USER'S MANUAL

B870 VESA VL-BUS SERIES

80486SX/80486DX/80486DX4

Rev. D

DISCLAIMER

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8/11/94

1. INTRODUCTION

This system series is an 80486 based system that is fully compatible with IBM PC/AT systems. This system performs 32-bit memory access The 870 series includes the following models:

B870 = System board wiithout CPU;
B873 = System board with 486SX-25 CPU;
B874 = System board with 486SX-33 CPU;
B875 = System board with 486DX-33 CPU;
B876 = System board with 486DX-40 CPU;
B877 = System board with 486DX-50 CPU-
B878 = System board with 486DX2-66 CPU;
All the abomv with a standard 128KB Cache memory that is expandable to 1MB

This series of motherboards provides two VESA VL-BUS slots to support 1 master or 2 slave mode cards.
These motherboards provide functional flexibility, expandability, and investment protection. The user has the option of upgrading or expanding his personal computer to the next higher or optimum level of performance and capability without having to discard the basic system--and the investment that has been made in that system. A simple jumper setting and CPU change are all that's required when upgrading the 486 CPU speed. This enables users to keep up with state-of-the-art technology at tremendous savings.

CAUTION:
To conserve battery power, the factory default jumper setting position at JP1 is "open" Therefore. the user should short the JP1 instead of open prior to initial operation. JP1 will be available in PCB Version B87ODl and afterward.

TABLE OF CONTENTS

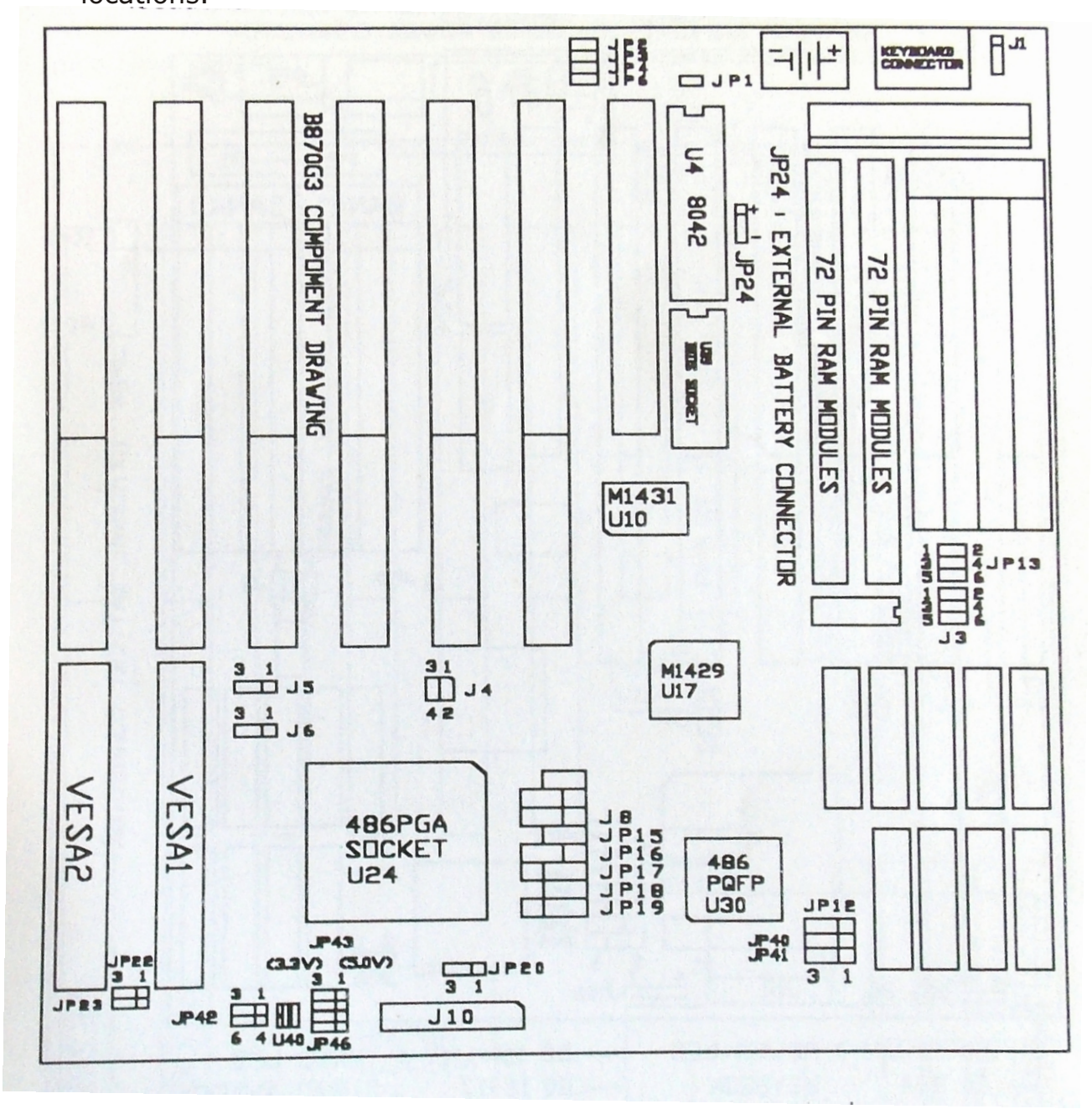
2. SPECIFICATIONS AND FEATURES

* User upgradeable via simple CPU change and jumper adjustment. NO oscillator change or soldering work required.

Fully PC/AT compatible with most 486 CPUs, including the 486 PQFP and PGA type; 486SX-20, 486SX-25, 486SX-33, 486DX-33, 486DX40, 486DX22-50, 486DX-50, 486DX2-66
Supports Intel 486DX/DX2/SX/P24T, AMD 486DX, CYRIX CX486DX,CX486DX2,486DX4 CPU.
Supports synchronous SRAM L2 writeback writethrough-but no write-buffered, cache size supports 128K ,256K, 512K. 1M bytes.
P24T L1-WRITEBACK feature support.
Supports DRAM memory size up to 128MB, using 256KB/1MB/ 4MB/16MBSlM Modules.
Page mode only.
HIDDEN refresh, SLOW refresh, NORMAL refresh.
Shadow RAM support.
256K remapping to top of memory.
Software AT clock programmable.
Hardware/Software TURBO speed control
Fast Gate A20, Fast reset support,
Six 16 Bit l/O Expansion slots, including two VESA Local Bus standard slots. One B Bit l/O Expansion slot.
VESA Bus supports one master mode or two slave mode cards.
CPU Speed:
The ISA Bus can accomodate 486DX-50 & 486DX2-66;
With VESA Bus, CPU Speed depends upon the specifi-cations of the VESA VL-Bus Card .and whether or not the card matches the mainboard.

