I/O ADDRESS MAP

I/O Address Map on System Board

I/O address hex 000 to 0FF are reserved for the system board I/O.

ADDRESS (HEX)	DEVICE
000-01F	DMA Controller 1, 8237
020-03F	Interrupt Controller 1, 8259, Master
040-05F	Timer, 8254
060-06F	Keyboard Controller
070-07F	Real Time Clock, NMI (non-maskable interrupt) mask
080-09F	DMA Page Register, 74LS612
0A0-0BF	Interrupt Controller 2, 8259
0C0-0DF	DMA Controller 2, 8237
0F0	Clear Math Coprocessor Busy
0F1	Reset Math Coprocessor
0F8-0FF	Math Coprocessor Port

I/O address hex 100 to 3FF are available on the I/O channel.

ADDRESS (HEX)	DEVICE
1F0-1F8	Fixed Disk
200-207	Game I/O
278-27F	Parallel Printer Port 2
2F8-2FF	Serial Port 2
300-31F	Prototype Card
360-36F	Reserved
378-37F	Parallel Printer Port 1
380-38F	SDLC, bisynchronous 2
3A0-3AF	Bisynchronous 1
3B0-3BF	Monochrome Display and Printer Adapter
3C0-3CF	Reserved
3D0-3DF	Color Graphics Monitor Adapter
3F0-3F7	Diskette Controller
3F8-3FF	Serial Port 1

SYSTEM TIMERS

OCTEK Jaguar-386 has three programmable timer/counters controlled by 82C206 and they are defined as channels 0 through 2 :

Channel 0	System Timer
Gate 0	Tied on
Clk in 0	1.190 Mhz OSC
Clk out 0	8259 IRQ 0

Channel 1	Refresh Request Generator
Gate 1	Tied on
Clk in 1	1.190 Mhz OSC
Clk out 1	Request Refresh Cycle

Channel 2	Tone Generation of Speaker
Gate 2	Controlled by bit 0 of port hex 61 PPI bit
Clk in 2	1.190 Mhz OSC
Clk out 2	Used to drive the speaker

Note : Channel 1 is programmed to generate a 15-micro-second period signal.

The 8254 Timer/Counters are treated by system programs as an arrangement of four programmable external I/O ports. Three are treated as counters and the fourth is a control register for mode programming.

SYSTEM INTERRUPTS

Sixteen levels of system interrupts are provided on OCTEK Jaguar-386. The following shows the interrupt-level assignments in decreasing priority.

Level	Function
Microprocessor NMI	Parity or I/O Channel Check
Interrupt Controllers	
CTLR 1 CTLR 2	
IRQ0	Timer Output 0
IRQ1	Keyboard (Output Buffer Full)
IRQ2	Interrupt from CTLR 2
IRQ8	Real-time Clock Interrupt
IRQ9	Software Redirected to INT 0AH (IRQ2)
IRQ10	Reserved
IRQ11	Reserved
IRQ12	Reserved
IRQ13	Coprocessor
IRQ14	Fixed Disk Controller
IRQ15	Reserved
IRQ3	Serial Port 2
IRQ4	Serial Port 1
IRQ5	Parallel Port 2
IRQ6	Diskette Controller
IRQ7	Parallel Port 1

DIRECT MEMORY ACCESS (DMA)

OCTEK Jaguar-386 supports seven DMA channels.

Channel	Function
0	Spare (8 bit transfer)
1	SDLC (8 bit transfer)
2	Floppy Disk (8 bit transfer)
3	Spare (8 bit transfer)
4	Cascade for DMA Controller 1
5	Spare (16 bit transfer)
6	Spare (16 bit transfer)
7	Spare (16 bit transfer)

The following shows the addresses for the page register.

Page Register	I/O Address (HEX)
DMA Channel 0	0087
DMA Channel 1	0083
DMA Channel 2	0081
DMA Channel 3	0082
DMA Channel 5	008B
DMA Channel 6	0089
DMA Channel 7	008A
Refresh	008F

REAL TIME CLOCK AND CMOS RAM

Real time clock and CMOS RAM are contained on board. Real time clock provides the system date and time. CMOS RAM stores system information. Both are backed up by battery and will not lose information after power off. The following page shows the CMOS RAM Address Map.

CMOS RAM ADDRESS MAP

Addresses	Description
00-0D	* Real-time clock information
0E	* Diagnostic status byte
0F	* Shutdown status byte
10	Diskette drive type byte - drives A and B
11	Reserved
12	Fixed disk type byte - drives C and D
13	Reserved
14	Equipment byte
15	Low base memory byte
16	High base memory byte
17	Low expansion memory byte
18	High expansion memory byte
19-2D	Reserved
2E-2F	2-byte CMOS checksum
30	* Low expansion memory byte
31	* High expansion memory byte
32	* Date century byte
33	* Information flags (set during power on)
34-3F	Reserved

REAL TIME CLOCK INFORMATION

The following table describes real-time clock bytes and specifies their addresses.

