MITSUBISHI ELECTRIC

apricot

LS/VS550

Owner's Handbook

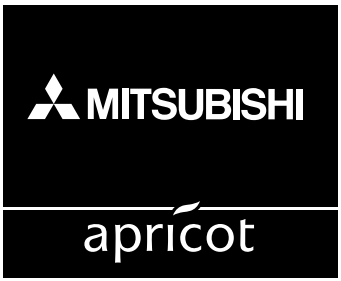
intel inside
PENTIUM PRO PROCESSOR

BSI REGISTERED FIRM
NATIONAL ACCREDITATION OF CERTIFICATION BODIES

OWNER'S HANDBOOK

APRICOT LS/VS550

with Pentium-Pro processor



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MITSUBISHI ELECTRIC

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SAFETY AND REGULATORY NOTICES

General

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.

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 contains a lithium battery:

Do not use a metal or other conductive implement 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. Dispose of the battery in accordance with the manufacturer's recommended instructions and ***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 CLASS 1 LASER PRODUCT label is located on the underside of the system unit.

It will be in high visibility colours and bear the details shown above.

Use the CD-ROM drive only as described in this manual. Failure to do so may result in exposure to hazardous radiation.

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 European safety standard EN60950. When required, any applicable national deviations for the country in which it is sold will be shown on an appropriate label affixed to the system underside.

Electro-magnetic Compatibility (EMC)

This product complies with the following European EMC standards:

Emissions	EN55022	Class B
Immunity	EN50082	Level 2

This product also complies with the following International EMC standards:

VCCI level 1 (Japan)

German Acoustic Noise Regulation

Sound power level is less than 70 dB(A) according to DIN 45635 Part 19 (ISO 7779).

Notes

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:

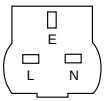
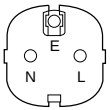
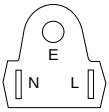
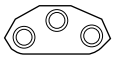
Low voltage Directive	**73/23/EEC**
EMC Directive	**89/336/EEC**
CE marking Directive	**93/668/EEC**

Caution

This system has been tested to comply with CE marking and its strict legal requirements. Use only Apricot tested and approved parts. Failure to do so may result in invalidating both the compliance and your warranty. All expansion cards or upgrade components must carry CE approvals.

Power connection information

Typical AC plugs

250V	250V	125V	250V	250V
				
BS1363A	**SHUCO**	**NEMA 5-15P**	**SRAF 1962/DB16/87**	**ASE 1011**
U. K.	Austria Belgium Finland France Italy Germany Sweden Norway Holland	Taiwan Thailand Japan USA Canada	Denmark	Switzerland

Procedure

Note

Any ancillary equipment using an AC power supply cable should be earthed.

The power supplies in the computer and the monitor are correct for the country in which the system is first sold. Do not alter any switch settings on the rear of the system. If you wish to use the computer in another country it may not be suitable, contact your supplier or an authorised Apricot dealer.

- Before connecting up any parts of the system, ensure that the AC supply is switched off or disconnected.
- First connect up the keyboard, mouse, monitor signal cable, and audio cables as appropriate.
- Connect up **all** AC cables. (System to supply, system to monitor, all related peripherals.) Then switch on or connect the AC supply.
- Switch on the monitor first, then the computer followed by the peripherals, such as printer or speakers.
  - ◊ If the monitor AC power cord is connected to the computer AC outlet, when you come to switch off, the computer's power button will switch off the monitor at the same time.

Power Cable Connections - UK ONLY

This equipment is supplied with an AC power lead that has a moulded, non-removable, 3-pin AC plug.

Always replace the fuse with one of the same type and rating which is BSI or ASTA approved to BS1362.

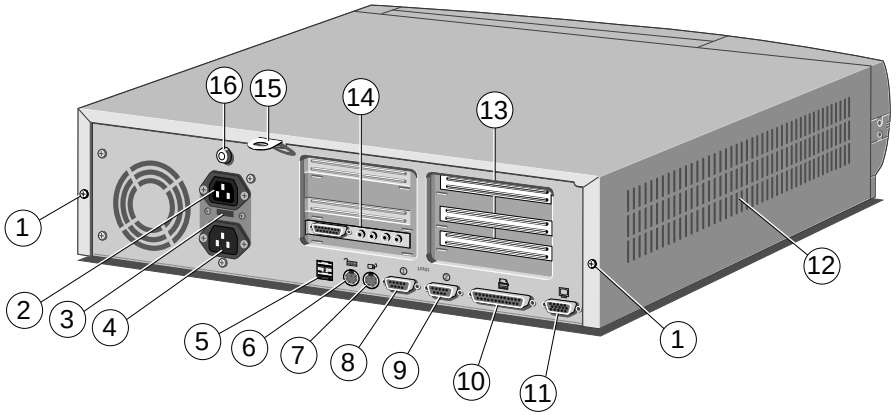
Always refit the fuse cover, never use the plug with the fuse cover omitted.

Never substitute a power cord from any other appliance. If you suspect a fault with the AC power lead, obtain a replacement from your supplier or authorised maintainer.

1 FIRST STEPS

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 use your computer safely and with ease.

System rear



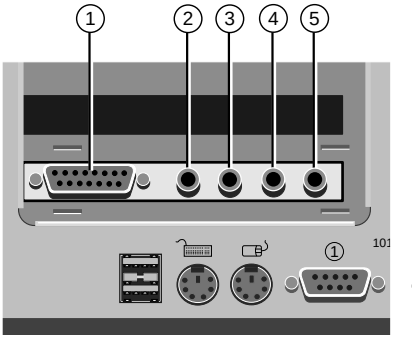
1. Casing screws	7. PS/2 mouse port	13. Expansion
2. AC supply socket	8. Serial port (COM1)	14. Audio connections*
3. Supply selector switch	9. Serial port (COM2)	15. System security loop
4. AC outlet for monitor	10. Parallel/printer port	16. Optional case lock
5. USB port	11. Not used	
6. Keyboard port	12. Side air vents	

*detailed on following page

Security

The optional Security case-lock (16), can help prevent casual and unauthorised removal of the cover, while the security loop, (15) above, can be used for either alarmed loop cable, anchoring cable, or padlocking mechanisms. This will help prevent unauthorised cover removal as well as system theft.

Audio subsystem (option)



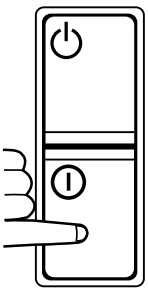
1. Joystick/MIDI port	4. Line out
2. Microphone	5. Speakers
3. Line in	

The motherboard sound system is a Creative Labs Vibra, full 16 bit. Audio output from the CD-ROM drive is internally connected to the Vibra sound system.

There is a built-in amplifier suitable for driving headphones and passive speakers. Phantom power is provided for microphone types that require this facility. (Electret type) 8 Ohm impedance minimum on both microphone and speakers.

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. The monitor has its own power control (see the monitor's *User's Guide* for details) 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.

The boot sequence

Provided that POST succeeds without any serious errors, the computer looks for 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 floppy disk bearing at least the rudiments of an operating system. If the computer detects a disk in the floppy drive, it tries to boot from it. If it is 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 is usually already in place or *pre-installed* on this, the **C:** drive. The C: drive is usually made 'active', i.e. *the bootable hard disk*.

Energy Saving features

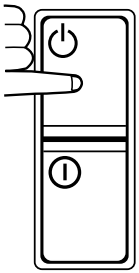
Energy saving is normally enabled in the Power Management section of the system BIOS. If the system is left unattended for more than a predetermined time, energy saving features come into play. The screen will blank, components will slow down, software will still run, but very slowly.

