	BANK 3	MEMORY SIZE
2MB	2MB	16MB	16MB	36MB
4MB	16MB	16MB	NONE	36MB
4MB	32MB	NONE	NONE	36MB
4MB	4MB	16MB	16MB	40MB
4MB	4MB	32MB	NONE	40MB
8MB	8MB	8MB	16MB	40MB
16MB	16MB	16MB	NONE	48MB
16MB	32MB	NONE	NONE	48MB
8MB	8MB	16MB	16MB	48MB
8MB	8MB	32MB	NONE	48MB
16MB	16MB	16MB	16MB	64MB
64MB	NONE	NONE	NONE	64MB
16MB	16MB	32MB	NONE	64MB
32MB	32MB	NONE	NONE	64MB
1MB	64MB	NONE	NONE	65MB
4MB	64MB	NONE	NONE	68MB
4MB	32MB	32MB	NONE	68MB
4MB	4MB	64MB	NONE	72MB
4MB	4MB	32MB	32MB	72MB
16MB	64MB	NONE	NONE	80MB
16MB	32MB	32MB	NONE	80MB
8MB	8MB	32MB	32MB	80MB
16MB	16MB	64MB	NONE	96MB
16MB	16MB	32MB	32MB	96MB
32MB	32MB	32MB	NONE	96MB
64MB	64MB	NONE	NONE	128MB
32MB	32MB	32MB	32MB	128MB

Table 10: On-board Memory Configuration

2.11.1 INSTALLING SIMM

Install a SIMM in a memory socket as follows:
Caution: Static electricity can seriously damage SIMM modules.

1.   Review the section on static electricity precautions at the beginning of this manual.

2.   Align the SIMM module so that the pin-1 marking on the module corresponds to the socket pin-1 marking.

3.   Hold the module at a 70-degree angle to the socket, and insert the module's connectors into the socket.

4.   Snap the module to a vertical position in the socket. The module is fully inserted when retaining pegs snap into holes at each end of the module.
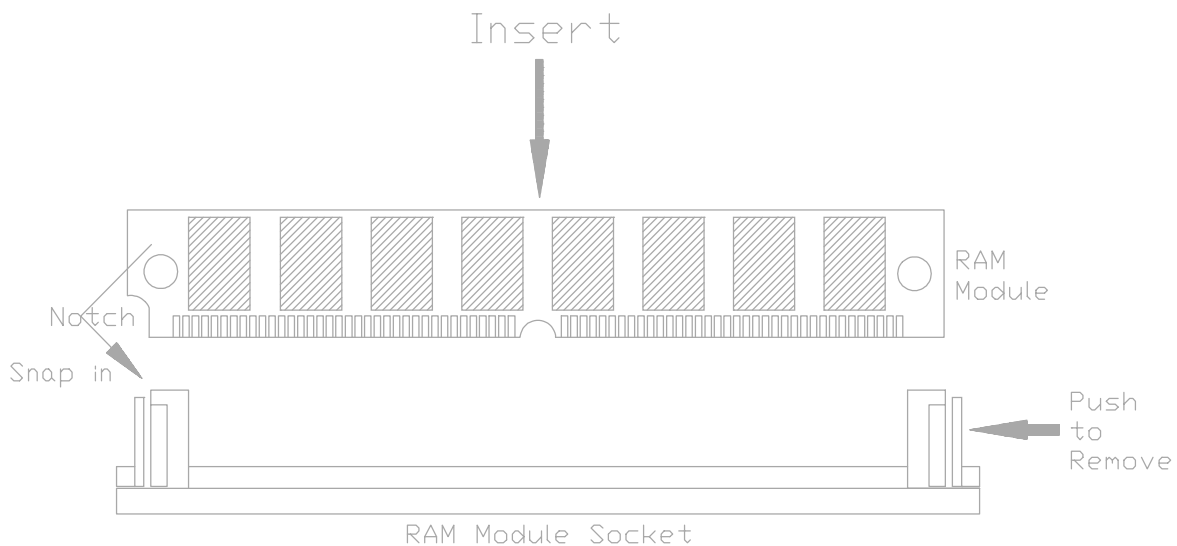
Fig 6 Installing a SIMM

5.   To fill a bank, repeat steps 1 through 4 until the sockets in each bank contain SIMMs.

6.   After installing memory, run BIOS Setup to indicate to the system for how much memory the user has installed.

CHAPTER 3   MAINBOARD INSTALLATION

Once the mainboard's hardware has been configured, the user is now ready to install the mainboard into the system chassis. This chapter describes what are needed to assemble an advanced computer system based on the mainboard.