Byte	Function	Address
0	Seconds	00
1	Second alarm	01
2	Minutes	02
3	Minute alarm	03
4	Hours	04
5	Hour alarm	05
6	Day of week	06
7	Date of month	07
8	Month	08
9	Year	09
10	Status Register A	0A
11	Status Register B	0B
12	Status Register C	0C
13	Status Register D	0D

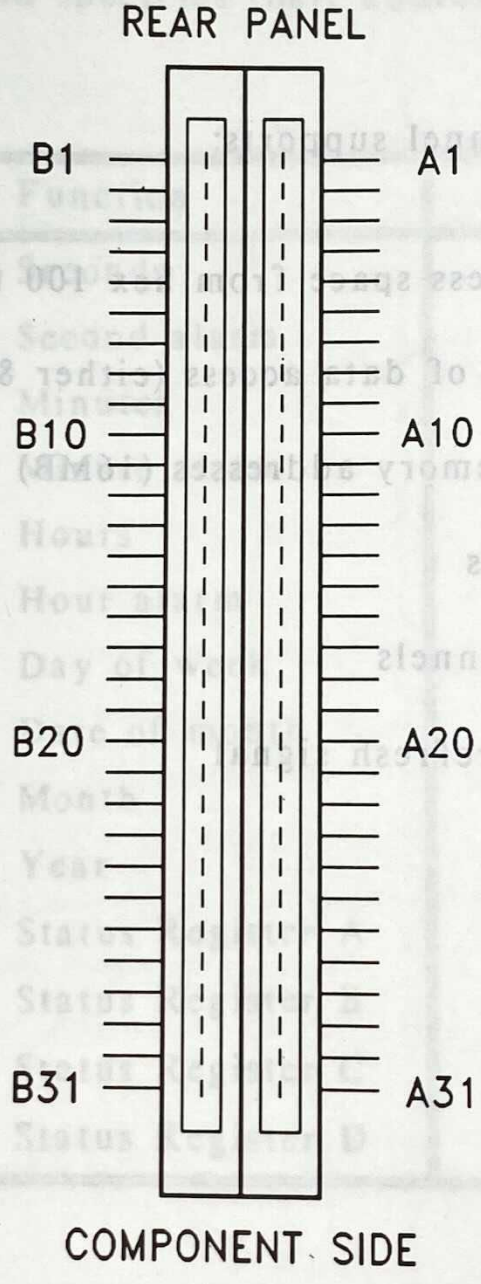
SYSTEM EXPANSION BUS

OCTEK Jaguar-386 provides eight 16-bit slots.

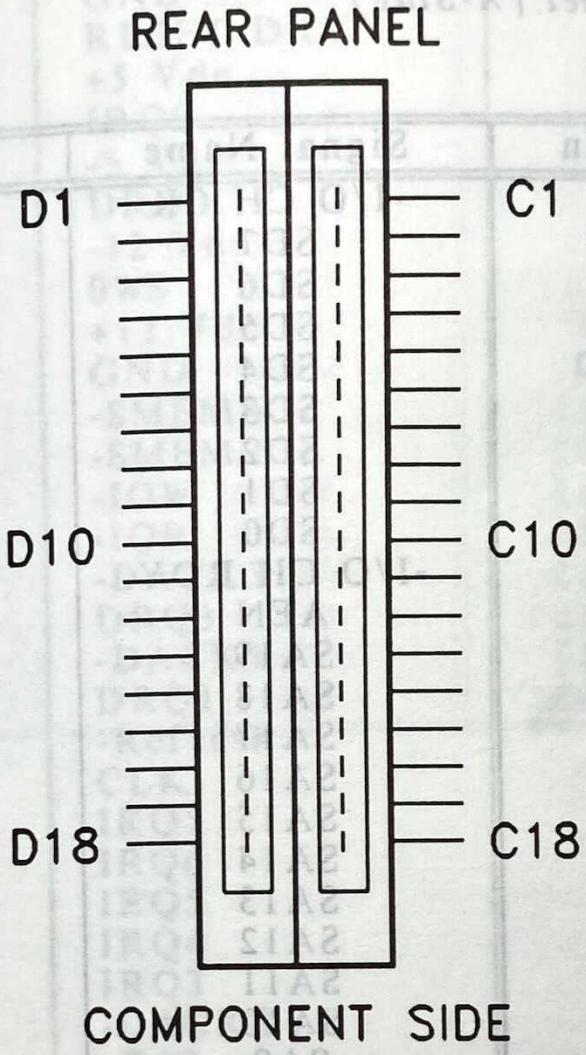
The I/O channel supports:

* I/O address space from hex 100 to hex 3FF
* Selection of data access (either 8 or 16 bit)
* 24 bit memory addresses (16MB)
* Interrupts
* DMA channels
* Memory refresh signal

The following figure shows the pin numbering for I/O channel connectors JA1 to JA7.