3. CONFIGURATION

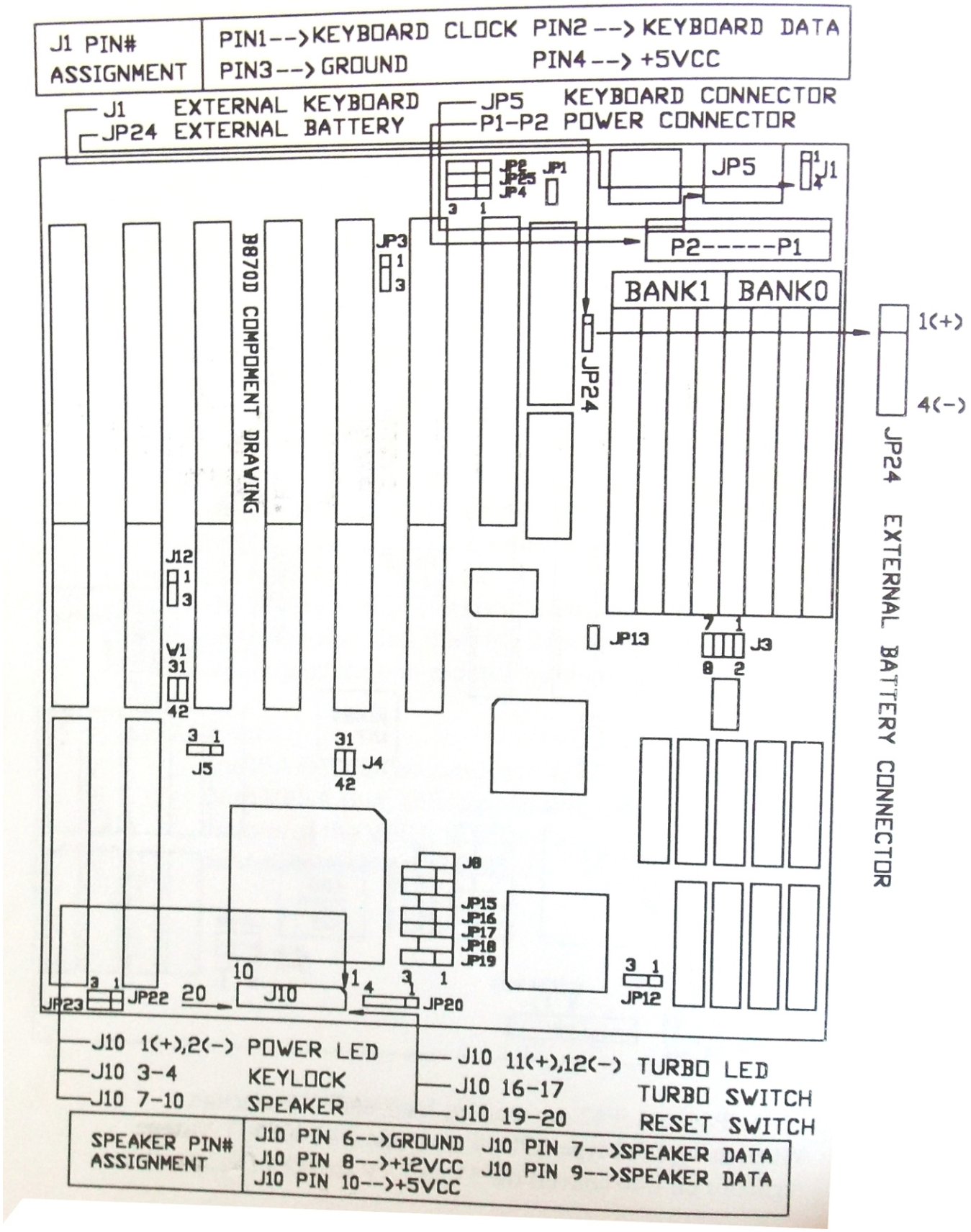
Before the system is ready to operate, the hardware must be configured to allow for various functions within the system. To configure the Cache system board is a simple task, because after the system has been configured, the user only has to set a few jumpers, connectors, and sockets. The following diagram illustrates jumper connector locations.



Note: JP43-JP-46 and JP42 are used for Intel 486DX-4 selection When using DX4 type CPU. it must add a LT1085CT Voltage regulator on U40 convert the 5V to 3.3V for Dx4 CPU use

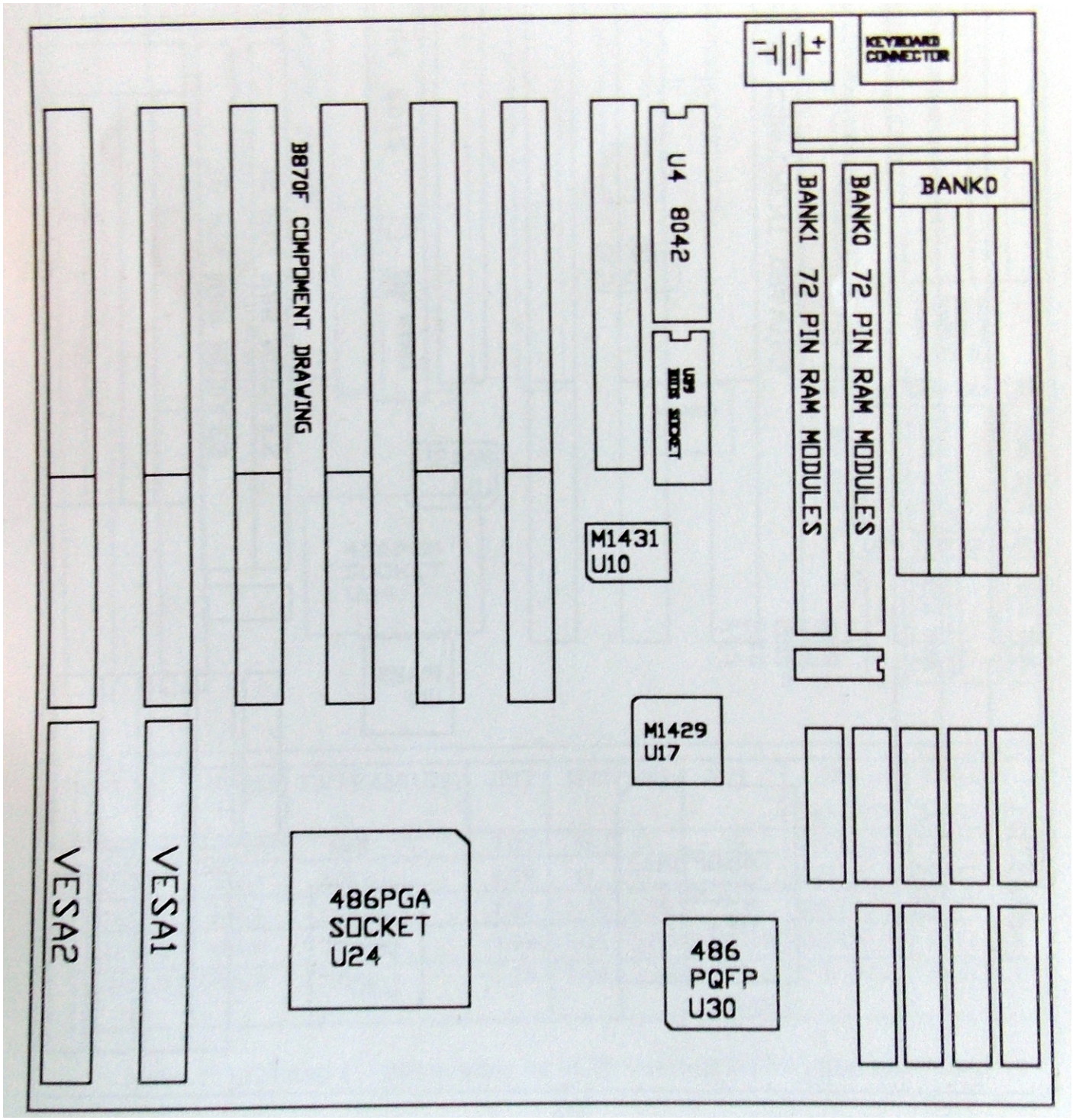
3-1 CONNECTORS

A connector is two or more pins that are used to make connections to the system's standard accessories (such as power, battery, etc.). The following diagram illustrates connector locations:

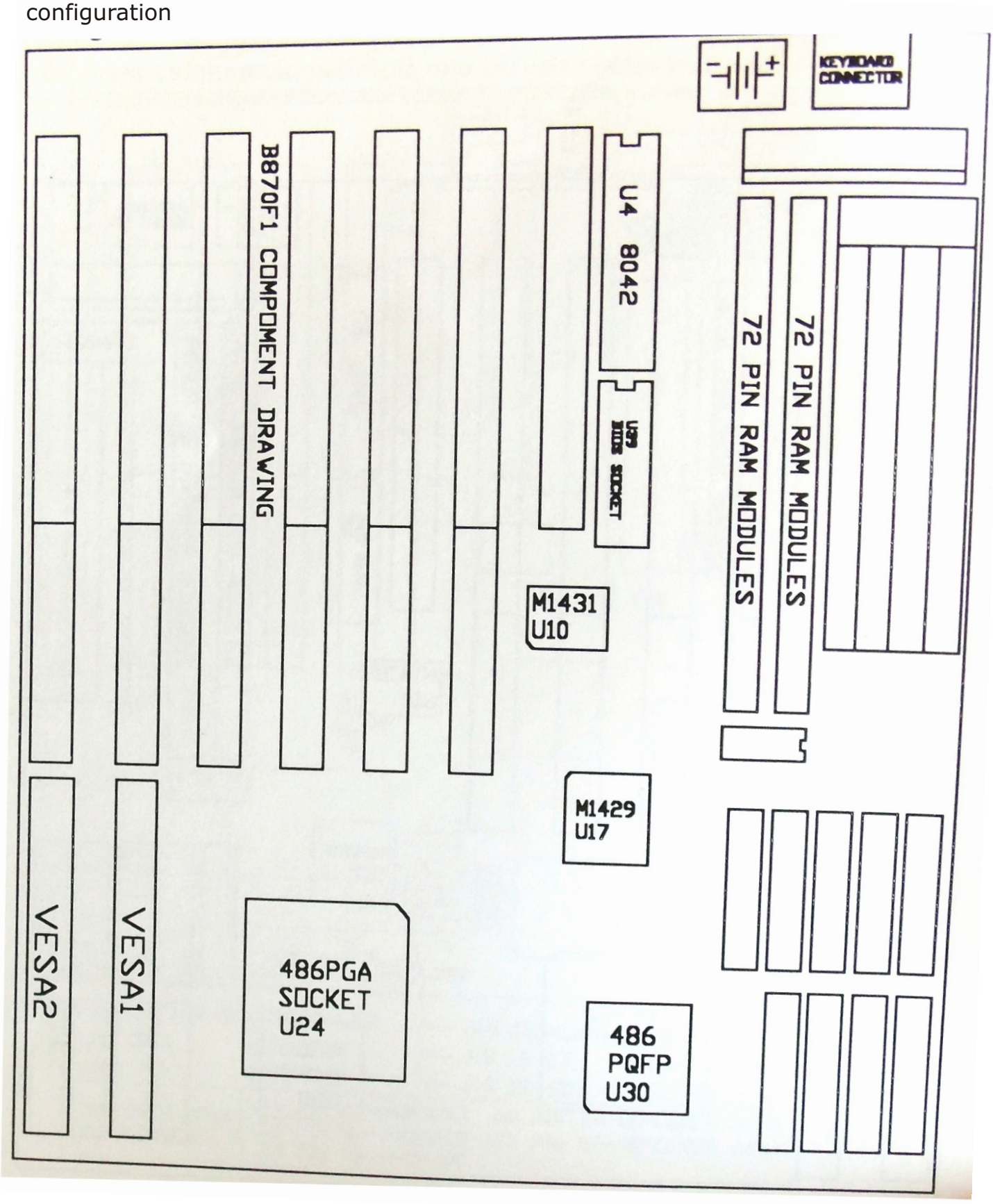


3.2 DRAM SIMM SOCKETS

B87OC,B87OD,B87OF supports 2 DRAM banks. The four 30 Pins SIM socket configure as one bank(32bit), which is equial to 72 Pin SIM socket one Pcs. The 30 Pins SIM socket is the Same bank as middle position of 72 Pins SlM socket and the left side 72 Pin SIM socket & 005' _ e left side 72 Pin SW1
another bank. The 30 Pin SIM socket can support 1MB, 4MB, 16MB by 8 bit. The 72 Pin SIM socket can support 1MB,4MB, 16bit by 32bit (with or without parity check).(B87OC and B870D only support eight 30 pins SIM sockets)

