CH-386-25D/33A

Main Board

User's Manual

0386-B17

CH-386-25D/33A

Main Board

User's Manual

Version 1.1, September 1990

The information contained in this manual is subject to change without notice.

Table of Contents

1. INTRODUCTION

This CH-386-25D/33A is a high-performance main board that provides the primary elements for advanced personal computers. This board is functionally and mechanically compatible with the IBM PC/AT main board.

There are two types of main board to choose from:

Type 1: CH-386-25D (25MHz)
Type 2: CH-386-33A (33MHz)

	CH-386-25D	CH-386-33A
CPU	80386DX-25	80386DX-33
Oscilator	50MHz	66MHz
Chipsets	25MHz	33MHz
Cache SRAM	35ns	25ns
TAG SRAM	25ns	15ns
Comparator	74F521 (11ns)	74PCT521 (5.5ns)

Table 1-1. Type 1 and Type 2 different elements.

1-1 CH-386-25D/33A Function Specification

- 25MHz/33MHz INTEL 80386DX CPU.
- 80387/WEITEK 3167 Coprocessor socket on board.
- Supports coprocessor 80387 synchronous/asynchronous mode.
- OPTI 82C381, 82C382 chipsets.
- Direct mapped 64KB Cache organization.
- Supports page mode in odd banks and 2/4 way page/interleave mode in even banks.
- Selectable DRAM read/write wait state.
- Non-cacheable programmable memory regions.
- On board 1-8MB SIP/SIMM RAM module available.
- 8MB expansion memory card option.
- Supports video and BIOS shadow RAM.
- On board rechargeable battery back-up for CMOS configuration and real-time clock.
- Optimized for OS/2, Window/386, XENIX, UNIX software operation.
- One 32-Bit memory slot, two 8-Bit and six 16-Bit expansion slots.
- Baby AT size, with XT/AT mounting hole.

2. HARDWARE DESCRIPTION

2-1 Connector and Jumper Settings

This chapter is a description of the jumpers and connectors of the CH-386-25D/33A main board.

The system layout is shown on the next page. Each group of jumpers and connectors is separately illustrated on pages 2-3, 2-6 and 2-8.

Note: Jumper default settings are shown in bold type.

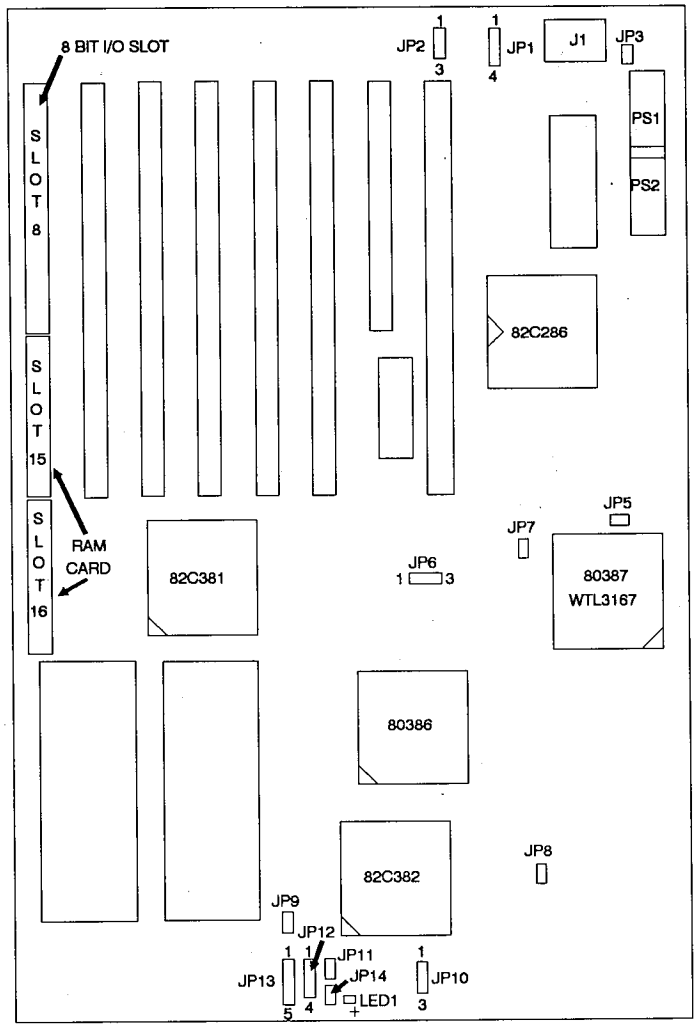


Figure 2-1. System Layout Block Diagram.

Note: Slot 8 in figure 2-1 is for an 8 bit I/O card *only*. Please do not insert a 16 bit I/O card in this slot.

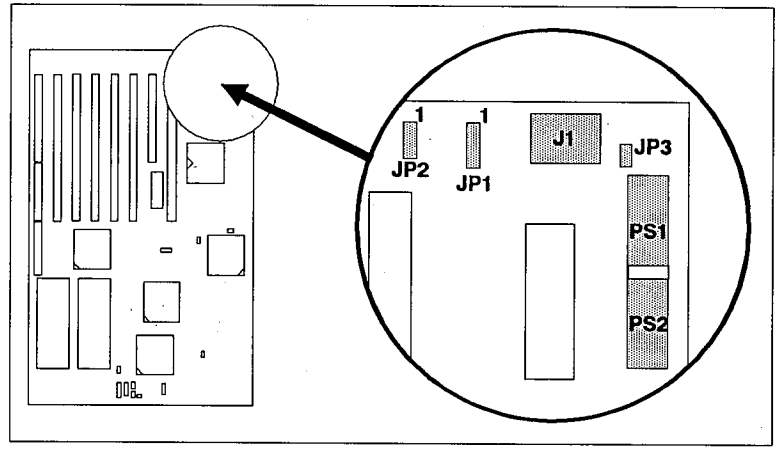


Figure 2-2.

The following tables (2-1 to 2-5) refer to figure 2-2 above.