3.1   COMPONENTS

The following components are recommended:

- Case with standard chassis and hardware. The mainboard fits most AT compatible cases.

- Standard AT power supply.

- 8 ohm speaker.

- Floppy disk drive(s) (360KB, 1.2MB, or 1.44MB).

- Hard disk drive (optional).

- Hard disk and floppy disk drive controller card.

- Flat ribbon cables to connect the disk drive controller and the disk drive(s).

- Serial/parallel interface card.

- AT-compatible keyboard.

- Video card and Display (monochrome, CGA, EGA, or VGA).

3.2   INSTALLING THE MAINBOARD

Before starting, check the location of the mounting holes in the case and on the mainboard.
Caution: Static electricity can damage the mainboard.

Install the mainboard as follows:
1.   Review the section on static electricity precautions at the beginning of this manual.
2.   Place the case on an anti-static mat and remove the cover. Remove the nylon stand-offs and screws for mounting the mainboard.
3.   Put the front of the case to the right and the rear to the left. The mainboard occupies the section of the case nearest the user; the power supply goes on the far side.
4.   Align the mounting holes on the case to the mounting holes on the mainboard. Make sure to access the keyboard connector once the board is installed.
5.   From the bottom of the mainboard, insert stand-offs into the proper holes on the board, and attach the mounting screws to the bottom of the case.
Note: Some cases do not use stand-offs and mounting screws; in this case user can fasten the mainboard into the case with regular screws.
6.   Place the mainboard into the case and fasten the board securely with regular screws.

3.3   CONNECTION THE MAINBOARD

Once the mainboard has been fastened into the system case, the next step is to connect the internal cables. The internal cables are wire leads with plastic female connectors that attach to the connectors. The mainboard connectors have varying numbers of pins and are the points of contact between the mainboard and other parts of the computer.

A description of each connector and its connector pins follows. See Fig 7 for the location of the connectors on the mainboard.
Note: Before making connectors on the board, make sure that power to the system is turned off.

