

Amstrad

PC7486 **SLC** 33

TECHNICAL REFERENCE

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1. Introduction

This manual includes the technical and machine specific details that relate to the PC7486SLC-33. The content is intended to supplement the Amstrad PC User Guide and additional information regarding pre-installed software can be found in the Amstrad Software Installation Guide.

1.1 Specification

CPU:	486SLC with 1kb internal cache and Hardware multiplier
CPU Speed:	33MHz
Co-Processor:	Socket for 80387sx or equivalent rated at 20MHz.
Memory size:	2 or 4 Mb. Can be upgraded to 16Mb.
Cache:	16 or 64kb direct mapped cache.
Keyboard:	101 or 102-key, PS/2 keyboard
Mouse:	Two button PS/2 type
Floppy Disk:	3.5 inch, 1.44Mb
Hard Disk:	130 or 214Mb 16ms average access time
Video adapter:	SVGA supporting VGA, EGA, MCGA, CGA, MDA and Hercules
Video memory:	512kb or 1Mb
Resolution:	1024 x 768x 256 colours
Parallel Port:	Bi-directional port with centronics 25-way D-type female connector
Serial Port:	Two RS232 ports with 9-way D-type male connectors
Expansion slots:	Two 16 bit ISA 2/3-length
Exp Bus speed:	Selectable up to 13MHz synchronous to CPU.
BIOS:	Integrated System and Video BIOS ROM Operating System with shadow facility and Setup configuration utility.
PSU:	65W Auto-ranging from 110 to 250V.

1.2 BIOS features

DRAM Timing option

Option for FAST or SLOW DRAM Timing, providing maximum performance for the DRAM provided as standard. If the System memory is upgraded, some vendor types may require the SLOW option to be set for reliable operation.

Local refresh.

DRAM requires constant 'refreshing' to keep its contents preserved. While this is in progress, data cannot be written or programs loaded so the performance suffers. Therefore the time spent refreshing the DRAM should be as short and infrequent as possible. The time between refreshes is dependent on the DRAM and can be set to one of the following values:- 15, 30, 60 or 120us using the Advanced CMOS Setup utility described in Chapter 9.

Decoupled refresh

The standard IBM PC/AT system uses "Coupled refresh" whereby the on-board system DRAM is refreshed concurrently with the AT bus with the CPU idle. Decoupled refresh allows the local DRAM to be refreshed separately to avoid the bus arbitration and handshaking overhead, thus reducing the CPU idle time.

WINBUS

The PC7486SLC-33 uses a 'local bus' timing feature for faster Video Controller operation. This uses a compressed timing sequence to accelerate memory and I/O performance. The options available are described in Chapter 5 on the Video controller and Chapter 9. Setup utility.

BIOS Shadow

This feature allows some of the extended memory to be used for storing a copy of the System and/or Video BIOS ROM code. This provides faster operation of the BIOS due to the reduced access time of the DRAM relative to the ROM.

Fast Booting

There are three options which allow faster booting.

- 1) The memory above 1Mb can be disabled from testing during the power on sequence (P.O.S.T.).

- 2) The Floppy Drive seek test can be disabled.
- 3) The system can attempt to boot to the C: drive before the A: drive

Password protection

To prevent unauthorised access to your system, a password can be set that must be entered before boot up can be completed or the Setup program entered. There is an alternative setting that allows the system to boot but requires the password for access to the setup program only. Password protection can be disabled by entering <Enter> in the Set password routine or setting Disabled in the Password Checking Option.

If the Password cannot be remembered, the password checking can be disabled by fitting a Jumper to JP14 before switching the system unit on. This enables a new password to be set and the jumper can then be removed.

Boot sector Bios protection

When enabled, the system intercepts any write attempts to the Bootsector and displays a warning. The user can then decide if this is a legitimate access and proceed as necessary. This ensures the bootsector cannot be accidentally re-written or corrupted by a Virus.

Hard Disk Auto-detection facility.

The hard disks supplied as standard with the PC7486SLC-33 have pre-defined drive types stored in the BIOS ROM along with several other drive types for popular drive configurations. If a different drive is attached to the system that does not have a defined type, or the type is unknown, the parameters can automatically be determined by this utility.

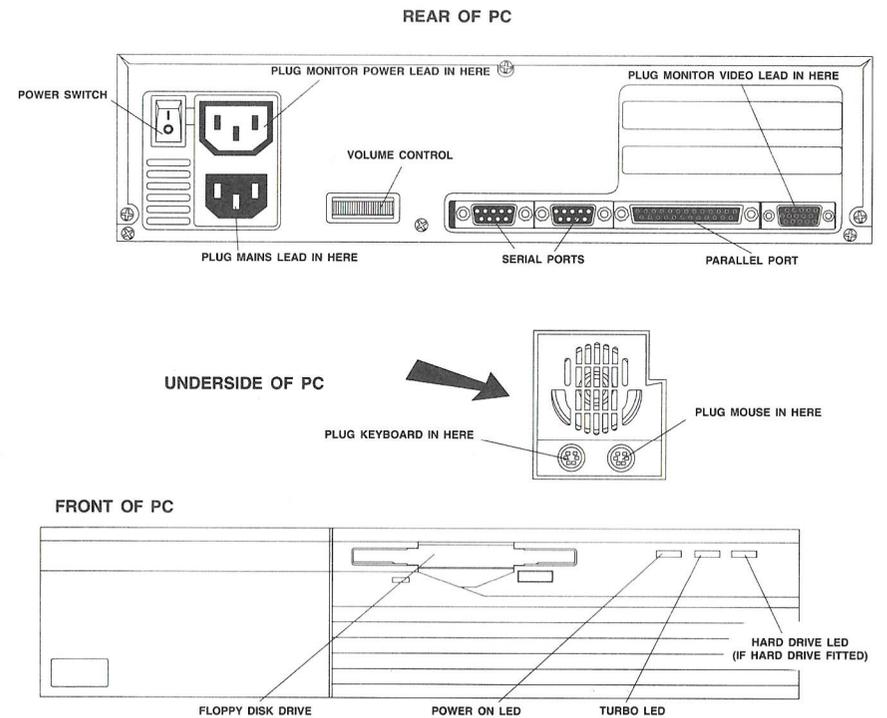
Hot key speed selection

Pressing <Ctrl>-<Alt>-<-> sets the system speed to half the specified 33MHz. <Ctrl>-<Alt>-<+> restores the system to full speed.

2. Installation

Step 1

Before proceeding with the installation, familiarise yourself with the various sockets, connectors and indicators on all sides of the system unit. These will be referred to during the Installation sequence. These items are shown below:-

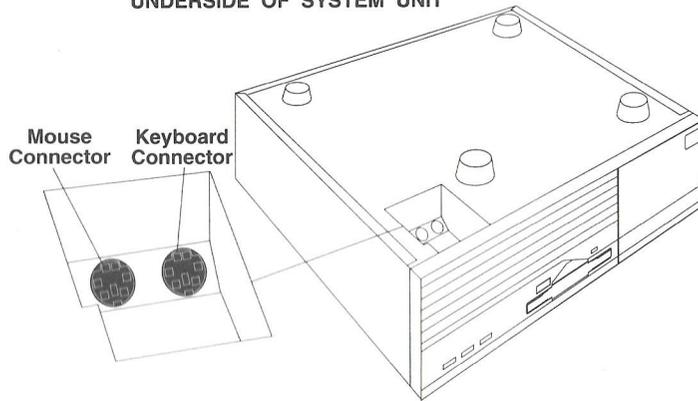


Step 2

Connect the keyboard and a mouse to the system unit

- i) Check that your PC is not plugged into the mains supply
- ii) Turn the system unit upside down
- iii) Connect the keyboard to the system unit by inserting the plug at the end of the keyboard cable into the keyboard socket.