PINOUT	SIGNAL NAME
1	Keyboard clock
2	Keyboard data
3	NC
4	Ground
5	+5V

Table 2-1. Keyboard connector (J1)

PINOUT	ASSIGNMENTS
1	Power good
2	+5V
3	+12V
4	-12V
5	Ground
6	Ground
7	Ground
8	Ground
9	-5V
10	+5V
11	+5V
12	+5V

Table 2-2. Power connector (PS1, PS2)

PINOUT	SIGNAL NAME
1	VDD (Normal 6V)
2	NC
3	Ground
4	Ground

Table 2-3. External battery connector (JP1).

SETTING	RESULT
1-2 short	**Normal operation**
2-3 short	Clear CMOS RAM setup data

Table 2-4. CMOS RAM power jumper (JP2).

SETTING	RESULT
Short	Color display
Open	**Monochrome display**

Table 2-5. CRT type jumper (JP3).

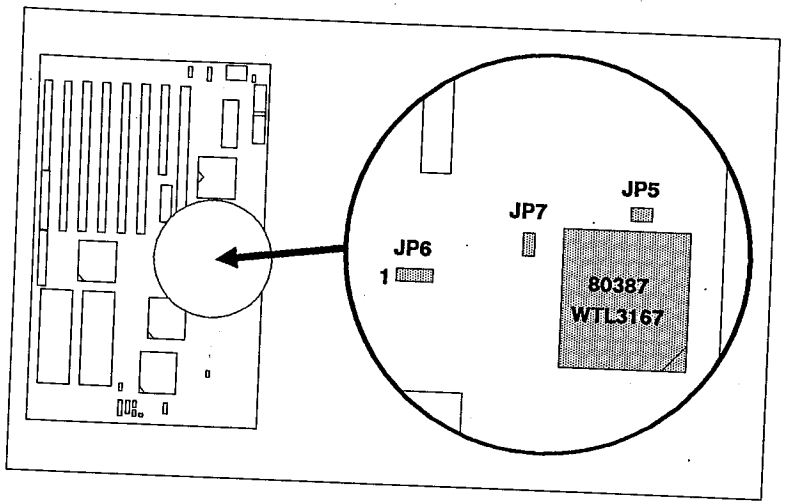


Figure 2-3.

The following tables (2-6 to 2-8) refer to figure 2-3 above.

SETTING	RESULT
Short	WTL3167 inserted
Open	**WTL3167 not inserted**

Table 2-6. WTL3167 installation jumper (JP5).

Note: WTL3167 must work in synchronous mode (JP7 open).

SETTING	RESULT
1-2 short	**non-pipeline mode**
2-3 short	pipeline mode

Table 2-7. Pipeline select jumper (JP6).

Note: With direct-mapped cache installed, CPU always runs in non-pipeline mode (1-2 short).

SETTING	RESULT
Short	80387 Asynchronous mode
Open	**80387 Synchronous mode**

Table 2-8. Coprocessor synchronous/asynchronous jumper (JP7).

Note: CH-386-25D — When 80387 is working in synchronous mode (JP7 open), a 25MHz 80387 must be used. When 80387 is working in asynchronous mode (JP7 short), a 20 MHz 80387 can be used.

CH-386-33A — When 80387 is working in synchronous mode (JP7 open), a 33MHz 80387 must be used. When 80387 is working in asynchronous mode (JP7 short), a 25 MHz 80387 can be used.

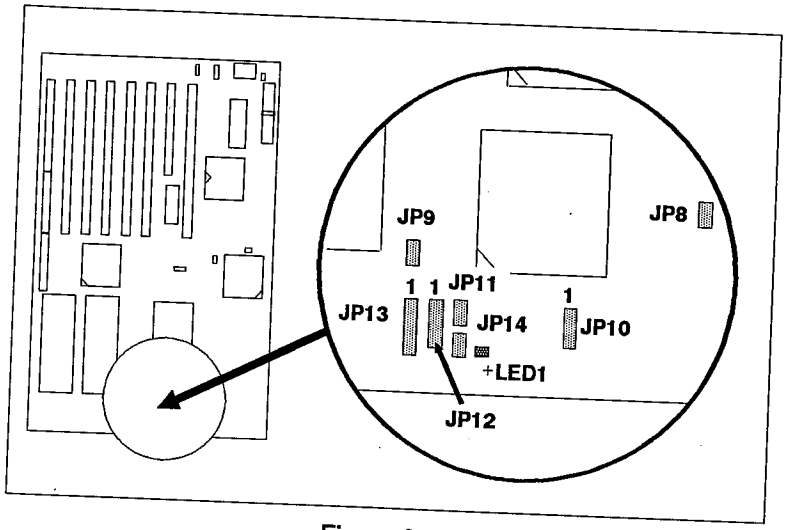


Figure 2-4.

The following tables (2-9 to 2-14) refer to figure 2-4 above.

PINOUT	ASSIGNMENTS
1	LED output
2	Ground

Table 2-9. Turbo LED connector (LED1).

**** JP8: Always short .****

SETTING		RESULT
JP9	JP10	Line Size
Short	1-2 short	4 bytes
Short	2-3 short	8 bytes
Open	**2-3 short**	**16 bytes**

Table 2-10. Cache memory line size select (JP9, JP10).

Note: Please check TAG-RAM (U46, 47) size (4K x 4, or 16K x 4) for selectable line size.
Example 1: TAG-RAM size 4K x 4, line size can only be 16 bytes (JP9 open, JP10 2-3 short).
Example 2: TAG-RAM size 16K x 4, line size can be 4 bytes, 8 bytes or 16 bytes.

PINOUT	ASSIGNMENTS
1	Reset
2	Ground

Table 2-11. Hardware reset connector (JP11).

PINOUT	ASSIGNMENTS
1	Speaker output
2	Ground
3	Ground
4	+5V

Table 2-12. Speaker connector (JP12).

PINOUT	ASSIGNMENTS
1	Power LED output
2	NC
3	Ground
4	Keylock
5	Ground

Table 2-13 Keylock and power LED connector (JP13).

PINOUT	ASSIGNMENTS
1	Turbo pin
2	Ground

Table 2-14. Hardware turbo switch connector (JP14).

Note: The mainboard supports hardware/software (Turbo switch/ Key: Ctrl + Alt + "+"/"-") speed change, but only when running at low speed. For example, if the turbo switch is used to set the system to high speed, you cannot change to low speed by using Ctrl + Alt + "-".