The following figure shows the pin numbering for I/O channel connectors JB1-JB6.



The following tables summarize pin assignments for the I/O channel connectors.

I/O Channel (A-Side)

I/O Pin	Signal Name	I/O
A1	-I/O CH CK	I
A2	SD7	I/O
A3	SD6	I/O
A4	SD5	I/O
A5	SD4	I/O
A6	SD3	I/O
A7	SD2	I/O
A8	SD1	I/O
A9	SD0	I/O
A10	-I/O CH RDY	I
A11	AEN	O
A12	SA19	I/O
A13	SA18	I/O
A14	SA17	I/O
A15	SA16	I/O
A16	SA15	I/O
A17	SA14	I/O
A18	SA13	I/O
A19	SA12	I/O
A20	SA11	I/O
A21	SA10	I/O
A22	SA9	I/O
A23	SA8	I/O
A24	SA7	I/O
A25	SA6	I/O
A26	SA5	I/O
A27	SA4	I/O
A28	SA3	I/O
A29	SA2	I/O
A30	SA1	I/O
A31	SA0	I/O

I/O Channel (B-Side)

I/O Pin	Signal Name	I/O
B1	GND	Ground
B2	RESET DRV	O
B3	+5 Vdc	Power
B4	IRQ9	I
B5	-5 Vdc	Power
B6	DRQ2	I
B7	-12 Vdc	Power
B8	0WS	I
B9	+12 Vdc	Power
B10	GND	Ground
B11	-SMEMW	O
B12	-SMEMR	O
B13	-IOW	I/O
B14	-IOR	I/O
B15	-DACK3	I
B16	DRQ3	O
B17	-DACK1	I
B18	DRQ1	O
B19	-Refresh	I/O
B20	CLK	O
B21	IRQ7	I
B22	IRQ6	I
B23	IRQ5	I
B24	IRQ4	I
B25	IRQ3	I
B26	-DACK2	O
B27	T/C	O
B28	BALE	O
B29	+5 Vdc	Power
B30	OSC	O
B31	GND	Ground

I/O Channel (C-Side)

I/O Pin	Signal Name	I/O
C1	SBHE	I/O
C2	LA23	I/O
C3	LA22	I/O
C4	LA21	I/O
C5	LA20	I/O
C6	LA19	I/O
C7	LA18	I/O
C8	LA17	I/O
C9	-MEMR	I/O
C10	-MEMW	I/O
C11	SD8	I/O
C12	SD9	I/O
C13	SD10	I/O
C14	SD11	I/O
C15	SD12	I/O
C16	SD13	I/O
C17	SD14	I/O
C18	SD15	I/O

I/O Channel (D-Side)

I/O Pin	Signal Name	I/O
D1	-MEM CS16	I
D2	-I/O CS16	I
D3	IRQ10	I
D4	IRQ11	I
D5	IRQ12	I
D6	IRQ15	I
D7	IRQ14	I
D8	-DACK0	O
D9	DRQ0	I
D10	-DACK5	O
D11	DRQ5	I
D12	-DACK6	O
D13	DRQ6	I
D14	-DACK7	O
D15	DRQ7	I
D16	+5 Vdc	Power
D17	-MASTER	I
D18	GND	Ground

Appendix A
System BIOS

The system BIOS provides an interface for operating systems and applications to access hardware. It is fully compatible with standard AT BIOS and works in the network system. It also performs self-test after reset and includes a setup program to setup the system.

SELF-TEST

To ensure the computer hardware is functional, the system BIOS will carry out a self-test upon reset. The test is very intensive and covers all parts of hardware. It takes a while before some messages are shown on the screen. It does not mean that the system is not working when the screen is blank. So wait for a while after turning on the power and listen carefully to the speaker. Some errors are reported by a number of beep sounds. After completing the self-test, the BIOS will display some messages on the screen.

Unlike most of the tests which take a short time, the memory test may be very slow, especially when the memory size is large. Therefore the system BIOS allows you to bypass the memory test by pressing 'ESC'. The following message will be shown during memory test :

Press <ESC> Key to bypass MEMORY test

It is recommended to complete the memory test. The total memory size is displayed after the memory test.