UNDERSIDE OF SYSTEM UNIT



- iv) If you have a mouse, connect it to the system unit, by inserting the plug on the end of your mouse lead into the mouse socket.
- v) Check that the keyboard and mouse cables are positioned correctly, then turn the system unit the right way up.

Step 3.

Connect the monitor to the system unit

- i) Check that the monitor and the system unit are not plugged into the mains supply.
- ii) Place the monitor on top of the system unit. Insert the 15-pin plug on the end of the VDU cable leading from the back of the monitor into the video socket on the back panel of the system unit.
- iii) Connect the monitor power socket on the System Unit to the power inlet on the rear of the monitor using the power cord provided.
- iv) Swivel the monitor so that its screen is at a suitable angle. You can adjust this angle at any time.

Step 4.

Connect a printer to the system unit

If you have a printer, you may want to connect this to your PC now.

If you have a serial printer, you will need a cable that connects your printer to the serial interface connector on the back of the system unit. Your dealer will be able to tell you what type of cable you need.

If you have a parallel (or Centronics) printer, you will need a cable that connects your printer to the parallel printer connector on the back of the system unit. Your dealer will be able to tell you what type of cable you need.

If your printer is of some other type, you will need to set up your PC specifically for your printer. It would be advisable to contact your dealer for more information.

Step 5.

The start up procedure

If, while you are following these instructions, things happen that are not explained here, or if you see messages that are nothing like those described here, turn to Chapter 12, to see if you can find out what has gone wrong. If you can't, consult your dealer.

Start with:

- * the mains plugs out of the supply sockets
- * the power switches, on the monitor and the back panel of the system unit, in the OFF position

Then

- * plug the system unit into the mains supply
- * turn the PC on by pressing the power switches on the monitor and on the back panel of the system unit, in the top righthand corner.

Step 6

The hard disk should already be installed with software from Amstrad. The software includes on screen help information, but if you are unsure of what to do or suspect there is a problem, you can find more information in the Amstrad Software Installation guide. This guide includes details on the screens you should encounter and how to use the Amstrad Desktop,

Tutorial and various utilities supplied. This guide also includes information on the following:-

- * Backing up pre-installed software
- * Installing your applications programs
- * Re-installing software to the hard disk

Step 7

How to reset the PC

Resetting your PC clears its memory so that you can start using the machine afresh. It is often used to change from using one application software package to another, or after a program has failed.

Do not reset your PC before you have checked whether there is any information, currently held in its memory, that you want to save to disk. Any information that has not been saved to disk will be lost.

The steps are as follows:

- 1) Press the drive release button and withdraw the disk from the disk drive.
- 2) Hold down both the (Ctrl) and (Alt) keys and press the (Del) key.

Note:

On hard disk PCs, there is no need to insert a System (MS-DOS) disk, unless you want to override the operating system loaded automatically from the hard disk.

Step 8.

Switching off the PC

- 1) Check that your PC isn't reading any data from your disks or writing data to them.
- 2) Press the disk drive release button. This automatically releases the disk from the drive.
- 3) Withdraw the disk from the drive.
- 4) Only then, switch off your PC.

ALWAYS REMEMBER TO REMOVE YOUR DISK(S) FROM THE DISK DRIVE(S) BEFORE YOU SWITCH OFF.

ALWAYS WAIT FOR AT LEAST FIVE SECONDS BEFORE SWITCHING BACK ON.

3. Processors

3.1 CPU

The Central Processing unit used in the PC7486SLC-33 is a 486SLC. This is a 32 bit processor using a 16 bit external data path. In addition it has a 1kb instruction cache and a hardware multiplier for improved math performance.

3.2 Processor Speed

The PC7486SLC-33 CPU runs at 33MHz. For older software that requires the CPU speed to be reduced, there is a 'hot key' sequence to half the CPU operating speed.

<Ctrl>-<Alt>-<-> to set half speed,

<Ctrl>-<Alt>-<+> to set full speed.

3.3 Co-processor

The PC7486SLC has a socket to use the 80387sx co-processor or equivalent of 20MHz or higher rating. To install a Maths co-processor, refer to chapter 10.

4. System Memory

4.1 Memory Configuration

There are two standard configurations, 2Mb and 4Mb. Both the System and Video ROM bios areas are shadowed by default into memory. Either or both of these can be disabled to provide further extended memory but at the cost of reduced BIOS operating speed. An expanded memory driver is not supplied. The allocation of memory as supplied is as follows:-

	2Mb	4Mb
Base	640	640
Extended	1280	3328
Shadow	128	128
Expanded	0	0

4.2 Upgrading Memory

The PC7486SLC-33 uses 30 pin Single Inline Memory Modules (SIMMs) for its system memory. Each of these contains two 1M x 4 DRAM devices giving a SIMM capacity of 1M x 8 or 1Megabyte (1Mb). The CPU has a 16 bit data path so a minimum of two SIMMs are required, referred to as a 'bank'. The SIMMs supplied do not have any parity checking facility but the system can support this if 9-bit SIMM types are used. Please note that if a mixture of parity checked (9-bit) and non-parity checked (8-bit) SIMMs is used, then parity checking must be disabled.

The SIMMs can be added to or replaced with larger types to achieve the desired amount of memory. All SIMMs must be of 70ns or faster for correct operation. A timing option exists in the BIOS setup program which can be set to slow if problems arise due to speed rating. The following configurations of memory are supported by the system. Refer to chapter 10 for information on how to upgrade the memory and chapter 9 for using setup to enable parity checking and setting DRAM speed.

OPTION	BANK 0	BANK 1	TOTAL
1	256kb	none	512kb
2	256kb	256kb	1Mb
3	1Mb	none	2Mb
4	1Mb	256kb	2.5Mb
5	1Mb	1Mb	4Mb
6	4Mb	none	8Mb
7	4Mb	1Mb	10Mb
8	4Mb	4Mb	16Mb

4.3 CACHE RAM

The PC7486SLC-33 has an option for a secondary direct-mapped cache memory when the three cache sockets are populated with either 8k x 8 or 32k x 8 SRAM types of at least 20ns or faster and the relevant jumpers are set.

This cache memory works additionally to the 1kb cache internal to the CPU on the 486SLC which is available on all models of PC7486SLC-33 and provides fast accessing of programs and data. Refer to chapter 10 for information on upgrading the cache and chapter 9 for using the setup program to enable cache operation. Please note that if the cache is enabled by setup and the components are not fitted, the system may lock up or reboot.

Some software may have problems when run in a cached system. If these occur, the cache can either be disabled or a non-cacheable region of memory allocated for it to use. This applies to both the Internal CPU cache and the External cache. Setting non-cacheable regions gives better performance than completely disabling the feature as it allows other resident programs to use it as required. However, if you are not sure about the area that needs to be disabled, then disabling the cache may be the safest option.

