Apricot LS

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MITSUBISHI ELECTRIC

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PENTIUM®**PRO**
P R O C E S S O R

Apricot LS System

with Pentium®Pro motherboard

Owner's Handbook

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Safety and Regulatory Notices

Read the separate *Power Connection Guide* and *Health and Comfort Guide* before using the computer for the first time.

Electrical

The computer uses a safety ground and must be earthed.

The system unit AC power cord is its 'disconnect device'. Ensure that the system unit is positioned close to the AC power outlet and that the plug is easily accessible. The power cord packed with the computer complies with the safety standards applicable in the country in which it is first sold. Use only this power cord. Do not substitute a power cord from any other equipment.

It is imperative that the system unit is set to the correct voltage range before use. If not, the machine may be irreparably damaged.

To prevent fire and electric shock, do not expose any part of the computer to rain or moisture and turn off the computer and unplug all power cords before moving or cleaning the system unit, or removing the system top cover.

Battery

This product may contain a lithium battery.

Do not use a metal or other conductive impliment to remove the battery. If a short-circuit is made between its positive and negative terminals the battery may explode.

Replace a discharged configuration (CMOS) battery with one of the same type. Follow the instructions contained in the Owner's Handbook to replace the battery.

Dispose of the battery in accordance with the manufacturer's recommended instructions.

Do not attempt to recharge, disassemble or incinerate the discharged battery. Keep away from children.

Laser products

Any CD-ROM drive fitted in this system is classified as a CLASS 1 LASER PRODUCT according to IEC825 *Radiation Safety of Laser Products (Equipment Classification: Requirements and User's Guide)*. The

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CLASS 1 LASER PRODUCT label is located on the under side of the system unit.