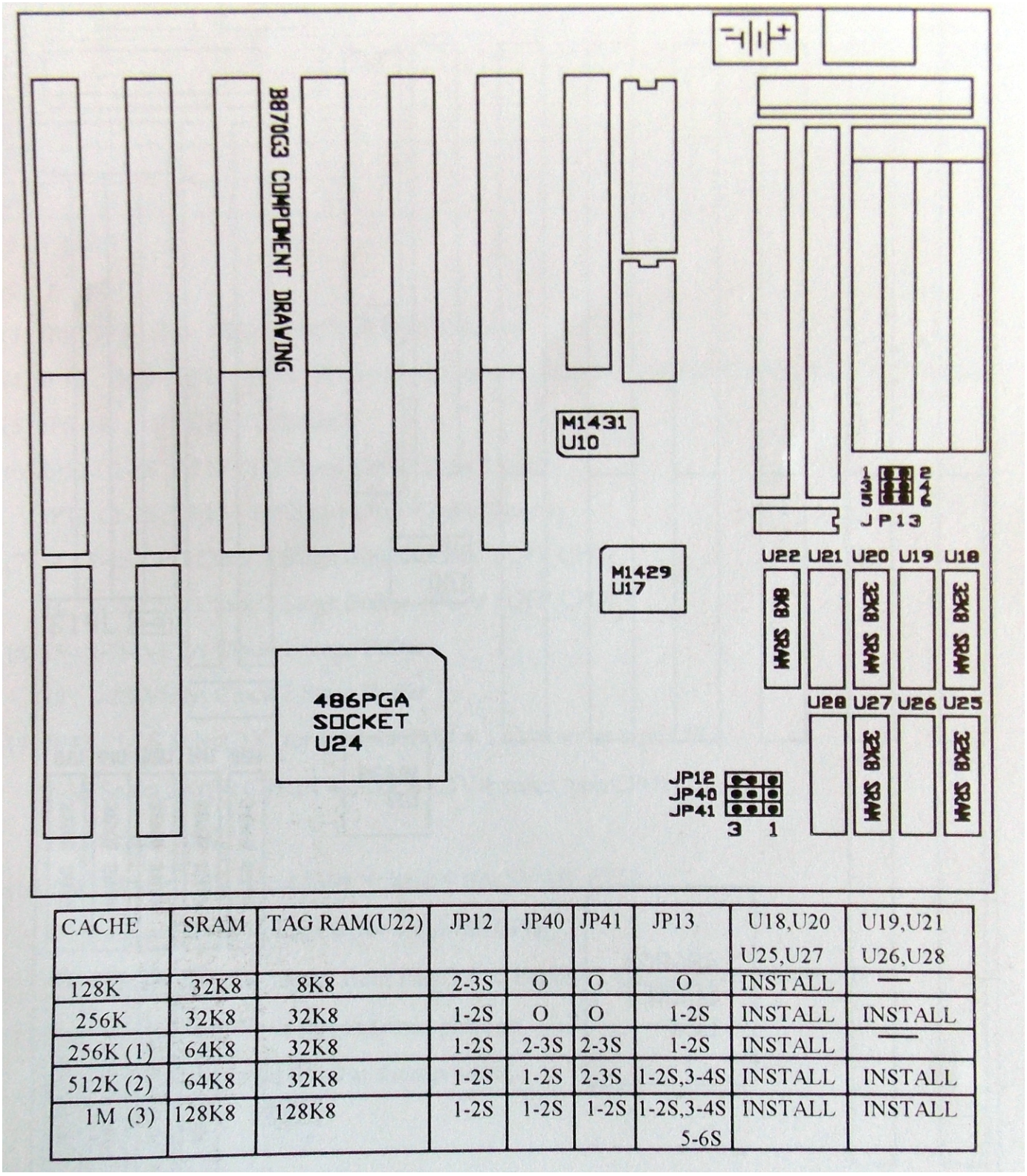


The B87OF1 and afterward Version supports 3 banks of DRAM memory Bank0, bank1 and bank2 4 pcs of 30 Pins SIM socket configure as one bank. The other 72 Pins SIM socket is one PCS one bank Any bank can work as bank 0,1,2 The system will auto detect and configuration



3.3 CACHE MEMORY SOCKETS

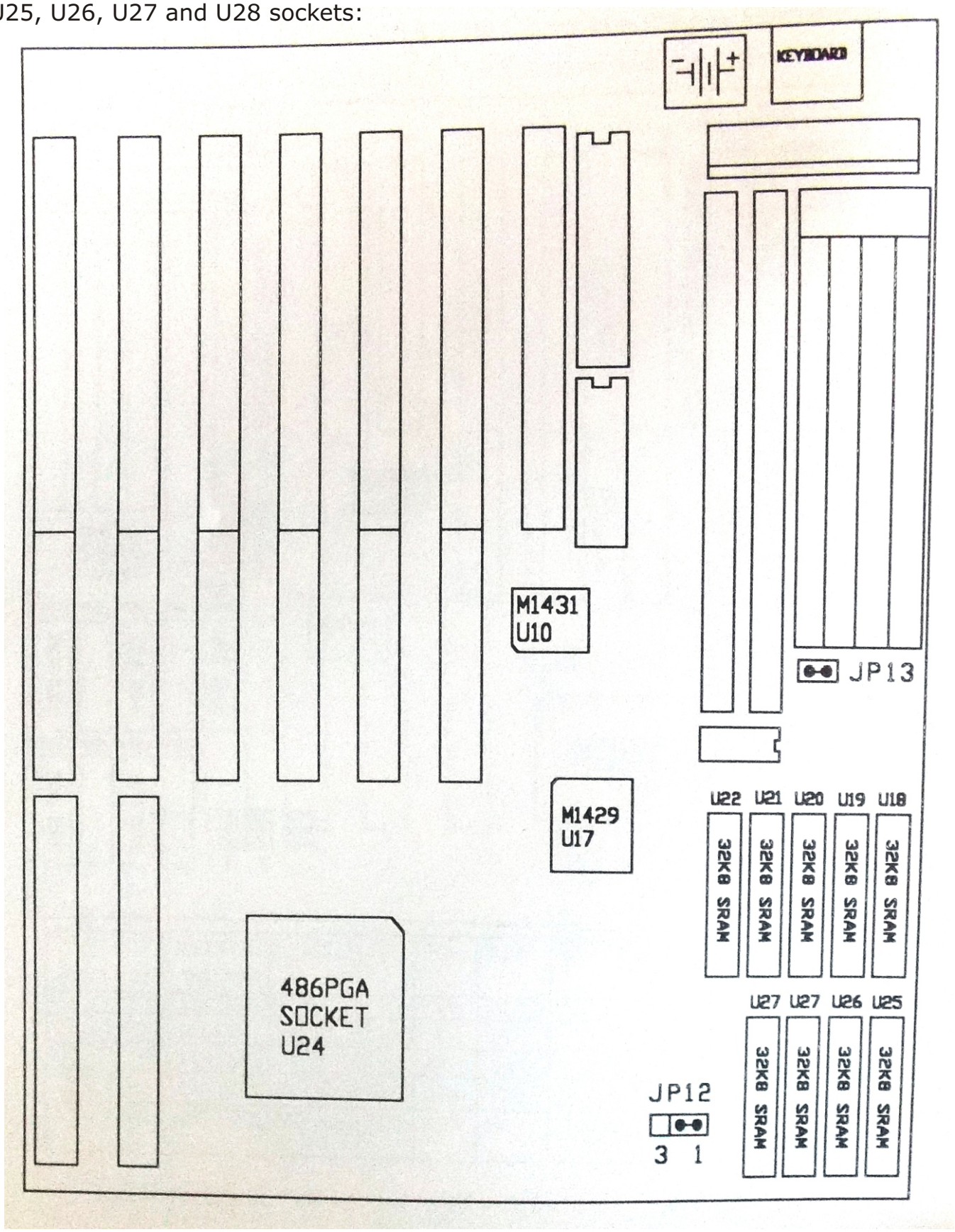
The Cache system board supports 2 banks of cache SRAM which provides either 128K, or 256K,512K,1M of cache memory.The following diagram illustrates the selection of a 128K Cache mermorv by installing one 8K8 SRAM at U22 and four 32KB SRAM at U18, U20, U25 and U27 sockets.