2-2 DRAM Bank Configuration

The local DRAM system can be configured from one up to four banks of 256K x 36-bits or 1M x 36-bits each. Each bank of memory is further divided into four 8-bit banks with one additional bit for parity. Only banks 0 and 1 reside on the mainboard, and an additional RAM card must be installed in slots 15 and 16 for banks 2 and 3.

Bank0	Bank1	Bank2	Bank3	Total Memory
0	0	0	0	0
256K	0	0	0	1M
256K	256K	0	0	2M
256K	256K	256K	0	3M
256K	256K	256K	256K	4M
1M	0	0	0	4M
256K	1M	0	0	5M
1M	256K	0	0	5M
256K	1M	256K	0	6M
1M	256K	256K	0	6M
256K	256K	1M	256K	7M
256K	1M	256K	256K	7M
1M	256K	256K	256K	7M
1M	1M	0	0	8M

Continued on next page.

Continued from previous page.

Bank0	Bank1	Bank2	Bank3	Total Memory
256K	1M	1M	0	9M
1M	1M	256K	0	9M
1M	256K	1M	0	9M
256K	256K	1M	1M	10M
256K	1M	1M	256K	10M
1M	1M	256K	256K	10M
1M	256K	1M	256K	10M
1M	1M	1M	0	12M
256K	1M	1M	1M	13M
1M	1M	1M	256K	13M
1M	256K	1M	1M	13M
1M	1M	1M	1M	16M

Table 2-14. DRAM BANK configuration.

Note: Shadowed areas show on-board DRAM type selection.

3. BIOS SETUP

AMI BIOS provides standard CMOS setup and extended CMOS setup.

There are two ways to enter the BIOS SETUP program:

1. Whenever BIOS detects any equipment error or the CMOS contents are not consistent with the equipment.

2. After power on memory test bypass, the screen will show:

```
Press <DEL> if you want to run SETUP/EXIT-SETUP
```

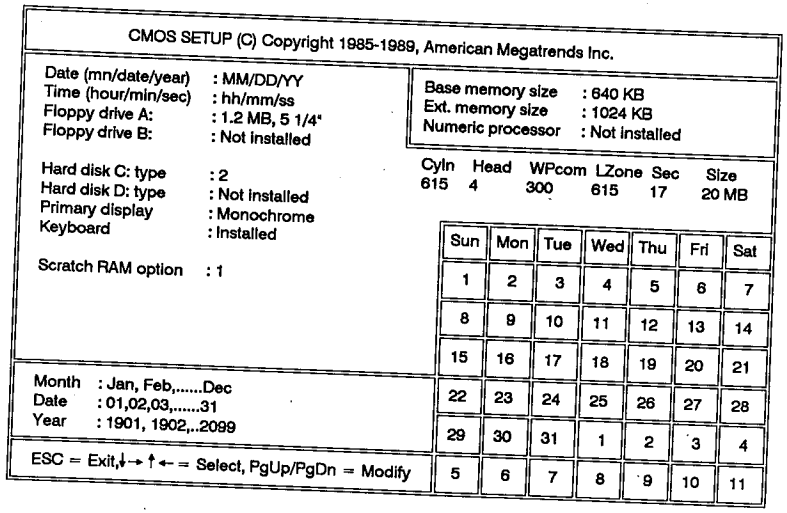
Press the DEL key to get the following screen:

```
EXIT FOR BOOT
RUN CMOS SETUP
RUN XCMOS SETUP
```

Use the < ↑ > or < ↓ > keys to highlight the desired option and press <Enter>.

3-1 Standard CMOS Setup

When you enter standard CMOS SETUP, the screen will be as follows:



3-1.1 CMOS Setup Option

The setup screen requires you to set the following:

a. Date

b. Time

c. Floppy drive A type

d. Floppy drive B type

e. Hard disk type for drive C

f. Hard disk type for drive D

g. Type of display card

h. Presence of keyboard

i. Scratch RAM option.

The setup screen also displays the following:

a. Amount of real and extended memory

b. Presence of numeric co-processor

c. A calendar

Note:	The Setup option is available even after a soft reset.

3-1.2 Key Conventions Used

The following key conventions are used:

<Enter> ..... moves the selection bar

<←> & <→> ..... moves the selection bar

<PgUp> & <PgDn> ..... scrolls allowable settings

<Esc> ..... exit and save CMOS register

<Ctrl> <Alt> <Del> ..... exit without save

3-1.3 Date and Time Setup

The first entry in the setup screen is current date. A calendar has been provided to help the user in this procedure.
Use the <←> and <→> keys to highlight month, date or year and press the <PgUp> or <PgDn> keys to select the appropriate value. The procedure for setting the time is similar to that of setting the date. The time here is 24-hour time so don't be alarmed when hour 13 shows up on the screen. Simply highlight either the hours, minutes or seconds and press the <PgUp> or <PgDn> keys to step through the numbers.

3-1.4 Floppy Disk Drive Setup

Drives A: and/or B: may be one of the following types:

Allowable drive types:

360KB 5¼"
1.2MB 5¼"
720KB 3½"
1.44KB 3½"
Not installed

3-1.5 Hard Disk Drive Setup

Drives C: and D: are the hard drives in the system. 46 drive types have been defined by AMI. If for some reason your particular drive is not one of the 46 pre-defined types, simply scroll down to type 47 and enter the following drive specifications: cylinders, heads, WPcom, LZone and sectors.
Please consult the documentation received with the drive for the specific values that will give optimum performance.

3-1.6 Display Type Setup

The next option is the primary display selection. The options are as follows:

Type of display allowed:

Monochrome
Color 40 x 25
Color 80 x 25
EGA or VGA
Not installed

3-1.7 Keyboard Setup

The keyboard setup is the next option. You may choose either to enable or disable the keyboard test during Power On Self Test by setting keyboard as "Installed" or "Not Installed".