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CLASS 1 LASER PRODUCT TO IEC 825
LASER KLASS 1 PRODUCT NACH IEC 825
```
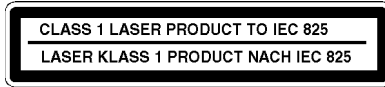
Use the CD-ROM drive only as described in this manual. Failure to do so may result in exposure to hazardous radiation.

Do not attempt to dis-assemble the CD-ROM drive.

Ergonomic

When positioning the system unit, monitor and keyboard, take into account any local or national regulations relating to ergonomic requirements.

Standards

Safety

This product complies with the following European safety standards:

EN60950

and when applicable, will include the national deviations for the following countries:

UK   Germany
Denmark Norway
Sweden

This product also complies with the following International safety standards:

UL1950   (USA)
C22.2-950   (Canada)

Electro-magnetic Compatibility

This product complies with the following European EMC standards:

Emissions   EN55022 Class A / B   * test dependant *
Immunity   EN50082 Level 1 / 2   * test dependant *
Harmonics   EN61000-3-2

This product also complies with the following International EMC standards:

FCC class A / B   (USA)   * FCC text - test dependant *
DOC class A / B (Canada)   * DOC text - test dependant *
VCCI level 1 / 2 (Japan)

The applicable standards for the country of sale will be shown on the label fixed to the rear of the system.

Notes

All ancilliary equipment using an AC power cord should be earthed.

All interconnecting cables (e.g. Microphone, headphone and speaker) and communication cables should be less than 2 metres in length.

If cable extensions are used, ensure adequate earth connections are provided and screened cables are used.

Legalities

This equipment complies with the relevant clauses of following European Directives:

Low voltage Directive   73/23/EEC

EMC Directive   89/336/EEC

CE marking Directive   93/668/EEC

PREFACE

Some systems may be supplied for the networking environment and therefore may not have a hard disk drive or a floppy disk drive fitted. These systems would probably have a network card installed in an available slot.

The motherboard may not be fitted with a on-board video system. In which case a higher grade of video system may be installed in the form of a plug in card occupying one of the expansion slots.

Systems may be supplied with Windows ® 95, or Windows® NT operating software instead of DOS and Windows ® . The appropriate guide will be supplied for the software.

This handbook is intended to give advice and guidance on the use of your computer and include details on some of the optional drives and upgrades that you may have chosen to be fitted into it.

These may have been fitted prior to supply, during manufacture at the factory. Others may be installed by your supplier or Apricot dealer.

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CONTENTS

1 THE BEGINNING. . .

You should read this chapter even if you do not read any other. It provides important basic information to help you in using your computer. It is the minimum you need to know in order to start work straight away.

Note particularly the information given in the section 'Energy Saving Features'.

Connections

Details of the rear port connections are shown in the appendix B '*System Motherboard*', but an overall view is given here.
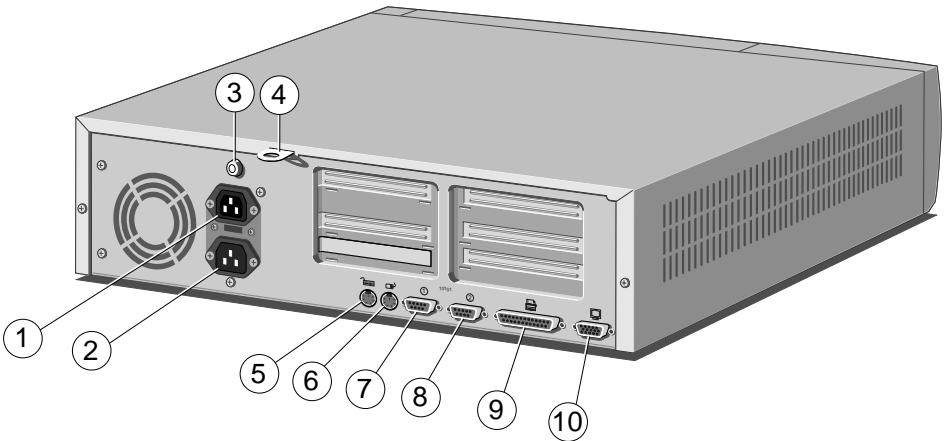
1	AC supply socket	2	AC outlet for monitor	3	Optional case lock
4	System security loop	5	Keyboard port	6	PS/2 mouse port
7	Serial port (COM1)	8	Serial port (COM2)	9	Parallel/printer port
10	Monitor connection ⋆				

⋆If fitted, details in appendix B, 'System motherboard'

The optional Security case-lock (3), can help prevent unauthorised removal of the cover, while the security loop, (4) above, can be used for either alarmed loop cable or padlocking mechanisms.

Turning on and booting the computer

Turning the power on

To turn on the computer, press the lower, or white, POWER button. The green POWER ON light should come on to show that the system unit is powered. Remember that the monitor has its own power control (see the monitor's *User's Guide* for details) and that it may take a few moments to warm up. Do not touch the purple button yet, that will be dealt with on the next page.

If nothing happens when the POWER button is pressed, check that the system unit and monitor power cords are securely connected and that the AC power supply is switched on. See also the chapter on '*Troubleshooting*'.

Power-on self-test

Whenever the computer is turned on, the 'power-on self test' (POST) routine checks the actual set-up of the computer against that recorded in its internal configuration memory. During this time, various messages are displayed. Further information on the computer's Basic In/Out System (BIOS) and its setting up can be found in Appendix C, '*System BIOS and set-up*'.

The boot sequence

Provided that POST succeeds without any serious errors, the computer attempts to find its operating system to start it going, that is, it attempts to *boot*. By default, the computer will first look for a floppy *system disk*, then for a *bootable hard disk* partition or area.

System disk

A system disk is a floppy disk bearing at least the rudiments of an operating system. If the computer finds such a disk in the floppy or A: drive, it boots from it. If it finds a non-system disk, the computer will ask you to replace it.

Bootable hard disk

Most computers with a hard disk containing pre-installed software arrive set up with a suitable 'boot partition'. The operating system

already in place or *pre-installed* on this, the **C:** drive, and it is usually made 'active', i.e. *the bootable hard disk.*

Energy Saving features

If the system is left unattended for more than a predetermined time, energy saving features will come into play. The screen will blank, components will slow down, software will still run, but very slowly.

This is meant to happen.

A flashing light on the purple button will warn you that 'Low power' mode is operative.

Warning

*The energy saving features built into this computer are designed to be used with the monitor supplied with the system. If you wish to use another, or older monitor **it may not** be compatible and **permanent damage may be caused**. Check with your Apricot dealer.*

To restart the system, just move the mouse or press a keyboard key. Everything will return to the exact state in which it was left.

You may also press the purple button, just above the power switch. This button can also be pressed while you are using the system, to override the BIOS timer and force the system into the 'low power' mode.

The power management section of the system BIOS gives access to the control settings of the 'low power' mode, see appendix C, '*System BIOS and set-up'*. You may also disable various features if required.

Turning the power off

Before turning off the computer, run through the following simple checklist:

- Quit or exit from all the applications you are running, making sure to save any files you have altered or created. Information held only in the computer's memory **will be lost** when you turn off the computer.

- Always exit from, or close down Windows. This procedure deletes the temporary files it creates, and will close down all your applications in an orderly manner. It will prompt you to save any unsaved work in the process.

- You should always turn off any attached peripherals first. However, there is no need to turn off the monitor (if it is powered from the system unit.)

- To turn off the computer, simply press the POWER button again. The power indicator on the system goes out. If the monitor is powered from the system unit, it will be turned off at the same time.

- After you turn the computer off, wait at least 5 seconds before turning it on again. The computer may not initialise itself properly if you turn it off and on again in quick succession.

Cleaning and Transporting

Your Apricot computer requires little physical maintenance other than occasional cleaning, but you must take care when transporting it to avoid damage to some of its more delicate components, particularly the hard disk.

Warning

Turn off the system unit and unplug all power cords before cleaning or moving the computer.

Cleaning the computer

Do not use solvents or abrasives, they might damage the system unit surfaces.

Do not use aerosols or sprays near any part of the system, *in particular*, air vents or grills, ports, or removable-media drives, as microscopic droplets can remain in the air for some time and then penetrate and cause irreparable damage.

The system unit

- Occasionally wipe the system unit with a soft, slightly damp, lint-free cloth.

- Occasionally check the air vents on the rear and sides of the system unit. Dust and fluff can block the vents and limit the airflow. A small, clean, soft brush may be useful.

- Occasionally clean the removable media drives using a special disk cleaning kit. These are available from many sources including your Apricot dealer.

The monitor

Occasionally wipe the monitor with a soft, slightly damp, lint-free cloth. It is best to use anti-static glass cleaner on the monitor screen. **Do not** spray glass cleaner directly onto the screen, it could run down inside the case and damage the circuitry.

The keyboard

When necessary, clean the keycaps with a slightly damp cloth and a minimum amount of a non-abrasive cleaning agent.

Regularly check the keyboard cable for wear and tear, particularly near table or shelf edges.

Take care not to spill any liquid or drop small objects, e.g. paper clips or staples, onto the keyboard. Follow these steps if this should happen to the keyboard and it stops working:

1. Switch off and unplug the keyboard.

2. If the liquid is sticky or viscous, unplug the keyboard and call your supplier or an authorised maintainer.

3. If the liquid is thin and clear, try unplugging the keyboard, turning it upside down to let the liquid drain out, and drying it for at least 24 hours at room temperature. If the keyboard does not work, call your supplier or an authorised maintainer.

4. If a solid object drops between the keys, turn the keyboard upside down and shake it gently. **Do not** probe between the keys as this may cause serious damage.

The mouse

The mouse tends to be used heavily and so is susceptible to damage, but a little care should minimise this.

Dust and fluff often accumulates in the ball tracking mechanism of the mouse and should be checked for regularly. To clean the mouse follow this procedure:

1. Unplug the mouse, turn it upside down and locate the plastic cover that holds the ball in place. Depending on the model, the plastic cover can be removed either by rotating it counter-clockwise or by sliding it forward slightly.

2. Remove the cover and set it aside.

3. Cupping one hand over the underside, turn the mouse back the right way up. The ball should drop into your hand.

4. Blow gently into the mouse to remove any dust that has collected there.

5. Inside the mouse there are three small rollers. Using a cotton swab moistened with a solvent cleaner, gently wipe off any oil or dust that has collected on the rollers, rotating them to reach all of their surfaces.

6. Use clear water, or water with a mild detergent, to clean the ball. Then dry it with a clean, lint-free cloth.

7. Put the ball back in its socket and replace the plastic cover. It should click into place.

The mouse cable should also be regularly checked for wear and tear, especially near table or shelf edges.

Transporting the computer

Use common sense when handling the computer. Hard disks in particular can be damaged if the computer is dropped or handled roughly. As a precaution, back up your data from the hard disks to tape or floppy disks before moving the computer. (See the Hard disk section of the chapter *'System drives'*).

Do not try to move the computer while it is plugged into the AC power supply or with any other cables, network, printer etc., still attached.

When lifting and carrying the computer, grip the metal underside of the system unit. **Do not** lift the unit by the front bezel. **Never** attempt to use a drive door as a carrying handle. **Never** attempt to lift the system with a monitor on top.

Do not leave floppy disks or CDs in the drives while moving the system as irreparable damage could occur to either drives or disks.

If you need to transport the computer any great distance, use the original packing materials.

Warning

*If you intend to use the computer in another country, read the information in the **Power Connection Guide** before connecting the computer to a different power supply or electrical system.*

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2 THE SYSTEM DRIVES

This chapter contains simple operating instructions about the drives that may be currently fitted in your computer.

Using the floppy disk drive

The floppy disk drive is usually configured in the system BIOS as drive **A:**, with a capacity of **1.44 Mbytes.**

Floppy disks should be kept away from bright sunlight, dust, moisture and any strong magnetic fields, e.g. do not place them on the monitor, printer, or near a telephone. It is common to store them in a lockable "disk-box", away from the computer itself. Avoid opening the metal window on the disk as this exposes the magnetic surface to contamination which could damage the data or cause the disk to become useless.

Inserting a floppy disk

1. First test the eject button to ensure there are no disks in the drive.