In case of serious errors, the BIOS will suspend the test. If the display is not initialized, the BIOS will report the error through a sequence of beep sounds. Otherwise, error message will be shown on the screen.

There are two types of errors reported by beep sounds. One is conveyed as one long beep followed by a number of short beeps. The meanings of the errors are as below :-

Short Beep Count	Meaning
3	Memory Failure
8	Display Adapter Failure

The other type of errors are serious failure and are conveyed as a number of beep and repeated infinitely.

Beep Count	Meaning
1	DRAM Refresh Failure
3	Base 64K Byte Memory Failure
4	System Timer Failure
5	Processor Failure
6	Keyboard Controller - Gate A20 Failure
7	Virtual Mode Exception Error
9	ROM-BIOS Checksum Failure

If no error is found during self-test, the system BIOS will proceed to boot from floppy disk or hard disk. The system BIOS will list the system configuration on the screen as below.

System Configuration (C) Copyright 1985-1990, American Megatrends Inc.,			
Main Processor	: 80386	Base Memory Size	: 640 KB
Numeric Processor	: None	Ext. Memory Size	: 7424 KB
Floppy Drive A:	: 1.2 MB, 5¼"	Hard Disk C: Type	: 2
Floppy Drive B:	: 1.44MB, 3½"	Hard Disk D: Type	: None
Display Type	: VGA or EGA	Serial Port(s)	: None
ROM-BIOS Date	: 04/30/90	Parallel Port(s)	: 3BC

Do check the list to make sure that the configuration is correct. Sometimes, problems arise because of the incorrect information of the configuration. For example, if you forget to modify the setup after changing the floppy disk drive from one type to another, it can not boot from floppy disk or may not work properly. If you check the list, you can find the cause of the problem.

SYSTEM SETUP

The BIOS incorporates two setup sections:

(1) CMOS SETUP
(2) EXTENDED SETUP PROGRAM

It is important that all the setup procedures should be completed before operating the system. Otherwise, the system will not run properly with the incorrect setup information. Run the setup again if the configuration is changed.

To enter the setup section, press 'Del' when the following message is shown :

Press <Del> if you want to run SETUP/EXTD-SET

Whenever the system BIOS finds that the configuration of the system is altered, error message will be shown and you may press 'F1' to run setup. Then the following messages are shown on the screen.

EXIT FOR BOOT
RUN CMOS SETUP
RUN EXTD SETUP

In CMOS SETUP section, you can enter system configuration information which will be stored in CMOS RAM on the motherboard. The information includes the devices of the system as well as memory size.

EXTENDED SETUP allows you to modify the registers of the chipsets. These registers are programmed with default settings by the BIOS. You may change the settings to improve the system performance or to suit the system configuration. Improper settings of the registers may cause the system malfunction. Consult your dealer if you have any doubt.

(1) CMOS SETUP

The memory size and the numeric processor are detected by the BIOS. So you are only required to set those options on the left side of the screen. The system configuration information are shown as follows:

CMOS SETUP (C) Copyright 1985-1990, American Megatrends Inc.,

Date (mn/date/year)	:	Sun, Jul 01, 1990	Base memory size	:	640 KB
Time (hour/min/sec)	:	12 : 05 : 30	Ext. memory size	:	7424 KB
Floppy Drive A:	:	1.2 MB, 5¼"	Numeric Processor	:	None
Floppy Drive B:	:	1.44 MB, 3½"			
Hard Disk C: type	:	Not Installed			
Hard Disk D: type	:	Not Installed			
Primary Display	:	VGA or EGA			
Keyboard	:	Installed			

Cyln Head WPcom LZone Sect Size

Sun	Mon	Tue	Wed	Thu	Fri	Sat
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	9	10	11

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

ESC=Exit,↓→↑←=Select,PgUp/PgDn=Modify

OPTION 1 TIME AND DATE

Use PgUp and PgDn keys to change the value. The date and time cannot be entered directly. An calender is displayed on the lower right corner of the screen for your reference.

OPTION 2 FLOPPY DISK DRIVE

Four types of floppy disk drives are supported:

1. 5-¼ inch standard drive (360K)
2. 5-¼ inch high-density drive (1.2M)
3. 3-½ inch standard drive (720K)
4. 3-½ inch high-density drive (1.44M)

The system BIOS supports two floppy disk drives and they are recognized as drive A and B. Select the correct types. Otherwise the drives cannot work properly. If one of them is not installed, select 'Not Installed' for that drive.

The BIOS is able to detect the type of the drives automatically. But remember to check the settings before exit.