CACHE	SRAM	TAG RAM(U22)	JP12	JP40	JP41	JP13	U18,U20 U25,U27	U19,U21 U26,U28
128K	32K8	8K8	2-3S	O	O	O	INSTALL	—
256K	32K8	32K8	1-2S	O	O	1-2S	INSTALL	INSTALL
256K (1)	64K8	32K8	1-2S	2-3S	2-3S	1-2S	INSTALL	—
512K (2)	64K8	32K8	1-2S	1-2S	2-3S	1-2S,3-4S	INSTALL	INSTALL
1M (3)	128K8	128K8	1-2S	1-2S	1-2S	1-2S,3-4S 5-6S	INSTALL	INSTALL

Note: (1),(2) and (3) are available in PCB Version B870G and afterward

The following diagram illustrates the selection of a 256K Cache memory by installing nine 32K8 SRAM at U18, U19, U20, U21, U22, U25, U26, U27 and U28 sockets:



3.4 CPU Type & Clock selection

B870G CPU Type & Clock Select

	JP2	JP3	JP4(3)	JP15	Jp16	JP17	JP18	JP19	JP20	JP6	J6(5)	J3 (Clock Generator Freq)	JP43-JP46	JP42
486SX-25	O	O	O	S	1-2S	1-2S	S	1-2S	O	O	2-3S	1-2S 5-6S (50Mhz)	1-2S	X
486SX-33	O	O	O	S	1-2S	1-2S	S	1-2S	O	O	2-3S	1-2S 3-4S (66Mhz)	1-2S	X
486SX2-50	O	O	O	S	1-2S	1-2S	S	1-2S	O	O	2-3S	1-2S 5-6S (50Mhz)	1-2S	X
486DX-33	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	O	2-3S	1-2S 3-4S (66Mhz)	1-2S	X
486DX-40	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	S	1-2S	3-4S 5-6S (40Mhz)	1-2S	X
486DX-50	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	S	1-2S	1-2S 3-4S (50Mhz)	1-2S	X
486DX2-50	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	O	2-3S	1-2S 5-6S (50Mhz)	1-2S	X
486DX2-66	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	O	2-3S	1-2S 3-4S (66Mhz)	1-2S	X
CX486DX-33	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	O	2-3S	1-2S 3-4S (66Mhz)	1-2S	X
CX486DX-40	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	S	1-2S	3-4S 5-6S (40Mhz)	1-2S	X
CX486DX2-50	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	O	2-3S	1-2S 5-6S (50Mhz)	1-2S	X
CX486DX2-66	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	O	2-3S	1-2S 3-4S (66Mhz)	1-2S	X
486DX4-100	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	O	2-3S	1-2S 3-4S (60Mhz)	2-3S	1-2S
486DX4-75	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	O	2-3S	1-2S 5-6S (50Mhz)	2-3S	1-2S

(1)S: Short
(2)0: Open
(3) JP2 , JP3 , JP4: 486 , M7(CX486DX) Selection
(4)JP15 , JP16 , JP17 , JP18 , JP19 , JP20: 486SX. 486DX, CX486DX(M7), 486DX4 Selection
(5)JP6, J6, J3: Clock Selection.
(6)JP12: 2-3S, JP13: 1-2 Open 128K Cache Memory
JP12: 1-2S, JP13: 1-2 Short 256K Cache Memory.
(7) J4: 3-4S CPU Clock 1 Stage Buffer. (PGA/PQFP CPU)
J4: 1-3S CPU Clock 2 Stage Buffer. (PGA/PQFP CPU)
(8) J5: 2-3S VESA Clock 1 Stage Buffer.
J5: 1-2S VESA Clock 2 Stage Buffer.
(9) JP42: 1-2S Select 3X (for Intel 486DX4 * 3.3V * series type CPU)
2-3S Select 2X(for CYRIX 486DX * 3.3V * series type CPU)
5-6S Select 2.5X
(10)JP43-JP46: 1-2S Select 5V * Voltage * (for 5V 486 CPU)
2-3S Select 3.3V* Vo1tage* (for 3.3V 486 CPU)
(11)The jumper with "*" mark from Page 3-9 to Page 3-12 are all adjustable by user
(12)Pin3 and Pin-4 of W1 is fixed at short position.
Pin2 and Pin3 of J12 is fixed at short position.

B870F CPU Type & Clock Select

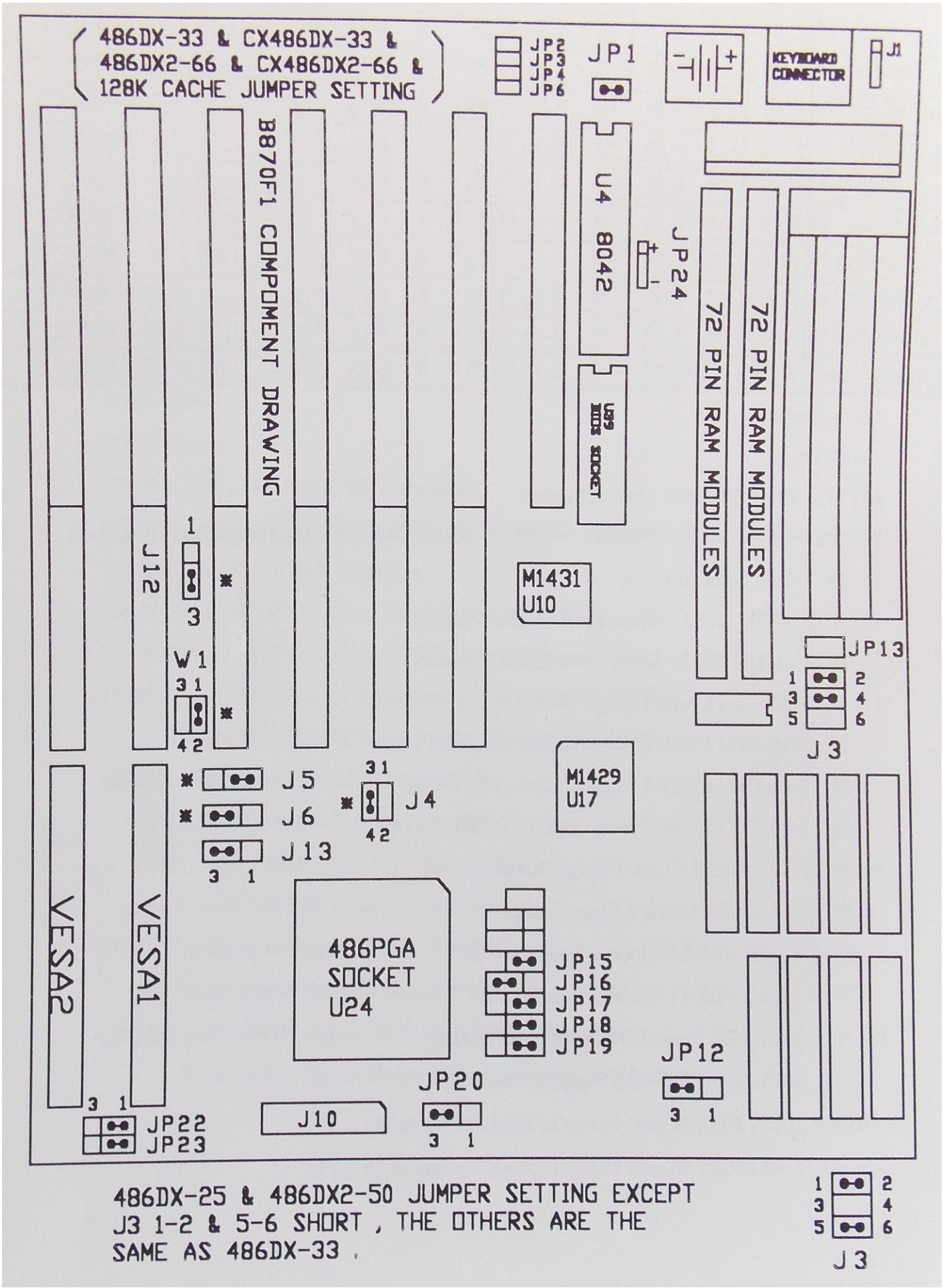
	JP2	JP3	JP4(3)	JP15	Jp16	JP17	JP18	JP19	JP20	J3 (Clock Generator Freq)
486SX-25	O	O	O	S	1-2S	1-2S	S	1-2S	O	1-2S 5-6S (50Mhz)
486SX-33	O	O	O	S	1-2S	1-2S	S	1-2S	O	1-2S 3-4S (66Mhz)
486SX2-50	O	O	O	S	1-2S	1-2S	S	1-2S	O	1-2S 5-6S (50Mhz)
486DX-33	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	1-2S 3-4S (66Mhz)
486DX-40	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	3-4S 5-6S (40Mhz)
486DX-50	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	1-2S 3-4S (50Mhz)
486DX2-50	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	1-2S 5-6S (50Mhz)
486DX2-66	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	1-2S 3-4S (66Mhz)
CX486DX-33	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	1-2S 3-4S (66Mhz)
CX486DX2-40	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	3-4S 5-6S (40Mhz)
CX486DX2-50	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	1-2S 5-6S (50Mhz)
CX486DX2-66	O	O	O	S	2-3S	1-2S	S	1-2S	2-3S	1-2S 3-4S (66Mhz)