4.4 Cache utilities

Switching the cache off can be achieved through the Setup program as described in chapter 9. There are two Utilities supplied to set Non-cacheable regions, one each for the Internal and External cache.

4.4.1 Internal CPU cache

There are two main uses of this utility. Firstly you can run the program, edit the registers and write to the CPU directly or secondly use a pre-defined setup stored in a file which can be run from the DOS command line or in the AUTOEXEC.BAT file.

The Cache control register 0 (CCR0) is set in the BIOS to 14h. This is the Optimum value for performance and should not require changing. The other registers set Non-cacheable regions of system memory. There are four regions listed in the utility but two of these have been pre-defined for the region of memory from 640k to 1Mb. This allows 2 free regions to be set by you.

To run the Utility, type

```
C:>CD \DRIVERS\DISK1\CACHE
```

```
C:>TI486SLC <Enter>
```

Use the <Tab> and <Shift tab> keys to move from field to field and the cursor keys and the keyboard to set the desired value. Onscreen help is provided by pressing <F1> and this describes the use in more detail.

The utility allows you to create your own settings and store in a file for automatic loading from the command line or a batch program. Once you have set the regions, use the FILE SAVE option and enter your filename (name.reg) at the prompt.

To run from a command line type the following or place in a batch file.

```
C:>TI486SLC name.reg
```

where name.reg is a file that has previously been created.

4.4.2 External cache utility

This utility allows 2 non-cacheable regions to be set by entering the start address and the region size in the fields displayed.

To run the program, type:-

```
C:>CD \DRIVERS\DISK1\CACHE
```

```
C:>cache <Enter>
```

To set a configuration from a previously stored file, press <D>. To enter the program and create a file or just to set the cache controller, press.

Move around the fields using the cursor controls and edit the settings with <PgUp> <PgDn>. To set the cache controller and store the settings in a 'cache.dat' file press <F2>. A brief help file is available by pressing <F1>.

5. Video Adapter

The PC7486SLC-33 uses the Cirrus Logic GD5420 SVGA controller and a frame buffer of either 512kb or 1Mb using conventional 256k x 4 DRAM devices.

5.1 Standard Video modes

The following modes are compatible with the IBM PC/XT/AT series and are available with the Amstrad SVGA monitor.

Mode No.	VESA mode	Colours	Char x Row	Char. Cell	Screen Format	Display Mode	Pixel Freq. MHz	Horiz. Freq. kHz	Vert. Freq. Hz
0,1	0,1	16/256k	40 x 25	9 x 16	360 x 400	Text	14	31.5	70
2,3	2,3	16/256k	80 x 25	9 x 16	720 x 400	Text	28	31.5	70
4,5	4,5	4/256k	40 x 25	8 x 8	320 x 200	Graphics	12.5	31.5	70
6	6	2/256k	80 x 25	8 x 8	640 x 200	Graphics	25	31.5	70
7	7	Mono	80 x 25	9 x 16	720 x 400	Text	28	31.5	70
D	D	16/256k	40 x 25	8 x 8	320 x 200	Graphics	12.5	31.5	70
E	E	16/256k	80 x 25	8 x 14	640 x 200	Graphics	25	31.5	70
F	F	Mono	80 x 25	8 x 14	640 x 350	Graphics	25	31.5	70
10	10	16/256k	80 x 25	8 x 14	640 x 350	Graphics	25	31.5	70
11	10	2/256k	80 x 30	8 x 16	640 x 480	Graphics	25	31.5	60
12	12	16/256k	30 x 30	8 x 16	640 x 480	Graphics	25	31.5	60
12+	12+	16/256k	30 x 30	8 x 16	640 x 480	Graphics	31.5	37.9	72
13	13	256/256k	40 x 25	8 x 8	320 x 200	Graphics	12.5	31.5	70

5.2 Extended Modes

These modes are the extended modes that go beyond the IBM standard. Those marked with an * require 1Mb of Video memory to be fitted.

Mode No.	VESA mode	Colours	Char x Row	Char. Cell	Screen Format	Display Mode	Pixel Freq. MHz	Horiz. Freq. kHz	Vert. Freq. Hz
14	-	16/256K	132 x 25	8 x 16	1056 x 400	Text	41.5	31.5	70
54	10A	16/256K	132 x 43	8 x 8	1056 x 350	Text	41.5	31.5	70
55	109	16/256K	132 x 25	8 x 14	1056 x 350	Text	41.5	31.5	70
58,6A	102	16/256K	100 x 37	8 x 16	800 x 600	Graphics	36	35.2	56
58,6A	102	16/256K	100 x 37	8 x 16	800 x 600	Graphics	40	37.8	60
58,6A	102	16/256K	100 x 37	8 x 16	800 x 600	Graphics	50	48.1	72
5C	103	256/256K	100 x 37	8 x 16	800 x 600	Graphics	36	35.2	56
5C	103	256/256K	100 x 37	8 x 16	800 x 600	Graphics	40	37.9	60
5C	103	256/256K	100 x 37	8 x 16	800 x 600	Graphics	50	48.1	72
5D	104	16/256K	128 x 48	8 x 16	1024 x 768	Graphics	65	48.3	60
5D	104	16/256K	128 x 48	8 x 16	1024 x 768	Graphics	75	56	70
5Di	104	16/256K	128 x 48	8 x 16	1024 x 768	Graphics	44.9	35.5	87i

Mode No.	VESA mode	Colours	Char x Row	Char. Cell	Screen Format	Display Mode	Pixel Freq. MHz	Horiz. Freq. kHz	Vert. Freq. Hz
5F	101	256/256K	80 x 30	8 x 16	640 x 480	Graphics	25	31.5	60
5F	101	256/256K	80 x 30	8 x 16	640 x 480	Graphics	25	31.5	72
*60i	105	256/256K	128 x 48	8 x 16	1024 x 768	Graphics	44.9	35.5	87i

i = interlaced mode.

5.3 Upgrading Video memory

To upgrade the amount of video memory from 512kb to 1Mb, four 256k x 4 DRAMs of at least 70ns are required. For instructions refer to Chapter 10.

5.4 Fitting an alternative adapter

The on-board video controller can be disabled to allow alternative types of adapter card to be fitted on the expansion bus. Refer to Chapter 11 for the link setting to do this and Chapter 10 for installing adapter cards.

5.5 WINBUS

The PC7486SLC-33 has a unique feature known as WINBUS which allows for faster operation of the Video controller than using the standard ISA bus timing. There are two jumpers on the Motherboard, which are factory set to enable this feature and further control is present in the Setup utility under the Advanced Chipset Setup.

WINBUS Auto Function: (Default = Auto)

Manual: Allows the timing to be selected by Setup.

Auto: The system determines the best timing regardless of other settings and will disable WINBUS if it decides the timing is not adequate.

WINBUS A0000h - BFFFFh: (Default = Enabled)

Enabled: Enables WINBUS in manual operation

Disabled: Disables WINBUS in manual operation

WINBUS Timing Select: (Default = Fast)

Fast: Increased performance for manual timing

Slow: Slower but more reliable performance for manual operation.

5.6 Video drivers

Drivers are available to allow specified applications to make use of the extended SVGA modes. Full details are given in the PC Software Installation Guide.