OPTION 3 FIXED DISK DRIVE

There are 47 types of fixed disks supported by the BIOS. Consult your fixed disk manual to determine its correct type. The parameters such as cylinder number, head number, sector number and pre-compensation must match your fixed disk's parameters.

Use PgUp and PgDn keys to change the fixed disk type. If the type of your fixed disk is not included in the hard disk list, define a new type as type 47. Use left and right arrow keys to move between the parameter fields and enter the parameters. The parameters will be stored in the CMOS RAM and your fixed disk can be used afterwards. Each hard disk can be assigned a different type 47 hard disk. So two hard disks which are not included in the list can be used together in your system.

If the type of fixed disk is wrong, it takes a while before the BIOS can identify the error. After setting the fixed disk type, if the system halts after reboot, please wait for a while. It is most likely that the setting of fixed disk type is incorrect.

When you install a new hard disk, make sure whether it is already formatted. If not, the BIOS has to check for a while before reporting the hard disk error. In fact, the error arises only because the hard disk is not formatted. If the hard disk is formatted, you can run DOS FDISK and DOS FORMAT.

Some fixed disks are specially handled and must be set to 'Not Installed'. Consult the fixed disk manual for details.

OPTION 4 DISPLAY

Four types of display are supported:

1. CGA 80 column mode
2. CGA 40 column mode
3. EGA and VGA
4. Monochrome

If the type of display is incorrect, the BIOS will prompt you and ask you to set up again. But the BIOS is still able to display messages on the display attached to the system. Thus you can enter the setup program.

The jumper JP8 must be set according to this setting. Otherwise, the BIOS will report error after self-test.

OPTION 5 KEYBOARD

If a keyboard is attached to the system, select 'Installed'. The BIOS will test the keyboard during self-test.

(2) EXTENDED SETUP PROGRAM

All the registers of the chipsets are set to default values by the system BIOS. Usually, there is no need to modify these registers unless the configuration is changed. Since improper settings of these registers may cause the system malfunction, check your settings carefully before exit.

In EXTENDED SETUP PROGRAM, the main menu is shown as below:

SIS 386 Chipset Setup Program Main Menu
Extended Setup SIS 386 Chipset Write CMOS Register Exit Do Not Write CMOS Register and Exit

Select 'Write CMOS register and exit' to save the new settings in the CMOS RAM. The BIOS will then reboot the system and the new settings are in effect afterwards.

After changing the registers' settings, test your system first to make sure that the settings are correct. It is possible that your system becomes unstable and you need to setup the registers again.

EXTENDED SETUP SIS 386 CHIPSET

In Extended Setup Program, the menu is shown as below :

SIS 386 EXTENDED SETUP PROGRAM Ver - 1.00, 1990, American Megatrends Inc.

```
        BITS    7 - 0
85C310  00H -> 0 0 0 0 0 R R 0
        01H -> 1 1 0 0 R R R R

85C320  00H -> R R R 0 0 0 0 0
```

```
Go to Prev/Next Register - ↑ ↓
Go to Prev/Next Entry -
     Scroll Bit Value    - PgUp/PgDn
Return to MAIN MENU      - <ESC>
```

```
CLOCK ENABLE/DISABLE

0 -> CACHE DISABLE
1 -> CACHE ENABLE
```

In this section, you simply use the left and right arrow keys to move between options and press PgUp/PgDn to scroll bit value. After you finish the Setup, press 'Esc' to return to main menu. The BIOS will set the registers accordingly.

(1) Cache Enable/Disable

0 -> Cache disable *
1 -> Cache enable

The cache controller is incorporated in the chipset and can be enabled or idsabled. If disabled, the performance will be very low.

(2) Cache Size

00 -> No cache selected *
01 -> 32K cache
10 -> 64K cache and above
11 -> 128 byte internal cache

For 32K, 64K and 128 byte, it must set the jumper in suitable position, otherwise, it may cause the system malfunction. If you select the wrong cache size, it will hang up during boot up. You may clear the CMOS content by JP7 and re-enter the Extended Setup Program.

(3) Cache Write Wait State

0 -> 1 wait state *
1 -> 0 wait state

The following table shows the speed rating of SRAM in 25MHz and 33MHz.

Operation Speed	0 Wait State
25MHz	35ns
33Mhz	25ns

(4) Shadow RAM Option

00 -> 64K AT F0000 *
01 -> 64K AT C0000, 64K AT F0000
10 -> 128K AT E0000, C0000 AT E0000
11 -> Reserved

There are three options of shadow RAM for different system configuration. For the option 00, the content of the system at F000H segment BIOS is copied to the on board memory. For the option 01, both the system ROM and video ROM at C0000H segment are copied to memory. If you install an add-on card which has a ROM at E000H, you may select option 10 to shadow this ROM as well as the system BIOS. If there is any problem

after enabling the shadow memory on the add-on card, it recommends to enable the shadow RAM function for system BIOS only.

