

apricot



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Revision 01

Safety and Regulatory Notices

Read the separate *Power Connection Guide* before using the computer for the first time. Information in the *Owner's Handbook* relating to connection to the AC power supply may not apply outside the United Kingdom.

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.

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.

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

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

The CD-ROM drive contains a laser system which is harmful to the eyes, and is classified as a CLASS 1 LASER PRODUCT according to IEC825 *Radiation Safety of Laser Products (Equipment Classification: Requirements & User's Guide)*. Do not attempt to disassemble the CD-ROM drive; if a fault occurs, call an authorized maintainer. Use the CD-ROM drive only as described in this manual; failure to do so may result in exposure to hazardous radiation.


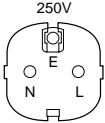
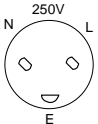
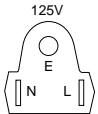
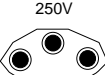
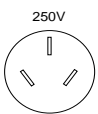
Microphone and headphone cables must be less than 2 metres long.

Warning: This product contains a replaceable lithium battery. 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, the battery may explode. Replace a discharged battery with one of the same type; another type may explode or ignite. Dispose of a discharged battery promptly and in accordance with the manufacturer's instructions. Do not recharge, disassemble or incinerate. Keep away from children. If in any doubt, contact your supplier or an authorized maintainer.

Power cord requirements

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.

If you wish to use the computer in another country, you must ensure that you use a power cord and plug which complies with the safety standards of that country.

Plug	Standard	Countries
250V 	BS1363A	United Kingdom
250V 	SHUCO	Austria, Belgium, Finland, France, Germany, Holland, Italy, Norway, Sweden
250V 	SRAF 1962/ DB16/87	Denmark
125V 	NEMA 5-15P	USA, Canada
250V 	ASE 1011	Switzerland
250V 	AS 3112-1981	Australia

The power cord fittings must bear the certification mark of the agency responsible for evaluation. Refer to your supplier if you ever require additional or alternative power cables.

UK plug wiring instructions

IMPORTANT: Power Cable Connections

This equipment is supplied with a mains lead that has a non-removable moulded plug. If the socket outlets are not suitable for the plug supplied with this appliance, it should be cut off and an appropriate three-pin plug fitted.

Note: The plug severed from the mains lead must be destroyed, as a plug with the bared flexible cord is hazardous if engaged in a live socket outlet.

The following wiring information should be employed when adding the replacement plug.

The wires in the mains lead are coloured in accordance with the following code:

Green and Yellow	Earth
Blue	Neutral
Brown	Live

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows.

The wire which is coloured green-and-yellow must be connected to the terminal in the plug which is marked with the letter **E**, or by the earth symbol \perp or coloured green or green-and-yellow.

The wire which is coloured blue must be connected to the terminal which is marked with the letter **N** or coloured black. The wire which is coloured brown must be connected to the terminal which is marked with the letter **L** or coloured red.

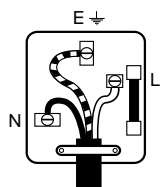
Use a fuse approved to BS1362, i.e. one which carries the \diamond or \heartsuit mark. Only replace the fuse with one of the same type and rating.

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

Replace with same colour fuse cover only. Replacement fuse covers may be obtained from your dealer.

WARNING: THIS APPLIANCE MUST BE EARTHED

This diagram shows the wiring inside the moulded plug. Use it as a guideline if you need to re-fit a plug of a similar type to the mains lead.

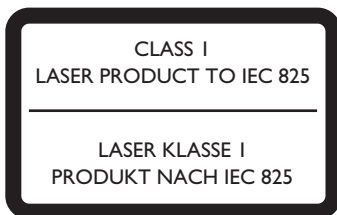


German Acoustic Noise Regulation

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

Die Deutsche Akoustische Lärm-Regulierung

Der Grad der Klangstärke ist weniger als 70 dB (A) je nach DIN 45635 Teil 19 (ISO 7779).



The CD-ROM drive is classified as a CLASS 1 LASER PRODUCT. The CLASS 1 LASER PRODUCT label is located on the under side of the system unit.

Refer to the labels on the side of the computer to establish which of the following warnings apply.

FCC Class A

Warning - this equipment has been tested and found to comply with the limits for a Class A computing device, pursuant to Subpart J of Part 15 of FCC rules. Only peripherals (computer input/output devices, terminals, printer, etc.) certified to comply with the Class A limits may be attached to this computer. Operation of this equipment in a residential area may cause unacceptable interference to radio and television reception requiring the operator to take whatever steps are necessary to correct the interference.

FCC Class B

Warning - this equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC rules. Only peripherals (computer input/output devices, terminals, printer, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference with radio and TV reception.