3.3.1　CONNECTIONLOCATIONS
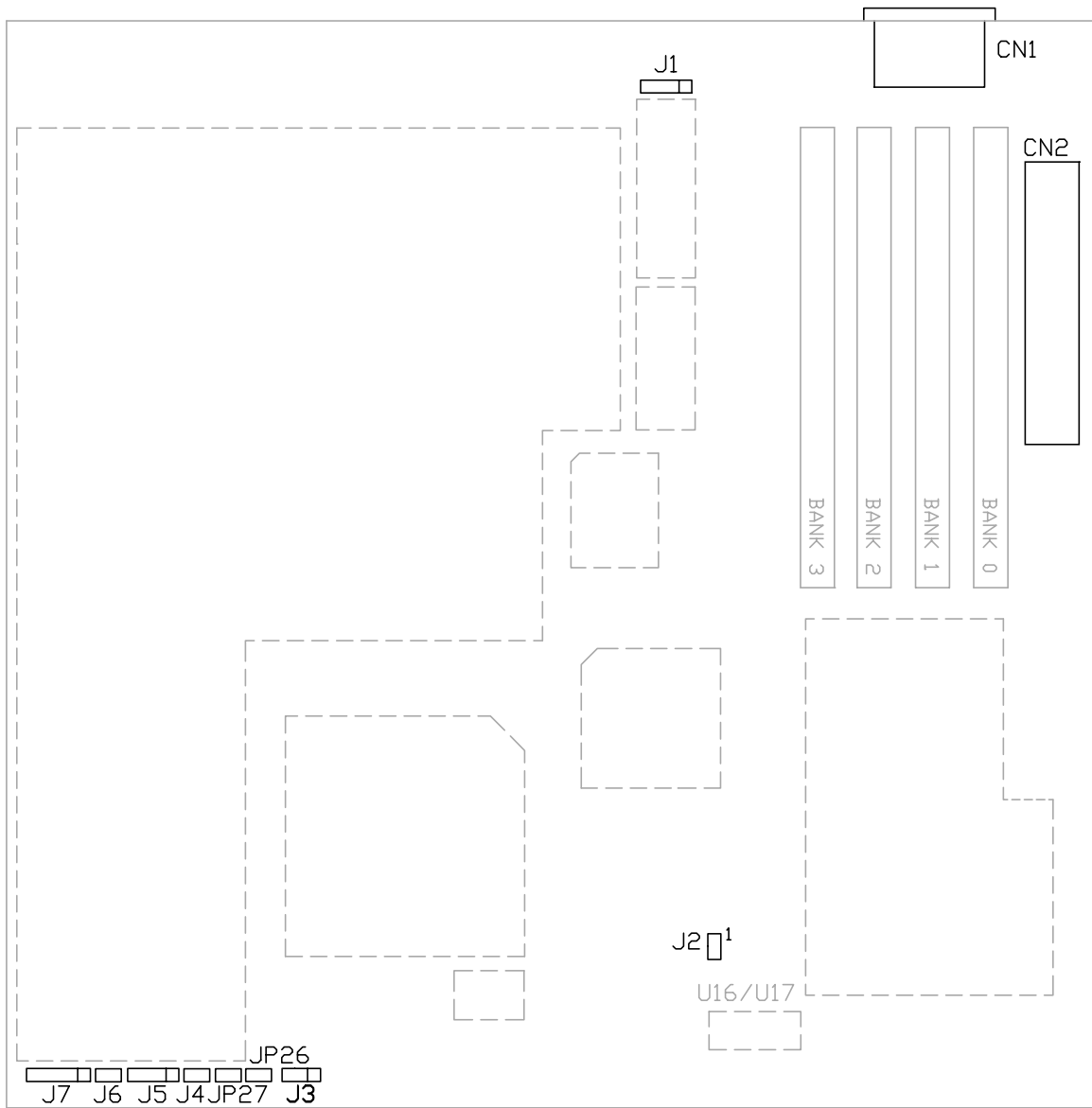
Fig 7 Connector Locations

3.4   CONNECTORS

3.4.1   CN1 - KEYBOARD CONNECTOR

A standard five-pin female DIM keyboard connector is located at the rear of the keyboard. Plug the jack on the keyboard cable into this connector.

Pin	Description
1	Keyboard Clock
2	Keyboard Data
3	Spare
4	Ground
5	+5V DC

Table 11

3.4.2   CN2 - POWER SUPPLY CONNECTOR

The power supply connector has twelve-pin male header connectors. Plug the dual connectors from the power directly onto the board connector.

CN2			
Pin	Description	Pin	Description
1	Power Good	7	Ground
2	+5V DC	8	Ground
3	+12V DC	9	-5V DC
4	-12V DC	10	+5V DC
5	Ground	11	+5V DC
6	Ground	12	+5V DC

Table 12

3.4.3   J1 - EXTERNAL BATTERY

The mainboard has a battery on-board; however, user can also attach an external battery to connector J1. Using an external battery helps to conserve the on-board battery.

Pin	Description
1	VDD (6V)
2	Not Used
3	Ground
4	Ground

Table 13

3.4.4   J2 - GREEN POWER SUPPLY CONNECTOR

Attach the green power supply control connector to J2.

Pin	Description
1	Pull Low on Power Down
2	GND

Table 14

3.4.5   J3 - TURBO SWITCH CONNECTOR

J3 connects to the Turbo switch, which is used to select the mainboard's clock speed.
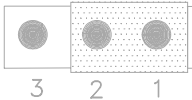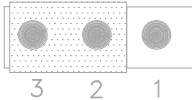
TURBO SWITCH	J3
De—Turbo	⦿ ⦿ ⦿ 3 2 1
Turbo (Default)	⦿ ⦿ ⦿ 3 2 1

Table 15

3.4.6   J4 - TURBO LED CONNECTOR

J4 is usually connected to a Turbo LED on front of the system case. If the system board select is in Turbo mode, the indicator will light during high-speed operation.

Pin	Description
1	- Cathode
2	+ Anode

Table 16

3.4.7   J5 - SPEAKER CONNECTOR

Attached the system speaker to connector J5.

Pin	Description
1	Data Out
2	Not Used
3	Ground
4	+ 5V

Table 17

3.4.8   J6 - RESET SWITCH CONNECTOR

Attach the Reset switch cable to this connector. The Reset switch restarts the system.

Setting	Description
Close	Reset
Open	Normal

Table 18

3.4.9   J7 - KEYLOCK & POWER LED CONNECTOR

J7 is a keylock connector that enables and disables the keyboard and the Power-LED on the case.

Pin	Description
1	LED Power
2	Not Used
3	Ground
4	Keyboard Inhibitor
5	Ground

Table 19

3.4.10 JP26 - GREEN PC BREAK SWITCH

JP26 is for the Green feature activation Break Switch. When JP26 is changed from open to close then open again, the system will go to suspend mode immediately. In suspend mode; if JP26 is changed from open to close then open again, the system will resume immediately.