(5) Page Mode Enable/Disable

0 -> Disable *
1 -> Enable

The page mode feature is advanced for the system DRAM. It provided higher performance over conventional DRAM access. The page is enabled by using the page-mode RAM as required.

(6) Shadow RAM Enable/Disable

0 -> Disable *
1 -> Enable

If enabled, the content of the system BIOS is copied to the on board memory and thus the operation of the system BIOS is speeded up.

(7) DRAM CMOS Wait State

00 -> 2 Wait State *
01 -> 1 Wait State (25MHz only)
10 -> Reserved
11 -> 3 Wait State

The number of wait state for memory read and write operations depends on the clock speed of CPU and the speed rating of the DRAM. The following table shows the recommended speed ratings. To ensure the stability of the system, select DRAM equivalent to or better than these ratings.

Number of wait state			
CPU speed	1	2	3
25 Mhz	70ns	80ns	100ns

	Number of wait state	
CPU speed	2	3
33 Mhz	70ns	100ns

Check carefully whether your DRAM is suitable for the number of wait states you want to select. Improper setting can make the system unstable. The DRAM timing is tight at 33Mhz or at zero wait state. Since the specification of

DRAM from different manufacturers may vary, you would better consult your local dealer for the detail information.

(8) DMA CLK Selection

0 -> 7.195MHz *
1 -> 4.773MHz

The standard AT DMA clock is 4.77MHz. The option of 7.195 is used in fast DMA device. In normal operation, it is recommended to use the 4.77MHz clock.

(9) 8-bit/16-bit AT Cycle Wait State

For 8 bit AT Cycle wait state

0 -> 4 Wait State *
1 -> 5 Wait State

For 16 bit AT Cycle wait state

0 -> 1 Wait State *
1 -> 2 Wait State

For the standard AT bus, it requires 1ws for 16 bit and 8 bit bus operation to 8 bit drive, take 4 wait state, so cycle time is achieved. The lower I/O device will require more wait to complete cycle.

(10) Bus Clock Speed Selection

00 -> 1/4 System clock *
01 -> 1/3 System Clock
10 -> 1/2 System Clock
11 -> Unused

Bus clock is used by peripherals on the motherboard and slots, such as display and DMA. Bus clock is generated from CPU clock-in and the speed of Bus clock is shown below.

CPU Speed		
ICLK	33 MHz	25 MHz
CLKIN/4	8.25	6.25
CLKIN/3	11.00	8.33
CLKIN/2	16.50	12.50

The system performance can be improved by selecting a higher Bus clock speed. To be compatible with general add-on cards, the Bus clock must be 8.33 MHz or less. There are many old version add-on cards that can only run at the slow speed. so, be careful when you want to set to higher speed.

* Default Setting

Appendix B
Memory Expansion Card

Memory expansion card contains bank 2 and bank 3 of memory. There are 8 SIMM modules on the card and total memory on this card is 8MB. Please refer to Chapter 3 for the configuration of the memory.

After installing the memory card, the system BIOS will determine the type of DRAM and the amount of total memory. There is no need to set any jumper. The system BIOS will prompt you to setup the memory size after re-boot.

However, you should make sure that the memory on the memory expansion board can be used reliably with the current setting of wait state. If there is any problem, increase the number of wait state.

There is a mounting plate on rear of the card. This mounting plate is used to keep the card on the slot firmly. Use a screw to fasten the card to the case.

Appendix C
Operation and Maintenance

STATIC ELECTRICITY

When installing or removing any add-on card, DRAM module or coprocessor, you should discharge the static electricity on your body. Static electricity is dangerous to electronic device and can build-up on your body. When you touch the add-on card or motherboard, it is likely to damage the device. To discharge the static electricity, touch the metal of your computer. When handling the add-on card, don't contact the components on the cards or their "golden finger". Hold the cards by their edges.

KEEPING THE SYSTEM COOL

The motherboard contains many high-speed components and they will generate heat during operation. Other add-on cards and hard disk drive can also produce a lot of heat. The temperature inside the computer system may be very high. In order to keep the system running stably, the temperature must be kept at a low level. A easy way to do this is to keep the cool air circulating inside the case. The power supply contains a fan to blow air out of the case. If you find that the temperature is still very high, it would be better to install another fan inside the

case. Using a larger case is recommended if there are a number of add-on cards and disk drives in the system.