3-1.8 Scratch RAM Option

The final option is the setting of the scratch RAM. The purpose of this element is to (1) save the user-definable drive type 47, (2) translate 80386 Loadall function for programs like OS/2, RAMDRIVE, etc. If shadow RAM is not enabled, the parameters of the drive must be stored in normal RAM, but the integrity of the data must be maintained. The options you have are as follows:

1. The BIOS to use 100 bytes at 30h:0
2. The BIOS to reduce the size of the base memory by 1KB.

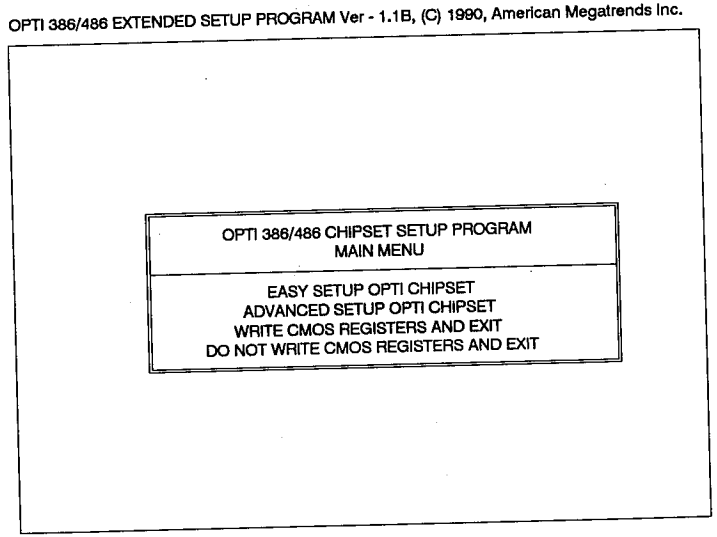
The default is 1. If you are not using drive type 47 and not running programs like OS/2 or RAMDRIVE, this RAM will never be used so you may leave the value as 1.

3-2 Extended CMOS Setup

The OPTI 386 chipset extended CMOS setup program can be used to program the chipset extended CMOS with user-defined values which will be used by the BIOS to program the chipset registers during system boot-up. If this program is not run, then the BIOS will use the default values for these chipset registers.

3-2.1 Main Menu

When you enter the Extended CMOS setup main menu, the screen will display the following:



The OPTI CHIPSET EXTENDED CMOS SETUP menu offers the following options:

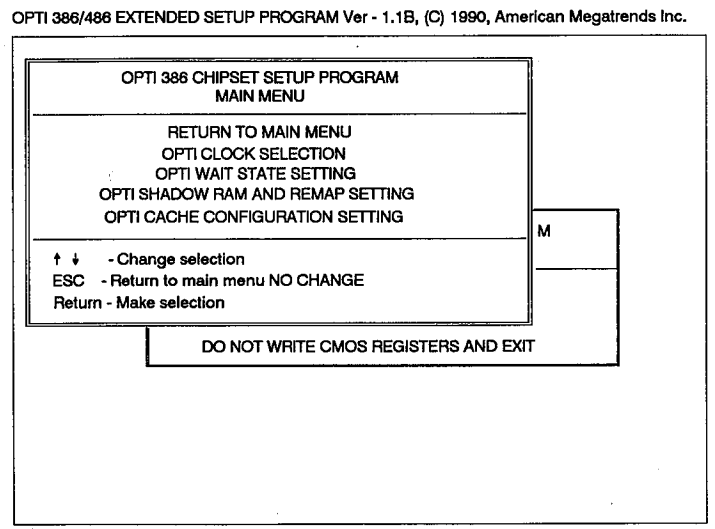
- EASY SETUP OPTI CHIPSET
- ADVANCED SETUP OPTI CHIPSET
- WRITE CMOS REGISTERS AND EXIT
- DO NOT WRITE CMOS REGISTERS AND EXIT

The ADVANCED SETUP OPTI CHIPSET option is for technically advanced users who wish to fine-tune their systems. Most users will only need the EASY SETUP option.

Note: In the EASY SETUP OPTI CHIPSET windows, use:
< ↑ > and < ↓ > keys to change selection,
<Esc> key to return to the main menu without making changes,
<Enter> key to make selection.
To return to the previous window, select RETURN TO PREVIOUS WINDOW and press the <Enter> key.

3-2.2 Easy Setup OPTI Chipset

Enter EASY SETUP OPTI CHIPSET and the screen will show the following:

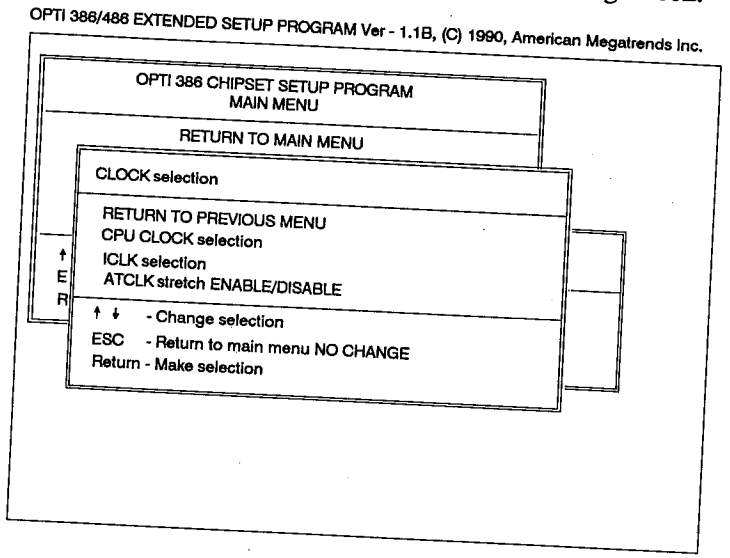


The EASY SETUP OPTI CHIPSET menu offers the following options:

- OPTI clock selection
- OPTI wait state setting
- OPTI shadow RAM and remap setting
- OPTI cache configuration setting

3-2.3 OPTI Clock Selection

Enter OPTI CLOCK SELECTION to see the following screen:

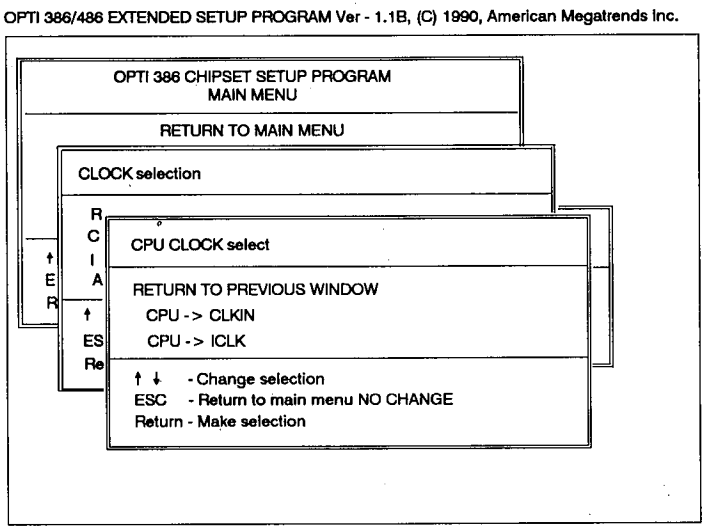


The OPTI CLOCK SELECTION menu offers the following options:

- CPU clock selection
- ICLK selection
- ATCLK stretch ENABLE/DISABLE

3-2.4 CPU Clock selection

When you enter CPU CLOCK SELECTION, the screen will show the following:

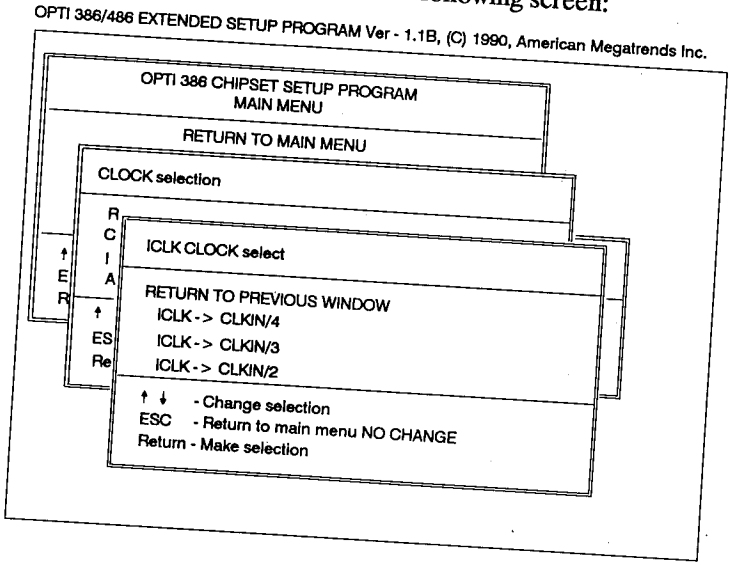


The CPU CLOCK SELECTION option gives you two choices:

- CPU -> CLKIN
- CPU -> ICLK

3-2.5 ICLK Selection

Enter ICLK SELECTION to see the following screen:



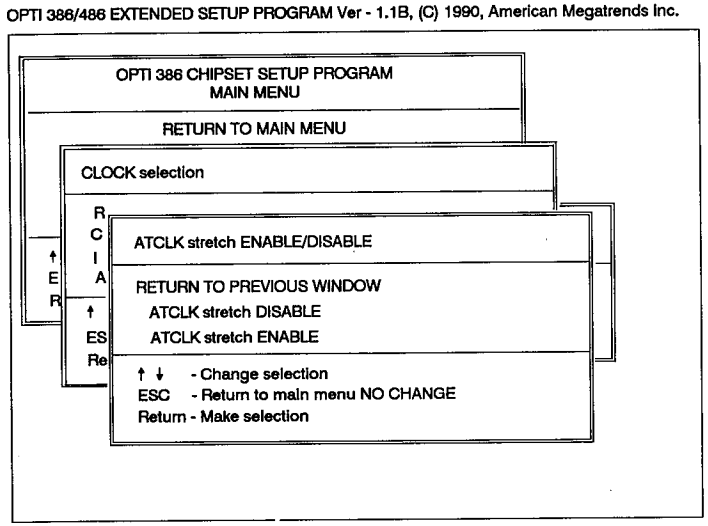
The ICLK SELECTION option gives you three choices:

- ICLK - CLKIN/4
- ICLK - CLKIN/3
- ICLK - CLKIN/2

Note:	CLKIN equals oscillator frequency. This option is used to set the low speed and AT SYSCLK frequencies. AT SYSCLK = ICLK/2. CH-386-25D recommended setting: ICLK-> CLKIN/3 CH-386-33A recommended setting: ICLK-> CLKIN/4

3-2.6 ATCLK Stretch Enable/Disable

Enter ATCLK stretch ENABLE/DISABLE to see the following screen:



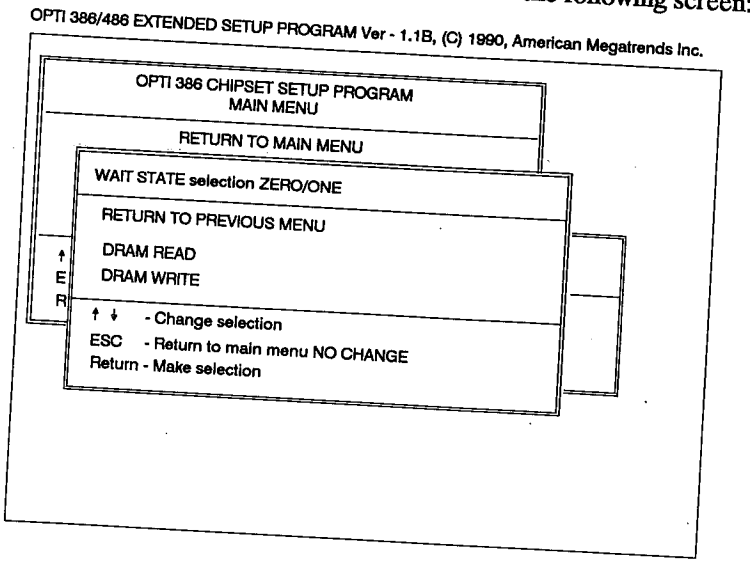
The ATCLK stretch ENABLE/DISABLE option gives you two choices:

- ATCLK stretch DISABLE
- ATCLK stretch ENABLE

Note:	ATCLK stretch ENABLE gives higher performance, but will cause problems with some software. We strongly recommend only using ATCLK stretch DISABLE.