6. Serial and Parallel Ports

6.1 Serial Port

There are two RS232 serial ports which can be configured to four COM port addresses by using the Setup programs Advanced Chipset Setup utility:-

3F8, 2F8, 3E8, 2E8.

Refer to Chapter 9 for details of the Setup program.

6.2 Parallel Port

The on-board Parallel port can be configured for standard and Bi-directional operation on one of three possible addresses

3BC, 378, 278

7. Hard Disk

There are two standard options for Hard Disk, 130 and 214 Mb. However, due to market conditions and local Dealer Upgrades, it is possible that a drive of different Specification may be fitted. Check with your dealer if you are not sure about which drive you should have. The standard drive parameters and seek times are given below:-

	ST3144A	ST3243A
BIOS drive type	30	44
Cylinders	1001	1024
Heads	15	12
Sectors/Track	17	34
Formatted Capacity million Bytes	130.7	213.9
Average Seek Time Typ ms	16	16
Track-Track Seek Typ ms	5	5

8. Expansion Slots

8.1 Power Availability

The standard PC7486SLC-33 has two free expansion slots operating at 8MHz (gamespack or other special packages may only have one free slot). The total power available to the slots is:-

+5V ± 5%	:	2A max
+12V ± 5%	:	0.5A max
-12V ± 5%	:	0.1A max
-5V ± 5%	:	0.1A max

8.2 Bus Speed

The Bus frequency can be selected from the following values using the Setup program. See chapter 9 for details on how to run setup and change the settings:-

CLK2IN/5	=	13.2MHz
CLK2IN/6	=	11MHz
CLK2IN/8	=	8.25MHZ
CLK2IN/10	=	6.6MHz

9. SETUP Utility

The system stores information about your computer's configuration in CMOS memory, which is backed up by a battery when the system is powered off. This information may need to be modified if you upgrade your system or just want to change the configuration to suit your own requirements. There is also a password facility that can be set using this program. The system performs a number of tests immediately after it has been switched on and if it detects an incompatibility between the stored information and the actual hardware recognised then it may display a message of what the discrepancy is and prompt you to enter setup to change the configuration. The instructions given here are for changing the values. If more information is required on what the options do, refer to the BIOS features in Chapter 1 or other chapters concerning hardware affected.

9.1 Running the SETUP program

The setup program allows the configuration information to be displayed and edited and can only be entered during the booting process. This can be when switching the system on (known as 'cold boot') or using a combination of three keys (known as 'warm boot').

Both types of bootstrap process reset the system but the warm boot skips some of the self-tests performed at power on and is quicker to operate. However, it relies on direct keyboard operation which may not be available in some software applications. In this case, the software should be closed and any open files saved before using the key sequence.

If the configuration is such that the system 'locks up', the three key sequence may not force a reset. If this instance occurs, the system should be switched off and on again from the power switch on the rear of the system unit, ensuring a delay of 5 seconds between the two actions.

9.1.1 When the system is off.

- (i) Switch the power on at the rear of the system.

The monitor may take a short while to warm up and provide a visible display but will show the following message for a short duration

XXXX KB OK Hit , if you want to run Setup

- (ii) Press the key

There should now be a menu of options displayed on the screen. If you miss the above message, then you can switch the system off and on again or alternatively follow the instructions below for entering Setup while the system is on.

9.1.2 When the system is on

- (i) Press <CTRL>-<ALT>- to reset the system with a warm boot.

During the boot process you will see the following message displayed for a short time:-

Hit , if you want to run setup

- (ii) Press the key while this is displayed.

If you miss the message, repeat the three key reset sequence and ensure you press while it is displayed.

You should now see a menu of options to select.

9.1.2 When the system prompts to run SETUP

If the following message is displayed, the system has detected an incompatibility between the hardware and the information in the CMOS memory:-

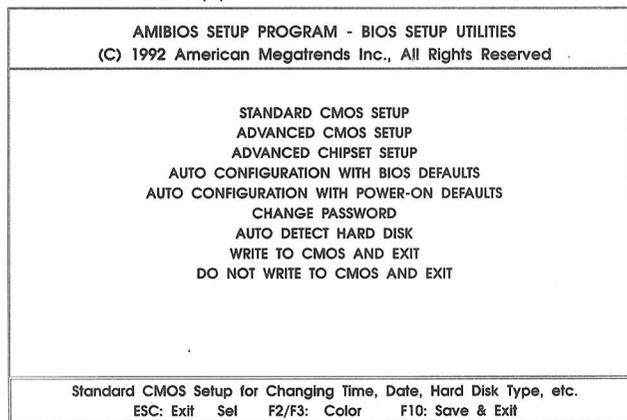
Run SETUP UTILITY

Press <F1> to resume

- (i) Press <F1> and you should see the menu of configuration options to select.

9.2 The Main Menu options

This is the first menu that appears after SETUP has been entered.



The cursor control keys can be used to select the parameter by highlighting it. A brief description of the highlighted item is displayed at the bottom of the screen and the available control keys are displayed

beneath that. At the top level menu, <Esc> exits the SETUP program and reboots the system without saving any changes you may have made. The <F10> key saves any changes before exiting and rebooting. In both cases you are asked to confirm your intention before it is implemented.

9.2.1 Standard CMOS Setup

This includes the Time and Date, Hard Disk type, Floppy Disk type, display type, memory size and keyboard test.

9.2.2 Advanced CMOS Setup

These parameters control more detailed features such as BIOS shadowing and cache control

9.2.3 Advanced Chipset Setup

This option allows selected registers to be defined to configure hardware dependent features.

9.2.4 Auto Configuration with BIOS Defaults

The BIOS defaults are those values which give the optimum performance for the standard system as supplied. These can be loaded automatically if the need arises.

9.2.5 Auto Configuration with power on Defaults

The Power On defaults are 'worst case' parameters that can be used if the system performs abnormally due to hardware incompatibility. These will give reduced performance compared to the BIOS defaults.

9.2.6 Change Password

Allows the user to set a password which must then be used to enable booting or subsequent entering of the SETUP program.

9.2.7 Auto Hard Disk Detection

Allows the user to install a drive with unknown drive type or parameters.

9.2.8 Write to CMOS and Exit

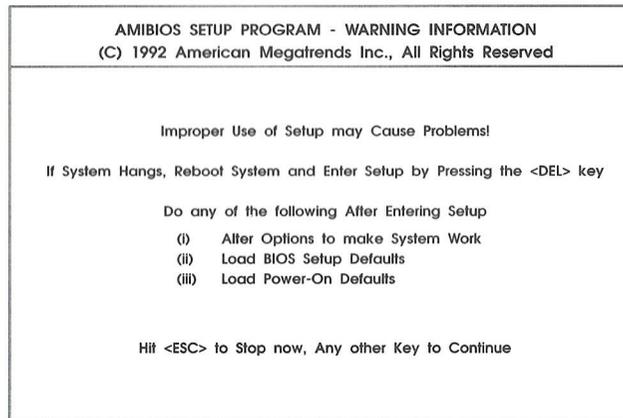
Saves any changes you have made and reboots the system.

9.2.9 Do Not Write to CMOS and Exit

Exits and reboots the system without saving any changes you may have made.