2. Insert the disk with the metal window first, with the label side uppermost into the drive. This will push open the drive door.
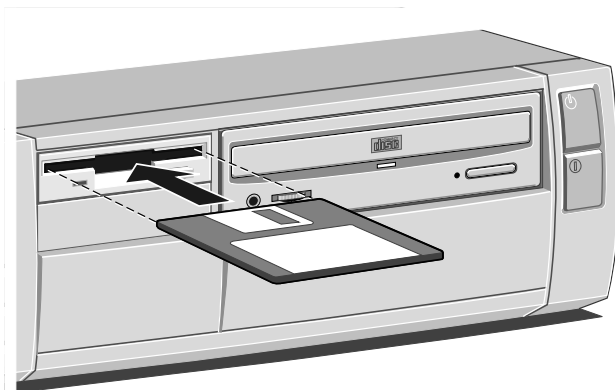
3. Push the disk gently home until it 'clicks' into place. The drive button will also move outwards slightly. The drive door will stay open, leaving the disk just visible

4. The system should now be able to access the disk and the information it may contain. While the system is accessing the disk, the 'drive in use' LED should be lit.

Pressing the button, when the drive is not in use, will eject the floppy disk. Use only the 'High Density' type of floppy disk which has a formatted capacity of 1.44 Mbytes and is readily identified by the HD logo next to the metal window.

Using a CD-ROM drive

Current options include the fitting of a CD-ROM drive to a system. A great deal of software is now supplied on this format, mainly due to the large capacity of the CD-ROM disk.

A CD-ROM drive is available either as an upgrade kit from your supplier, or may have been pre-installed for you at the factory.

Unless either a second hard drive has been installed, or the existing hard drive has been given more than one partition, a CD-ROM drive will usually become drive **D:.**

The drive has its own headphone jack, with associated volume level control, for use in playing an audio CD. It is also possible if you wish to link the headphone socket, via a cable, to your Hi-fi system and play CDs at higher power.

DISC DRAWER

HEADPHONE JACK
AND HEADPHONE LEVEL

BUSY
INDICATOR

EMERGENCY
EJECT HOLE

EJECT
BUTTON
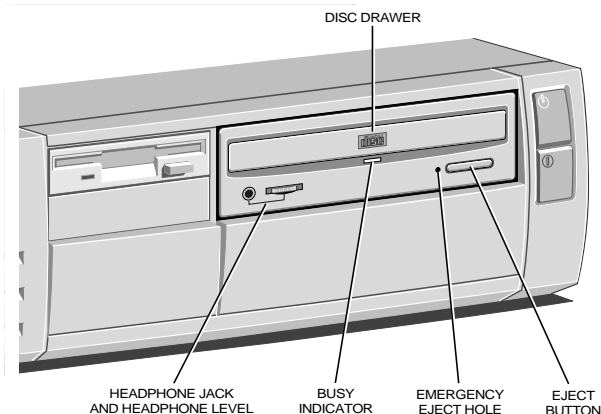
With the appropriate software, a CD-ROM drive can retrieve multimedia data from CD-ROM discs, pictures from Multisession Photo-CD discs and also play commercial audio CDs.

Warning

The laser beam inside the CD-ROM drive is harmful to the eyes if looked at directly. Do not attempt to remove the drive cover or otherwise disassemble the CD-ROM drive. If a fault occurs, call an authorised maintainer.

Keep CDs well away from dust, moisture and temperature extremes and avoid touching the surface of the CD. Store them in solid containers wherever possible. Replacement plastic CD containers are available from most large record stores.

Inserting a compact disc

1. Press the EJECT button on the front of drive.

2. Place the CD centrally face up on the platter.

3. If the platter ejected fully, push the EJECT button again, or gently push the front of the platter, and it will be drawn back into the drive.
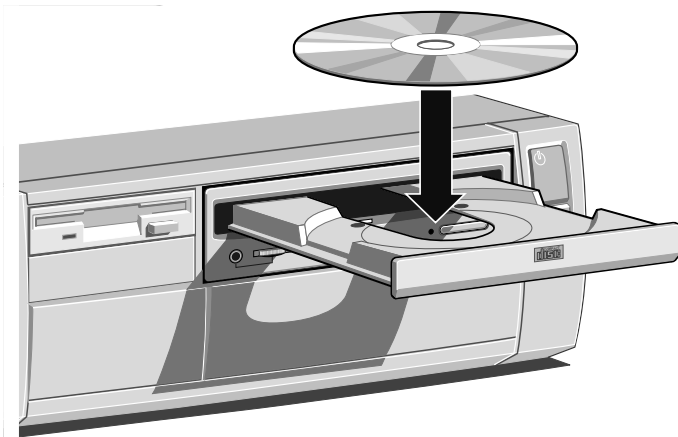
Note

Wait a few seconds for the CD to spin up to full speed before attempting either to play the audio tracks or to read data from it.

To remove a compact disc, press the eject button and then lift out the CD. It is best to close the drawer, to prevent dust getting in, unless you intend to put in a new CD.

Do not attempt to move the computer while a CD is in the drive, as serious damage may be caused to both the CD and the drive, especially if the drive is active at the time.

To remove a CD manually (for example, during a power failure) you must first ensure that the computer is turned off. Insert a thin metal rod (such as an unwound paper clip) into the emergency eject hole. Push carefully and firmly (see below).
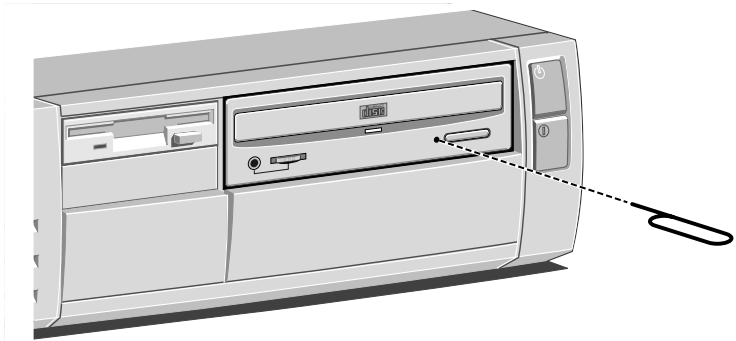
Hard disk drives

Most modern computers are fitted with a 'hard' disk drive (HDD). These can have very large capacities. They have delicate, sealed and air-tight, mechanisms. They operate within microscopic tolerances and spin at high speed. Note that some networked machines may not have HDDs or even floppy drives.

Caution

Try not to jar or move the computer while the system is powered up as this could cause irreparable damage to the delicate drive surface.

The primary hard drive

The majority of computers are supplied with one internal or 'primary' hard disk drive (HDD) designated as the **C:** drive. The operating system will normally be installed on this drive.

Data is stored on the HDD in Directories and Subdirectories, often referred as 'folders'. More details on directories and folders will be found in the Windows guide, as will information on Windows utilities.

The HDD will have only one active partition i.e. the bootable disk but larger HDDs may be supplied with more than one partition. Partitions are like dividing panels or false walls in a large office, they cut the area into smaller sections, each one then becomes almost independent.

A secondary hard drive

Caution

Apricot Computers Ltd have tested many types of hard disks from a variety of manufacturers and all of our upgrade parts are guaranteed. The quality or compatibility of components obtained from any other source cannot be guaranteed.

Computers with an IDE interface can have two HDDs, the primary drive being designated as the Master and the new drive becoming the Slave. The Apricot system BIOS is capable of handling this.

Any slave drive will be supplied completely blank, but will be complete with its fitting instructions. Fitting and setting up a second hard drive is not difficult. If you do not feel confident about installing a second hard drive you may wish to have your supplier or an authorised engineer complete this task for you.

Installation

Switch off the system and remove the cover. Take care to observe anti-static precautions at all times while the system cover is removed. Further details on antistatic precautions can be found in appendix A, 'The system unit.'

It should not be necessary to actually remove any internal screws, merely loosen them sufficiently to remove an assembly.

Remove the floppy drive assembly, slide it towards the rear of the system and lift it out. It may be necessary to temporarily disconnect drive cables. Take careful note of how they are fitted.

Locate and loosen the four screws that hold the CD-ROM drive assembly into the system, slide it back and lift it out.
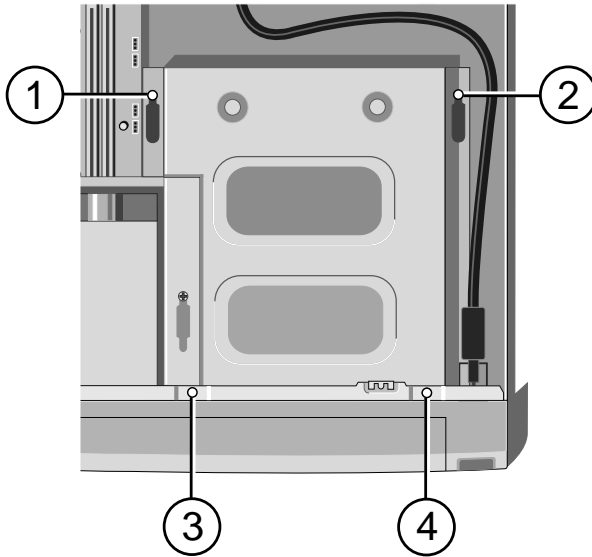
Again, you may have to temporarily disconnect any wires and cables on any fitted drives. You now have access to the hard disk drive assembly.

Loosen the screws holding it to the baseplate and lift carefully out.

Observe anti-static precautions and check the new IDE drive's master/slave links as shown. For a master, or first drive, link across **DS**. For a slave, or second drive, **remove** the link, but retain it by placing it onto **one** of the two pins. Take great care, as this link is very small. (Any existing installed drive should already be linked

across **DS**.) A new SCSI drive will need its ID link set. Check the drive documentation.

MASTER   SLAVE
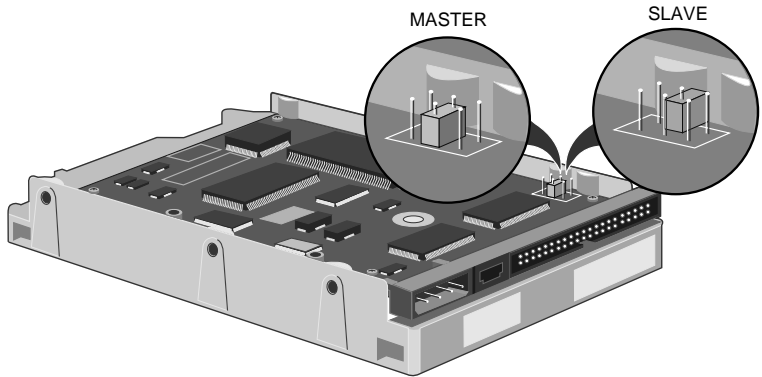
Fit the new hard drive in the available position using the special screws provided taking sure not to touch either of the exposed control boards, then refit the assembly to the baseplate.

Fit an appropriate power connector to the new drive and connect up its signal/ribbon cable. The ribbon cable is 'striped' to indicate pin 1. Correct orientation **must** be observed. (Pin 1 is usually at the end nearest the power connector.)

Refit the CD-ROM drive assembly followed by the floppy drive assembly. Tighten all the screws as you fit the assemblies and reconnect any cables, including earth wires, that had been removed, taking care to reconnect them to their original state.

Refit the system cover carefully, checking first that no other cables or connections have become dislodged or trapped during the work.

Preparing the drive

On switch-on, enter the BIOS as described in appendix C, '*System BIOS and set-up*' and check that the drive details appear on the system summary page. If all is correct then allow the system to boot as normal.

First you must run the DOS **FDISK** program, (choose option 5, 'select new disk drive' if you have just fitted a *second* drive.) Set one or more drive partitions as required.

The disk will then need to be formatted. Look in your software user guide for further information, or in Windows Help. If you have a CD-ROM drive fitted this will have to be renamed as drive E:, as a second hard drive will be designated automatically as drive D: by the operating system.

HDD control interface

There are two current designs of HDD control interface. The more common type is the IDE (integrated drive electronics) which is built into the motherboard. This requires comparatively simple electronics on the motherboard and is a very efficient interface to the more complex control electronics on the HDD itself. Access times and data transfer rates are quite fast.

A secondary IDE interface, also on the motherboard, will control drives such as the ATA-PI CD-ROM drive described on previous pages. A single IDE interface can handle only two similar drives.

The second interface which can be fitted in the factory, is a plug in SCSI (small computer system interface) controller. This will occupy an expansion slot. It has its own control circuits and BIOS. There are benefits in systems where multiple disk access is required, along with repetitive access to large or complex data files.

The main advantage of the SCSI interface, that overcomes its higher cost, is that it can handle several devices, not all of which need to be similar. For example, 2 or 3 HDDs, a CD-ROM, a Tape drive, a Scanner etc., could all be connected via a single SCSI ribbon cable in the system. This does require great care and attention to detail when installing and setting up new devices.

The basic installation requirements outlined above for an IDE HDD will be the same for a SCSI drive, except that an 'ID' link will need to be set on the SCSI drive instead of the master/slave link of the IDE. Details of this will be supplied with the drive. SCSI devices start from '0', which will be the '*bootable*' HDD. There is a practical limit on most SCSI interfaces of about six or seven logical devices.

Software backup

Within Windows you will find Help on numerous topics including backing up, or making a security copy, of your software. It is vital to maintain a discipline of regular backup of your data. Power cuts or hard disk failure are just two reasons.

Your operating system or applications e.g. word processing software, can be simply reinstalled from your master floppy disks or CDs. The files you have created *would be lost permanently.*

Copy your data files to floppy disks, or use proprietary utilities designed to do software backups, such as the one in Windows. Do this regularly and then keep the back-up in a safe place. It is good practice in a busy office, to perform a back-up regularly using two or more sets of disks, rotated for safety.

There are several companies that manufacture backup units, accompanied by dedicated software, some of which can backup your complete hard disk two or three times over on to one small tape cassette, in a comparatively short time. These are mostly used in networked office environments, but there are more simple, economic versions designed for personal or home use.

Copying pre-installed software

A disk imaging utility may be included with pre-installations of some software and operating systems. It will be found within the 'Apricot' group. This allows you to create installation disks from disk images pre-installed on the hard disk. See the utility's on-line help for more information.

Note

*Any copy you make of pre-installed software must be used **only** as a back-up copy, in case the pre-installed version is lost or needs re-installing or reconfiguring. In particular, you are not allowed to use installation diskettes created from disk images to install the software onto another computer. This is an infringement of the terms of the licence agreement.*

3   SYSTEM EXPANSION

Your computer can accept various expansion cards or boards. Most are simple to install. You can extend the capabilities of the computer, for example:

- A modem card can provide a connection to the Internet or a bulletin board via a telephone line.
- A network card can provide a connection to an office or business network fileserver and possibly mainframe.
- A television card can enable you to watch TV on your monitor and capture individual frames or video clips.
- A specialised video board can provide extended features not available on conventional video systems.

This computer system has room for five expansion boards:

two,   half length Industry Standard Architecture (ISA) cards.
one,   full length Peripheral Component Interface (PCI) card.
two,   half length PCI cards.

These can be arranged into the motherboard's 'riser card' generally as shown in this rear view (the blanking plates have been removed to show the possible layout).
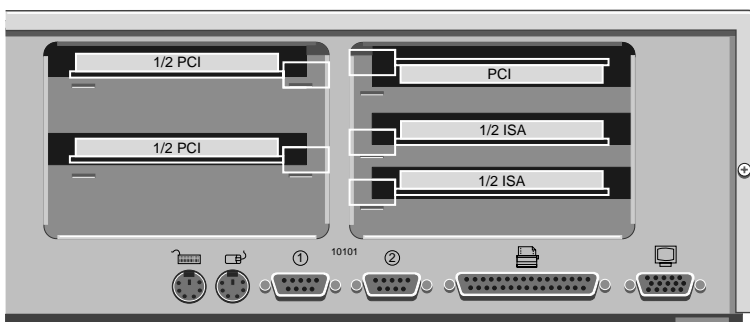
Configuring the card

Part of the installation procedure for many expansion cards involves setting up or configuring the card so it works correctly in the system. To configure, you assign values to various settings on the card, which enable the card to communicate with the computer. The chosen settings MUST be *registered* in the BIOS. See appendix C, '*System BIOS and set-up*' and the section '*ISA Legacy resources*'.

Many cards require that you specify at least two of the following:

- Interrupt request level (IRQ)

- Direct memory access (DMA) channel

- Base input/output (I/O) port address

- Base memory address

The settings used by the card **must** be different to existing hardware in the computer. The settings must not **conflict** with other cards or a component on the motherboard**.**