3.4.11 JP27 - SM_LED CONNECTOR

JP27 is used for Power Management Mode. If the system operate in Power Management Mode, the indicator will turn on during the mode.

Pin	Description
1	+ Anode
2	- Cathode

Table 20

3.5   SYSTEM ASSEMBLY OVERVIEW

After installing and connecting the mainboard, assemble components in the following order:

1.   **Power Supply:** Place the power supply so that it fits the raised tongues on the chassis floor. Insert and fasten the two screws on the back panel of the chassis. Connect the power supply to the power supply connector.

2.   **Disk Drives:** Slide disk drives into the chassis. Connect a wide 34-wire ribbon cable to each disk drive; this cable will attach to an adapter card. The power supply has four cables, each with four wires. Connect these cables to the disk drives.

3.   **Adapter Cards:** Insert each adapter card -- Disk Controller cards, Video card, Serial/Parallel Interface card, etc. -- into an expansion slot. Refer to the installation and configuration instructions that comes with the card. Connect the disk drives to the Floppy Disk and Hard Disk Controller cards.

4.   **Keyboard:** Connect the keyboard to its connector.

5.   **Display:** Connect the display cable to the Video Card, and the display's power cord into a power outlet.

6.   **Case:** Slide on the case cover and fasten its screws.

Connect the power cord to the power supply and plug it into a wall outlet. Put the boot disk into drive A: and turn on the power. User will then need to run the BIOS setup program.

CHAPTER 4 AWARD BIOS SETUP

Award's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed RAM so that it retains the Setup information when the power is turned off.

4.1   ENTERING SETUP

Power on the computer and press <Del> immediately will allow you to enter Setup. The other way to enter Setup is to power on the computer, when the below message appears briefly at the bottom of the screen during the POST (Power On Self Test), press <Del> key or simultaneously press <Ctrl>, <Alt>, and <Esc> keys.

TO ENTER SETUP BEFORE BOOT PRESS CTRL-ALT-ESC OR DEL KEY

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously press <Ctrl>, <Alt>, and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to,

PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP

4.2   CONTROL KEYS

Up arrow: Move to previous item
Down arrow: Move to next item
Left arrow: Move to the item in the left hand
Right arrow: Move to the item in the right hand
Esc key: Main Menu -- Quit and not save changes into CMOS
                    Status Page Setup Menu and Option Page Setup Menu -- Exit current page and
                    return to Main Menu
PgUp key: Increase the numeric value or make changes
PgDn key: Decrease the numeric value or make changes
F1 key: General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key: Change colour from total 16 colors
F3 key: Calendar, only for Status Page Setup Menu
F4 key: Reserved
F5 key: Restore the previous CMOS value from CMOS, only for Option Page Setup Menu
F6 key: Load the default CMOS value from BIOS default table, only for Option Page Setup Menu
F7 key: Load the default
F8 key: Reserved
F9 key: Reserved
F10 key: Save all the CMOS changes, only for Main Menu

4.3   GETTING HELP

Main Menu:
The on-line description of the highlighted setup function is displayed at the bottom of the screen.

Status Page Setup Menu/Option Page Setup Menu:
Press F1 to pop up a small help window that describes the appropriate keys to use and the possible
selections for the highlighted item. To exit the Help window press <Esc>.

4.4   THE MAIN MENU

Once you enter Award BIOS CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from ten setup functions and two exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

ROM ISA BIOS (2C4I9G30)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	PASSWORD SETTING
BIOS FEATURES SETUP	IDE HDD AUTO DETECTION
CHIPSET FEATURES SETUP	SAVE & EXIT SETUP
POWER MANAGEMENT SETUP	EXIT WITHOUT SAVING
LOAD BIOS DEFAULTS	
LOAD SETUP DEFAULTS	

Esc : Quit   ↑ ↓ → ← : Select Item
F10 : Save & Exit Setup   (Shift)F2 : Change Color