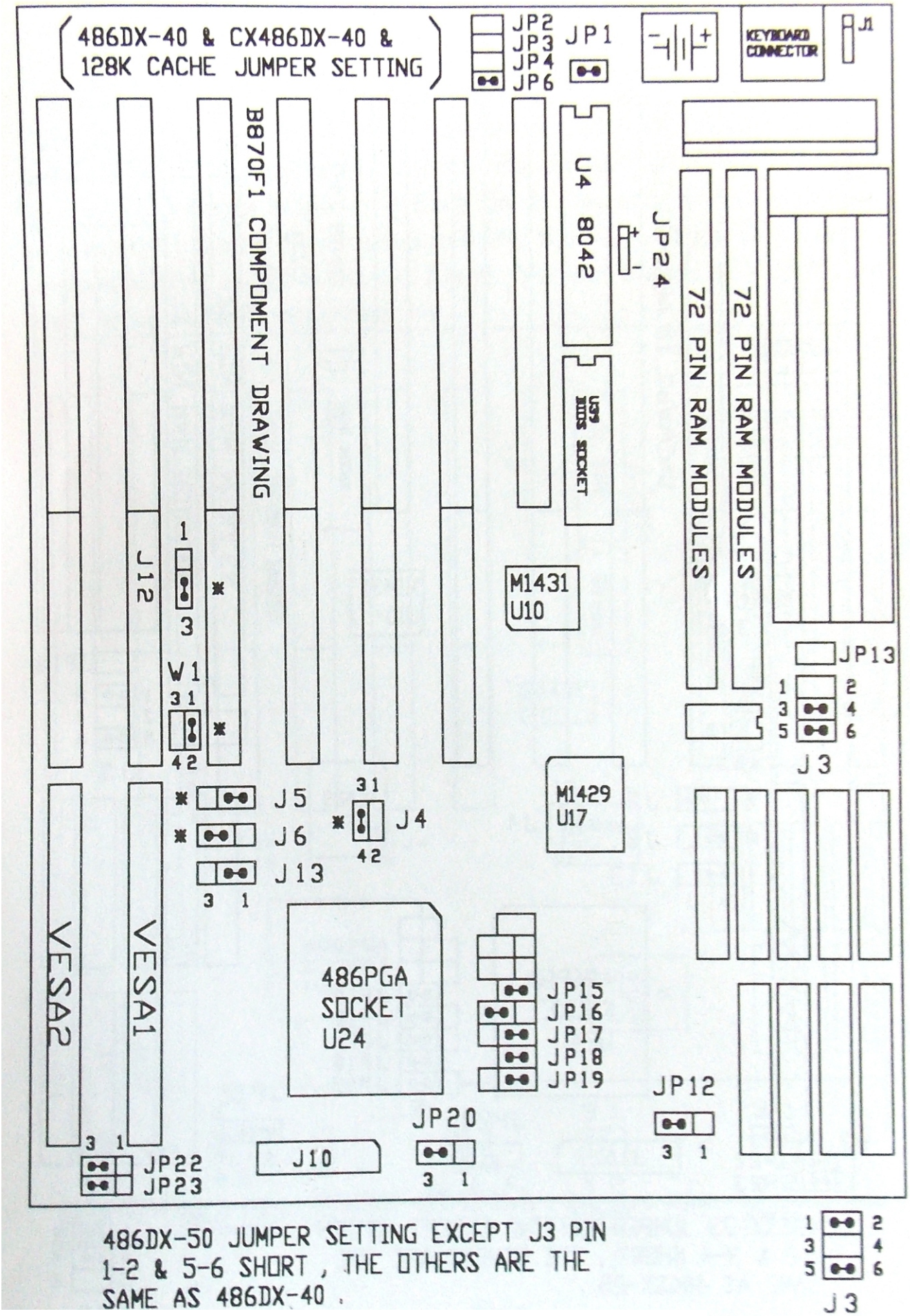
(1)S: Short
(2)0: Open
(3) JP2 , JP3 , JP4: 486 , M7 Selection
(4)JP15 , JP16 , JP17 , JP18 , JP19 , JP20: 486SX. 486DX, CX486DX(M7) Selection
(5)JP6, J6, J3: Clock Selection.
(6)JP12: 2-3S, JP13: 1-2 Open 128K Cache Memory
JP12: 1-2S, JP13: 1-2 Short 256K Cache Memory.
(7) J4: 3-4S CPU Clock 1 Stage Buffer. (PGA/PQFP CPU)
J4: 1-3S CPU Clock 2 Stage Buffer. (PGA/PQFP CPU)
(8) J5: 2-3S VESA2 Clock 1 Stage Buffer.
J5: 1-2S VESA Clock 1 Stage Buffer.
JP13: 2-3S VESA1 Clock 1 Stage Buffer
Jp13: 1-2S VESA1 Clock 2 Stage Buffer
(9) J12: 1-2S ADS Signal Delay 1 Clock Timing
J12: 2-3S Direct to ADS Signal (*Default)
(10)W1: 1-2S LRDY Signal Direct to M1429 (*Default)
3-4S LRDY Signal Delay 1 Clock Timing to M1429