Some settings are done by jumpers and/or switches on the card and are best completed **before** installation, others are configured by running installation software after the card has been fitted inside the computer. Some cards use a mixture of both methods.

The documentation accompanying the card should tell you what is required. Remember to check any diskettes supplied with the card for README or other help files, **before** you start. If you are in any doubt consult the supplier or manufacturer.

Cards often come with pre-configured or default settings. It is best to rely on these settings as much as possible, and change them only if they conflict with other devices.

ISA Interrupt request level (IRQ)

The *interrupt request level* or *IRQ* (the two terms are used interchangeably) is the line over which the expansion card sends a signal to get the attention of, or interrupt, the processor. Many of these are reserved for components on the computer's motherboard.

Some interrupts are fixed, others can be re-assigned. The following table lists the interrupts used by the computer and shows which may be available for use by expansion cards.

IRQ	Default assignment	Available?
IRQ0	System timer	No
IRQ1	Keyboard controller	No
IRQ2	PIC daisy chain	No
IRQ3	Serial port 2	Optionally
IRQ4	Serial port 1	Optionally
IRQ5		Yes
IRQ6	Diskette controller	No
IRQ7	Parallel port	Optionally
IRQ8	Real time clock	No
IRQ9		Yes
IRQ10		Yes
IRQ11		Yes
IRQ12	Mouse	No
IRQ13	Coprocessor	No
IRQ14	Primary ATA/IDE interface	Optionally*
IRQ15	Secondary ATA/IDE interface	Optionally*
	*If SCSI controller card fitted	

With the BIOS Set-up utility IRQs 3 and 4 are available if you disable serial ports 2 and 1 respectively. Similarly, if you have no intention of using the parallel port, you can disable it with the BIOS Set-up utility, freeing IRQ7. **Do not** disable ports unless you have no intention of using them.

Direct memory access (DMA) channel

Some hardware devices can use a DMA channel to access system memory without directly burdening the processor. Computers have DMA channels numbered DMA0 to DMA7.

The following table lists the DMA channels used by the computer and shows which are available for use by expansion cards.

DMA	Default assignment	Available?
DMA0		Yes
DMA1	Alternate ECP printer port	Optionally
DMA2	Diskette/floppy disk controller	No
DMA3	ECP printer port(default)	Optionally
DMA4	DMAC daisy chain	No
DMA5		Yes
DMA6		Yes
DMA7		Yes

Base input/output (I/O) port address

Some expansion cards are also controlled by I/O ports or 'address space'. The base I/O port address specifies where the card's ports begin. The following table lists the I/O ports used by devices on the motherboard.

I/O ports	Default assignment
1F0h-1F7h	Hard disk drive controller
278h-27Fh	Parallel port 2 (optional)
2B0h-2DFh	Alternate VGA
2F8h-2FFh	Serial port 2
378h-37Fh	Parallel port 1
3B0h-3BFh	Monochrome display and printer adapter
3B4h, 3B5h, 3BAh	Video subsystem
3C0h-3C5h	VGA
3C6h-3C9h	Video DAC
3CAh-3DFh	VGA
3F0h-3F7h	Diskette drive controller
3F8h-3FFh	Serial port 1

Any ports not listed are available for expansion cards. All addresses below 100h are used by the system board for various fixed system components and chipset controller settings.

They are unavailable for use.

Base memory address

Some expansion cards are fitted with memory of their own, usually read-only memory (ROM) containing functional extensions to the computer's BIOS (basic input/output system) ROM. Some cards also have random-access memory (RAM).

In order that this memory can be recognised by the system processor, it must be mapped somewhere within the computer's own address space. By setting the base memory address you specify where the card's memory begins within the address space. Typically, an expansion card's memory must be mapped onto the addresses between C8000h and EFFFFh in upper memory. With most modern expansion cards this is fully automatic.

Note

Memory addresses are always written in base 16 or hexadecimal notation. Unlike the ten digits of the decimal system (0-9), hexadecimal uses sixteen digits (0-9 and A-F, where A=10, B=11, C=12 and so on up to F=15). Hexadecimal numbers are denoted either by the suffix "h" or by the prefix "0x". The final digit of a five-digit memory address is often omitted, so C8000h may be written as C800. Since amounts of memory are usually stated as kilobytes rather than in hexadecimal notation, the following conversion table may be helpful:

4 Kbytes =	*1000h*	*32 Kbytes =*	*8000h*
8 Kbytes =	*2000h*	*64 Kbytes =*	*10000h*
16 Kbytes =	*4000h*	*128 Kbytes =*	*20000h*

The card's documentation should list its possible base memory addresses. You will also need to know how much memory the card has, so that you can leave the right gap between this card's base address and the next.

Installing the card

Read all these instructions through before attempting to install any expansion card.

Installing expansion cards can be one of the most difficult operations you may ever perform within your computer. If you are in any doubt, or come into difficulties you are unable to resolve, contact the supplier of the expansion board or ask your Apricot dealer for advice or assistance.

The only tool required is a small cross-head screwdriver

1. Turn off the computer and unplug all power cords.

2. Take suitable anti-static precautions and remove the system unit cover.

Caution

If you are unfamiliar with the recommended anti-static precautions and/or the process of removing the system unit cover, refer to Appendix A, "Inside the System Unit".

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3. First decide in which of the available slots you wish to install the card. In general it is easiest to start with the lowest slot and work upwards.

4. Check on two things, the type of board (ISA or PCI) and then its length. ***Not all slots take the same length or type of card.*** Details are given at the beginning of this chapter.

   ♦ Note that PCI cards have their components on the ***opposite side*** to older ISA cards.

5. Remove the blanking plate of the chosen slot by removing its securing screw. On the power supply side, remove the security plate, then slide the blanking plate out of its slot. Keep all the screws, etc., they will be needed later to secure the card.

6. If the card you are installing is configured by the means of jumpers or switches, check that it is correctly configured before proceeding.

7. Position the expansion card alongside the slot in which you wish to install it. Align the rear of the card with the slot in the rear of the system unit, and, if the card is full length, align the front of the card with the card guide.

8. Slide the card into the slot ensuring that the card edge connector engages correctly with the socket on the riser board. **Do not use excessive force.**
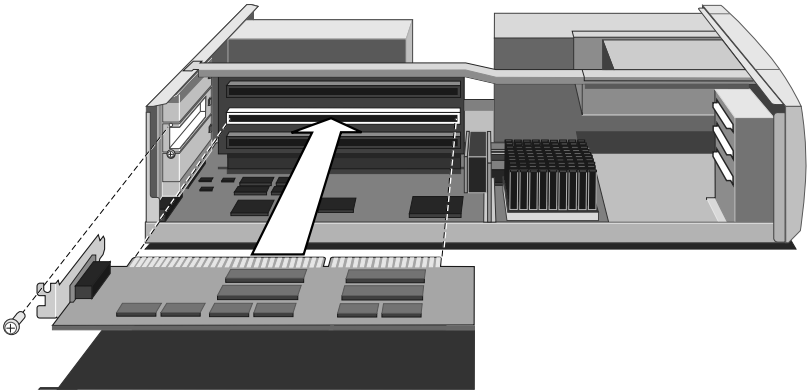
9. Secure the card by replacing all the screws/clamps that you removed in Step 5.

10. Connect any necessary signal cables to the card.

11. Check to ensure no other cables or connectors have become dislodged and replace the system unit cover.

Before you switch on, read the manuals supplied with the card. If you are certain all is correct, switch on. Your first task if you have just fitted an ISA card will be to enter the BIOS to register the settings in the '*ISA Legacy resources*' section. See Appendix C '*System BIOS and set-up*'. PCI cards will not need this step.

Follow any other installation requirements, such as the card's own configuration or installation software.

4   SYSTEM UPGRADES

Read this chapter before purchasing any memory or processor upgrade and if you are in any doubt, consult your supplier. Then, if having read the relevant instructions, you still do not feel confident about installing the upgrade, you may wish to have your supplier or service organisation install it for you.

Caution

Apricot Computers Ltd has extensively tested many combinations of memory and all of our upgrade parts are guaranteed. The quality or compatibility of components obtained from any other source cannot be guaranteed.

Appendix A, "*The System Unit*", provides an overview of anti-static precautions, instructions on removing the top cover and the appendix B '*System Motherboard*', an outline guide showing the memory locations and the link/jumper settings.

The only tool required to complete the installation of the upgrades is a small cross-head screwdriver.

Warning

Never carry out any work inside the computer with AC power applied. Turn off the computer and unplug all power cords before starting work.

Adding more system memory

The computer's motherboard is fitted with sockets for up to four DIMMs (Dual in-line memory modules). You may need to add more memory if you want to run complex operating systems or large application programs.

The memory is fitted in four vertical DIMM sockets which must be populated with gold contact, 3.3V, 72-bit DIMMs. 80, 70 and 60nS timings are supported, but 60nS are recommended as they enable more efficient memory control within the chipset and this may improve system performance with some software.

DIMMs have hardware outputs, readable by the chipset, which indicate the memory chip speed to the controller. Detection of memory size is automatic by the BIOS.

Although the minimum configuration is one DIMM there are considerable performance benefits in fitting more than one DIMM, as 2-way or 4-way interleave become available when two, or four DIMMs respectively, are fitted.

This table shows the supported memory configurations. All fitted DIMMs must have the same capacity and timing.

Total memory	MM1	MM2	MM3	MM4
16 Mb	8 Mb	8Mb	-	-
16 Mb	16 Mb	-	-	-
32 Mb	8 Mb	8 Mb	8 Mb	8 Mb
32 Mb	16 Mb	16 Mb	-	-
32 Mb	32 Mb	-	-	-
64 Mb	16 Mb	16 Mb	16 Mb	16 Mb
64 Mb	32 Mb	32 Mb	-	-
64 Mb	64 Mb	-	-	-
128 Mb	32 Mb	32 Mb	32 Mb	32 Mb
128 Mb	64 Mb	64 Mb	-	-
128 Mb	128 Mb	-	-	-
256 Mb	64 Mb	64 Mb	64 Mb	64 Mb
256 Mb	128 Mb	128 Mb	-	-
256 Mb	256 Mb	-	-	-
512 Mb	128 Mb	128 Mb	128 Mb	128 Mb
512 Mb	256 Mb	256 Mb	-	-
1 Gb	256 Mb	256 Mb	256 Mb	256 Mb

Installing and removing DIMMs
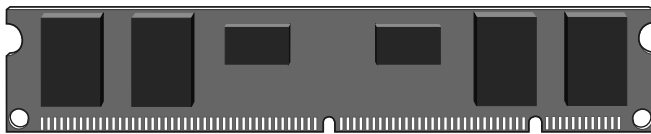
Note the indents along the connector edge, they prevent the DIMM from fitting into the socket the wrong way round.

1. Turn off the computer and unplug all power cords.

2. Take suitable anti-static precautions and remove the system unit cover.

Caution

If you are unfamiliar with the recommended anti-static precautions and/or the process of removing the system cover, refer to Appendix A, "The System Unit".

3. Remove carefully the floppy disk drive module which restricts access to the memory sockets (first identifying the way all cables are fitted) by disconnecting the cables, loosening the screws and lifting out.

4. Check the configuration for the upgrade you intend to install. It may be necessary to remove all of the existing DIMMs, before going on to install the new modules.

To install a DIMM
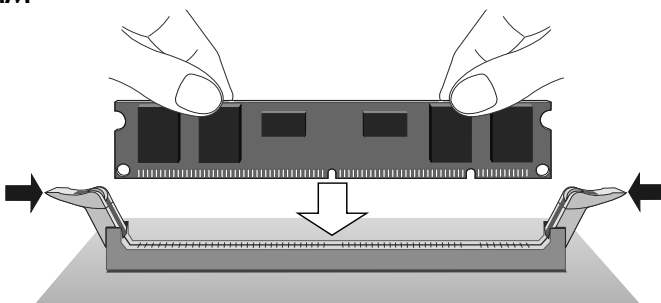
1. Take the module out of its anti-static packaging. Hold it by its ends and avoid touching the metal contacts.

2. Align with and place carefully above the chosen socket, ensuring that the socket end clips are not obstructing.

3. Pushing gently on its top corners, press the DIMM into the socket and make sure the two end clips are snapped into place.

    Do not use excessive force.

4. If the module will not fit easily, remove it and start again.

5. Repeat these steps for each module to be installed.

Note

It is not important which memory socket is used first, but it is usual practice to start with the lowest number bank available (socket MM1.)

To remove a DIMM
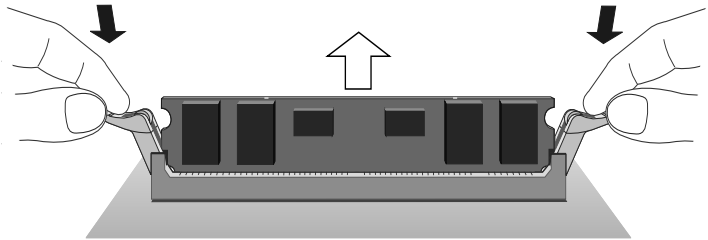
1. Gently press the tabs on both of the end clips at the same time. This will release the DIMM and lift it out of its socket.

2. Lift the module clear of its socket. Hold it by its ends and avoid touching the metal contacts.

3. Place the DIMM in suitable anti-static packaging.

When you have finished, replace and reconnect the drive module you removed earlier, then refit and secure the system unit cover.

The first time you turn on the computer after adding or removing memory, the change will be automatically detected by the system BIOS, if an error message occurs check that you have:

•   Installed a configuration supported in the list above.

- Correctly fitted the DIMMs in their slots.

- The DIMMs are of the correct type.

- The DIMMs are all of the same capacity.

It may be necessary to refit the original memory to check if there is a problem with your new modules. If in any doubt contact your supplier.

Upgrading the processor

The ZIF (zero insertion force) 'type 8' processor socket on the motherboard is designed to accept a variety of Intel **Pentium-Pro** processors. You may wish to upgrade your processor by replacing it with one of higher performance.

Read these instructions carefully before commencing work.

Note

The external or motherboard bus frequency is lower than the processor's internal frequency, which is usually the one advertised. The ratio of the internal and external frequencies is known as the 'processor clock multiplier'. Details are given in the appendix B, 'System motherboard'.

Changing the processor

To remove the existing processor:

1. Turn off the computer and unplug all power cords. If the system was in use just before starting this procedure, the processor **will be hot**, wait at least 15 minutes for it to cool down.

2. Take suitable anti-static precautions and remove the system unit cover.

Caution

If you are unfamiliar with the recommended anti-static precautions and/or the process of removing the system unit cover, refer to Appendix A, "The System Unit".