A light is provided on the **purple button** to warn you that 'Low power' mode is operative. The 'power on' light will still be visible.

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 instead press the purple button, just above the power switch to restore the system. This button can also be pressed while you are using the system, to override the time-out and put 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.

Turning the power off

Remember these two simple points:

- Close down any applications you are running and save any files you have altered or created. Data held only in the computer's memory **will be lost** when you turn off the computer.
- Always exit from, or 'shut down' Windows. This procedure deletes the temporary operational files it creates and will close down everything in an orderly manner.

You will usually be prompted to save any work you may have forgotten in any 'minimised' applications, for example a spreadsheet working in the background.

To turn off the computer, simply press the POWER button again. If the monitor is powered from the system unit, it will be turned off at the same time. Wait at least 10 to 20 seconds before turning on again. The computer may not initialise itself properly if you turn it off and on again in quick succession.

It may be advantageous on some occasions to use the 'Energy Saving' features of the computer. Press the purple button on the front panel and put the system into 'Low Power'. This will provide a quick start up next time you use the system.

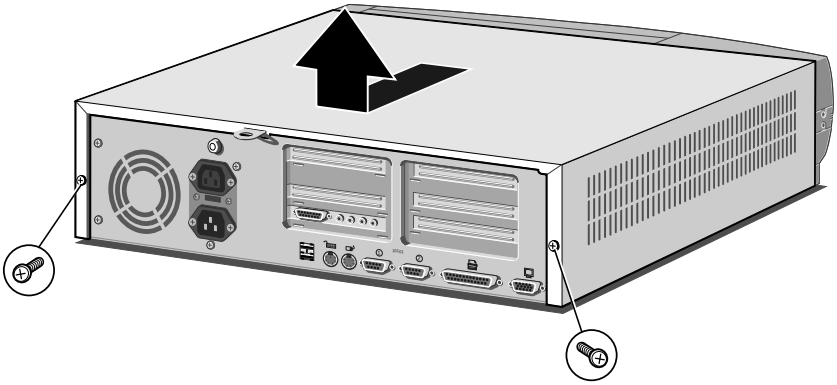
Opening the system unit

The only tool required is a medium cross head screwdriver.

Warning

Turn off the computer, along with all peripherals, and unplug all power cords before removing the top cover. Take suitable antistatic precautions while the system cover is removed.

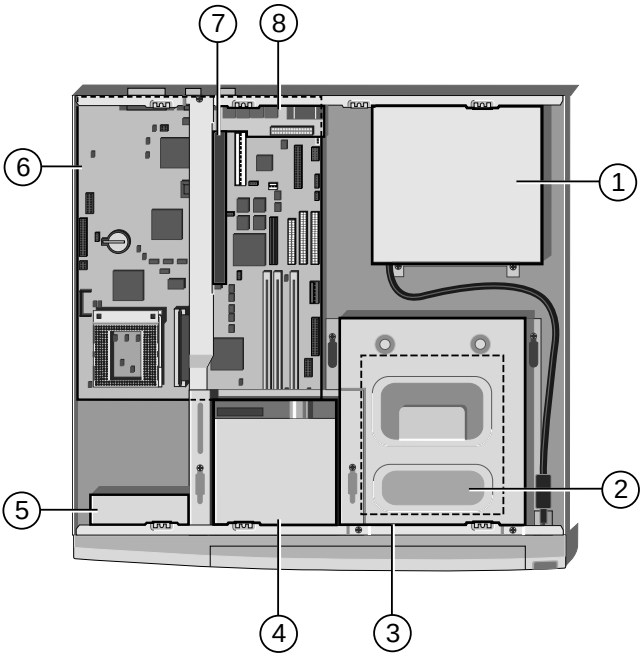
1. Turn off both the system unit and the monitor and unplug all power cords from rear of the system unit.
2. Remove the two casing screws, and put them to one side.



3. Release the caselock or remove any locking device from the loop, if fitted.
4. Slide the top cover rearwards slightly, then lift it off.

Refitting the cover is simply a reversal of the procedure.

The components inside*



1.	Power supply	5.	System cooling fan
2.	Hard disk (below CD-ROM)	6.	Motherboard
3.	CD-ROM drive	7.	Expansion riser board
4.	Floppy drive	8.	Rear audio board (option)

* Please note that, for clarity, all the power and signal cables are not shown in the above illustration.

2 THE SYSTEM DRIVES

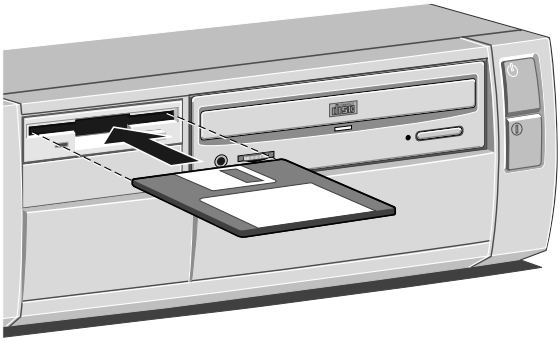
Using the floppy disk drive

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. Avoid opening the metal window on the disk as this exposes the magnetic surface to contamination which could render the disk useless.

Inserting a floppy disk

1. Insert the disk with the metal window first, with the label side uppermost into the drive. This will push open the drive door.



2. 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

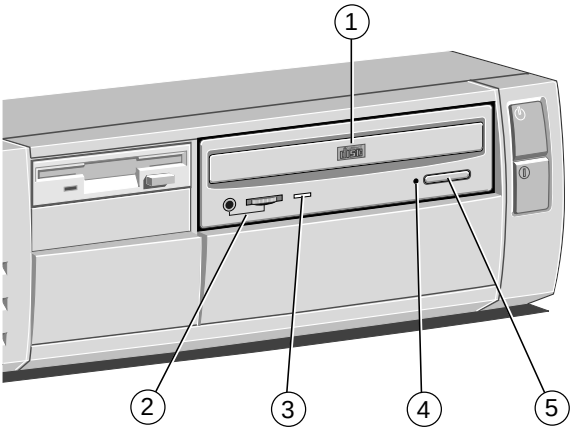
3. The system should now be able to access the disk and the information it may contain. While the system is accessing the disk, the 'drive in use' LED should be lit.

Pressing the button, *when the drive is not in use*, will eject the floppy disk. It is best to 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

The CD-ROM drive can retrieve multimedia data from CD-ROM discs and multi-session Photo-CD discs. It can also play normal audio CDs.

It is important that the computer is not moved while a CD is in the drive, especially if the CD is being accessed at the time.



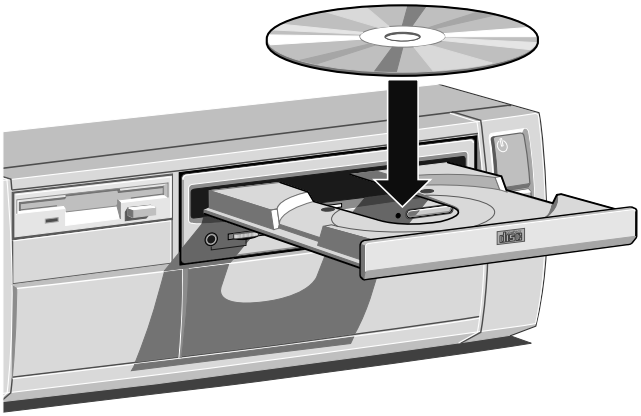
1. Disc drawer	4. Emergency eject hole
2. Headphone jack and volume	5. Eject button
3. Activity light	

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.

Inserting a compact disc

1. Press the EJECT button on the front of drive.
2. Place the CD centrally, printed side 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.