CLEANING THE "GOLDEN FINGER"

Whenever inserting an add-on card to the motherboard, make sure that there is no dirt on the "golden finger" of the add-on card. If not, the contact between the "golden finger" and the slot may be poor and thus the add-on card may not work properly. Use a pencil eraser to clean the "golden finger" if dirt is found.

CLEANING THE MOTHERBOARD

The computer system should be kept clean. Dust and dirt is harmful to electronic devices. To prevent dust from accumulating on the motherboard, installing all mounting plates on the rear of the case. Regularly examine your system, and if necessary, vacuum the interior of the system with a miniature vacuum.

Appendix D
Troubleshooting

POOR PERFORMANCE

If the performance of the system becomes very poor after enabling cache memory, it is likely that the jumper setting for the cache memory is incorrect. Refer to CONFIGURATION OF CACHE MEMORY in the Chapter 3 for the description of the related jumper. Note that if U16 is not installed, there should be no jumper on JP3.

MAIN MEMORY ERROR

After power up, the monitor remains blank, and there are beep sounds indicating a main memory failure. In this case, turn off the power and remove all SIMM modules. Carefully place the modules back to the sockets and make sure that all the modules are locked by the locking latches firmly.

In some other cases, the total memory found by the BIOS is different from the actual amount of memory on board. (Note that 128K bytes memory is reserved for the shadow RAM function and will not be counted by the BIOS). It is also a memory failure and you can follow the instruction above.