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3. If there are any expansion cards in the way, you may have to remove them. (Take note of which way all of the cables are

connected.) Disconnect any cables connected to the cards, remove the securing screws at the rear of the system unit, then remove the cards.
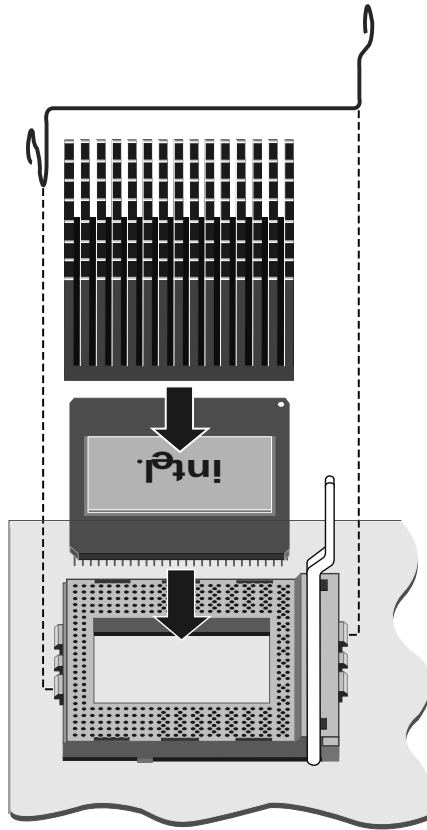
4. If there is no processor fan, a strong spring clip secures the large heatsink to the processor. Release the end of the spring from the hook on the front of the ZIF socket with care and slide the heatsink clear. Handle carefully as there may be heat transfer compound on the heatsink face.

- There may be a power lead for the fan if the processor has one fitted. Take note of the fan power lead polarity before releasing it from its board connection (PL2.)

5. A lever attached to the ZIF socket secures the processor in the socket. Unhook the lever from the locked position. Lift it upright (at right-angles to the motherboard). There may be a little stiffness at the beginning and end of the lever's movement.

6. Lift the processor out of the socket and place it on an anti-static surface outside the system unit. Hold the processor by its edges and *avoid touching any of the metal pins.*

Warning

*If the processor does not easily lift out of, or fit into the socket, do **not** force it or damage may be caused to the processor and the socket. Consult your supplier or an Apricot dealer.*

To fit the upgrade processor:

1. Ensure that the securing lever on the ZIF socket is still in the upright position.

2. Take the upgrade processor out of its anti-static packaging. Hold the processor by its edges and *avoid touching the metal pins.* The upgrade processor and the ZIF socket are keyed to ensure that the processor is installed in the correct orientation. (The pin pattern is totally different at one end.) It will only fit into the socket one way.

3. Place the processor in the socket, making sure that it is correctly aligned and that you do not bend or otherwise damage the pins. **Do not use excessive force**.

4. Move the ZIF socket lever to the locked position. Apply just enough pressure to overcome the resistance offered by the lever. Ensure that it is firmly locked into its down position.

5. Refit the heatsink if the new processor was supplied without one and secure correctly the retaining spring. **Ensure the heatsink is central on the processor and is securely held**.

   • If the spring is no longer required, remove it completely by disengaging it from its hook on the rear of the ZIF socket.

- The upgrade processor may have a fan power lead to be connected to the pins on the board (PL2.) The 'overdrive' type processor however may have its own internal connection for the fan power supply.

6. **Now adjust the processor multiplier and external bus clock speed links** on the motherboard in conjunction with the new processor's data sheet. See appendix B, *'System motherboard'*, for detailed information about changing the link settings.

Warning

Ensure that the supply lead for the front casing fan is still connected to PL1 to ensure adequate airflow over the processor assembly.

This processor requires continuous airflow.

Return to their original position any expansion cards that had been removed earlier, then refit and secure the system unit cover.

5 TROUBLESHOOTING

This chapter offers advice if you suspect a fault with your computer.

If in doubt
Turn off the computer and unplug all power cords before consulting your supplier or maintenance provider. Make a note of any of the symptoms, error codes, display messages etc., before calling.

This chapter is concerned mainly with problems caused by the computer itself, although problems can often arise from other sources such as your network cabling, operating system or application software.

Problems when starting

If you suspect a blown fuse

In the UK, and some other countries, mains plugs contain fuses. Your Apricot computer is supplied with the correct power lead with an appropriate fuse fitted for operation within the UK. If the fuse in the system unit's mains plug blows when you turn it on, this may be caused by an AC power surge, but is more likely a symptom of problems with the computer or its peripherals. Follow these steps:

1. Turn off the computer and unplug all power cords.

2. Unplug all peripherals from the system, e.g. monitor.

3. Look for any obvious cause of the fault. If none is apparent, replace the blown fuse with one of the same rating, reconnect the system power cord and try to turn it on again.

4. If the replacement fuse blows, call your supplier or maintenance provider.

5. If the replacement fuse does not blow, reconnect one peripheral at a time and switch it on. Repeat this step for each peripheral in turn.

Power-on self-test (POST)

Whenever the computer is switched on, the POST routine tests various hardware components, including memory, and compares the actual configuration of the computer with that recorded in configuration (CMOS) memory. During this time, BIOS sign-on and POST messages are displayed.

A configuration discrepancy could arise if you have just installed or removed a hardware option In this case you may be diverted directly into the BIOS set-up. If POST detects a hardware fault, one or more error messages may be displayed. A full list of these is given at the end of appendix C '*System BIOS and set-up*'.

Your first action should be to turn off the computer, wait at least 30 seconds, and then turn it on again to see if the error is transitory or persistent. Persistent POST errors indicate a fault in the system. The computer may be able to continue despite the error indication (for example, if a memory chip fails POST, the computer can sometimes continue with less memory).

If after checking the BIOS settings you are unable to clear the hardware problem call your supplier or authorised maintainer.

Failure to boot

The computer attempts to boot from a system diskette or bootable HDD partition.

Failure to boot correctly may result in an error message from the operating system, most others will be from the BIOS.

One common boot failure message is:

Non system disk or disk error. Replace and strike any key when ready.

There may be a floppy disk in the drive which is not a bootable floppy, in which case remove it, or replace it with one that is.

If the message persists there may be a fault with the HDD, in which case, check the BIOS settings are correct. If they are then the HDD may need to be reformatted and the system software restored.

Troubleshooting checklist

If you encounter a problem with the computer the following sections suggest checks to make before you alert your dealer, authorised maintainer or support organisation. The checks listed cover the causes of common problems.

Connections

Check that all power and signal cables are securely connected to the correct port on the computer.

The keyboard and mouse are particularly easy to connect into the wrong port. Although the connectors are identical, the keyboard will not work if plugged into the mouse port, and vice versa.

The two serial ports also appear identical. If you have a problem make sure that the cable is connected to the correct port.

Power

Check that the AC power supply is switched on, and that the fuse in the AC plug (if any) has not blown. If the system still does not seem to be getting power, obtain another power cord from your supplier.

Monitor

If there is no display check that the monitor is turned on, and the brightness and contrast controls are not turned to minimum. check also that the monitor is connected to the correct video output.

Expansion cards

If an expansion card does not work, check that all internal cables are securely connected, that the card is configured correctly and does not 'conflict' with another card or motherboard component. Check also that the software that controls or uses the card is correctly configured. Look in the chapter 'System *expansion'* for information on, for example IRQs and in the Appendix C '*System BIOS and set-up'* whether your chosen settings are usable. Ensure that the ISA resources used are registered in the BIOS.

Video

If you have fitted a new video controller card ensure that the monitor cable is connected to the new card.

Check that you have removed the old video drivers/software from your system before installing any software for the new video card.

If you have difficulty reading the screen, or some programs do not seem to display correctly, try a different video resolution or colour setting. Some application software may only work using a specific colour setting or display resolution.

System BIOS

Check the system BIOS to ensure that it has not been disturbed from the original settings. If the settings appear to have altered, there may be a fault with the BIOS battery. See Appendix B, '*System Motherboard*' and Appendix C '*System BIOS and set-up*'.

The system's disk drives

Refer also to the chapter on using the '*system drives*'.

Floppy disk drives

If you have problems accessing a floppy disk, check that it is inserted correctly, that it has been correctly formatted, that is not write-protected, and that the permissions assigned by the BIOS allow the intended access.

Some application software may not allow you to read or write to floppy disks until it has finished all other tasks, or will only save your files when you exit the program.

CD-ROM drives

If you have problems accessing a CD, check that you have allowed a few seconds for the disk to spin up to full speed, that the disk is the correct way up in the drive and that it is a data CD.

Remember that you cannot save data onto a compact disk with a conventional CD-ROM drive and disk.

Check also that the disk is not badly scratched or dirty. Clean them carefully, wiping them with a clean, soft cloth, slightly moistened if necessary. Clean from the centre outwards. Always store CD-ROMs in hard cases and handle them by the edges only wherever possible.

Hard disk drives

If you have problems accessing your hard disk drive, check that the controller to which the drive is connected is enabled, that the disk has been correctly formatted, and that the permissions assigned by the BIOS or the software that you are using allow the intended access.

Check the cables and device allocation on any new SCSI device fitted for conflict with existing devices.

Software

It has become a requirement to regularly scan your system for software 'virus' intrusion. This can cause strange effects with serious consequences to software and sometimes hardware, especially via open networks.

Inability to access drives, destruction of data and even wiping of system BIOS have been experienced by recipients.

Check all floppy disks of unknown origin with virus scanning software before use. If it is suspected of being supplied from an unauthorised source, be on your guard. The supplier may not be aware of the potential problem. Illegal copying of programs has led to distribution of the many common types of virus.

There are software companies specialising in Anti-Virus software for both home and corporate use. They are however no substitute for tight control of **your** system and **your** software.

Virus infection can be easily prevented, providing reasonably simple precautions are taken:

- Purchase software from only reputable sources.

- Avoid 'second hand' software.

- Do not lend other people your software master disks.

- Keep your floppy disks in a safe place.

- Write protect your floppy disks.

- Perform regular backups of your data.

- Always be aware of what other people might be doing when they have open access to your computer.

- With any 'Second hand' disks, format them **first**.

Very few software problems are actually caused by a virus and with reasonable precautions the vast majority of users will not get infected by them. In the greatest majority of cases it is more likely to be a corruption of some of the data, often due to slightly damaged or old floppy disks.

It is possible to encounter problems when trying to load the wrong type of file into an application. This can sometimes cause the application to stop, or in some cases the system to completely halt. In this situation, remove any floppy disks and switch the system of for a few moments, then restart.

A THE SYSTEM UNIT

This appendix provides instructions regarding access to the inside of the system unit for the purposes of maintaining or upgrading the system. There is also the general system/drives specifications.

The only tool required is a small cross head screwdriver.

Warning

Turn off the computer, along with all peripherals, and unplug all power cords before removing the top cover.

Anti-static precautions

Static electricity can cause permanent damage to electronic components. You should be aware of this risk, and take precautions against the discharge of static electricity into the computer.

Static electricity can be generated by moving on a chair, brushing against desks or walls, or simply walking across an ordinary carpet. Items handed from one person to another, or being wrapped or unwrapped, can acquire a static charge. Air conditioning systems can also result in very high levels of static.

Clothing made of synthetic fibres is particularly likely to generate static electricity; this static electricity is often completely unnoticed by the wearer, but can be sufficient to cripple or destroy sensitive electronic components in computers.