{Description}

Fig 8

4.4.1 STANDARD CMOS SETUP MENU

The items on Standard CMOS Setup Menu are divided into 10 categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

```
                    ROM ISA BIOS (2C4I9G30)
                    STANDARD CMOS UTILITY
                    AWARD SOFTWARE, INC.
┌──────────────────────────────────────────────────────────────────────┐
│                                                                        │
│ Date (mm:dd:yy) : Thu, Mar  3 1994                                     │
│  Time (hh:mm:ss) : 11 : 23 : 53                                        │
│                      CYLS. HEADS PRECOMP LANDZONE SECTORS MODE         │
│ Drive C : None ( 0Mb)   0     0      0        0       0    ----        │
│ Drive D : None ( 0Mb)   0     0      0        0       0    ----        │
│                                                                        │
│ Drive A: 1.44M, 3.5in.           ┌──────────────────────────────────┐ │
│ Drive B : None                   │    Base Memory:       640K        │ │
│                                  │  Extended Memory:     3072K       │ │
│                                  │  Expanded Memory:       0K        │ │
│ Video   : EGA/VGA                │    Other Memory:       384K       │ │
│                                  │                                   │ │
│ Halt On : All Errors             │    Total Memory:      4096K       │ │
│                                  └──────────────────────────────────┘ │
│                                                                        │
│ Esc : Quit        ↑↓→← : Select Item    PU/PD/+/- : Modify            │
│ F1  : Help        (Shift)F2 : Change Color                            │
└──────────────────────────────────────────────────────────────────────┘
```

Fig 9

4.4.2   BIOS FEATURES SETUP MENU

```
                    ROM ISA BIOS (2C4I9G30)
                     BIOS FEATURES SETUP
                    AWARD SOFTWARE, INC.
┌──────────────────────────────────────┬────────────────────────────────────┐
│ Virus Warning           : Enabled     │ Video  BIOS Shadow  : Enabled      │
│  CPU Internal Cache     : Enabled     │ C8000-CFFFF Shadow: Disabled       │
│  External Cache         : Enabled     │ D0000-D7FFF Shadow: Disabled       │
│  Quick Power On Self Test : Enabled   │ D8000-DFFFF Shadow: Disabled       │
│  Boot Sequence          : C,A         │ E0000-E7FFF Shadow : Disabled      │
│  Swap Floppy Drive      : Disabled    │ E8000-EFFFF Shadow: Disabled       │
│  Boot Up Floppy Seek    : Disabled    │                                    │
│  Boot Up Numlock Status : On          │                                    │
│  Boot Up System Speed   : High        │                                    │
│  IDE HDD Block Mode     : Disabled    │                                    │
│  Gate A20 Option   : Fast             │                                    │
│  Typematic Rate Setting  : Disabled   │                                    │
│  Typematic Rate (Chars/Sec): 6        │                                    │
│  Typematic Delay (Msec)  : 250        │                                    │
│  Security Option        : Setup       │                                    │
│                                        ├────────────────────────────────────┤
│                                        │ ESC: Quit      ↑↓→ ←: Select Item  │
│                                        │ F1: Help      PU/PD/+/-: Modify    │
│                                        │ F5: Old Values  (Shift)F2: Color   │
│                                        │ F6: Load BIOS Defaults             │
│                                        │ F7: Load Setup Defaults            │
└──────────────────────────────────────┴────────────────────────────────────┘
```

Fig 10

4.4.3 CHIPSET FEATURES SETUP MENU

ROM ISA BIOS (2C4I9G30)
CHIPSET FEATURES SETUP
AWARD SOFTWARE, INC.

```
Auto Configuration  : Enabled          Latch Local Bus     : T3
                                        Local Bus Ready     : Synchronize
 AT Bus Clock        : 1/5CLK
 Hidden Refresh      : Enable

 L2 Cache Scheme     : Write Back
 L1 Cache Scheme     : Write Back
 Cache Burst Read    : 2T
 Cache Write Cycle   : 3T
 System Shadow       : Non-Cacheable
 Video Shadow        : Non-Cacheable

 Fast Reset Emulation: Enable
 Fast Reset Latency  : 2 us
                                        ESC: Quit      ↑↓→←: Select Item
                                        F1: Help       PU/PD/+/-: Modify
                                        F5: Old Values  (Shift)F2: Color
                                        F6: Load BIOS Defaults
                                        F7: Load Setup Defaults
```

Fig 11: Default Setting for Cx486DX 40MHz CPU

Note: 1) the following table shows the settings for different CPU
Support: -

System Clock Freq.	20MHz	25MHz	33MHz	40MHz	50MHz
CPU Internal Clock Freq.	x1	x1/x2/x3	x1/x2/x3	x1/x2	x1
AT Bus Clock	1/3CLK	1/3CLK	1/4CLK	1/5CLK	1/6CLK
Cache Burst Read	1T	1T	2T	2T	2T
Cache Burst Write	2T	2T	2T	3T	3T

2) The option "L1 Cache Scheme" is shown only when the
Cyrix Cx486S/Cx486DX/DX2 CPUs are used.