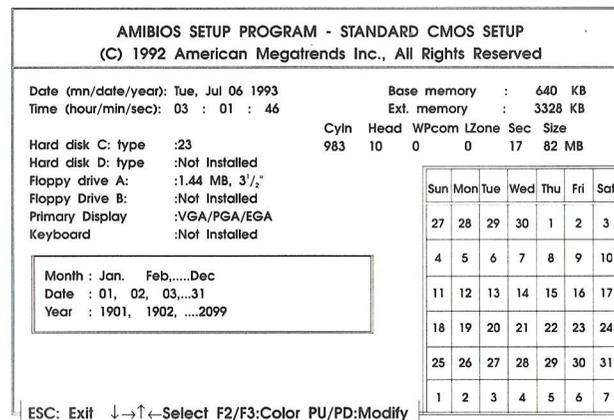
9.3 BIOS Setup Warning Message

Selecting the STANDARD CMOS SETUP, ADVANCED CMOS SETUP or ADVANCED CHIPSET SETUP from the top level menu will cause the following warning to be displayed:-



9.4 Editing the Standard CMOS SETUP

The following screen will be displayed:-



The controls available are displayed at the bottom of the display.

1. Use the cursor controls to highlight the required option.
2. Change the option with the Pg Up and Pg Dn keys
3. Press <Esc> when finished. There is no save option at this time. All options can be saved at the top level menu.

9.4.1 Date

Set the date as necessary.

9.4.2 Time

Set the Time as necessary.

9.4.3 Hard Disk C: and D: types

There is no default type (Not Installed) but the system is factory set to the value displayed on a label on the rear of the chassis conforming to the drive fitted.

If the hard disk is upgraded, you will need to find out the relevant parameters and compare to the pre-defined types in the table given below. If a suitable entry cannot be found, enter the parameters for Type 47. Alternatively, the Automatic Hard Disk Detection utility from the main menu can be used to do this for you.

Drive D: would only be used if two hard disks are attached to the system, but the above details apply for this also.

Drive Type Table

TYPE	CYL	HEADS	WPcom	Lzone	SECTOR	SIZE
1	306	4	128	305	17	10
2	615	4	300	615	17	20
3	615	6	300	615	17	31
4	940	8	512	940	17	62
5	940	6	512	940	17	47
6	615	4	65535	615	17	20
7	462	8	256	511	17	31
8	733	5	65535	733	17	30
9	900	15	65535	901	17	112
10	820	3	65535	820	17	20
11	855	5	65535	855	17	35
12	855	7	65535	855	17	50
13	306	8	128	319	17	20
14	733	7	65535	733	17	43
15	Does not exist					
16	612	4	0	663	17	20
17	977	5	300	977	17	41
18	977	7	65535	977	17	57
19	1024	7	512	1023	17	60
20	733	5	300	732	17	30
21	733	7	300	732	17	43
22	733	5	300	733	17	30
23	983	10	0	987	17	82
24	1024	10	0	1024	17	85
25	925	9	65535	925	17	69
26	754	7	754	754	17	44
27	754	11	65535	754	17	69
28	699	7	256	699	17	41
29	823	10	65535	823	17	68
30	930	15	918	918	17	116
31	1001	15	65535	1024	17	125
32	1024	15	65535	1024	17	128
33	1024	5	1024	1024	17	43
34	612	2	128	612	17	10
35	1024	9	65535	1024	17	77
36	1024	8	512	1024	17	68
37	615	8	128	615	17	41
38	987	3	987	987	17	25
39	987	7	987	987	17	57
40	903	8	820	820	46	162
41	977	5	977	977	17	41
42	981	5	981	981	17	41
43	830	7	512	830	17	48
44	1024	12	65535	830	34	204
45	978	14	65535	918	35	234
46	1224	15	65535	1223	17	152
47	USER					

9.4.4 Floppy drive A: and B:

Default is A:1.44Mb 3 1/2". B: Not Installed.

The Floppy drive installed in the PC7486SLC-33 is a 1.44Mb 3 1/2 " type set to drive A:. This setting should not require adjustment unless the drive is replaced with a different type. If a second Floppy Drive is fitted, the B: option should be set to the capacity of that drive.

9.4.5 Primary Display

Default: VGA

The on-board display adapter is VGA, although it supports extra 'Super' VGA modes. If an external adapter is fitted and the on-board controller disabled, then this option would be set for the type of adapter fitted.

9.4.6 Keyboard

Default: Not Installed

INSTALLED: This setting ensures the keyboard is tested during the Power-On Self Tests (POST) and any errors are reported.

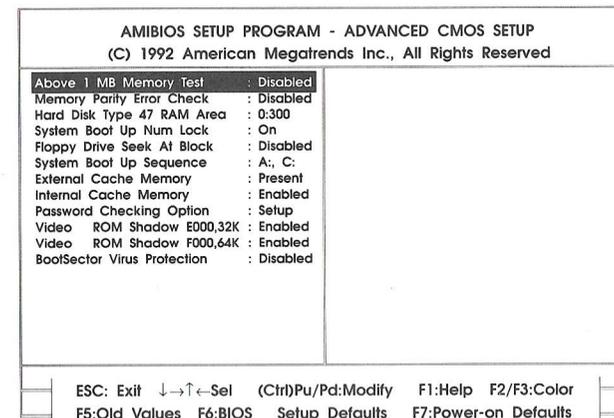
NOT INSTALLED: This is set during manufacture to ignore the keyboard test. This does not affect the actual keyboard operation.

9.4.7 Base Memory and Extended Memory

These settings are automatically updated when Setup is invoked using the detected values when the system was Powered on. There is no facility to change these settings.

9.5 Advanced CMOS Setup

The following screen is displayed:-



The cursor keys are used to select the option and the <Pg Up> and <Pg Dn> keys change the value. <F1> provides a list of all the available values from which you can choose.

The system should already be configured with BIOS default values which are optimised for the best performance. If these have been changed or corrupted by any means, they can be reset using the <F6> key.

If you change the settings but then decide to set them back to their original setting before you quit the Setup program, you can use the <F5> key to recover the 'old' values.

The <F7> key provides basic Power-On defaults which can be used if there are any abnormal actions caused by hardware problems.

9.5.1 Above 1MB Memory Test

Default: Disabled.

Enabled: The entire system memory will be checked during the power on sequence.

Disabled: Only the first 1Mb will be checked, thus saving time especially if large amounts of system memory is fitted.

9.5.2 Memory Parity Error check

Default: Disabled

Enabled: Allows parity checking. Should only be used if all SIMMs have parity bit.

Disabled: No parity checking is performed.

9.5.3 Hard Disk type 47 RAM area

Default: 0:300

The parameters for Type 47 are normally copied from CMOS RAM to base memory at 0:300. If for any reason a software package requires to use this area, the top 1k of the DOS shell (**DOS 1 kb**) can be allocated to store these parameters.

9.5.4 System boot up num lock

This option sets the Numlock key on or off when the system is powered on or rebooted.

9.5.5 Floppy drive seek at boot

Default: disabled

During the POST check, a Floppy drive seek test can be performed to check the media inserted. If disabled, the system will take less time to boot.

9.5.6 System boot up sequence

Default: A, C

If set to A,C, the system attempts to boot from floppy drive A: and if unsuccessful will then attempt to boot from the hard drive C: This sequence can be reversed by selecting C, A, which will make booting to the hard disk faster.

9.5.7 External cache memory

Default: disabled

This option enables or disables the cache controller depending on if the cache is fitted. If there are no cache devices present, this option must be set to Absent.