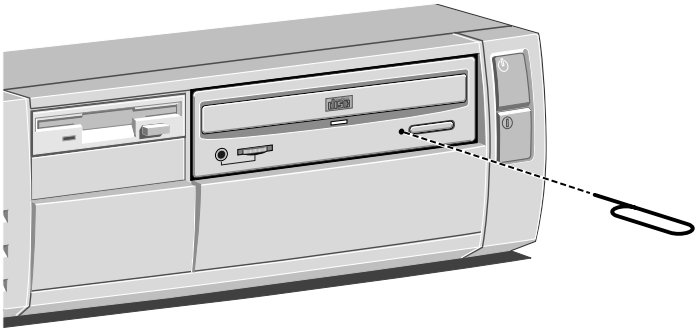
To remove a compact disc, press the eject button and then lift out the CD. It is best to close the drawer, to prevent dust getting in, unless you intend to put in a new CD.

Care of CDs

Keep CDs well away from dust and moisture, and avoid touching the surface of the CD. Avoid extremes of temperature and exposure to direct sunlight as these may cause the disk to warp.

Always store CDs in there original cases wherever possible. Replacement cases are readily available in record stores. CD storage racks are useful as you will find the majority of new software is now supplied in CD format.

Emergency CD removal



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.

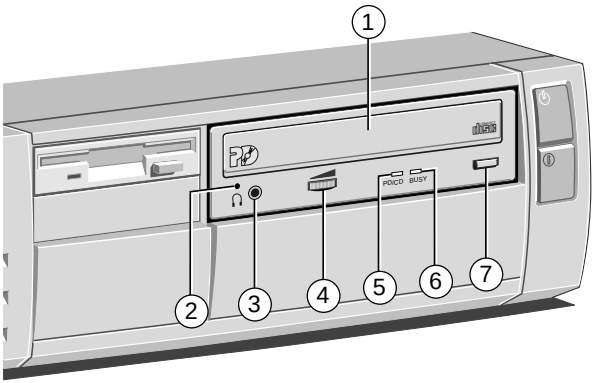
Optional PD drive

This dual purpose drive can be fitted as an option into any system where both a CD-ROM drive and an efficient re-writable backup device is needed.

There is an indicator LED to show the type of disk which has been inserted, but the rest of the controls are very similar to a conventional CD-ROM drive.

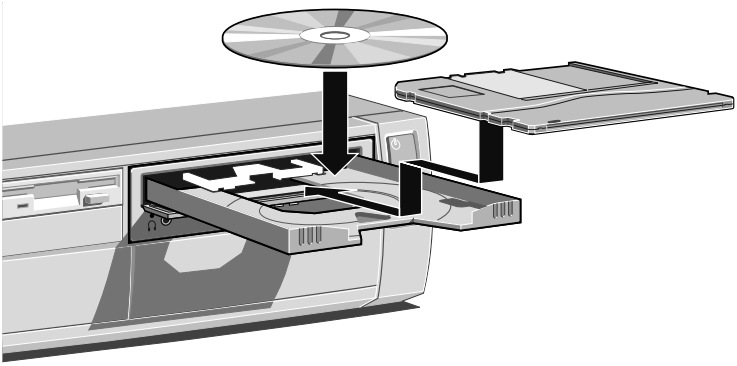
The drive can use any PD cartridges bearing the PD logo. If the cartridge is not formatted you will be prompted to format it. All the standard types of CD can be used in this drive, data, music etc., including the mini-CD.

The Phase-change drive will occupy the same space as the conventional CD-ROM drive, with minor differences as shown in the illustration opposite.

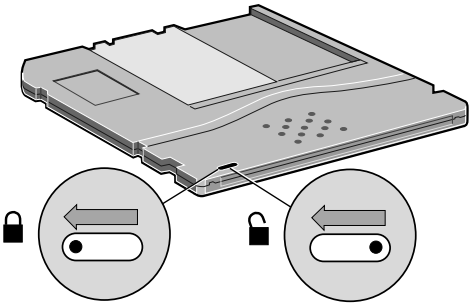


1. Drive tray	5. Media indicator
2. Emergency eject	6. Drive active indicator
3. Headphone socket	7. Tray eject button
4. Headphone volume	

The drive can handle the large and small types of CD-ROM (as well as music CDs), or it will accept the PD recordable cartridge:



These cartridges have a capacity similar to a CD-ROM but with the difference of being re-writable. They have a shelf life of 30 years or more, unlike magnetic material which decays over a relatively short period of time. Like floppy disks they have a write protect switch.



The drive control software provides two icons, each with its own drive letter. These will be found in Windows Explorer, or the drives section in the control panel. One is for use with data cartridges, the other is for CD-ROM and is easily identified as such with a CD symbol. Emergency removal of the media under conditions such as a power failure is similar in method to that of the conventional CD-ROM drive as detailed earlier.

Hard disk drives (HDDs)

The primary hard drive

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

The HDD can have only one active partition i.e. the bootable disk, but larger HDDs may be supplied with more than one partition.

Caution

Apricot Computers Ltd tests 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.

A second hard drive

Computers with an integrated drive electronics (IDE) interface can have two HDDs connected to it. The primary drive being designated as the Master and the new drive becoming the Slave. The Apricot

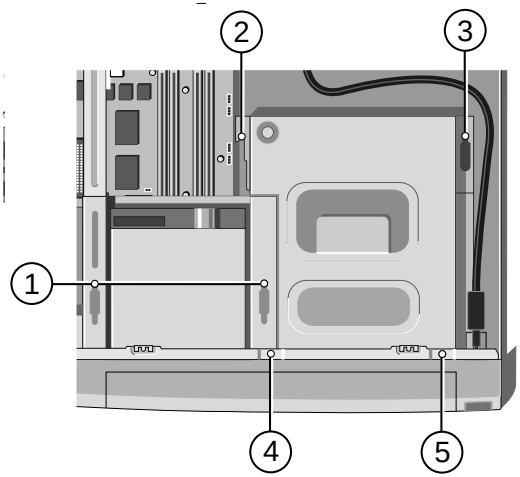
system BIOS is capable of handling this. If the SCSI interface is used the computer may have several devices connected to the same interface, each one requiring its own individual 'ID' to be set.

Installing and setting up a second hard drive is not difficult, but 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.

Installation of second HDD

Switch off the system and remove the cover. Take care to observe anti-static precautions at all times while the system cover is removed. Information on suitable precautions can be found at the rear of this manual.

Remove the floppy drive assembly by loosening its screws, sliding it towards the rear of the system and lifting it out. It may be necessary to temporarily disconnect drive cables. Take careful note of how they are fitted.

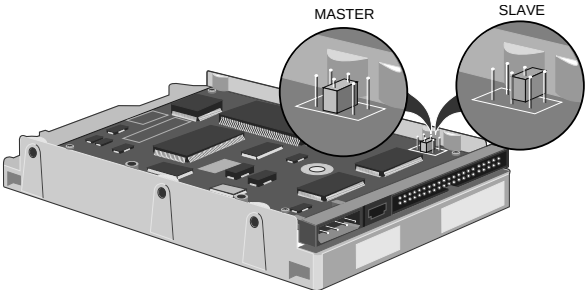


1	Floppy drive fixing screws	2-5	CD-ROM assembly screws

Locate and loosen the four screws that hold the CD-ROM drive assembly into the system, slide it back and lift it out. You now have access to the hard disk drive assembly. Loosen the screws holding it to the baseplate and lift carefully out.

IDE drive

*The master, or first drive, should have a link across **DS**. On a slave, or second drive, **remove** the link, but retain it by placing it onto **one** of the two pins as shown in the following illustration.*



SCSI drive

A new SCSI drive will need its ID link set. Read carefully the documentation supplied with the drive. Note that the boot SCSI drive is usually 'device 0' and the CD-ROM (if a SCSI type is fitted) may be 'device 1' or 'device 2'.