The computer is at risk from static discharge while the top cover is off, as the electronic components of the motherboard are exposed. Memory modules, cache upgrades and OverDrive processors are other examples of electrostatic sensitive devices (ESSDs).

All work that involves removing the cover must be done in an area completely free of static electricity. We recommend using a Special Handling Area (SHA) as defined by EN 100015-1: 1992. This means that working surfaces, floor coverings and chairs must be connected to a common earth reference point, and you should wear

an earthed wrist strap and anti-static clothing. It is also a good idea to use an ioniser or humidifier to remove static from the air.

- When installing any upgrade, be sure you understand what the installation procedure involves before you start. This will enable you to plan your work, and so minimise the amount of time that sensitive components are exposed.

- Do not remove the system unit cover, nor the anti-static bag or wrapping of any upgrade, until you need to.

- Handle static-sensitive items with extreme care. Hold expansion cards and add-on components only by their edges, avoiding their electrical contacts. Never touch the components or electrical contacts on the motherboard or on expansion cards. In general, do not handle static-sensitive items unnecessarily.

- Keep all conductive material, foodstuffs and especially liquids, away from your work area and the open computer.

Opening the system unit

To remove the system unit cover:

CASING SCREW
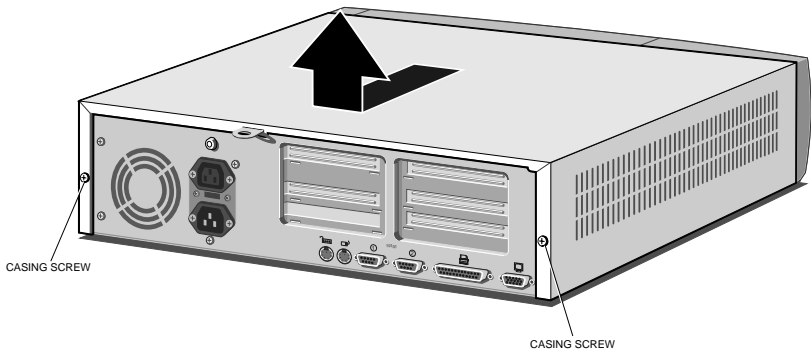
CASING SCREW

1. Turn off both the system unit and the monitor.
2. If your AC power outlets have switches, set them to their Off positions.
3. Unplug all power cords from rear of the system unit.
4. Remove the two casing screws, and put them to one side.

5. Release the caselock and/or remove any locking device from the loop, if fitted.

6. Slide the top cover rearwards slightly, then lift it off.

Refitting the cover is simply the reverse of removal. Take effective anti-static precautions while the top cover is off.

The components inside
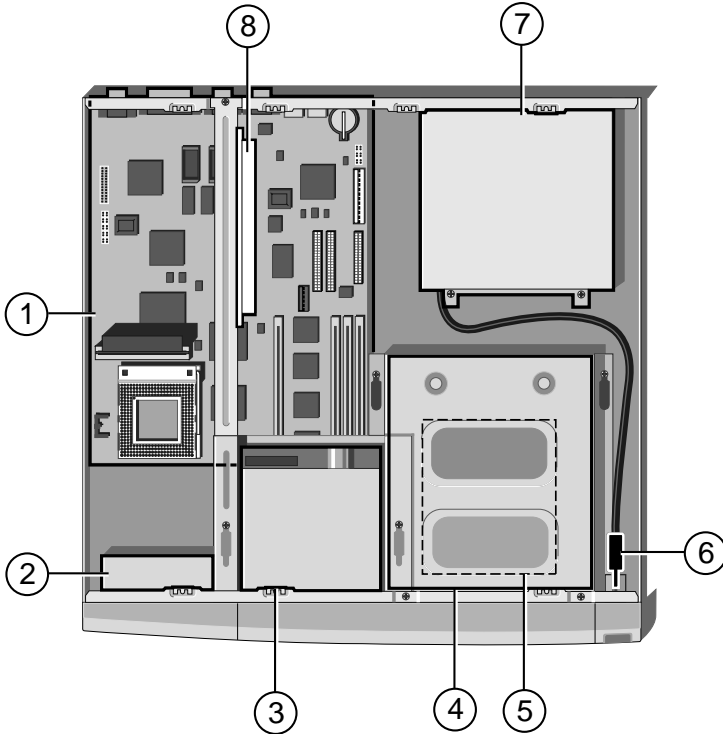
1	System main board	2	Processor and system cooling fan
3	Floppy disk drive	4	CD-ROM drive
5	Hard disk drive, (below CD-ROM)	6	'Power' and 'Low power / Restore' switches
7	Power supply unit	8	Riser board, see chapter '*Expansion*'

For simplicity, ribbon and power cables are not shown in the above illustration

Drive Specification summary   **(removable media only)**

Floppy disk drive

Manufacturer	Mitsubishi	MF355F-2450MP	
Interface		34 Pin connector	
Power	Connector	4 pin miniature	
	Loading	1.5W during read/write	
		100mW during standby	
		(400ms start time)	
Disk formats	(3 Mode)	DS-DD 720 Kb	
		(1.2 Mb NEC, Japan)	
		HD 1.44 Mb	
Reliability	MTBF	80,000 hours	

CD-ROM drive

Manufacturer	Sony	CDU77E	
Interface	IDE	ATA-PI (on main board)	
	Mode 2	4Mb/s typical	
Speed	Quadruple	600Kb/s Mode 1	
	Access time	190mS	
		410 ms full stroke	
Cache		Built into drive electronics	
Power	Connector	Standard 4 pin	
	Loading	26W (max. at tray open/close)	
Audio	Internal line	750mV at 47Kohms	
	Headphones	550mV at 32ohms	
Disks	Size	12 cm, or 8 cm	
	Types	CD-ROM mode 1, or 2, data	
		CD audio disks	
		Audio-combined CD-ROM	
		Multisession Photo-CD	
Laser	Type	GaA1As semiconductor	
	Wavelength	780 nm	
	Power	0.6 mW	
Reliability	MTBF	100,000 hours	

Warning

The laser beam inside the CD-ROM drive is harmful to the eyes if looked at directly. Do not attempt to remove the drive cover or otherwise disassemble the CD-ROM drive. If a fault occurs, call an authorised maintainer.

Note

The IDE CD-ROM drive detailed opposite may be replaced with a similar specification SCSI device when systems are fitted with a suitable interface.

Physical Characteristics   (system unit)

Weight and dimensions

Component	Height	Depth	Width	Weight
System unit	120 mm	425 mm	445 mm	10-11 Kg*
Keyboard	45 mm	170 mm	465 mm	1.3 Kg

* Depending on configuration

Temperature and Humidity ranges

Range	Temperature	Relative humidity with no condensation
Storage/Transport	+5 to +55°C	20% to 80%
Operational	+10 to +35°C	20% to 80%

Voltage range

Setting	AC Voltage	Frequency
115V	100 to 120V	50 to 60 Hz
230V	220 to 240V	50 to 60 Hz

Warning

The power cord supplied with the system complies with the safety standards applicable to the country in which it was originally sold. You should consult an Apricot dealer before using the system in another country .

B SYSTEM MOTHERBOARD

This appendix details the specification and settings for the main processor board fitted inside your computer. Normally the vast majority of jumper settings should *never be changed*.

Board Specification

Processor	Type	Intel Pentium-Pro (P6) 150MHz and upwards
	Bus speeds	50, 60, 66 MHz
	Socket	Type 8 ZIF
Chipset		Intel Orion
Cache	L2	Internal to processor
BIOS	Surepath 1.3	4 Mb Flash BIOS ROM
	Battery	On board Lithium Type CR2032 or direct equivalent
Memory	DIMMs	4 x 72bit, (16 to 512Mb) 3.3V. 80, 70, or 60nS. (All four should be the same)
Video★	**(If equipped)**★	Cirrus Logic GD543x/544x
	Memory★	2 Mb on board
	(★options include without on-board video)	

Upgrading

For upgrading information of main memory, or system processor, refer to the chapter titled 'System Upgrades'.

Drives Floppy drives Support for 720 Kb,
              1.2 Mb (3-Mode, Japan only)
              1.44 Mb at 3.5 inch,
              and 1.2 Mb at 5.25inch

        Hard drives PCI/IDE controller.

        (*Primary connector for IDE Hard disk drives)*

        CD-ROM ATA-PI IDE drives.

        (*Secondary connector for ATA-PI CD-ROM drives)*

Ports   Parallel   25-way female 'D' connector
              IEEE 1284
              EPP/ECP supported

        Serial   2 x 9 way male 'D' connector
              RS232, 16550 compatible.

        Keyboard PS/2 compatible

        Mouse   PS/2 compatible

        Monitor★

        ★*(Equipped only with on-board video option.)*

Expansion By means of a riser board fitted to a socket on
        the motherboard, which can accept five
        expansion cards as follows:

        ISA   two half length cards

        PCI   two half length cards

        PCI   one full length card

Board layout
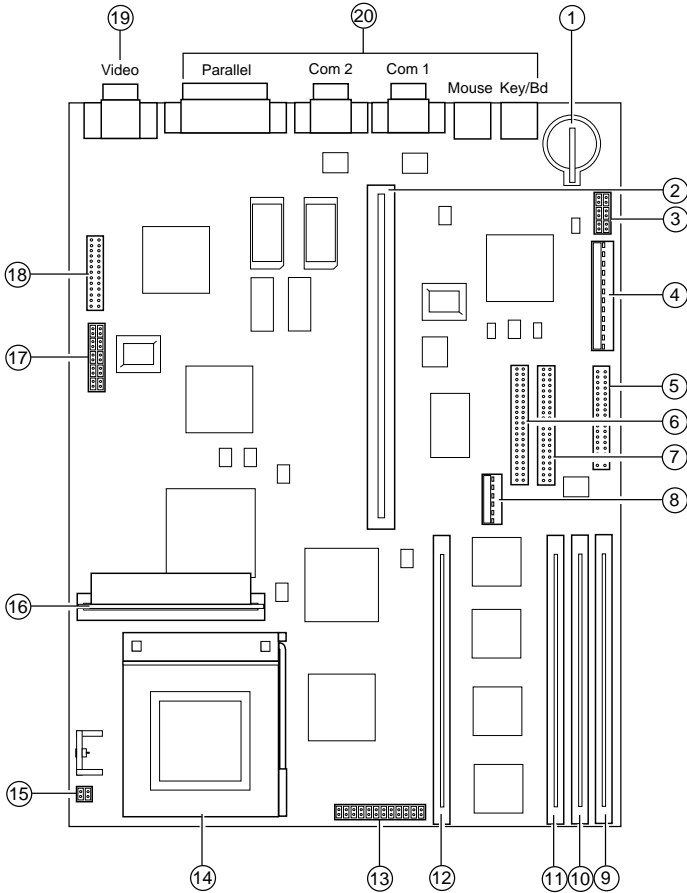
1	Battery (type CR2032)	2	Expansion riser socket	3	BIOS control links
4	Main power supply connector	5	FDD connector	6	Primary IDE interface
7	Secondary IDE interface	8	Aux. 3.3V power connector	9	Memory socket 4
10	Memory socket 3	11	Memory socket 2	12	Memory socket 1
13	Front bezel connections	14	Processor ZIF socket, type 8	15	Fan connections
16	Power regulator module	17	Processor and bus setting links	18	VGA feature connection [*]
19	Monitor connection [*]	20	External ports		

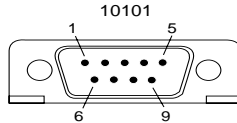*[*] May not be present if motherboard supplied without on-board video.*

System Ports   *(external connections)*
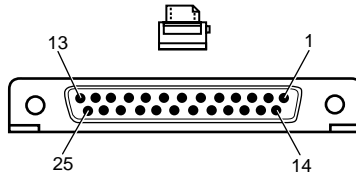
Serial communications COM 1, COM 2
9 way Male D-type connector

1. Data carrier detect   2. Receive data

3. Transmit data   4. Data terminal ready

5. Signal ground   6. Data set ready

7. Request to send   8. Clear to send

9. Ring indicate

Parallel port
25 way female D-type connector

1. -Strobe	2. Data bit 0	3. Data bit 1
4. Data bit 2	5. Data bit 3	6. Data bit 4
7. Databit 5	8. Data bit 6	9. Data bit 7
10. -ACK	11. BUSY	12. PE
13. SLCT	14. -Auto Feed	15. -ERROR
16. -INIT	17. -SLCT IN	18. to 25. (incl.) Ground.

Keybord and Mouse ports
6 pin miniature DIN connector
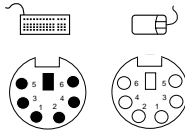
Both of the connections have the same voltages and signals but are **not** interchangeable.

1. Data   2. Reserved   3. Ground
4. +5V DC   5. Clock   6. Reserved

Monitor port   (if motherboard is video equiped)
15 way (3 row) female D-type connector
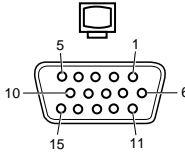
PIN	Output	Monochrome	Colour
1	Red	No pin	Red
2	Green	Mono	Green
3	Blue	No pin	Blue
4	Reserved	No pin	No pin
5	DIGITAL Ground	Self test	Self test
6	Red signal return	Key pin	Red signal return
7	Green signal return	Mono signal return	Green signal return
8	Blue signal return	No pin	Blue signal return
9	Plug	No pin	No pin
10	DIGITAL Ground	DIGITAL Ground	DIGITAL Ground
11	Reserved	No pin	DIGITAL Ground
12	Reserved	DIGITAL Ground	DDC Data
13	H-sync	H-sync	H-sync
14	V-sync	V-sync	V-sync
15	Reserved	No pin	DDC Clock

Jumper configurations

There are very few jumpers that will ever need changing, most of them have been factory set for your system and its needs, but for completeness, the details are given here.

BIOS control links

Set of links, identified at position '3' on the motherboard diagram.
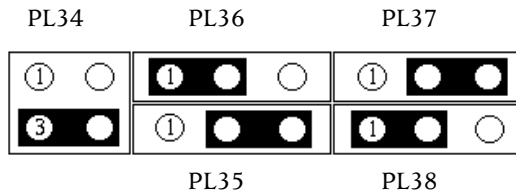
Floppy disk control mode

PL34, default position as shown above, pins 3-4. For 3-mode operation of the drive (Japan only), link pins 1-3 and 2-4.

BIOS recovery

PL35, default position as shown above, pins 2-3. If you require a BIOS upgrade it is reccommended that you contact your supplier or authorised maintainer for assistance.

BIOS re-program

PL36, default position as shown above, pins 1-2. To write enable the CMOS for a BIOS upgrade, move link to pins 2-3.

BIOS password

PL37, default position as shown above, pins 2-3. Locks password into the BIOS. To release, move link to pins 1-2.

Clear CMOS

PL38, default position as shown above, pins 1-2. To erase all CMOS settings (*extreme caution advised*), move link to pins 2-3. It is advised to make a careful note of all the BIOS settings **first**.

Processor and bus clock

Full details of the processor's requirements should accompany the new processor and the appropriate board links should then be identified from the information below.

PL11 and PL12 are reserved for video options if an on-board video system is fitted. Any fitted links here should not be moved.

Warning

DO NOT alter system bus, or multiplier links under normal circumstances as it may severely damage the processor and/or other components on the motherboard.

Set of links, identified at position '17' on the motherboard diagram.

PL5	PL8	PL9	PL400	PL12

PL6	PL7	PL10		PL11
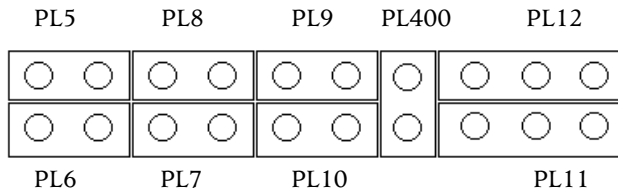
Bus clock speed
PL9, 10, 400:

50Mhz	Links on PL9 + PL10
60Mhz	Links on PL10 + PL400
66Mhz	Link on PL9 only

Multiplier
PL 5, 6, 7 and 8:

| x2	No links
x2.5	Link on PL8 only
x3	Link on PL6 only
x3.5	Links on PL6 + PL8
x4	Link on PL5 only
x4.5	Links on PL5 + PL8
x5	Links on PL5 + PL6
x5.5	Links on PL5 + PL6 + PL8

Processor settings examples

Processor speed	Links
150	PL8 PL10 PL400
166	PL8 PL9
180	PL6 PL10 PL400
200	PL6 PL9

External connections

Connectors identified at position '13' on the motherboard diagram.

PL18   PL17   PL22   PL23

PL16   PL20   PL21
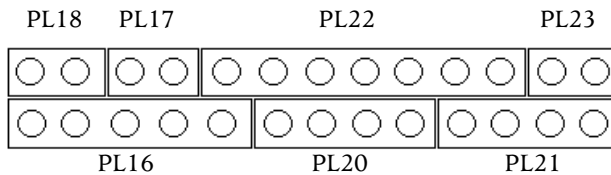
PL16   Keylock and power on LED
PL17   Standby power switch
PL18   System in standby LED
PL20   Drive active LEDs
PL21   Speaker
PL22   IRDA
PL23   System hardware reset

Set of links, identified at position '15' on the motherboard diagram. (Not illustrated)

PL1   Main system fan supply
PL2   Processor fan supply   (*pin1 - ground*)

Replacing the CMOS battery

If you find that have to reconfigure the computer BIOS every time you turn it on, the battery has discharged and needs to be replaced.

The battery is a 3 volt lithium type (CR2032 or equivalent) typically used in calculators, watches and other small, battery-powered electronic items. The average battery life is between 3 and 5 years.

Read carefully the following instructions before commencing work.

1. Turn off the computer and unplug all power cords.

2. Take suitable anti-static precautions and remove the system unit cover.

Caution

If you are unfamiliar with the recommended anti-static precautions and/or the process of removing the system unit cover, refer to Appendix A, 'Inside the System Unit'.

---

3. Identify the battery holder, identified at position '1' on the motherboard diagram.

4. Carefully disconnect and remove any expansion cards that may obstruct easy access to the battery. Take note of any cable positions before removal.

Warning

Do not *use a metal or other conductive implement to remove the battery. If a short-circuit is accidentally made between its positive and negative terminals, it may cause the battery to explode.*

---

5. Lift the edge of the battery far enough to clear the base of the holder, then slide the battery from under the contact spring.

6. Taking care not to touch the top or bottom surface of the battery, pick up the replacement with the positive (+) terminal upwards.

7. Slide the battery into the holder from the same side the old battery was removed.

8. Replace any expansion cards you had to remove in step 4.

9. Replace the system unit cover.

10. Dispose of the old battery according to the makers instructions.

When you next turn on the computer you will have to run the BIOS Set-up utility to enter the hardware configuration. See appendix C '*System BIOS and set-up*' for guidance.

C   SYSTEM BIOS AND SET-UP

When the system is switched on, the *power on self test* (POST) does its job depending upon the information it finds in the BIOS and sets up the computer to boot into operation. You can access the BIOS and check or alter the configuration via its set-up utility.
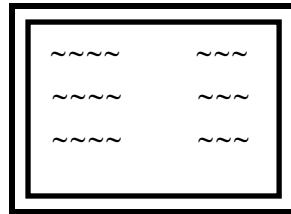

Caution

The BIOS has been set in the factory for the optimum system performance and operation. It is not advisable to alter any settings under normal use.

Entering Set-up

During, or just after, the POST, a small box appears in the top right corner of the screen.

It looks like this:

```
~~~~        ~~~
~~~~        ~~~
~~~~        ~~~
```

While this is on the screen press **F1** on the keyboard, and in a few seconds you will be presented with the BIOS set-up screen. You cannot enter this set-up utility at any other time or by any other method.

Control keys

| F1 | Esc | ↑/↓ | ←/→ | ↵ | 0/9 | +/− | F9 | F10 |

F1   Help on the highlighted topic, pressing it a second time transfers you to the general help pages.

Esc   Exit either the set-up, or go back a page if in a sub-menu.

↑ and ↓   Scroll through a menu list.

←and→ To toggle values or settings.

↵   The enter key, to select the highlighted item.

$^0/_9$ Numbers, used in places where values are to be entered.

$^+/_-$ Used when required, similar to numbers.

F9   Restores the original settings that you entered with.

F10   To restore the original default setting

Caution

*F9 will not affect the **date** settings and pressing F10 may put in a default setting that could have been changed by our factory during production build.* **Make a note of ALL of the settings before any changes are made.**

Set-up starts on its own

This can happen for three reasons:

- There is a configuration error, or fault. In which case an error message may well appear. A list of these is given at the end of this chapter.

- The BIOS battery may be running down. In this case you may also get error messages. If it happens every time you boot up, you may have to change the motherboard battery. Instructions for this are in the appendix B '*System Motherboard*'.

- The system's configuration may have been changed. More system memory, or an upgrade that uses ISA interrupts etc. *The BIOS set-up menu bullets will become an arrow where changes have been detected by the POST and this can be followed down through the sub- menus.*

If you are unable to resolve any problem, do not alter too many settings, but make a note of them and any error messages that appeared on the screen and call your Apricot dealer or authorised maintainer.