9.5.8 Internal cache memory

Default: Enabled

The CPU's internal cache is always present but can be disabled with this option. This would not normally be necessary but some software packages may require it.

9.5.9 Password checking option

Default: Disabled

SETUP: The password must be entered when prompted for to allow access to the Setup program. If three unsuccessful attempts are made, the system will lock and require rebooting.

ALWAYS: The password must be entered at the prompt to enable booting and access to Setup.

DISABLED: The password prompt is not displayed and full access is available.

Note that with Setup or Always set, the password must be set using the option from the main menu. If <Enter> is given as the password, this will act as the same as disabling the password.

9.5.10 Video ROM shadow c000,32k

Default: Enabled

When enabled, the Video BIOS code is copied from the ROM to a portion of RAM allowing faster operation. The extended memory will be reduced by 64kb if this is set.

9.5.11 System ROM shadow F000,64k

Default: Enabled

When enabled, the System BIOS code is copied from the ROM to a portion of RAM allowing faster operation. The extended memory will be reduced by 64kb if this is set.

9.5.12 Bootsector virus protection

Default: disabled

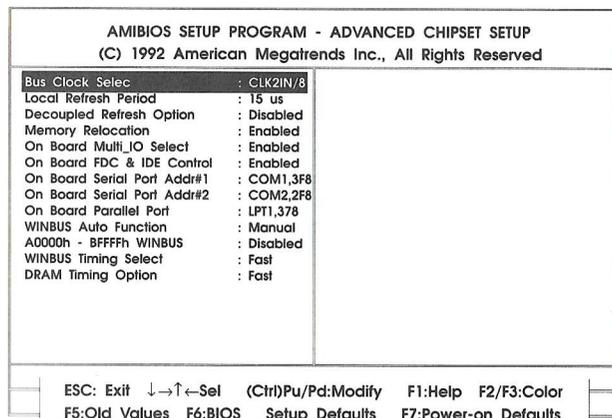
When enabled, the system intercepts any write attempts to the Bootsector and displays the following warning:-

```
Attempt to write to boot sector possible
virus continue (Y/N) ? N
```

If this occurs during partitioning or some other legal method then press Y and <Enter>.

Otherwise this could corrupt your hard disk with the possible loss of all your data and you should press <N> and <Enter>.

9.6 Advanced Chipset Setup



The cursor keys are used to select the option and the <Pg Up> and <Pg Dn> keys change the value. <F1> provides a list of all the available values from which you can choose.

The system should already be configured with BIOS default values which are optimised for the best performance. If these have been changed or corrupted by any means, they can be reset using the <F6> key.

If you change the settings but then decide to set them back to their original setting before you quit the Setup program, you can use the <F5> key to recover the 'old' values.

The <F7> key provides basic Power-On defaults which can be used if there are any abnormal actions caused by hardware problems.

9.6.1 Bus clock Select

This sets the ISA bus Sysclk frequency to be a synchronous division of the main system clock. Options are CLK2IN/5 (13.2MHz), CLK2IN/6 (11MHz), CLK2IN/8 (8.25MHz), and CLK2IN/10 (6.6MHz).

9.6.2 Local Refresh Period

Default: 15us

Determined by the type of DRAM SIMM's fitted, this can be set for 15, 30, 60 or 120us.

9.6.3 Decoupled Refresh Option

Default: Enabled

When enabled gives better performance than normal 'coupled' refreshing, but may affect system reliability if non-approved DRAMs are fitted.

9.6.4 Memory Relocation

Default: enabled

This option allows available memory from 640kb to 1Mb that is not used for 'Shadowing' the BIOS to be set to extended memory. This option would not normally require changing.

9.6.5 On board Multi_IO Select

Default: enabled

Allows the general disabling of serial ports and parallel ports, to enable an external multi_IO card to be fitted.

9.6.6 On Board FDC & IDE Control

Default: enabled

Allows the general disabling of Floppy disk controller and Hard Disk interface logic, to enable an external drive controller to be fitted.

9.6.7 On Board Serial Port Addr#1

Default: 3F8

Sets the address of Serial Port 1 to either 3F8 or 3E8.

9.6.8 On Board Serial Port Addr#2.

Default: 2F8

Sets the address of Serial Port 2 to either 2F8 or 2E8.

9.6.9 On Board Parallel Port

Default: 378

Sets the address of the Parallel port to either 3BC, 378 or 278.

9.6.10 WINBUS Auto function

Default: Manual

If enabled, the system chooses the optimum timing for accessing the video controller. If disabled, the timing select option can be used.

9.6.11 A0000h - BFFFFh WINBUS

Default: Enabled

Enabled: WINBUS timing is used for Video Controller access.

Disabled: Normal ISA bus timing is used.

9.6.12 WINBUS timing select

Default: Fast

This option is only valid if the WINBUS Auto function is set to manual. The fast option gives better performance but if slower or non approved DRAMs are fitted, the slow option may need to be set.

9.6.13 DRAM Timing option

Default: Fast

This option is set to fast as standard. If slower or non approved DRAMs are fitted, the slow option may need to be set.

9.7 Auto Configuration with BIOS Defaults

This option loads a complete set of BIOS defaults for all the Advanced CMOS and Chipset options described above. These defaults are factory set for the optimum performance.

9.8 Auto Configuration with Power-on Defaults

This option loads a complete set of Power On defaults for all the Advanced CMOS and Chipset options described above. These defaults configure the system to its most basic operation with all enhancements turned off in order to overcome any hardware problems that may have arisen due to changes to the system hardware.

9.9 Change Password

The Password feature is controlled by the setting in the Advanced CMOS Setup menu. If this is enabled for Setup only or Setup and Booting, you can set the Password with this option.

The screen will display the following message:-

Enter NEW Password:

- (i) If you want to disable the password protection, press <Enter> and the system returns to the main menu.
- (ii) To Enter a password type a sequence of no more than 6 characters and press <Enter>.

The System will respond by prompting for a re-entry to ensure a mistake was not made.

Re-enter NEW Password:

- (iii) Type the same sequence again and press <Enter>.

If the second entry is different to the first, the following error message will be displayed:-

ERROR, Press any Key....

You will then be prompted to start the Entry process again.

If the two entries are the same, the following message will be displayed:-

NEW Password Installed

(iv) <Esc> returns to the Main menu.

9.10 Auto Hard Disk Detection

If a different drive is attached to the system that does not have a defined type, or the type is unknown, the parameters can automatically be determined by this utility.

Once selected the screen detects first the C: drive then the D: drive and displays the message:-

Auto Drive detection in progress.

Pressing <Esc> can skip any of these if required. When the detection is completed the parameters will be displayed at the top of the screen under the type 47 user option and the following prompt will appear.

Accept these values (Y/N) ? N

Press <Y> and <Enter> to use these parameters.

Note:

Some Hard Disks may not be recognised by this utility and the message Not detected will be displayed instead of the drive parameters. If this happens, ask your Hard Disk supplier for details of the drive configuration.

9.11 Write to CMOS and Exit

This option saves the settings including all changes that have been made and exits the Setup program. The system will then reboot. The system will prompt you to confirm your intention to avoid choosing this option by mistake:-

Write to CMOS and Exit (Y/N) ? N

(i) Press <Enter> if you do not want to save and exit and <Y> and <Enter> to save and exit.