3-2.7 OPTI Wait State Setting

Enter OPTI WAIT STATE SETTING to view the following screen:



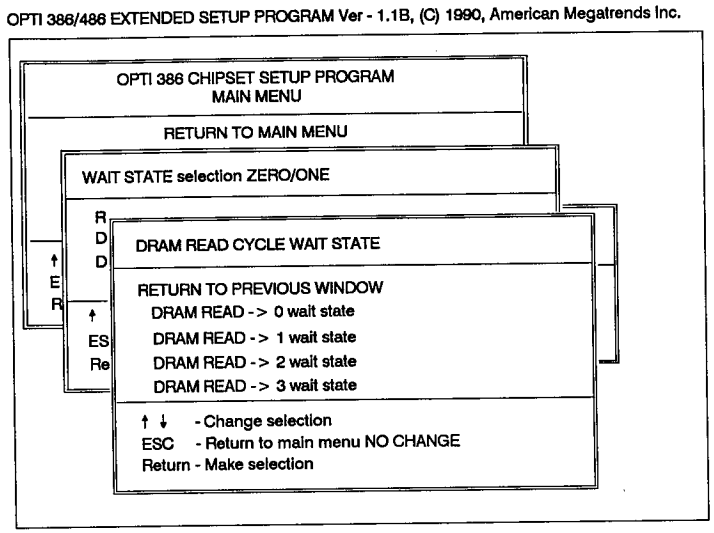
The OPTI WAIT STATE SETTING menu offers the following options:

- DRAM READ
- DRAM WRITE

Note:	The default DRAM WAIT STATE settings are: DRAM READ -> 1 wait state DRAM WRITE -> 1 wait state

3-2.8 DRAM Read

Enter DRAM READ to see the following screen:

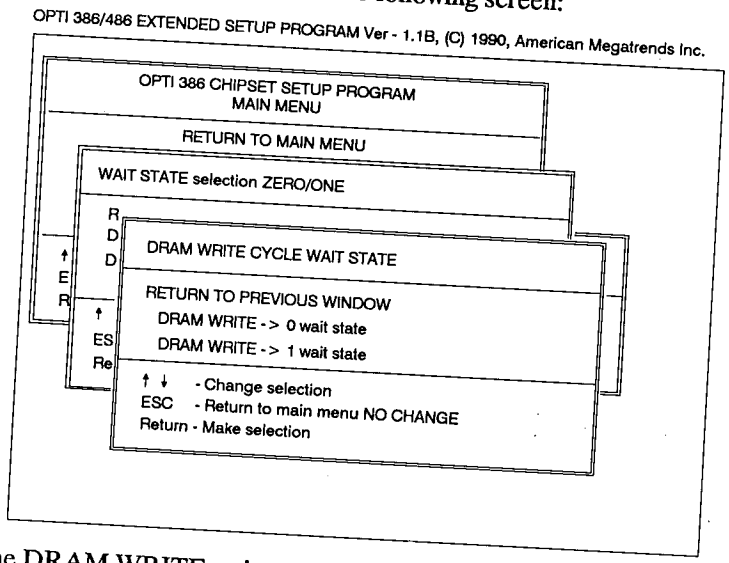


The DRAM READ cycle wait state option gives you four choices:

- DRAM READ -> 0 wait state
- DRAM READ -> 1 wait state
- DRAM READ -> 2 wait state
- DRAM READ -> 3 wait state

3-2.9 DRAM Write

Enter DRAM WRITE to see the following screen:



The DRAM WRITE wait state option gives you two choices:

- DRAM WRITE -> 0 wait state
- DRAM WRITE -> 1 wait state

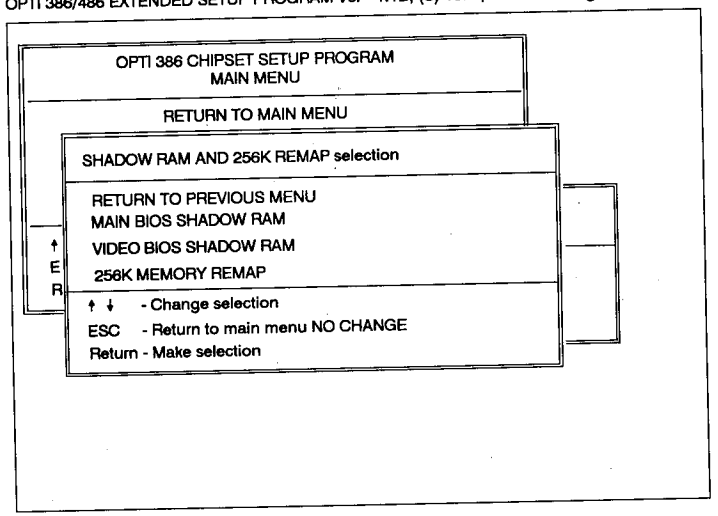
The table below gives our recommended wait state settings:

Model	DRAM used	DRAM WRITE	DRAM READ
CH-386-25D	100ns	0 wait state	1 wait state
	80ns	0 wait state	0 wait state
CH-386-33A	80ns	0 wait state	1 wait state
	60ns	0 wait state	0 wait state

If the system will not boot or there is a parity error, increase the DRAM READ wait state in the setup.

3-2.10 OPTI Shadow RAM and REMAP Setting

Enter OPTI SHADOW RAM AND REMAP SETTING to see the following screen:

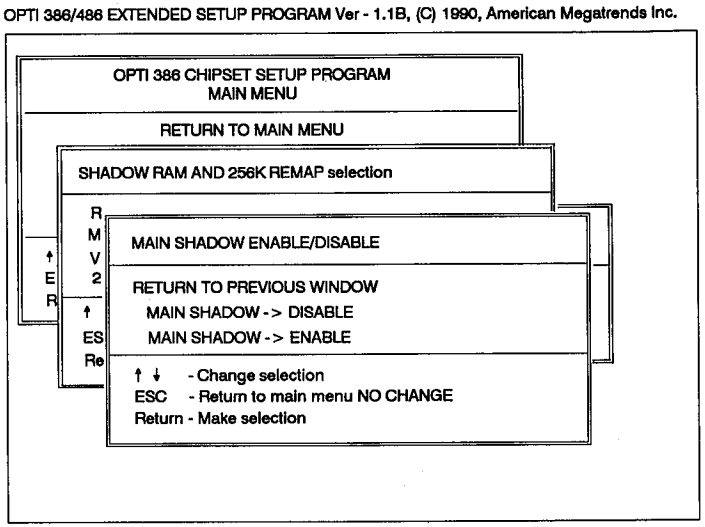


The OPTI SHADOW RAM AND REMAP SETTING menu offers the following options:

- MAIN BIOS SHADOW RAM
- VIDEO BIOS SHADOW RAM
- 256K MEMORY REMAP

3-2.11 Main BIOS Shadow RAM

Enter MAIN BIOS SHADOW RAM to view the following screen:



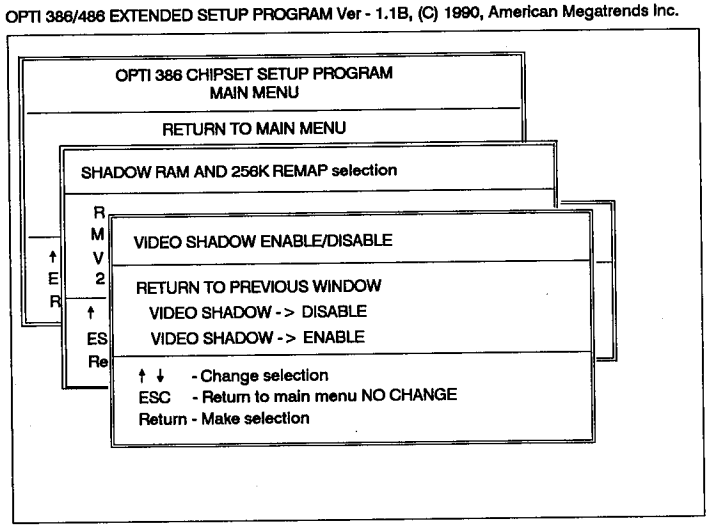
The MAIN BIOS SHADOW RAM option gives you two choices:

- MAIN SHADOW -> ENABLE
- MAIN SHADOW -> DISABLE

Note:	MAIN BIOS ENABLE for system BIOS ROM is at F0000-FFFFH address.

3-2.12 Video BIOS Shadow RAM

Enter VIDEO BIOS SHADOW RAM to view the following screen:



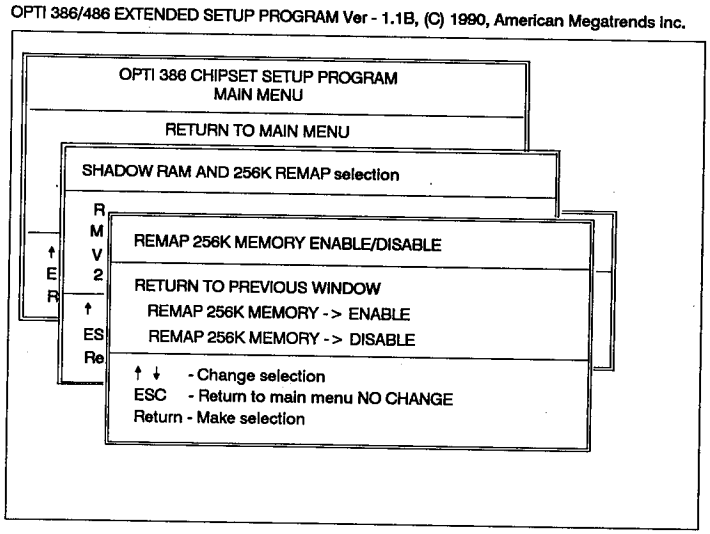
The VIDEO BIOS SHADOW RAM option gives you two choices:

- VIDEO SHADOW -> ENABLE
- VIDEO SHADOW -> DISABLE

Note:	VIDEO BIOS ENABLE for ADAPTOR BIOS ROM is at C0000-CFFFFH address.

3-2.13 256K Memory Remap

Enter 256K MEMORY REMAP to view the following screen:



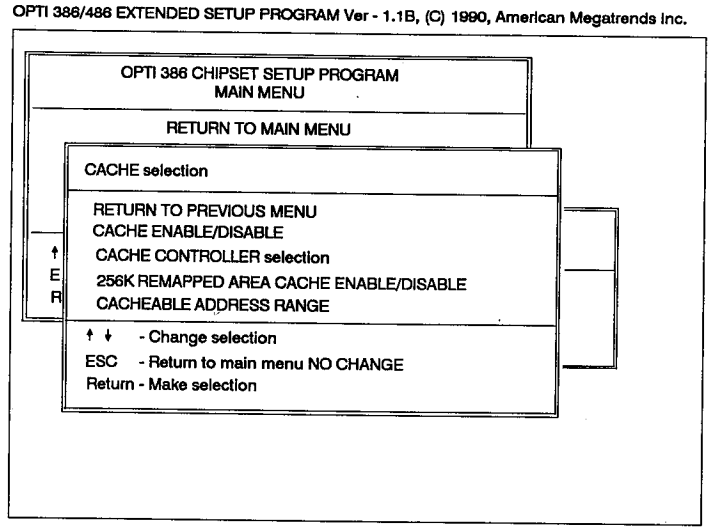
The 256K MEMORY REMAP option gives you two choices:

- REMAP 256K MEMORY -> ENABLE
- REMAP 256K MEMORY -> DISABLE

Note: If the adaptor BIOS area isn't shadowed (REMAP 256K MEMORY ENABLE) it can remap 256K of memory (A0000H-BFFFFH and D0000H-EFFFFH) to the top of system memory.