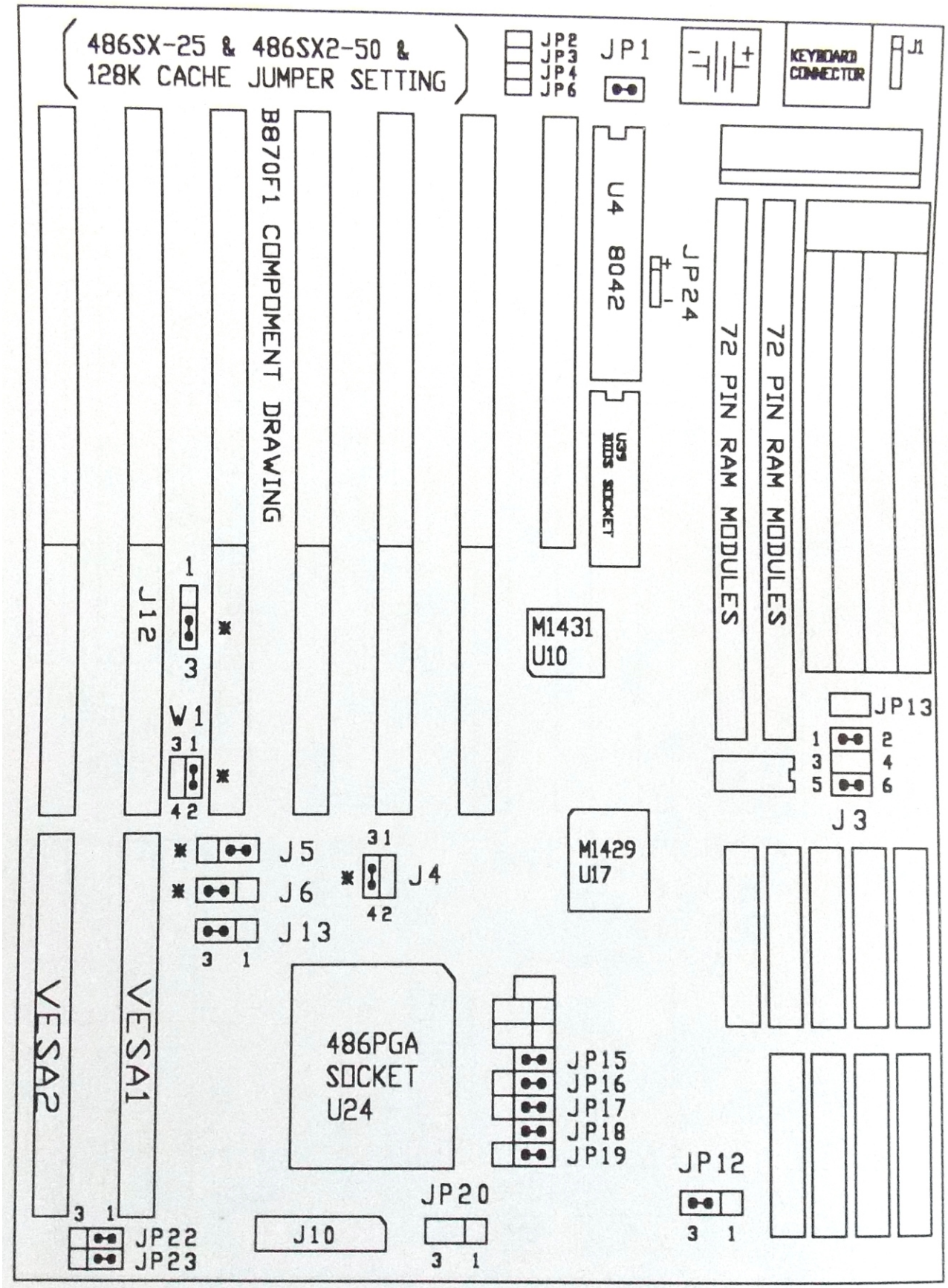
B870C & B870D CPU Type & Clock Select

	JP2 JP3 JP4(3)	JP15 Jp16 JP17 JP18 JP19 JP20	J3 (Clock Generator Freq)
486SX-25	2-3S 2-3S 1-2S	S 1-2S 1-2S S 1-2S O	1-2S 5-6S (25Mhz)
486SX-33	2-3S 2-3S 1-2S	S 1-2S 1-2S S 1-2S O	1-2S 3-4S (33Mhz)
486SX2-50	2-3S 2-3S 1-2S	S 1-2S 1-2S S 1-2S O	1-2S 5-6S (25Mhz)
486DX-33	2-3S 2-3S 1-2S	S 2-3S 1-2S S 1-2S 2-3S	1-2S 3-4S (33Mhz)
486DX-40	2-3S 2-3S 1-2S	S 2-3S 1-2S S 1-2S 2-3S	5-6 (40Mhz)
486DX-50	2-3S 2-3S 1-2S	S 2-3S 1-2S S 1-2S 2-3S	3-4S (50Mhz)
486DX2-50	2-3S 2-3S 1-2S	S 2-3S 1-2S S 1-2S 2-3S	1-2S 5-6S (25Mhz)
486DX2-66	2-3S 2-3S 1-2S	S 2-3S 1-2S S 1-2S 2-3S	1-2S 3-4S (33Mhz)
CX486DX-33	1-2S 1-2S 1-2S	S 2-3S 1-2S S 1-2S 2-3S	1-2S 3-4S (33Mhz)
CX486DX2-40	1-2S 1-2S 1-2S	S 2-3S 1-2S S 1-2S 2-3S	5-6S (40Mhz)
CX486DX2-50	1-2S 1-2S 1-2S	S 2-3S 1-2S S 1-2S 2-3S	1-2S 5-6S (25Mhz)
CX486DX2-66	1-2S 1-2S 1-2S	S 2-3S 1-2S S 1-2S 2-3S	1-2S 3-4S (66Mhz)

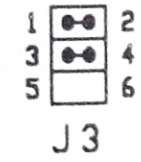
(1)S: Short
(2)0: Open
(3) JP2 , JP3 , JP4: 486 , M7 Selection
(4)JP15 , JP16 , JP17 , JP18 , JP19 , JP20: 486SX. 486DX, CX486DX(M7) Selection
(5)J3: Clock Selection.
(6)JP12: 2-3S, JP13: 1-2 Open 128K Cache Memory
JP12: 1-2S, JP13: 1-2 Short 256K Cache Memory.
(7) J4: 3-4S CPU Clock 1 Stage Buffer. (PGA CPU)
J4: 1-3S CPU Clock 2 Stage Buffer. (PGA CPU)
J4: 2-4S CPU Clock 1 Stage Buffer (PQFP CPU)
J4: 1-2S CPU Clock 2 Stage Buffer (PQFP CPU)
(8) J5: 2-3S VESA2 Clock 1 Stage Buffer.
J5: 1-2S VESA Clock 1 Stage Buffer.
JP13: 2-3S VESA1 Clock 1 Stage Buffer
Jp13: 1-2S VESA1 Clock 2 Stage Buffer
(9) J12: 1-2S ADS Signal Delay 1 Clock Timing
J12: 2-3S Direct to ADS Signal (*Default)
(10)W1: 1-2S LRDY Signal Direct to M1429 (*Default)
3-4S LRDY Signal Delay 1 Clock Timing to M1429