9.12 Do Not Write to CMOS and Exit

To quit the Setup program without saving any modified settings, select this option. The system will then reboot. The system will prompt you to confirm your intention to avoid choosing this option by mistake:-

Want to Quit without saving (Y/N) ? N

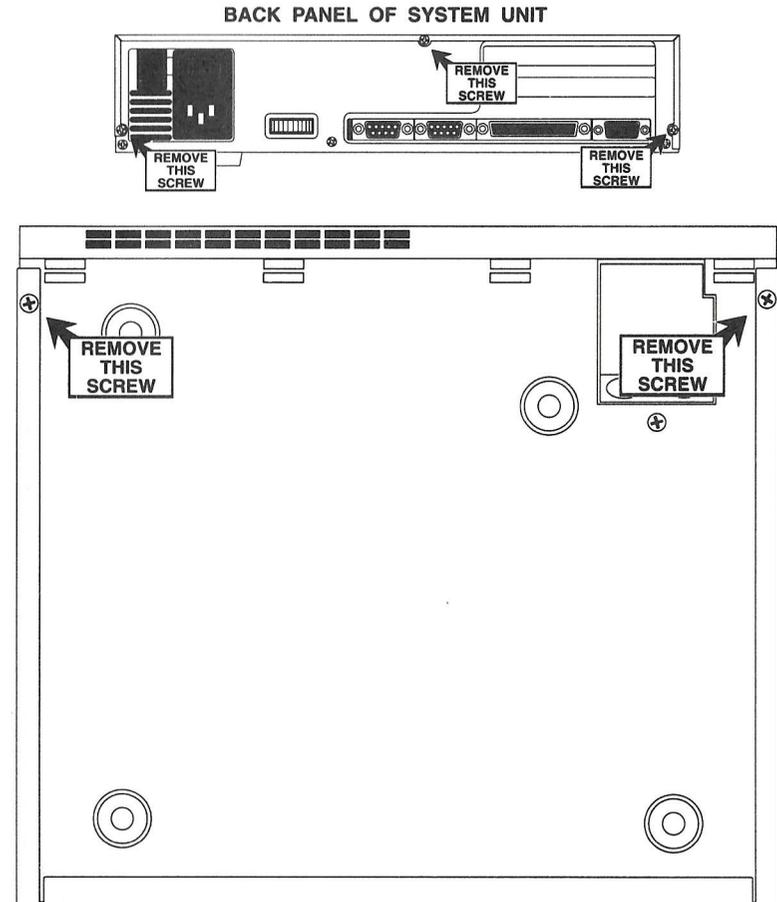
(i) Press <Enter> to return to the main menu or

(ii) <Y> and <Enter> to reboot the system without saving any changes.

10. Upgrading the System

10.1 Removing the System Cover

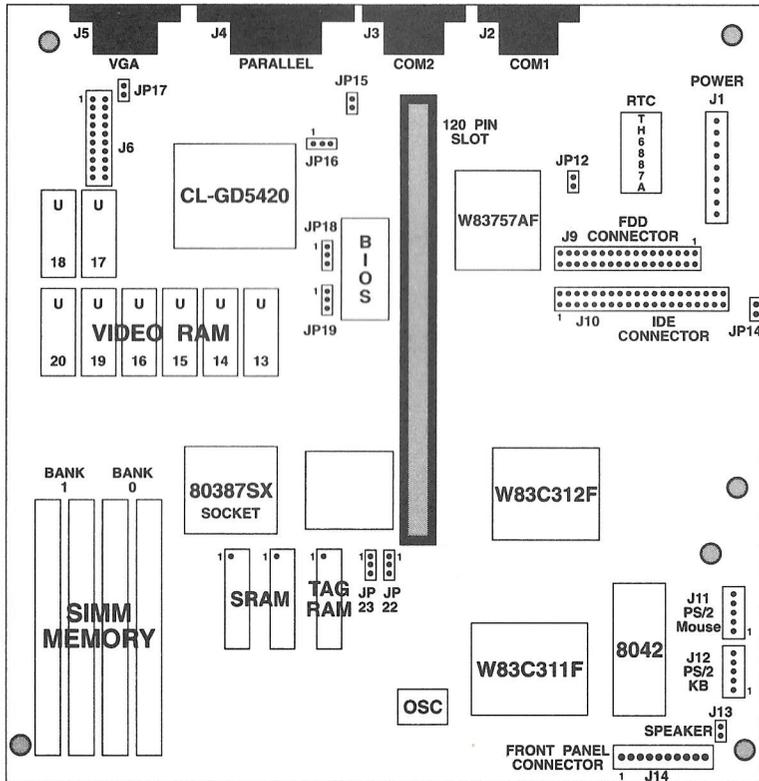
Always switch the system unit off and disconnect the power cord from the rear of the unit before removing the top cover.



- * Open the system unit by undoing the three screws on the back panel of the system unit and the two screws on the underside of the system unit, as illustrated below.
- * Carefully turn the unit the right way up, holding the cover and the base of the unit together as you turn the unit over.

- * Open the casing by sliding the top cover backwards, away from the front panel.

The following sections may refer to the motherboard layout shown:



10.2 System Memory upgrade

Chapter 4 describes the options available. When fitting SIMMs start from the innermost socket and work outwards to the edge of the motherboard. Looking from the front of the system, the SIMM should be fitted at an angle of 45 into the socket with the devices on the right face of the SIMM board. The SIMM can then be pushed upright to sit vertically in the socket, with the two locating pegs located in the holes in the SIMM board and the metal clips locked in place. If only two SIMMs are fitted these must be fitted to Bank 0.

10.3 Cache Memory upgrade

Chapter 4 describes the options available. If replacing devices, be sure to extract the device evenly at both ends preferably with the correct tool to avoid bending or breaking the legs. The Cache devices should be fitted into the available sockets, ensuring the correct orientation, i.e. pin 1 closest to the Co-Processor socket.

10.4 Video Memory upgrade

Chapter 5 describes the options available. If replacing devices, be sure to extract the device evenly at both ends preferably with the correct tool to avoid bending or breaking the legs. The DRAM devices should be fitted into the available sockets, ensuring the correct orientation, i.e. pin 1 pointing to the rear of the system. U17, 18, 19 and 20 should be populated for 1Mb total memory.

10.5 Fitting a Math Co-Processor

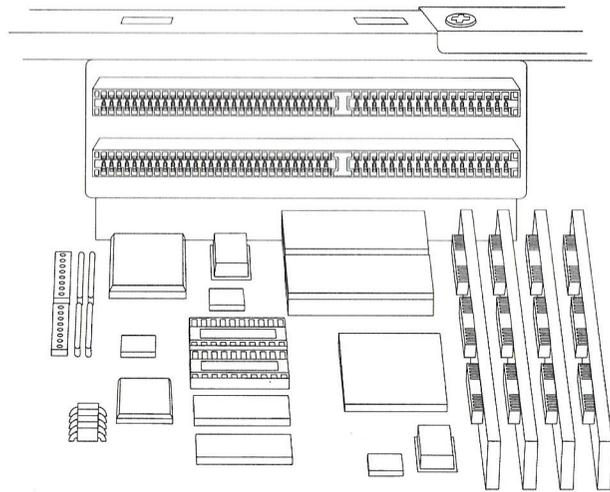
The math Co-Processor simply plugs into the Empty socket, ensuring pin 1 of the device mates with the arrow shown inside the socket.