Fit the new hard drive in the available position using the special screws provided taking care not to touch the exposed control board, 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.

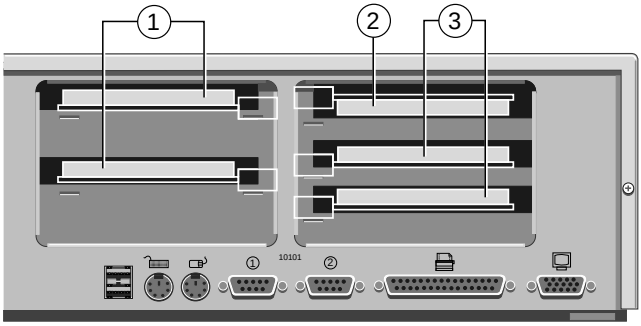
Refit the system cover carefully, checking first that no other cables or connections have become dislodged or trapped during the work.

You will now need to partition and format the new drive. Information on this topic can be found either in Windows 'help' or in your software guide.

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 by installing, for example, a modem, TV card, or network interface.

Most modern cards are very simple to install, particularly Peripheral Component Interface (PCI) types as they are 'plug and play' and require little in the way of configuration. Industry Standard Architecture (ISA) cards however often require a little preparation and setting up before they can be used.



1. Half PCI	2. Full PCI	3. Half ISA

The riser board can accommodate a number of expansion cards as shown in the above illustration. The normal fitted blanking plates are not shown for clarity.

Configuring the card

The installation procedure for many expansion cards involves setting up or configuring the card so it works correctly in the system. You assign values to various settings on the card, which enables the card to communicate with the computer. The settings MUST be registered in the '*ISA legacy resources'* section of the BIOS.

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. If you are in any doubt consult the supplier or manufacturer.

Most modern cards are supplied with default settings which are often an industry standard. It is best to rely on these where possible.

ISA Interrupt request level (IRQ)

The *interrupt request level* or *IRQ* (either term can be used) 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. While 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	Optional sound system	Optionally
IRQ6	Diskette controller	No
IRQ7	Parallel port	Optionally

IRQ	Default assignment	Available?
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 is used in place of IDE, 'Plug and Play' can place SCSI controller in one of these.*

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	Default audio (8 bit)	Optionally
DMA2	Diskette/floppy disk controller	No
DMA3	ECP printer port(default)	Optionally
DMA4	DMAC daisy chain	No
DMA5	Default audio (16 bit)	Optionally
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 DFFFF in upper memory. With most modern expansion cards this is fully automatic.

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

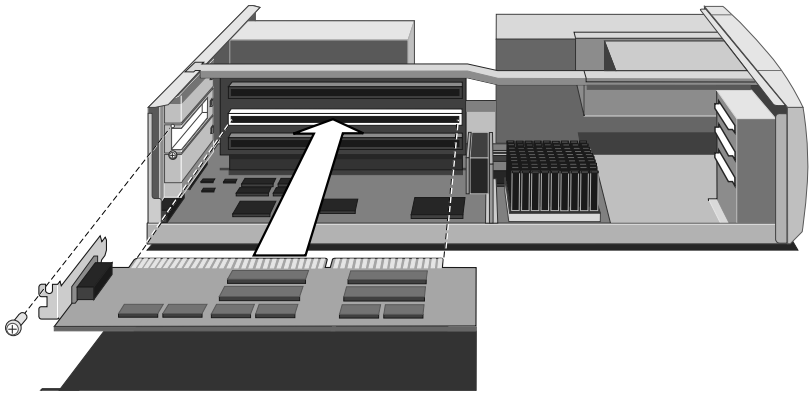
Read all these instructions through before attempting to install any expansion card.

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. Information on suitable precautions can be found at the rear of this manual.
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. Refer to the BIOS chapter for full information. PCI cards and full 'Plug and Play' cards, should fully configure with the system software automatically.

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

4 TROUBLESHOOTING

This chapter offers advice if you suspect a fault with your computer. It is concerned mainly with problems caused by the computer itself, problems more often arise from other sources such as your operating system or application software.

It must also be remembered that it can be very easy to leave off or dislodge cables and connectors inside the computer when fitting expansion cards, or upgrading the motherboard, or indeed anything that may require temporary removal of the system cover.

If in doubt

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

Problems when starting

If you suspect a blown fuse

In the United Kingdom, and some other countries, AC plugs contain fuses. Your Apricot computer is initially supplied and fitted with the correct supply cable and fuse for operation in the country in which it is sold. If the fuse in the system's unit AC plug blows when you turn on the computer, this may be caused by an AC power surge, but is more often 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.
3. Try to discover the cause of the fault. If none is apparent, replace the blown fuse with one of the same rating, reconnect the system unit 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 turned on, the power-on self-test (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 (for example, if you have added or replaced memory). In this case you may be diverted directly into the BIOS Setup utility.

If POST detects a hardware fault, one or more POST error codes and messages are displayed. A full list of these is given at the end of '*System BIOS and Setup'*. You may also be prompted to "Press the F1 key to continue" or "Press any key when ready".

Your first action should be to turn off the computer, wait 20 to 30 seconds, and then turn it on again to see if the error is transitory or persistent. Persistent POST errors may indicate a fault in the system.

- Check that all external cables are securely connected.
- Try running the BIOS Setup utility to reconfigure the system.
- Open up the system unit and check that all internal signal and power cables are securely connected.

If the problem persists, call your supplier or authorised maintainer.

Failure to boot

On completion of POST, the computer attempts to boot from a system diskette or bootable hard disk partition. The table below lists some of the messages that might appear during the boot sequence.

Boot failure message	Explanation
Non-system disk or disk error	The diskette drive contains a non-system diskette. Replace it with a system diskette and press F1.
Diskette read failure	The diskette is either not formatted or defective. Replace it with a system diskette and press F1.
No boot sector on fixed disk	The hard disk has no active, bootable partition or is not

Boot failure message	Explanation
	formatted. Insert a system diskette, press F1, and format the hard disk as described in your operating system manuals.
Fixed disk read failure	The hard disk may be defective. Press F1 to retry. Make sure the drive is correctly specified in the BIOS setup utility. If the problem persists, insert a system diskette, press F1, backup the data held on the defective hard disk and try reformatting it.
No boot device available	This may indicate a fault in the diskette or hard disk drive, or perhaps a damaged system diskette. Press F1 to retry, using another system diskette, if possible. Make sure that the Startup Devices option is correctly specified with the BIOS Setup utility. If the problem persists contact your supplier or authorised maintainer.

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 port you are trying to use.

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 too low.

If you have fitted a new video controller expansion card and subsequently encounter problems try disabling the on-board video controller by removing a jumper from the motherboard. See the chapter '*System motherboard'* for more information.

Expansion cards

If an expansion card does not work, check that all internal cables are securely connected, that the card is configured correctly, that its use of system resources does not conflict another card or motherboard component, and that legacy resources (if it is an ISA card) are properly declared in the BIOS setup utility. Check also that the software which drives or uses the card is correctly configured. Check in the chapter, *'Expansion Cards'* for information, and in '*System BIOS and Setup'* to see whether your chosen settings are useable.

System BIOS

Check finally 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 CMOS battery. See *'System motherboard'* and '*System BIOS and Setup'*.

The system's disk drives

Refer also to Chapter 2, '*Using your computer'.*

Floppy disk drive

If you have problems accessing a diskette or floppy disk, check that it is inserted correctly, that it has been correctly formatted, that it is not write-protected, and that the permissions assigned by the BIOS allow the intended access. Some application software also may not allow you to read or write to floppy disks during certain other operations, or until you are about to exit the programme.