4.4.4   POWER MANAGEMENT SETUP MENU

ROM ISA BIOS (2C4I9G30)
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.

```
Power Management : Max Saving          IRQ 4 (COM 1)           : Enable
 PM Control by APM          : Yes      IRQ 5 (LPT or LAN)      : Enable
 VGA Adapter Type: Non-Green           IRQ 6 (Floppy Disk)     : Enable
 Video Off Option           : Always On IRQ 7 (LPT or LAN)     : Enable
                                       IRQ 8 (RTC, OS2)  : Disable
         ** PM Timers **               IRQ 9 (Reserved)        : Enable
                                       IRQ 10 (Reserved)   : Enable
 HDD Power Down : Disable              IRQ 11 (Reserved)   : Enable
 System Suspend             : 10 Sec   IRQ 12 (PS2 mouse)      : Enable
                                       IRQ 13 (387)            : Enable
         ** PM Events **               IRQ 14 (Hard Disk) : Enable
 Local Master               : Disable  IRQ 15 (Reserved)   : Enable
 Local Device               : Disable
 Video Activities           : Disable
 DMA Activities             : Enable
 IRQ 1 (Keyboard)   : Enable
 IRQ 3 (COM 2)              : Enable

                                       ESC: Quit    ↑↓→←: Select Item
                                       F1: Help     PU/PD/+/-: Modify
                                       F5: Old Values  (Shift)F2: Color
                                       F6: Load BIOS Defaults
                                       F7: Load Setup Defaults
```

Fig 12A SL Enhanced 486 CPU

```
                    ROM ISA BIOS (2C4I9G30)
                   POWER MANAGEMENT SETUP
                    AWARD SOFTWARE, INC.
┌──────────────────────────────────────────────────────────────────────┐
│ Power Management : Max Saving     │ IRQ 4 (COM 1)          : Enable    │
│  PM Control by APM       : Yes    │ IRQ 5 (LPT or LAN)     : Enable    │
│  VGA Adapter Type: Non-Green      │ IRQ 6 (Floppy Disk)    : Enable    │
│  Video Off Option     : Always On │ IRQ 7 (LPT or LAN)     : Enable    │
│  PM Mode            : Via IRQ12   │ IRQ 8 (RTC, OS2)  : Disable        │
│                                   │ IRQ 9 (Reserved)       : Enable    │
│           ** PM Timers **         │ IRQ 10 (Reserved)  : Enable        │
│                                   │ IRQ 11 (Reserved)  : Enable        │
│  HDD Power Down : Disable         │ IRQ 12 (PS2 mouse)     : Enable    │
│  System Suspend       : 10 Sec    │ IRQ 13 (387)           : Enable    │
│                                   │ IRQ 14 (Hard Disk) : Enable        │
│           ** PM Events **         │                                    │
│  Local Master        : Disable    │                                    │
│  Local Device        : Disable    │                                    │
│  Video Activities    : Disable    │                                    │
│  DMA Activities      : Enable     │                                    │
│  IRQ 1 (Keyboard)  : Enable       │                                    │
│  IRQ 3 (COM 2)       : Enable     │                                    │
│                                   ├────────────────────────────────────┤
│                                   │ ESC: Quit    ↑↓→←: Select Item     │
│                                   │ F1: Help     PU/PD/+/-: Modify     │
│                                   │ F5: Old Values  (Shift)F2: Color   │
│                                   │ F6: Load BIOS Defaults             │
│                                   │ F7: Load Setup Defaults            │
└──────────────────────────────────────────────────────────────────────┘
```

Fig 12B Normal 486 CPU

Note:

1.   If the CPU does not belong to Intel S-series, Enhanced Am486DX or Cx486S/S2/DX/DX2, the system will support IRQ service. When you do not use MS-DOS as the operating system please set "Power Management" to Disable, because IRQ mode only support MS-DOS.

2.   If CPU belongs to Intel S-series, Enhanced Am486DX or Cx486S/S2/DX/DX2, the system will support SMI feature. It can support many operating system, such as MS-DOS, OS/2, Windows NT, etc.

4.4.5   LOAD BIOS DEFAULTS MENU

When you select this function, the following message will appear at the centre of the screen to assist you to load BIOS defaults (except Standard CMOS Setup).

Load BIOS Defaults (Y/N)?

4.4.6   LOAD SETUP DEFAULTS MENU

When you select this function, the following message will appear at the centre of the screen to assist you to load Setup defaults (except Standard CMOS Setup).