Radio and television interference

The computer described in this manual generates and uses radio frequency energy for its operation. If it is not installed and used properly, in strict accordance with the manual, it may cause interference with radio and television reception.

The computer has been tested and found to comply with the RF emission limits for an FCC Class B computing device which is intended to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause interference with radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Move the computer away from the receiver being interfered with.
- Turn the computer with respect to the receiver.
- Turn the receiver with respect to the computer.
- Plug the computer into an outlet that is on a different branch circuit from the receiver.
- Disconnect and remove any I/O cables that are not being used.
- Unplug and remove any expansion cards that are not being used, and replace the relevant blanking plates.
- Make sure that the computer is plugged into a grounded outlet.

If you need additional help, consult your supplier. You may find the following booklet helpful: How to Identify and Resolve Radio-TV Interference Problems. This booklet is available from the US Government Printing Office: Washington DC 20402 - Stock No. 004-000-000345-4.

DOC Class A

The computer described in this manual complies with: Canadian DOC radio interference regulations CRCc 1374 governing Class A digital devices.

DOC Class B

The computer described in this manual complies with: Canadian DOC radio interference regulations CRCc 1374 governing Class B digital devices.



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I INTRODUCING . . .

This chapter gives you a quick tour of the Apricot XEN computer. The initial summary of features is intended mostly for people who know a bit about computers and want to get an idea of what this one can do. But the unpacking instructions and pictorial guide will be helpful to everyone.

Don't worry if you're unfamiliar with some of the computer terminology used in this chapter. It's provided simply as a useful "shorthand" for more experienced readers. Be assured, you don't need to understand any jargon to use the computer safely and efficiently. (On the other hand, it can't hurt to learn; introductory books about computers can be found in your local bookshop or library.)

Warning

Read the separate Power Connection Guide before using the computer for the first time.

Summary of features

The models in the range are ideally suited for use as general-purpose personal computers, networked business workstations and workgroup servers.

Standard features

The standard features of the Apricot XEN range include:

- Intel486 or IntelDX4 system processor with Pentium OverDrive upgrade capability.
- 4 Mbytes of system memory, upgradeable to 64 Mbytes by the use of standard SIMMs (single in-line memory modules).
- Up to 256 Kbytes external (second-level) memory cache (amount varies according to model).

- BIOS Setup configuration utility in read-only memory (ROM).
- Cirrus Logic CL-GD543x local bus Enhanced Video Graphics Array (EVGA) controller with at least 1 Mbyte of video memory, upgradeable to 2 Mbytes.
- Primary and secondary local bus AT-Attachment/Integrated Drive Electronics (ATA/IDE) interfaces for IDE hard disk drives and ATA-PI (ATA Packet Interface) devices.
- 1.44 Mbyte 3.5" diskette drive; 3.5" hard disk drive bay with room for two one-inch drives (various capacities); one 5.25" removable-media drive bay.
- Industry Standard Architecture (ISA) expansion card slots: two full-length and one half-length.
- Parallel port with either standard, EPP (Enhanced Parallel Port) or ECP (Extended Capabilities Port) functionality; two serial ports; extended keyboard; two-button mouse.

Energy-efficient features

All models in the range comply with the requirements of the US Environmental Protection Agency's "Energy Star" programme for energy-efficient computers. These models support:

- System Management Mode (SMM) of Intel SL Enhanced processors.
- Operating systems and applications that use the Intel/Microsoft Advanced Power Management (APM) interface standard.
- VESA BIOS Extensions for Power Management (VBE/PM), for use with energy-efficient monitors that support Display Power Management Signalling (DPMS).

Special models

Apricot XEN-PC^{LS} models have additional networking, audio and security features; these are described in a supplement to this *Owner's Handbook*.

Apricot XEN-PC^M models have additional multimedia features, including a CD-ROM drive and SB Multimedia Audio card. These features are described in separate booklets.

Unpacking

On unpacking the computer, you should find:

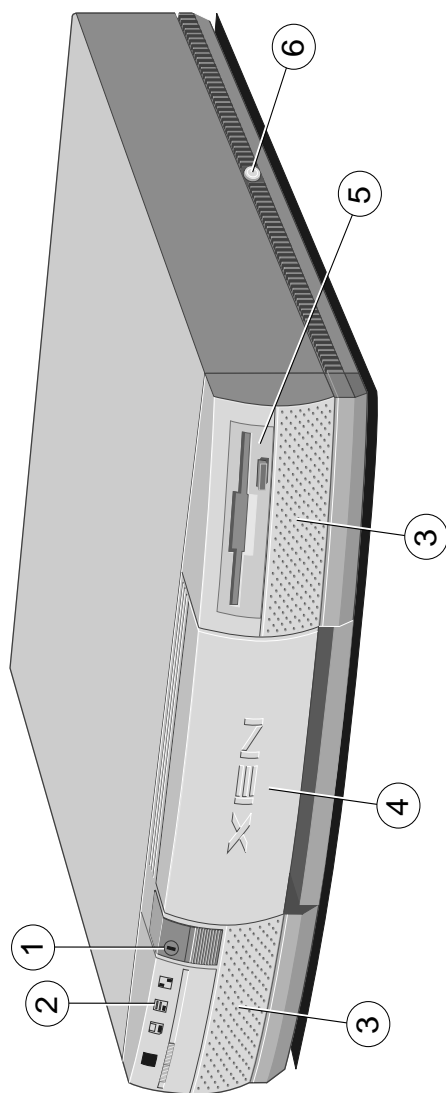
- Apricot XEN-PC system unit.
- Apricot/Mitsubishi monitor and accompanying *User's Guide*.
- Apricot extended keyboard and two-button mouse.
- System unit AC power cord and monitor power cord appropriate for the country of sale.
- System documentation (*Owner's Handbook*, etc.)
- Microsoft MS-DOS pack.
- Microsoft Windows for Workgroups pack (if the system has a hard disk).



More elaborate systems may include software or hardware options with accompanying installation diskettes and additional documentation. Some of these options may have been factory-configured or installed by your supplier.

Keep the cartons, boxes and packaging materials; you will need them again if you have to transport the computer elsewhere.

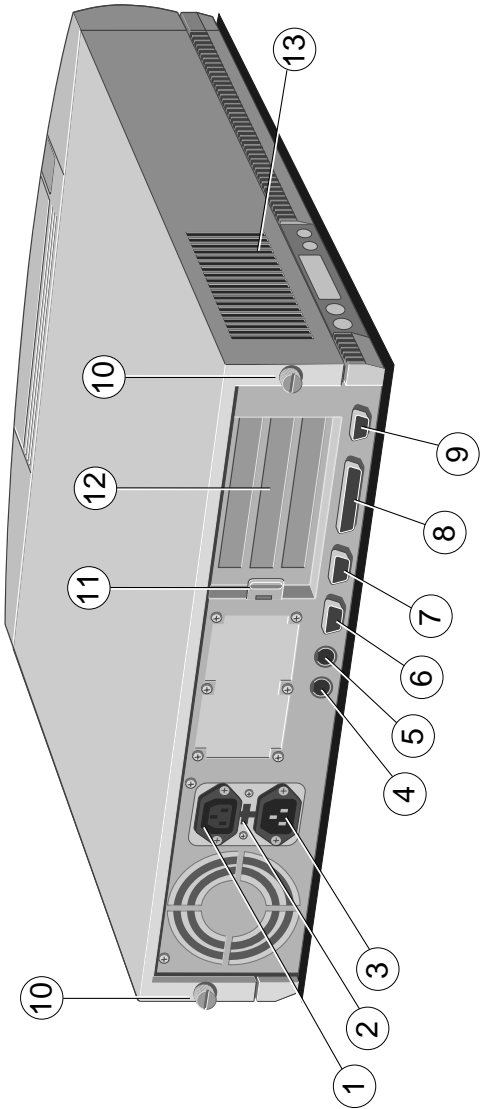
Make a note of the manufacturer's data recorded on the various components (product codes, serial numbers, etc.). A service engineer may need this information if the computer develops a fault.

Pictorial guide



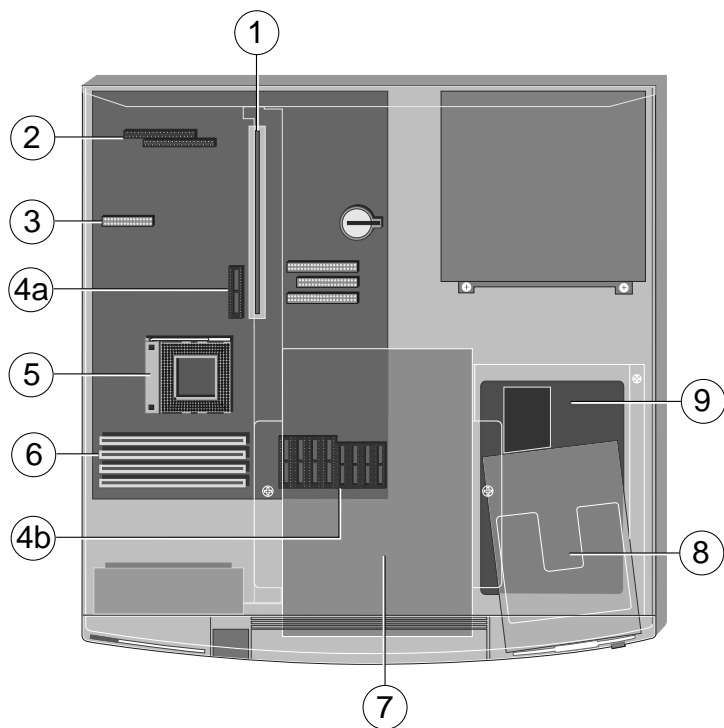
- ① **POWER button:** press to turn the system on or off. The green indicator on the button lights when the system unit is powered.
- ② **activity indicators**, from left to right:
 -  lights when a diskette, floppy disk or FTD tape drive is in use (depending on the operating system). Some diskette drives have their own activity indicators which override the front bezel activity indicator.
 -  lights when a hard disk drive or SCSI tape drive is in use (depending on the operating system).
- ③ **speaker grille:** Apricot XEN-PC^M and Apricot XEN-PC^{LS} models have internal stereo speakers.
- ④ **door** (shown closed): hinges down to reveal the removable-media drive bay.
- ⑤ **3.5" diskette drive** (optional).
- ⑥ **system lock:** prevents unauthorized access to the inside of the system unit.