CD-ROM drive

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, printed side upwards, and that it is a data CD. Remember that with a conventional CD-ROM drive you cannot write to a CD.

Optional PD drive

Check the type of media in the drive, CD or PD disk cartridge. Remember that the PD cartridge needs the disk inside to be formatted to allow it to be written to. There is also the write protect tab to check.

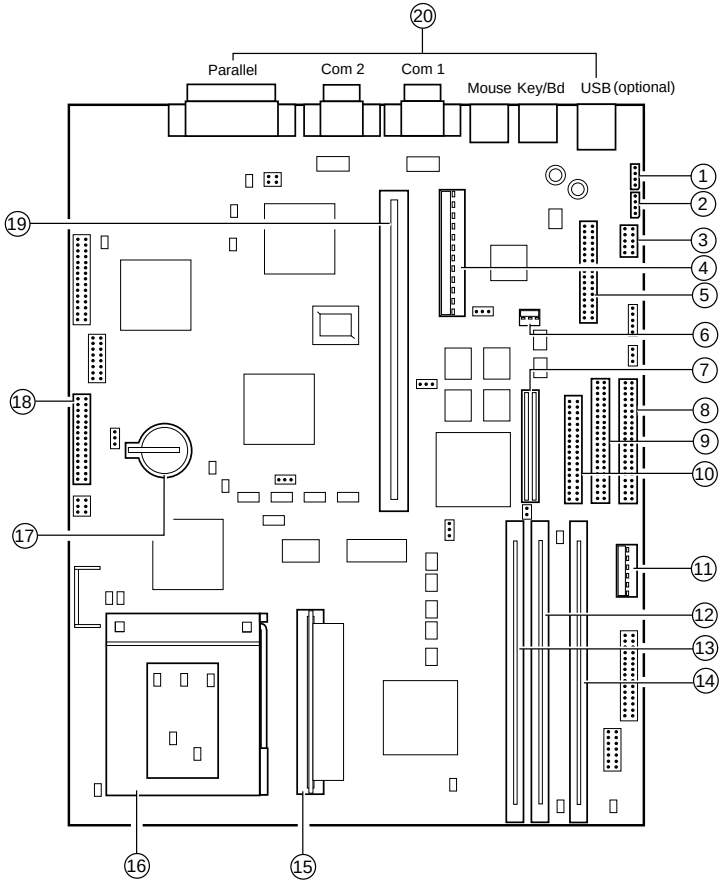
Make sure that you are trying to access the drive by the correct icon for the media in use.

Hard disk drive

If you encounter problems accessing the hard disk drive, use the BIOS Setup utility to check that the drive is correctly specified, and that the drive's controller is enabled. Check also that the disk has been correctly formatted, and that the permission assigned by the operating system allow the intended access.

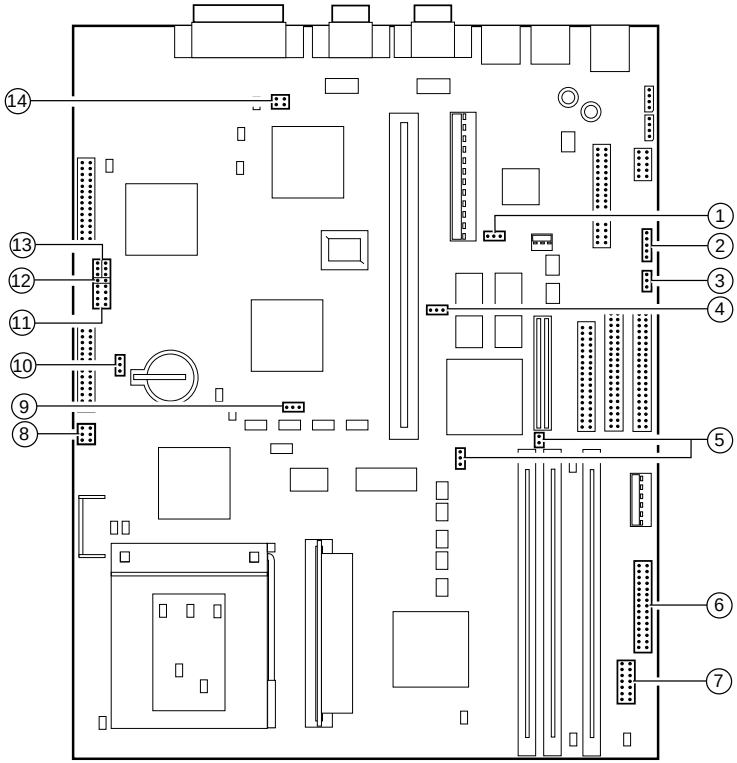
5 SYSTEM MOTHERBOARD

Major board features



1	CD-ROM audio connector	8	IDE primary connector	15	VRM8 socket
2	Aux. audio connector	9	IDE secondary connector	16	Zif socket for processor
3	modem audio input	10	Floppy drive connector	17	CMOS battery (CR2032)
4	Main PSU connections	11	PSU 3.3V aux. connector	18	Diagnostic board port
5	Rear audio connections	12	Memory slot, MM1	19	Expansion riser socket
6	PSU logic control (not used)	13	Memory slot, MM2	20	External ports
7	SCSI connector	14	Memory slot, MM3		

Jumpers and control connections



1	J80 - audio enable/disable	8	PL74 and PL75 - fan connectors
2	PL86 - speaker links	9	J70 - Reserved. Do not move.
3	J40 - hard disk LED select	10	J72 - battery disconnect
4	J71 - Reserved. Do not move	11	J1 to 4 - CPU clock divisor
5	J90 and J91 - SCSI setting links	12	J32 - board bus frequency
6	PL70 and PL71 - case connections	13	J30 and J31 - BIOS links
7	PL20 - front bezel daughterboard	14	J60 - floppy drive setting

Warning

Do not alter jumper settings under normal operation as permanent damage could be caused to motherboard components.

Processor clock multiplier, J1 to 4

J1	*J2*	*J3*	*J4*	*Ratio*
I	I	I	I	2
I	I	O	I	3
I	I	I	O	4
I	I	O	O	5
I	O	I	I	5/2
I	O	O	I	7/2
I	O	I	O	9/2
I	O	O	O	11/2
O	X	X	I	Strictly reserved
O	O	O	O	2

I=jumper fitted O=No jumper X=Don't care

Bus speed select, J32

Frequency	*Jumper J32*
60 MHz	No jumper
66 MHz	Jumper fitted

Flash BIOS, J30 & J31

Recovery J30	*Program enable J31*
2-3, Normal	1-2, Enable
1-2, Recover	2-3, Disable

Battery backup, J72

Erase CMOS settings
1-2, Normal
2-3, >1 sec. to discharge

Audio disable, J80

Audio J80
1-2, Enable Audio
2-3, Disable Audio

On-board SCSI Interface, J90 & J91

Link	SCSI Enable - J90	SCSI Type - J91	Link
1 - 2	Enable SCSI	Non Ultra SCSI	ON
2 - 3	Disable SCSI	Ultra wide SCSI	OFF

Hard drive LED, J40

J90 setting (see above)	Set J40 as follows:
SCSI Disabled (IDE drives fitted)	1 - 2
SCSI Enabled (SCSI drives fitted)	2 - 3

Floppy Disk mode, J60

Pins	Floppy options J60
1-3	3-mode operation
	Software control for 1.2Mb mode operation in Japan

Speakers, PL86

This is only for special system cases with internal stereo speakers, the normal casing is only fitted with a single 'beep' type speaker, connected to PL71.