Load SETUP Defaults (Y/N)?

4.4.7   PASSWORD SETTING MENU

When you select this function, the following message will appear at the centre of the screen to assist you in creating a password.

ENTER PASSWORD:

Type the password, up to eight characters, and press <enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To disable password, just press <Enter> when you are prompted to enter password. A message will confirm the password being disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED.

If you select System at Security Option of BIOS Features setup Menu; you will be prompted for password every time the system is rebooted or any time you try to enter Setup. If you select setup at Security Option of BIOS Features Setup Menu, you will be prompted only when you try to enter Setup.

4.4.8   IDE HDD AUTO DETECTION MENU
This function will automatically detect the information of the Hard Disk, and list them for your reference.

```
                    ROM ISA BIOS (2C4I9G30)
                     CMOS SETUP UTILITY
                    AWARD SOFTWARE, INC.

            CYLS. HEADS  PRECOMP  LANDZONE SECTORS
Drive C : (   Mb)


            Select Drive C Option (N=Skip) : N

    OPTIONS SIZE CYLS.  HEADS  PRECOMP  LANDZONE  SECTORS  MODE
     1(Y)    81   903     4     65535       902      46    NORMAL



                        ESC : Skip
```
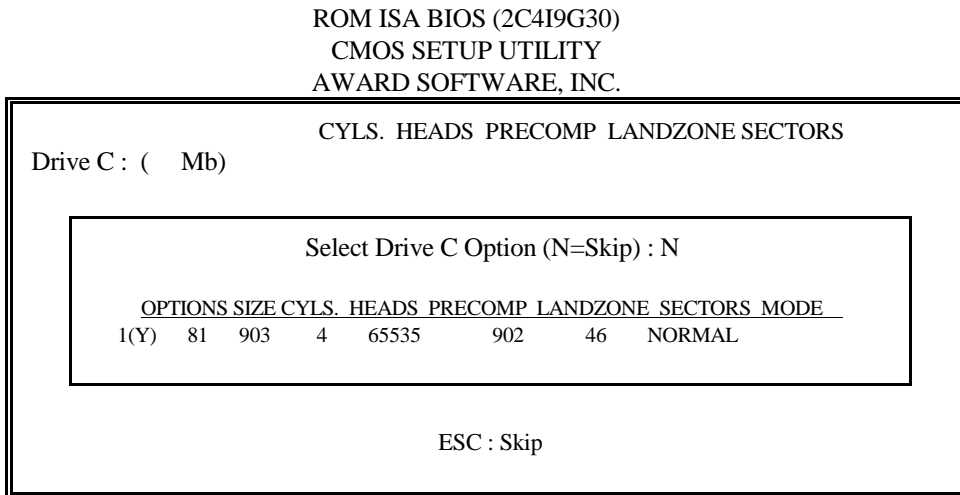
Fig 13

The BIOS support 3 HDD Mode, NORMAL, LBA & LARGE. **NORMAL** mode has the maximum 528MB HDD size; **LBA** (Logical Block Addressing) mode has the maximum 8.4GB HDD size; whereas **LARGE** mode has the maximum 1GB HDD size.

4.4.9   SAVE & EXIT SETUP MENU
When you select this function, the following message will appear at the centre of the screen to assist you to Save data to CMOS and Exit the Setup.
SAVE to CMOS and EXIT (Y/N)?

4.4.10 EXIT WITHOUT SAVING MENU
When you select this function, the following message will appear at the centre of the screen to assist you to Abandon all Data and Exit Setup.
Quit Without Saving (Y/N)?

CHAPTER 5 BIOS POST MESSAGE

When the BIOS encounters an error that requires the user to correct something, either a beep code will sound or a message will be displayed in a box in the middle of the screen and the message **PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP** will be shown in the information box at the bottom.

5.1   POST BEEP

Currently there is only one beep code in BIOS. This code indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps.

5.2   ERROR MESSAGES

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list includes message for both the ISA and the EISA BIOS.

CMOS BATTERY HAS FAILED:
CMOS battery is no longer functional. It should be replaced.

CMOS CHECKSUM ERROR:
Checksum of CMOS is incorrect. This can indicate that CMOS has become corrupt. A weak battery may have caused this error. Check the battery and replace if necessary.

DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS ENTER:
No boot device was found. Insert a system disk into Drive A: and press <Enter>. If you assumed the system would boot from hard drive, make sure the controller is inserted correctly and all cables are properly attached. Also be sure the disk is formatted as a boot device. Then reboot the system.