3-2.14 Cache Selection

Enter CACHE Selection to see the following screen:

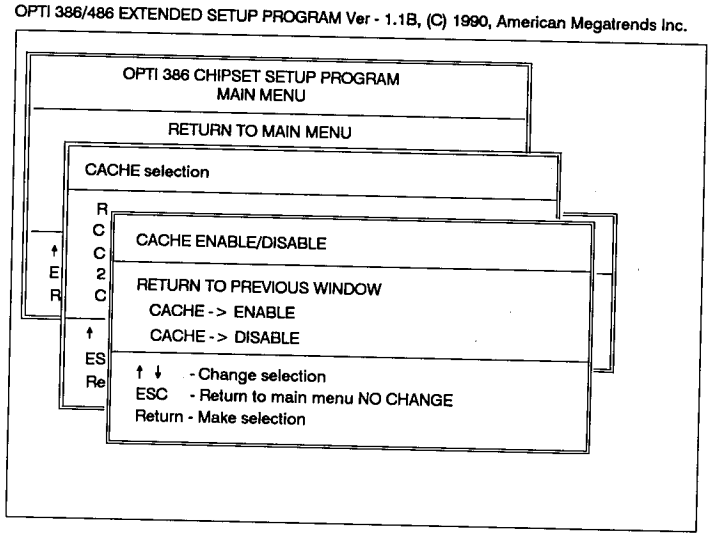


The CACHE Selection menu offers the following options:

- CACHE ENABLE/DISABLE
- CACHE CONTROLLER Selection
- 256K REMAPPED AREA CACHE ENABLE/DISABLE
- CACHEABLE ADDRESS RANGE

3-2.15 Cache Enable/Disable

Enter CACHE ENABLE/DISABLE to view the following screen:



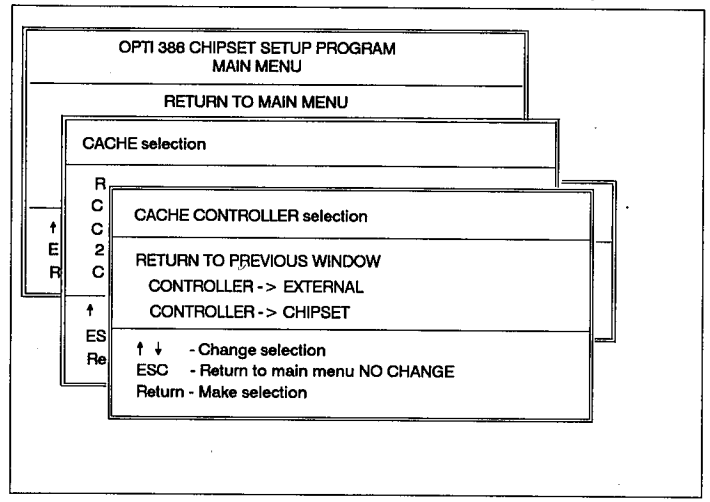
The CACHE ENABLE/DISABLE option gives two choices:

- CACHE -> ENABLE
- CACHE -> DISABLE

Note:	CACHE ENABLE - CPU always runs in non-pipeline mode (JP6 1-2 short). CACHE DISABLE - CPU running in pipeline mode can increase one CPUCLK access time for slower DRAM (JP6 2-3 short).

3-2.16 Cache Controller Selection

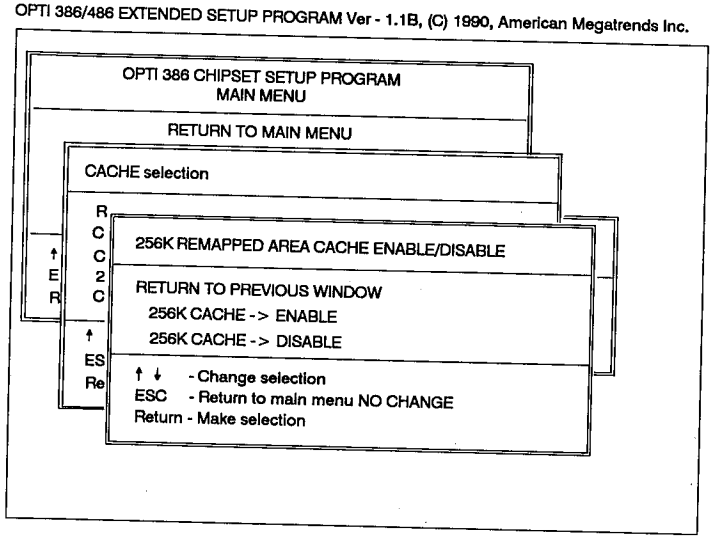
Enter CACHE CONTROLLER Selection to see the following screen:



Note:	You must select CONTROLLER -> CHIPSET from the choices.

3-2.17 256K Remapped Area Cache Enable/Disable

Enter 256K REMAPPED AREA CACHE ENABLE/ DISABLE to see the following screen:



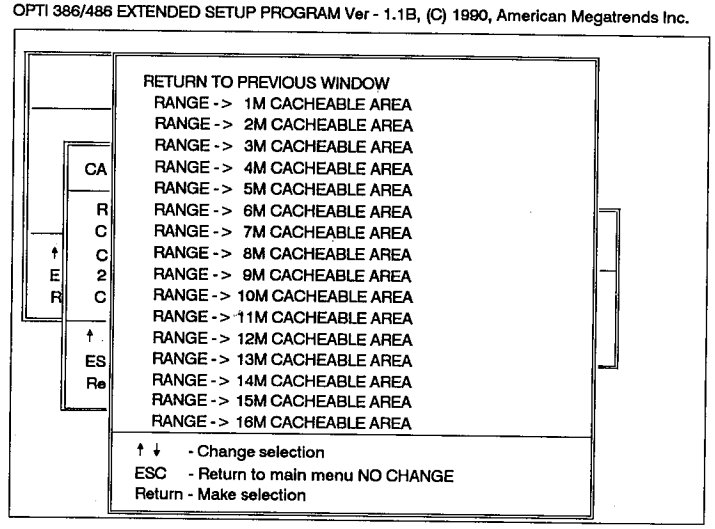
The 256K REMAPPED AREA CACHE ENABLE/ DISABLE option gives you two choices:

- 256K CACHE -> ENABLE
- 256K CACHE -> DISABLE

Note:	256K of memory is remapped to the top of the system memory regardless of whether you choose CACHE ENABLE or DISABLE.

3-2.18 Cacheable Address Range

Enter CACHEABLE ADDRESS RANGE to see the following screen:



The CACHEABLE ADDRESS RANGE option gives the following choices:

- RANGE -> 1M CACHEABLE AREA
- RANGE -> 2M CACHEABLE AREA

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- RANGE -> 15M CACHEABLE AREA
- RANGE -> 16M CACHEABLE AREA

Note:	Select an appropriate CACHEABLE AREA.

CH-386-25D/33A Layout Diagram