Pins	Function	Connection PL86
1	Stereo - Left	Left speaker = pins 1 and 2
2	Audio ground	
3	Mono	Mono = pins 3 and 2
4	Link	Link 4 and 5 for mono
5	Stereo - Right	Right speaker = pins 5 and 6
6	Audio ground	

Fan Connectors, PL73 & PL74

Pins	*CPU Fansink PL73*	*Pins*	*Main fan PL74*
1	Ground	1	Ground
2	Fan Fail	2	Controlled supply
3	+ 12 volts	3	Ground

Front and panel connectors, PL70 & PL71

Row A - PL70	*Pins*	*Row B - PL71*
Power (PSU control)	1	Standby switch
Power return	2	Standby switch return
(Connected to pin 6)	3	Vcc
Keyed	4	Keyed
Hard disk LED signal	5	IRDA input
Hard disk LED pullup	6	Ground
Ground	7	IRDA output
Keylock switch	8	Ground
Keylock switch return	9	Not used
Power on LED signal	10	Not used
Power on LED return	11	Speaker out (BEEP)
Standby LED signal	12	Message LED signal
Standby LED return	13	Message LED pullup
Reset switch return	14	Not used
Reset switch	15	Not used

Front panel connector, PL20

Analogue ground	1	2	KEYED
No connection	3	4	No connection
No connection	5	6	No connection
Message LED (control 2)	7	8	No connection
Message LED (control 1)	9	10	5 V supply (fused)
IR transmit	11	12	RTS
IR receive	13	14	Digital ground

Replacing the CMOS battery

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. Take suitable anti-static precautions and remove the system unit cover.
2. Identify the battery holder, identified at position '26' on the motherboard diagram.
3. 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.*

4. Lift the edge of the battery far enough to clear the base of the holder, then slide the battery from under the contact spring.
5. Taking care not to touch the top or bottom surface of the battery, pick up the replacement with the positive (+) terminal upwards and slide the battery into the holder from the same side the old battery was removed.
6. Replace any expansion cards you had to remove in step 4 and replace the system unit cover.
7. 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 '*System BIOS and set-up*' for guidance.

Upgrading the motherboard

Caution

Care must be taken in the purchase of upgrade parts to ensure both compatibility with the system and the compliance with appropriate approvals and certification, e.g., CE marking within Europe. Using non-approved parts may invalidate your warranty and system approvals.

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

Read all the instructions through carefully before starting. The tasks are not difficult, but if you do not feel confident about the work involved, you may wish to have your supplier or service organisation complete it for you.

Warning

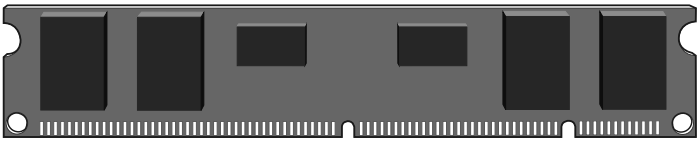
Never carry out any work inside the computer with AC power applied. Turn off the computer and unplug all power cords before starting work.

Adding more memory

Memory can be fitted in three vertical DIMM sockets which must be populated with gold contact, 3.3V, 72-bit unbuffered EDO type DIMMs having 60 ns timing.

The three DIMM slots accept DIMMs of 16, 32 and 64 Mbytes in any combination, to the maximum of 192 Mbytes.

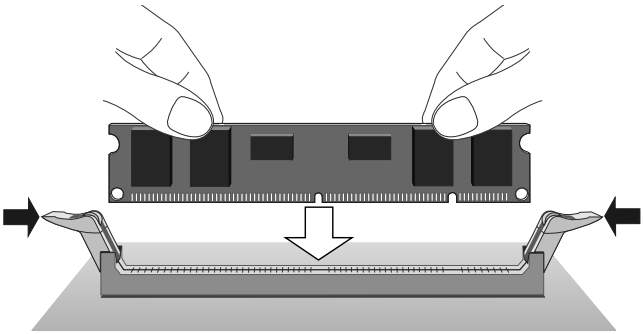
Fitting and removing DIMMs



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. Take suitable anti-static precautions and remove the system unit cover.
2. You may have to remove the floppy disk drive module which partly restricts access to the memory sockets (first identifying the way all cables are fitted) by disconnecting the cables, loosening the screws and lifting out.
3. 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



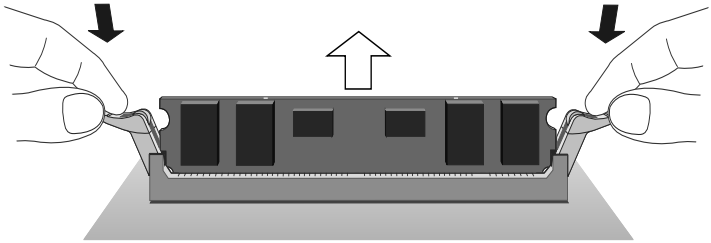
1. Take the module out of its anti-static packaging. Hold it by its ends and avoid touching the metal contacts.
2. Align with and place carefully above the chosen socket, ensuring that the socket end clips are not obstructing.
3. Pushing gently on its top corners, press the DIMM into the socket and make 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:

- Correctly fitted the DIMMs in their slots.
- fitted DIMMs of the correct type.

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. Remember that all new DIMMs must carry the appropriate approval markings etc. to avoid invalidating the system certifications.

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 the following instructions carefully before commencing work.

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. Information on antistatic precautions can be found at the rear of this handbook.

3. If there are any expansion cards in the way, you may have to remove them. Disconnect any cables connected to the cards, remove the securing screws at the rear of the system unit, then remove the cards.

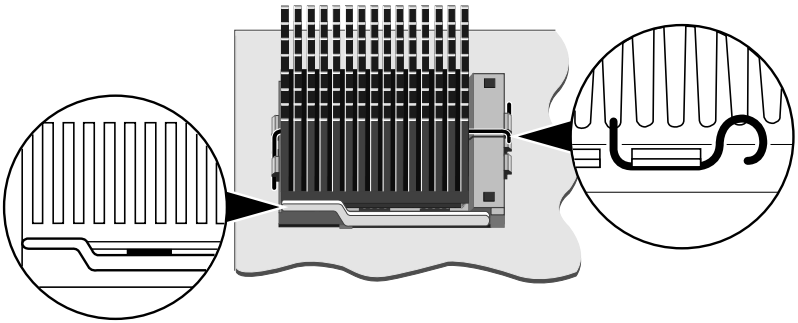
4. If there is no processor fan, a strong spring clip secures the large heatsink to the processor. Release the end of the spring from the hook on the front of the ZIF socket with care and slide the heatsink clear.

   ◊ Handle carefully as there may be heat transfer compound on the heatsink face.

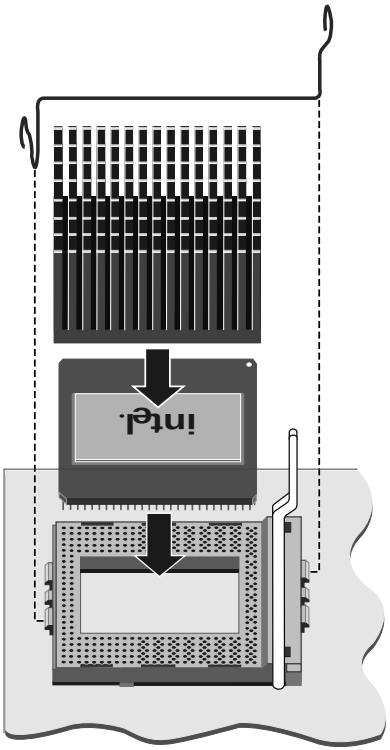
   ◊ There may be a power lead for the fan if the processor has one fitted. Take note of the fan power lead polarity before releasing it from its board connection.