DISKETTE DRIVES OR TYPES MISMATCH ERROR - RUN SETUP:
Type of diskette drive installed in the system is different from the CMOS definition. Run Setup to reconfigure the drive type correctly.

DISPLAY SWITCH IS SET INCORRECTLY:
Display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than indicated in Setup. Determine which setting is correct, and then either turn off the system and change the jumper, or enter Setup and change the VIDEO selection.

DISPLAY TYPE HAS CHANGE SINCE LAST BOOT:
Since last powering off the system, the display adapter has been changes. You must configure the system for the new display type.

EISA Configuration Checksum Error
PLEASE RUN EISA CONFIGURATION UTILITY:
The EISA non-volatile RAM checksum is incorrect or cannot correctly read the EISA slot. This can indicate either the EISA non-volatile memory has become corrupt or the slot has configured incorrectly. Also be sure the card is installed firmly in the slot.

EISA Configuration Is Not Complete
PLEASE RUN EISA CONFIGURATION UTILITY:
The slot configuration information stored in EISA non-volatile memory is incomplete.

*** *NOTE:* *When either of these errors appear, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.*

ERROR ENCOUNTERED INITIALIZING HARD DRIVE:
Hard drive cannot be initialized. Be sure the adapter is installed correctly and all cables are correctly and firmly attached. Also be sure the correct hard drive type is selected in Setup.

ERROR INITIALIZING HARD DISK CONTROLLER:
Cannot initialize controller. Make sure the cord is correctly and firmly installed in the bus. Be sure the correct hard drive type is selected in Setup. Also check to see if any jumper needs to be set correctly on the hard drive.

FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT:
Cannot find or initialize the floppy drive controller. Make sure the controller is installed correctly and firmly. If there is no floppy drives installed, be sure the Diskette Drive selection in Setup is set to NONE.

Invalid EISA Configuration
PLEASE RUN EISA CONFIGURATION UTILITY:
The non-volatile memory containing EISA configuration information was programmed incorrectly or has become corrupt. Re-run EISA configuration utility to correctly program the memory.

*** *NOTE:* *When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.*

KEYBOARD ERROR OR NO KEYBOARD PRESENT:
Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

If you are purposely configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot.

Memory Address Error at ...:
Indicates a memory address error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

Memory parity Error at ...
Indicates a memory parity error at a specific location. You can use this location along with the memory map for your system to find and replace bad memory chips.

MEMORY SIZE HAS CHANGED SINCE LAST BOOT:
Memory has been added or removed since the last boot. In EISA mode use Configuration Utility to reconfigure the memory configuration. In ISA mode enter Setup and enter the new memory size in the memory fields.

Memory Verify Error at ...:
Indicates an error verifying a value already written to memory. Use the location along with your system's memory map to locate the bad chip.

OFFENDING ADDRESS NOT FOUND:
This message is used in conjunction with the I/O CHANNEL CHECK and
RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.

OFFENDING SEGMENT:
This message is used in conjunction with the I/O CHANNEL CHECK and

RAM PARITY ERROR messages when the segment that has caused the problem has been isolated.

PRESS A KEY TO REBOOT:
This will be displayed at the bottom screen when an error occurs that required you to reboot. Press any key and the system will reboot.

PRESS F1 TO DISABLE NMI, F2 TO REBOOT:
When BIOS detects a Non-markable Interrupt condition during boot, this will allow you to disable the NMI and continue to boot, or you can reboot the system with the NMI enabled.

RAM PARITY ERROR - CHECKING FOR SEGMENT...
Indicates a parity error in Random Access Memory.

Should Be Empty But EISA Board Found
PLEASE RUN EISA CONFIGURATION UTILITY:
A valid board ID was found in a slot that was configured as having no board ID.

*** NOTE: *When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.*

Should Have EISA Board But Not Found
PLEASE RUN EISA CONFIGURATION UTILITY:
The board installed is not responding to the ID request, or no board ID has been found in the indicated slot.

*** NOTE: *When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.*

Slot Not Empty:
Indicates that a slot designated as empty by the EISA Configuration Utility actually contains a board.

*** NOTE: *When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.*

SYSTEM HALTED, (CTRL-ALT-DEL) TO REBOOT...
Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

Wrong Board In Slot
PLEASE RUN EISA CONFIGURATION UTILITY:
The board ID does not match the ID stored in the EISA non-volatile memory.

*** NOTE: *When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.*