Opening screen

On entering the set-up utility a main menu screen appears. If there is an associated sub-menu, or a further sub-menu available, then the listed options have a preceding bullet, as shown below:

- System summary — Information about the system. Processor, memory, drives etc.

- Devices and I/O ports — The settings for serial, parallel ports, IDE interfaces, HDD.

- Date and time — Change the system master clock

- System security — View or change access to HDD, user and administrator passwords.

- Start options — Boot from A: or C:, keyboard speed, POST speed etc.

- Advanced set-up — Change the cache setting, ROM shadowing and other related topics.

- ISA Legacy resources — Register resources used by new ISA expansion cards, memory, DMA, interrupts etc.

- Power management — Change settings for the Low power energy saving mode.

Save settings — Saves any changes that have been made

Restore settings — Restores all the settings to the values that were in force when you entered set-up, same as pressing **F9**

Load default settings — Restores the settings to their default possibly blank) state.

Exit set-up — Ends the session and starts the system POST again. If you have changed any settings you will be asked if you wish to save the new settings.

Sub-menu pages

System summary

This page cannot be edited, but gives a summary of the system main settings. Changes made in other pages will be reflected here.

Make a note of the information on this page before you progress any further or make any changes.

Devices and I/O ports

Serial ports 1 & 2 (COM1 & COM2)

Selects the I/O and interrupts used by the two serial ports. Do not disable the serial ports unless you are absolutely sure you are not going to need them.

Parallel port

You can select standard, or extended port modes. To obtain the extended port modes it will be necessary to change the I/O setting. If you choose the ECP setting there is a choice of 1 or 3 available for the DMA setting.

Standard mode	(default)	Output only.
Extended mode	Bi-directional	Simple two way data.
	EPP	Enhanced parallel port compatible operation.
	ECP	Extended capabilities port operation.

Any parallel port devices that you may wish to attach, such as a tape streamer or external hard drive etc., will have full instructions supplied with them that will tell you if the port capabilities need to be altered to one of the alternative options above.

ISA floppy interface

This sets the floppy drive interface to either Primary (default) or to disabled. If set to disabled the floppy drive cannot be used at all.

Floppy disk drives

This is available purely to change the mode of the floppy drive. The drive supplied and fitted is a 3.5inch 1.44 Mbyte. This setting, if changed, could prevent software access to the fitted drive.

IDE settings

Disk size and type is auto-detected if either an IDE HDD or CD-ROM drive is fitted to the appropriate motherboard interface and only one parameter can be changed for each drive. The system can control two HDDs and two CD-ROMs from the primary and secondary IDE interfaces respectively. This list will appear if 'IDE settings' is chosen:

> HDD 0
> HDD 1
> HDD 2
> HDD 3

When an IDE CD-ROM is fitted to the secondary interface, HDD 2 will change automatically to CD-ROM 1.

Selecting any fitted drive gives a sub-menu:

Size	Auto-detected by POST.
Performance	Select either *Compatible* or *High performance* The default setting is *High performance.*
Transmission mode	Auto-detected by POST and set by the BIOS to the highest available for that device.

Caution

Once the HDD has been formatted, do not alter the settings as it may lead to miss-read of the HDD and corruption of data.

If a SCSI control board has been fitted, along with SCSI drives, this menu may remain blank as the SCSI board has its own BIOS.

Mouse

This tells the system that a mouse is connected to the mouse port. The mouse is then detected by the POST. You should not normally change this setting.

Date and Time

There is a Real Time Clock (RTC) on the system motherboard. The RTC is maintained by the CMOS battery when the system is off.

System time

Using the left and right arrow keys to move around, you then use either the number keys to insert new figures or the + and - keys to increase/decrease the existing number. The time is in 24 hour format.

System date

The procedure is the same as setting the time, the date being in UK format of *Day / Month / Year*, e.g. 1st August 1995 = 01 / 08 / 1995.

System security

This is to allow you to set, change or delete a set of passwords for either user or administrator and to control access independently for HDD and floppy drives.

Caution

This menu can have interaction with the START OPTIONS menu. You must ensure that a user has access to a START-UP DEVICE, or the system could become unusable.

User password

If the user password feature is enabled, the correct password must be entered every time the system is switched on or re-booted. If you select this option a sub-menu appears:

Enter User Password	Type in your password, use numbers and letters only.
Enter Password Again	Re-type it as above.
Set Or Change	Select this to accept the password for all future sessions.

If you have not changed or entered a password before selecting 'Set Or Change', a box will appear asking you to press ENTER to confirm deletion of the existing password, effectively choosing 'no password'. If you make any mistakes, press 'Esc' to return to the main menu and start again.

Delete User password

Use this to clear or remove the existing password, without replacing it with a new one. You may be asked for confirmation or to enter the old password.

Warning

Remember your passwords, But do not write them down on a piece of paper and leave it in your desk drawer, or pin it on your wall!

Password prompt

The system can be set to 'ask' for the password on switch on or re-boot. You may not wish to have a prompt for security reason, but the user is still required to enter a password.

Administrator Password

This allows the setting of a supervisory password and to choose whether a user can change their individual password. This administrator password will be requested in order to enter the BIOS SET-UP. If the user password is entered instead, there is only access to the System Summary and (if enabled) access to setting the User Password of System Security.

The procedure is generally the same as for the User Password, with the addition of **User Password changeable by User.** Select either Yes or No for this feature.

Start Options

Certain features can be set or enabled for system boot up.

Keyboard Numlock

If ON, the keyboard number lock is enabled when the system boots and the right hand section of the keyboard is numbers only.

The default setting is *ON.*

Keyboard speed

This sets the speed at which a pressed key will repeat.

The default setting is *FAST*.

Diskette-less Operation

If this option is Disabled, POST will report a fault or any absence of the floppy drive and halt the boot process, if Enabled, POST will bypass the floppy test and continue, providing another boot device is available e.g. the HDD.

Displayless Operation

If this option is Disabled, POST will halt on any absence of a monitor, Enabled, will allow the system to start without a monitor e.g. when used as a small fileserver.

Keyboardless Operation

If this option is Disabled, POST will halt on any absence of a keyboard, Enabled, will allow the system to start without a keyboard e.g. when used as a small fileserver.

Note

If you disable the keyboard you may not be able to enter a password.

Start-up Devices

This allows the choice of sequence that the BIOS uses to look for a 'boot', drive. The default sequence is:

Diskette drive 0 ; Hard disk 0   (i.e. A: then C:)

It should not need to be changed for normal operation.

Power On Self Test

The POST can be selected to either run only a short set of tests (**Quick**) or a full test (**Enhanced**)

The default setting is *Enhanced.*

Virus Detection

When Enabled, the BIOS will perform a checksum operation on the boot sector to find if a 'boot virus' has crept in. **It is not an infallible check** against the newer types of virus, but it may help.

Advanced Set-up

Any settings changed in the following sections, if incorrect, may cause the system to halt or may cause your software to malfunction.

Error handling

This gives acces to a further menu where internal processor errors can be detected and displayed. These settings are intended for maintainance engineers for fault diagnostic purposes only and should not be changed.

BU

There are two settings, either enable or disable. This is used in conjunction with the motherboard link to perform an upgrade to the BIOS of the processor. This is recommended for authorised engineers only.

ROM Shadowing

The contents of the Read Only Memory are copied into the faster Random Access Memory during start-up, providing faster access and enhancing system performance. Choosing this option displays a sub-menu showing a split up table of the memory address range, with the range sectioned into 32K blocks. Some areas are greyed out as they are already in use by parts of the system.

PCI settings

A single setting to prefetch the readings for PCI Plug and Play can be disabled if required. This may improve performance with some operating systems, but can produce erratic or unpredictable results with some software.

ISA Legacy Resources

When expanding your system with an ISA card this menu section is used to 'register' the system resources that the card uses. This needs to be done as the system cannot auto-detect their being in use, but must be told about them so as to auto-configure any PCI Plug and Play cards and avoid conflicts. There is a menu for each topic.

The resources affected are:

Memory, I/O port addresses, DMA channels, System interrupts.

Some areas are shown as *Allocated by the system* and are only for your information. Finer detail is shown in the chapter dealing with Expansion, which should be consulted in conjunction with the information supplied with the expansion card being installed.

Each resource can be set to either **Available** or **Not available.**

If shown as *available*, it is assumed by the system not to be in use by any ISA card or device and therefore will be made available for the PCI auto-configure process. Although many ISA cards are very simple to configure, the resources they use, if any, **must** be registered in the BIOS.

ISA Graphics/Video device
Choice of present or not present. Default is 'not present' unless the system has an ISA video board fitted.

Power Management

The individual parts of the system can be selected to be shut down in the 'Low power mode' by enabling or disabling them in this menu. Some of the settings have been pre-set in the factory to comply with the Energy Star Programme.

Menu option	Choices
Standby mode for Hard disk	Disable, Enable. (*timing fixed at 20 mins.*)
Inactivity time-out	Disable, or range of times. (in minutes)
Standby mode for monitor	Disable, Enable.* *(* see warning below)*
Standby mode for CPU	Disable, Slow CPU.

Warning

*The energy saving features built into this computer are designed to be used with the monitor supplied with the system. If you wish to use another, or older monitor **it may not** be compatible and **permanent damage may be caused**. Check with your Apricot dealer.*

Error messages

Code	Cause	Code	Cause
0	Keyboard locked	301	Keyboard data line failure
101	Timer tick interrupt failure	301	Keyboard stuck key failure
102	Timer 2 test failure	303	Keyboard controller failure
106	Diskette controller failure	604	Diskette drive 0 failure
110	System board memory parity interrupt	604	Diskette drive 1 failure
114	Option ROM checksum failure	605	Diskette unlocked problem
151	Real time clock failure	662	Diskette drive configuration
161	Real time clock battery failure	762	Coprocessor configuration
162	CMOS RAM checksum failure	962	Parallel configuration
162	Invalid configuration information	1162	Serial configuration
163	Time of day not set -preboot	1762	Hard disk configuration
164	Memory size does not match CMOS	1780	Fixed disk 0 failure
165	Add/remove MC card	1781	Fixed disk 1 failure
166	Memory configuration change	1782	Fixed disk 2 failure
175	Bad EEPROM CRC #1	1783	Fixed disk 3 failure
176	System tampered	1800	No more IRQ available
177	Bad PAP checksum	1801	No more room for option ROM
178	EEPROM is not functional	1802	No more I/O space available
183	PAP update required	1803	No more memory <1Mb available
184	Bad POP checksum	1804	No more memory >1MB available
185	Corrupted Boot sequence	1805	Checksum error or 0 size option ROM
186	Hardware problem	1806	PCI-PCI bridge error
187	VPD S/N not set	1962	No bootable device
188	Bad EEPROM CRC #2	2400	Display adapter failed ; using alternate
189	Excessive password attempts	2462	Video configuration
201	Base memory error	5962	IDE CD-ROM configuration
229	External cache failure	8601	Pointer device failure
301	Keyboard failure	8603	Pointer device has been removed
301	Keyboard clock line failure		

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