5. A lever attached to the ZIF socket secures the processor in the socket. Unhook the lever from under the clip in 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.

   ◊ The illustrations opposite show the clip, lever locking mechanism and the processor socket along with the organisation of the whole assembly.



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.*



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 hooked 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 (PL73). 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, (Jumpers 1-4 and 32) in conjunction with the new processor's data sheet.

Warning

Ensure that the supply lead for the front casing fan is still connected to *PL74 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.

6 SYSTEM BIOS AND SETUP

The basic input-output system (BIOS) is permanently encoded in an area of read-only memory (ROM). It can be modified or upgraded if necessary, but this is recommended to be undertaken by an authorised engineer. It requires specialist software.

BIOS Setup is a utility within the computer BIOS. Its main purpose is to allow you to view and alter the computer hardware configuration. It is also used to configure various security and power-saving options.

The current configuration is kept in a special area of memory, called CMOS memory, and maintained by a small battery, so the configuration is preserved while the computer is switched off, along with other settings like the date and time.

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

Entering Setup

Not long after turning on your computer, the Mitsubishi symbol appears at the top right hand side of the screen:

While this symbol is displayed and the memory is counting, you can press the **F1** key to enter the BIOS Setup utility. You can only enter the setup utility at this time and by this method. It will take a few seconds for the utility to load.

Hint
A page is provided at the end of this chapter to make a note of your current BIOS settings.

If Setup runs on its own

This can happen for three reasons:

- Power on self test (POST) detects a configuration error or fault. This will result in either a BEEP code or one or more of the error messages listed at the end of this chapter. If a fault persists, make a note of error messages and the current configuration settings before calling an authorised maintainer.
- The CMOS battery may be running down. You may get spurious error messages. If this happens every time you turn on the computer, you may have to change the battery, instructions for this are given in the 'Motherboard' chapter.
- The configuration may have been changed, for example by the addition of more system memory, a new hard drive, or an expansion card. In this case you may have to define and check the new configuration.

In any areas where the POST has detected changes, or there is some contentious issue, the BIOS setup menu's buttoned items will change to show an arrowhead symbol. This can be followed down through any further levels of menu until you arrive at the screen with the change on it.

Control keys

A number of keys are used within the BIOS Setup utility, to select items on the screen, and change the settings. The two lines at the bottom of the screen indicate what you can do at any given time. The following are the keys and their function:

Keys to use	*Function*
	Provides help on the highlighted topic, pressing it again transfers you to the general help pages.
	Exit either the setup, or go back a page if in a sub-menu.
	Scroll through a menu list.

Keys to use	Function
	To toggle values or settings.
	The enter key, to select the highlighted item.
	Numbers, used in places where values are to be entered.
	Used when required, similar to numbers.
	Restores the original settings in force when you entered BIOS setup.
	To restore the original default setting

Main menu screen

When you start BIOS Setup a main menu screen appears with the following options:

- **System summary**
- **Devices and I/O ports**
- **Date and time**
- **System Security**
- **Start options**
- **Advanced setup**
- **Plug and Play**
- **Error Log**
- **Power management**

Save settings
Restore settings
Load default settings

Exit setup

Lines with a • bullet in front of them have further menus or dialog boxes associated with them, and are described later in this chapter.

The Save Settings options saves any changes that you have made so far.

The Restore Settings option restores the settings that were in effect when you started the BIOS Setup utility (with the notable exception of the Date and Time settings).

The Load Default Settings option restores the BIOS default settings.

Caution
The BIOS defaults may not be appropriate for your particular system. Make a note of ***ALL*** *the current settings before using the Load Default Settings option or pressing F10.*

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 A & B (COM1 & COM2)

This allows you to select the I/O ports and interrupts used by the two serial ports. The system will normally auto-configure, so it is best to leave these at the default settings.

Parallel port

This allows you to set the I/O port and interrupt used by the parallel port. It should be left at 'Auto-configure' unless required to be set to one of the following:

Parallel Port Mode		*Description*
Standard		Used for output only.
Extended	Bi-directional	Simple two-way data.
	EPP	Enhanced Parallel Port mode.
	ECP	Extended Capabilities Port mode.

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

Mouse

This option enables the use of a mouse. The actual presence of the mouse can then be detected by POST. You should not normally disable this setting.

Diskette Controller

This option enables the use of the 3.5" floppy diskette drive. You should not normally disable this setting.

Floppy disk drives

This lets you specify what diskette and floppy disk drives are fitted. Diskette drive A which is fitted by default, is invariably a 1.44 Mbytes 3.5" drive. You will not be required to change this setting.

Video Setup

If selected this opens a screen which details the video controller and the size of the video memory.

IDE Controller

This must be 'enabled' if the system is supplied with an IDE CD-ROM, but may be disabled if all drives are exclusively SCSI.

IDE Drives Setup

The motherboard has two IDE/ATA (Integrated Drive electronics AT-Attachment) interfaces, supporting two drives on each.

However, the computer itself can accommodate only two IDE hard disk drives, on the primary interface, so any removable-media drives, typically a CD-ROM drive, should be connected to the secondary interface.

Hard disk drives

Hard disk size, type and mode, is auto-detected when the computer is turned on, and the most suitable mode will have been selected. Do not alter this mode as it may cause your hard disk to be inaccessible, or the data to be lost.

Choosing any of the displayed drives opens a screen giving further details of the drive.

Date and Time

Use this to adjust the motherboard's Real Time Clock (RTC). This clock is maintained by the CMOS battery.

Time

The time is in 24-hour format. Use the 'control keys' to move around and change settings.

Date

The date is in the UK Day / Month / Year format. The procedure for setting the date is the same as for the time.

System security

Power-on Password

This option allows you to set a password that is required every time the computer is turned on or rebooted. Only people who know the password will be able to use the computer. The password can be up to seven characters long.

To define a power-on password:

1. In the Power-on Password dialog, type the password in the 'Enter Power-on Password' box, then press the DOWN ARROW key.

   ◊ To preserve confidentiality, the password is not displayed as you type it.

2. Type the password once more in the 'Enter Power-on Password Again' box.

3. If you want the computer to ask for the power-on password, ensure that Password Prompt is set to "On". If this option is set to "Off", the computer will **still require the password but will not ask for it.**

   ◊ If you do not enter the password on start-up, the keyboard is inoperative! To get round this you may have to boot from a floppy disk in the A: drive.

When the computer is next turned on or rebooted, the user is required to enter the password. If the Password Prompt is set 'On', the following prompt will be displayed:

Type your password, then press Enter.

If the Password Prompt option is set to 'Off', the user is not prompted at all but will wait for the user to type the password and press ENTER. It is important that authorised users of the computer are told to expect this, or they may think that the computer has stopped working.

The user is allowed three attempts to enter the correct password. If they fail the computer is locked and must be switched off. Turning the computer on again restarts the sequence.

To change or delete the password, select the appropriate option. You may be asked for the existing password to allow any change or deletion.

Administrator Password

The administrator password can be set up in the same way as a power-on password. If you define both an administrator and a power-on password, the computer will only allow you to enter Setup by using the Administrator's password.

Start Options

Certain features can be set or enabled automatically when the computer boots.

Keyboard Numlock State

If set to 'On' (default), the keys on the numeric keypad (on the right-hand side of the keyboard) will produce numbers when pressed. If 'Off', these keys provide cursor control functions instead.

Keyboard speed

This sets the speed (frequency) at which a pressed key will repeat; either 'Fast' (default) or 'Normal'.

Disketteless Operation

If this is 'Disabled', POST will look for and test the diskette drive, and report an error if the drive is faulty or missing. If 'Enabled', POST will omit the test and continue, provided that another boot device is available (i.e. the hard disk drive).