10.6 Changing Jumper settings

Jumpers can easily be removed with tweezers or small pliers, taking care not to bend or damage the pins. Refer to Chapter 11 for Jumper Configuration.

10.7 Fitting Adapter cards into the Expansion Slots

First, decide which slot you want to insert your card in and then remove the screw and blanking plate for that slot from the rear of the system unit. The card can now be inserted horizontally into the expansion slot, component side facing upwards. Fasten the card edge bracket to the chassis using the screw removed from the blanking plate.



10.8 Replacing the RTC/CMOS RAM

The combined RTC and CMOS RAM module are located in a socket at the rear of the mainboard close to the Power connectors. Before replacing this part, read the following notice:-

WARNING

The CMOS RAM contains a Lithium battery. Danger of explosion if recharging is attempted. Replace the CMOS RAM with the same type recommended by Amstrad plc. Do not dispose of the old CMOS RAM in the fire

11. Jumper Configuration

FUNCTION		JUMPER SETTING
Cache size	16kb	JP23 pin 2,3 closed
	64kb	JP23 pin 1,2 closed
Parity checking	enable	JP22 pin 1,2 closed
	disable	JP22 pin 2,3 closed
CMOS clear	clear CMOS	JP14 closed
	normal operation	JP15 open
Printer port	printer uni-directional	JP12 open
	printer bi-directional	JP12 closed
Video wait states	0 wait state	JP15 closed
	1 wait state	JP15 open
VGA adapter	disable on board VGA	JP16 pin 1,2 closed
	enable on board VGA	JP16 pin 2,3 closed
VGA mode	ISA bus	JP18 pin 1,2 closed
		JP19 pin 1,2 closed
	Local bus	JP18 pin 2,3 closed
		JP19 pin 2,3 closed

12. BIOS Error Messages

12.1 Beep Codes

The POST reports error messages in two ways:

Fatal errors that cause the system to 'lock up' are notified by a beep corresponding to the codes below. These error messages are not intended to provide a complete repair guide but may be useful in detecting bad memory SIMM's or video DRAM especially if the system has been upgraded.

No. of Beeps	Error Message	Description
1	Refresh failure	Memory refresh is faulty
2	Parity Error	Parity error was detected
3	Base 64kb memory failure	Memory test failed during first 64k
4	Timer not operational	Timer 1 failure
5	Processor error	The CPU failed during test
6	8042 - Gate A20 Failure	BIOS cannot put CPU into protected mode
7	Processor Exception Interrupt Error	The CPU has generated an Exception Interrupt error due to an unexplained occurrence
8	Display memory Read/write error	The system video adapter is missing (disabled) or its memory is faulty
9	ROM checksum error	The ROM checksum value does not match the stored value
10	CMOS shutdown Register Read/Write error	The shutdown register for the CMOS memory has failed

12.2 Non-Fatal Errors

These messages are stored in the ROM BIOS and most are displayed during the power on sequence as either a status of the system and its configuration or a description of an error that may have occurred but does not stop the system working.

These messages can be useful in identifying an error or providing information and should be used along with the MS-DOS error messages as a troubleshooting guide.

The full list of these messages is given below:-

CH-2 Timer Error

Timer 2 has failed. Unlike Timer 1 this is not fatal.

INTR #1 Error

The Interrupt controller's channel 1 has failed the POST routine

INTR #2 Error

As above but channel 2.

CMOS Battery State low

The battery supplied in the system appears to be low on power and may need replacing.

CMOS checksum failure

The checksum is generated for each SETUP configuration and is used for error checking. If this failure is detected, the Setup program will need to be run.

CMOS System options not set

This will be displayed if some values are corrupt or non existent

CMOS display Type mismatch

Reported when the BIOS detects a different display type to that stored in CMOS.

Keyboard Error

Keyboard timing error detected

KB/Interface Error

Problem with keyboard connection

CMOS Memory size mismatch

The detected memory configuration is different to the value in Setup.

FDD Controller Failure

A fault with the Floppy drive controller, this could be either the main board controller, the Floppy drive or poor cable connection.

HDD controller failure

This may be due to poor cable connection or faulty hard drive.

C: Drive Error

Possibly due to the wrong drive type in CMOS. Otherwise the mainboard or Hard drive is suspect.

D: Drive Error

Same as above but for a second drive. If no D drive is fitted, the CMOS value should be Not Installed.

C: Drive Failure

Similar to C: Drive Error but more serious as the system cannot get any response from the Hard drive.

D: Drive failure

As above but for D: Drive.

CMOS Time and date Not Set

Occurs when invalid value is found in CMOS. Run setup to cure the problem

Cache Memory bad, Do not enable Cache!

The BIOS has detected a fault in the cache memory. The cache can be disabled until the devices are replaced.

8042 Gate-A20 Error

Suspect faulty keyboard Controller

Address line short!

A fault has occurred on the Motherboard.

DMA #2 Error, and DMA # 1 Error

A fault has occurred with the DMA channel stated.

DMA Error

A fault has occurred with the DMA controller.

No ROM BASIC

The BIOS cannot find ROM BASIC due to a fault on the bootable sector on whichever drive you are booting from.

Diskette Boot failure

The diskette has a corrupt boot sector. Use an alternative or the hard drive.

Invalid Boot Diskette

The diskette can be read but the system cannot boot from it. Use a boot diskette or the hard drive.

On Board Parity Error

ADDR (HEX) = (xxxx)

The xxxx refers to the address of a memory parity failure. This may be used to locate a particular RAM chip or SIMM.

OFF BOARD PARITY ERROR

ADDR (HEX) = (xxxx)

Same as above but refers to an external memory card plugged into the system.

Parity Error ????

A Parity error has been detected but the system cannot locate the address.

12.3 Other Messages

A further set of Error messages may appear during operations

Undefined Error - Command Aborted

An error condition has occurred which the program cannot identify

Address Mark not found

The address mark on the hard disk could not be found

Requested Sector not found

The sector currently requested on the hard disk could not be found.

Reset failed

The program issued a reset command to the hard disk but this command did not properly reset the hard disk

Drive parameter Activity failed

The program has sent a reset command to the controller, followed by the drive parameters. Using the parameters sent to it, the controller is not getting a response from the hard disk drive. Check to see if the drive type selected in the CMOS is correct for the drive installed.

Bad Sector Flag detected

The program has tried to perform an operation on a sector which has been marked as bad.

Bad ECC on Disk read

The Error Correction Code (ECC) is calculated for the data written to the drive. This value is written to the drive and read back for error detection. If the read value is incorrect, this message is displayed.

ECC Corrected Data Error

The ECC value read is different from the written value and causes an attempt to correct the data. The ECC is not corrected and this message warns of this fact.

Controller has failed.

Message is reported when a diagnostic command to the controller fails.

Seek operation Failed

A seek operation is the process of finding a particular sector on a hard disk.

Attachment Failed to respond

If, during an operation, the hard disk no longer responds, this message will be displayed.

Drive not Ready

An operation on the hard disk has taken longer than a preset time causing the drive to "timeout" and this message to be displayed.

Write fault on selected drive

A fault has occurred while writing to the hard disk such that the written data is corrupted.

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