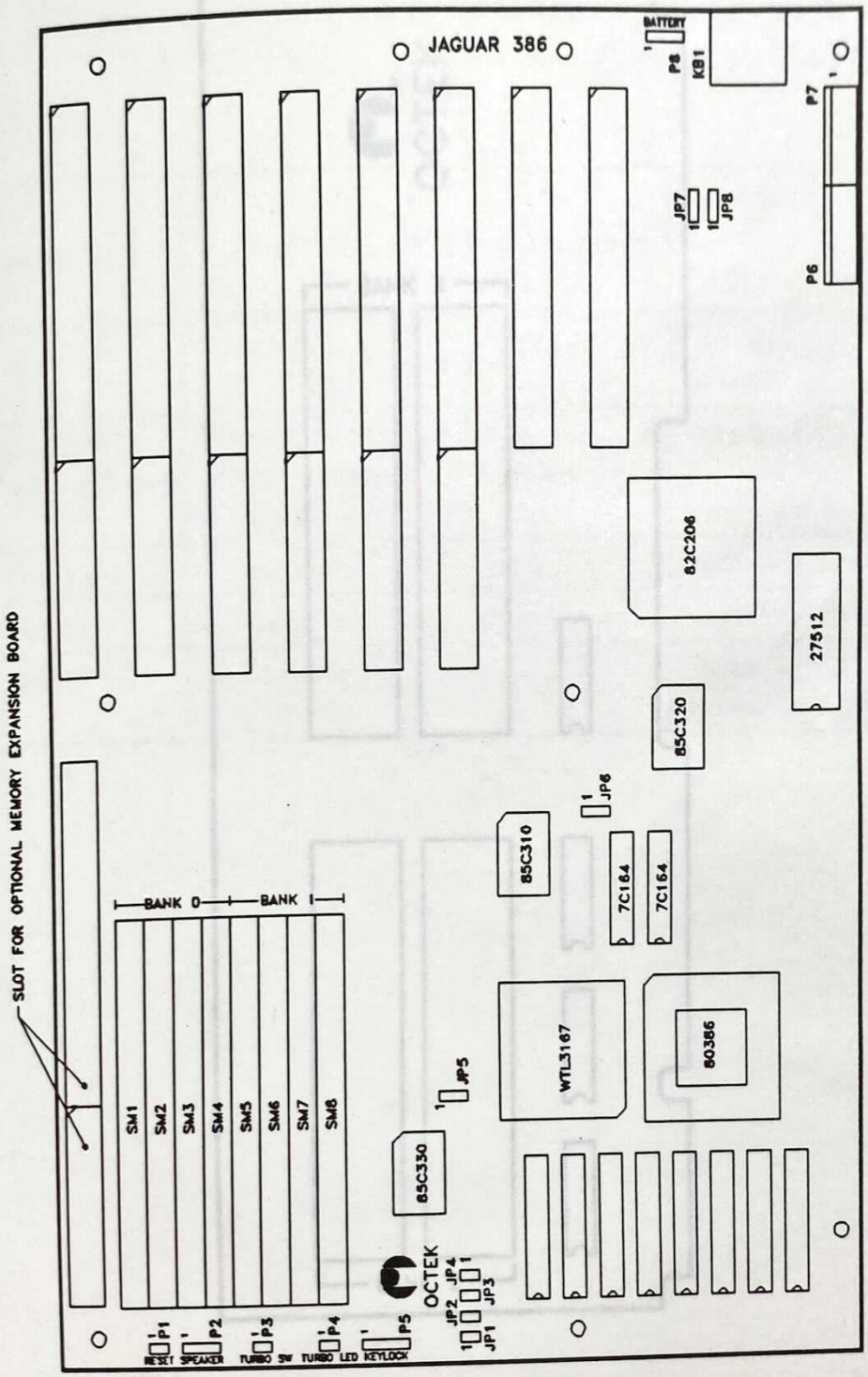
CACHE MEMORY FAILURE

If the system hangs after memory test, it is likely that the cache memory has some problems. May be some of the SRAMs are damaged or the contact of the IC pins is poor. Try to press the SRAM to make sure that the SRAMs are inserted in the sockets, or examine the SRAM to see whether any pins are bent under or out. If the bent pins are found, remove the SRAM, straighten the pin and place the SRAM again. You may also check the BIOS setup of the cache configuration. If the cache controller is enabled, you should select chipset's cache controller. Otherwise, the system will fail.

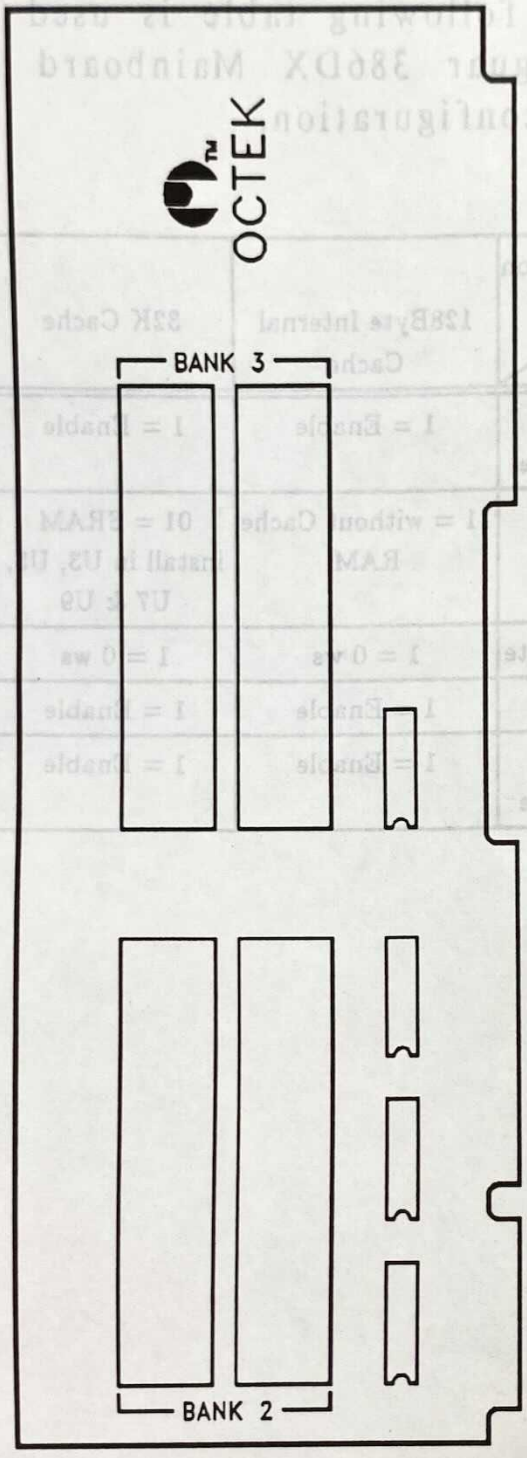
IMPROPER SETTING OF WAIT STATE

If the system hangs after memory test, another possible cause is the improper setting of the wait state for memory operation. The number of wait state must match the speed of the DRAM. Reset the CMOS RAM and set up the wait state. Try to increase the number of wait state.

Appendix E
System Board Layout



Appendix F
Memory Expansion Card Layout



33MHz Jaguar 386DX

Supplementary Note

The following table is used to make the 33MHz Jaguar 386DX Mainboard operating in different configuration.

Configuration / CMOS Setup	128Byte Internal Cache	32K Cache	64K Cache
Cache Enable/Disable	1 = Enable	1 = Enable	1 = Enable
Cache Size	11 = without Cache RAM	01 = SRAM install in U3, U5, U7 & U9	10 = SRAM install in U2 - U9
Cache Wait State	1 = 0 ws	1 = 0 ws	1 = 0 ws
Page Mode	1 = Enable	1 = Enable	1 = Enable
Shadow RAM Enable/Disable	1 = Enable	1 = Enable	1 = Enable