Displayless Operation

If this option is 'Disabled', POST will look for an attached monitor and report an error if it is faulty or missing. If 'Enabled', POST will allow the computer to start without a monitor.

Keyboardless Operation

If this option is 'Disabled', POST will look for an attached keyboard and report an error if it is faulty or missing. If 'Enabled', POST will allow the computer to start without a keyboard.

Start-up Devices

These options allow you to specify where the BIOS looks for an operating system when it boots. If the computer cannot locate an operating system on the First Startup Device, it tries the Second Startup Device.

Note that if the First Startup Device is set to 'Disabled', the computer will be unable to boot.

By default, the First Startup Device is 'Diskette Drive 0' and the Second Startup Device is 'Hard Disk 0'. this should not normally need to be changed.

Power On Self Test

The POST can be selected to either run only a 'Quick' set of tests or a more thorough (but longer) 'Enhanced' set.

Virus Detection

If this option is 'Enabled', each time the computer boots the BIOS will check the startup device to find if a boot sector virus has crept in. This is not an infallible check against the newer types of viruses, but it can help.

Advanced Setup

Any settings changed here, if incorrect, may cause the system to halt or may cause your software to malfunction. A warning about this appears on the screen when you choose Advanced Setup from the menu.

Cache Control

A simple dialog allows you to enable or disable the computer's memory cache. Some older software is speed sensitive and on rare occasions you may need to disable the cache.

ROM Shadowing

To shadow ROM means to copy its contents into the computer system or random-access memory (RAM). ROM has longer access times and the processor can access RAM faster than ROM. Also, the contents of RAM can be cached for even greater performance. All of the computer system BIOS ROM is shadowed.

The ROM Shadowing option allows you to shadow video BIOS and up to three 32 Kbytes areas of expansion card ROM (that is, ROM fitted on ISA or PCI expansion cards) addressed between C8000h and DFFFFh.

Caution
Shadowing is only appropriate for expansion card ROM. It must not be enabled for expansion card RAM.

PCI Settings

The only configurable PCI setting is Palette Snooping. This can be 'Enabled' or 'Disabled' and should be enabled **only** for PCI video expansion cards that specify it as being required.

Universal Serial bus (USB)

This is available for future use as more USB devices become available. Leave set to 'enabled'.

Memory settings

This page sets the level of memory testing. The available settings are, 'Disabled', 'Correction', 'Checking and Correction'. The default setting is for 'Correction'.

Pentium Pro features

The only setting is for BU Enable and this should be left 'Enabled'.

Plug and Play

Enabling the Plug and Play adapter configuration will auto-configure any Plug and Play cards but any ISA adapters which do not support Plug and Play will require the system resources to be registered.

There is a separate option for each resource; memory, I/O ports, DMA and interrupts. Some areas are allocated by the system and are not shown. Each resource can be set to either **Plug and Play** or **ISA legacy.** If shown as *Plug and Play*, 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. See the chapter dealing with *'Expansion'.*

Error Log

Any errors reported during the POST routine will be logged in the Error log. The log will display up to three errors detected

It can be reset, but should only be cleared after a note is made of the faults during any diagnostic work.

Power Management

The power management features provided aim to reduce the amount of electricity consumed by your computer if it should be left idle. If your system has Apricot power management software the BIOS settings should all be set to disabled as standard. That will allow use of the software to pre-program power restore events and operations. (incoming messages, alarm calls etc.)

The following menu is available:

Menu option	*Choices*
Power Management	'On' or 'Off'
Time Till (auto) Power Saving	'Disable', or range of times. (in minutes)
Hard disk Power Saving	'Disable', 'Enable'. (*timing fixed at 20 mins)*
Standby Switch Monitor Control	'Disable', 'Enable'. *(**see warning below**)*

Caution

The monitor supplied with your computer is designed to work with these energy-saving features. If you use another, or older monitor, It may not be compatible. It may cause permanent damage.

Beep codes

No beeps. If no beeps are heard at all the speaker may be disconnected or there may be a speaker circuitry fault.

One short beep. Marks the completion of POST and no functional errors found. You will also get a single beep if you press an invalid key for a power-on password.

Two short beeps. Indicates and draws your attention to an error during POST. This should be accompanied by an error message.

Three short beeps. System memory error, normally accompanied by code 201. Beeps are used when the video cannot display the code.

Continuous beep. Could indicate a serious failure of the system motherboard, or a failure of the speaker circuitry.

Repeating short beeps. Usually indicative of a keyboard key stuck down, but may be due to the keyboard interface failing.

One long and one short beep. POST has detected an error on the video adapter in the system. There may be no display on the screen.

One long and two short beeps. This means that either the video system is faulty, or that a video I/O adapter ROM is not readable.

Two long and two short beeps. The video subsystem cannot be supported by the main system POST. This can occur when the video subsystem is replaced or changed on site.

Many of these following codes indicate a serious fault and the system may halt. Switch off for 20 to 30 seconds and try again. If the fault persists, make a note of it and call your maintenance provider.

Number of beeps	*Meaning*
1-1-3	CMOS write/read test failure
1-1-4	BIOS ROM checksum failure
1-2-1	Programmable Interval Timer test failure
1-2-2	DMA initialisation failure
1-2-3	DMA page register read/write test failure
1-2-4	RAM refresh verification failure
1-3-1	First 64K RAM test failure
1-3-2	First 64K RAM parity test failure
1-3-3	Slave DMA register test failure
1-3-4	Master DMA register test failure
1-4-1	Master interrupt mask register test failure
1-4-2	Slave interrupt mask register test failure
1-4-4	Keyboard controller test failure
2-2-2	Search for video ROM test failure
2-2-3	Screen believed inoperable
2-2-4	Timer tick interrupt test failure
2-3-1	Interval timer channel 2 test failure
2-3-3	Time-of -day clock test failure
2-4-3	CMOS memory size against actual compare failure
2-4-4	Memory size mismatch occurred

Error Messages

If you get an error which is not listed or the problem persists, call your maintenance provider.

Code	Cause	Code	Cause
0	Keyboard locked	301	Keyboard clock line failure
062	Boot failure. Default values loaded	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

Notes

Use this area to make a note of your current BIOS settings for future reference.

APPENDIX

Cleaning and transporting

Suitable antistatic precautions

CLEANING AND TRANSPORTING

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 be sucked in when you switch on and cause irreparable damage.

Warning

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

The system unit

- Occasionally wipe the outside of the system unit with a soft, slightly damp, clean 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, clean cloth. It is best to use antistatic glass cleaner on the monitor screen to help prevent dust adhesion. **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 clean 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. Then cupping one hand over the underside, turn the mouse back the right way up. The ball should drop into your hand.
3. Blow gently into the mouse to remove any dust that has collected there.
4. 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.

5. Use clear water, or water with a mild detergent, to clean the ball. Then dry it with a clean, soft cloth.

6. 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.

Do not transport the computer with either a floppy disk or a CD-ROM left in the drives, as they may cause damage both to the media and to the drive.

Do not attempt to pick up the computer using either of the drives as a lifting point.

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 and **especially** with the monitor on top.

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

Warning

The computer is correctly set up to operate with the AC supply in the country in which it first sold. If you wish to use the computer in another country it may not be suitable. Consult your supplier or an authorised Apricot dealer.

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.

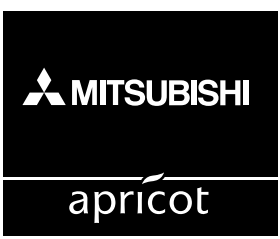
The computer is at risk from static discharge while the top cover is off, as the electronic components of the motherboard are exposed. Memory modules, cache upgrades and OverDrive processors are other examples of electrostatic sensitive devices (ESSDs).

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 ionizer 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.



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