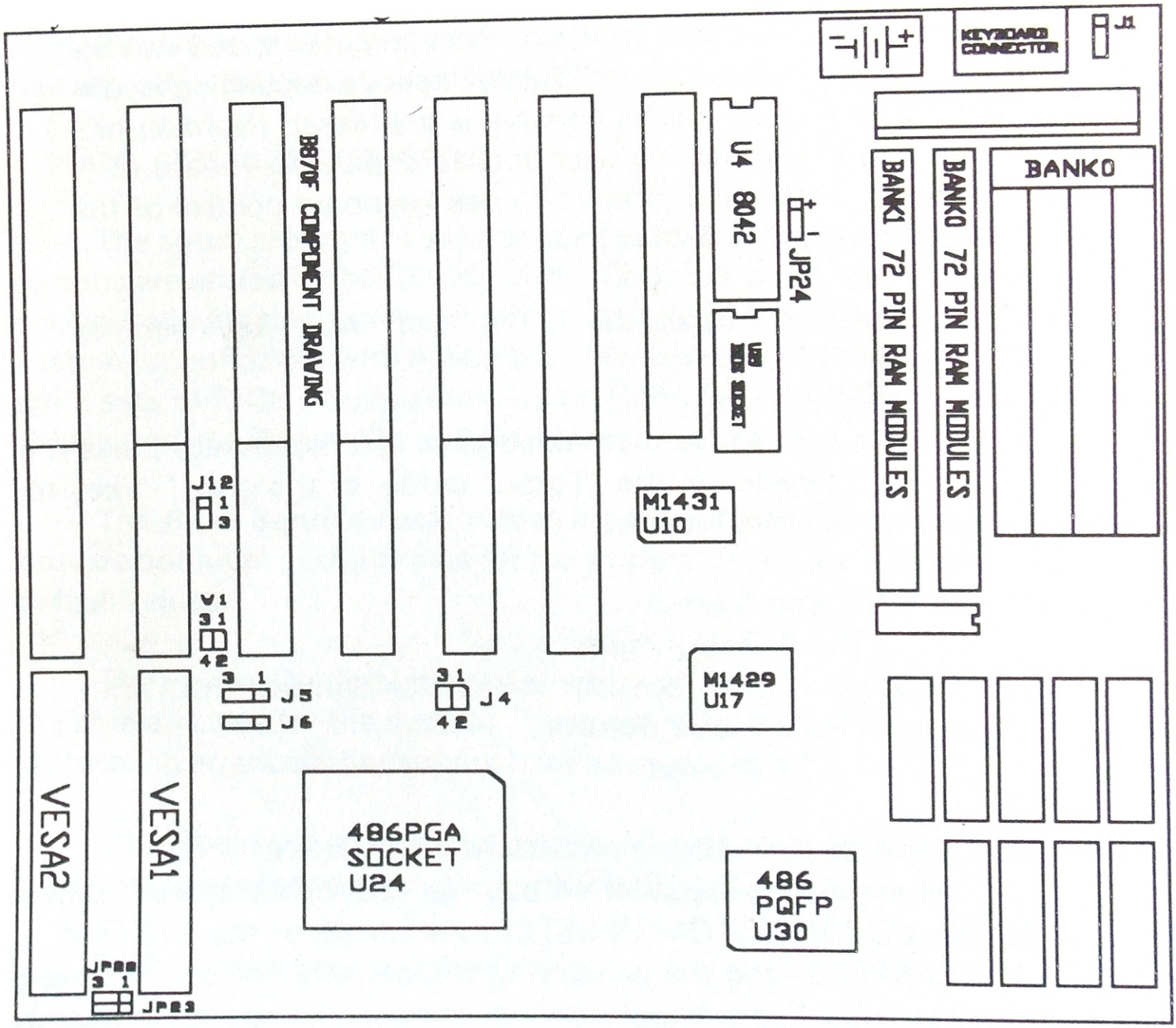


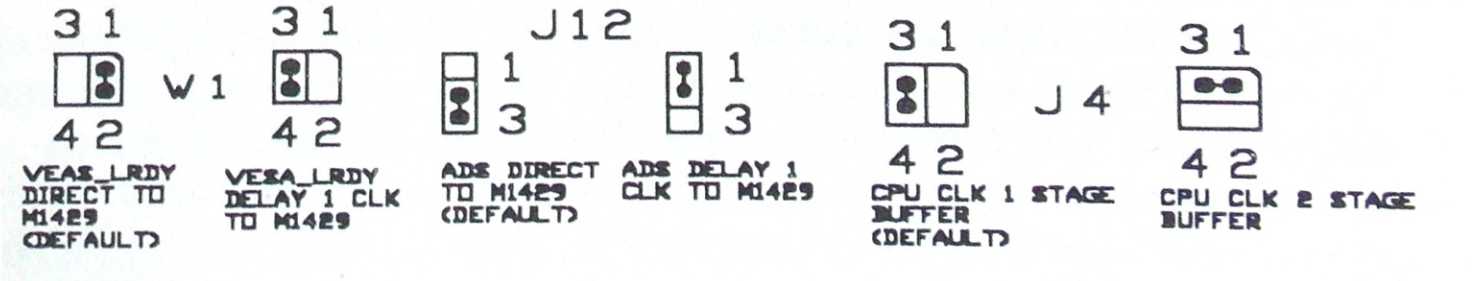




486SX-33 JUMPER SETTING EXCEPT J3 PIN 1-2 & 3-4 SHORT , THE OTHERS ARE THE SAME AS 486SX-25 .







3.6 TURBO / NORMAL SPEED CONTROL

This series of Main Boards can be operated at two CPU speeds Turbo Mode and Normal Mode. These two speeds exist in a toggle status, therefore operation is either “Normal” or “Turbo.” When the “Turbo” mode is operating, the “Turbo” LED on the console is lit. When “normal” mode is in operation, the “Turbo” LED on the console is not lit. Thus the "Turbo" LED at all times gives a clear indication of which mode is in effect.

The control of the status of Turbo or ormal operation resides in pins 15 & 17 of jumper J10. Pin 16 is the Turbo control and Pin 17 is Ground. When Pin 17 is clear--or open– the computer speed can be optionally operated at “Normal” or “Turbo” speeds depending upon whether the Turbo Switch on the console is depressed (Normal) or released (Turbo), or whether the user opts to use the keyboard to change the mode. If the user prefers to use keyboard control of the speed, the following procedure is used:

1. Press and hold down the "CTRL" and "ALT" keys simulta neously

2. With the two above mentioned keys still depressed, press the gray " +" key to set the "Turbo" mode, or the gray key to set the "Normal" mode.

J10 (16-17) Turbo Switch

Pin #	Assignment
16	Turbo Control
17	Ground

BIOS CONTROL OF TURBO / NORMAL FUNCTION:

When the initial power on boot up occurs the system seeks out, under the ADVANCED CMOS SETUP, the status of the SYSTEM BOOT UP CPU SPEED, and the position of the console switch. If speed has been set at "High" (the factory default status), the operation speed will automatically switch to "Turbo". However, the user can still control “Turbo” or “Normal” status through the use of the console switch or the Keyboard. If the CMOS has been set at "Low," the system will run at “Normal” speed, leaving to the user the option of selecting "Turbo" operation by using the keyboard with the console Turbo switch released or “open.”