Apricot XEN-PC^{LS} models also have a **network activity indicator**, an **infrared sensor** and a **master volume control**. See the *Networking, Audio and Security Supplement* for more information.



- ① **AC power outlet:** where the monitor power cord can plug in.
- ② **voltage selection switch:** the system unit can be set to operate with a 100-120 volt or 220-240 volt AC power supply.
- ③ **AC power inlet:** where the system unit AC power cord plugs in.
- ④ **keyboard port:** connect the keyboard to this port.
- ⑤ **mouse port:** connect the mouse to this port.
- ⑥ **serial port 1:** (110 baud to 9600 baud); typically used for connecting an external modem or a serial printer signal cable.
- ⑦ **serial port 2:** (110 baud to 9600 baud); typically used for connecting an external modem or a serial printer signal cable.
- ⑧ **parallel port** (standard or ECP/EPP); typically used for a printer signal cable.
- ⑨ **monitor port:** connect the monitor signal cable to this port (if you are using the on-board graphics system).
- ⑩ **casing screws:** loosen these to remove the top cover.
- ⑪ **security loop:** you can feed a security chain or cable through this loop and secure it to prevent theft of the system unit.
- ⑫ **blanking plates:** for Industry Standard Architecture (ISA) expansion card slots
- ⑬ There are **air vents** on the left-hand side and rear of the system unit; do not block these vents or the system will overheat.

Apricot XEN-PC^{LS} models also have some **network** and **audio** ports. See the *Networking, Audio and Security Supplement* for more information.



- ① **backplane:** with three Industry Standard Architecture (ISA) expansion card slots (one may be occupied by a SCSI drive controller card) and a proprietary connector for the multimedia daughterboard used in Apricot XEN-PC^{LS} systems.
- ② **video memory upgrade sockets:** systems with 1 Mbyte of video memory can be upgraded to have 2 Mbytes, providing more colours and/or higher resolutions.
- ③ **video feature connector:** can be used by video expansion cards which augment the capabilities of the motherboard EVGA video controller.
- ④ **external cache memory upgrade sockets:** you can improve the performance of the computer by adding cache memory.
- ⑤ **processor socket:** you can upgrade the processor by replacing it with one of higher performance.
- ⑥ **SIMM sockets:** every system can be upgraded to a maximum of 64 Mbytes of system memory by the use of single in-line memory modules.
- ⑦ **5.25" removable-media drive bay:** may be occupied by a removable-media drive.
- ⑧ **3.5" diskette drive** fitted as standard in every system.
- ⑨ **3.5" hard-disk drive bay:** this bay has room for two one-inch high IDE hard disk drives.

See the **label** inside the system unit lid for up-to-date information on the layout of the motherboard.



You should read this chapter even if you do not read any other. It provides important information to help you site, connect, power and configure the computer.

This chapter will tell you all you need to know in order to start work. The chapters after this one deal with the BIOS Setup utility and various removable-media drives.

Warning

Read the separate Power Connection Guide before using the computer for the first time

General advice

This computer is designed to be used in a normal office environment. Here are a few hints for choosing a suitable site:

- Place the system unit flat on a sturdy, level surface. Unlike some other computers, the system unit is not designed to be stood on its side.
- Site the computer away from moisture, direct sunlight, and extremes of heat and cold. Avoid situations in which the surrounding temperature or humidity may change rapidly.
- See Appendix B, “Technical Information”, for recommended temperature and humidity ranges.
- When positioning the system unit, monitor and keyboard, take into account any local or national regulations relating to ergonomic requirements. For example, you should ensure that little or no ambient light is reflected off the monitor screen as glare, and that the keyboard is placed in a comfortable position for typing.
- Give the computer plenty of room so that air can circulate on all sides. Air is drawn into the system unit through vents on the left-hand side, and expelled through the vent on the back. Ensure that these vents are never obstructed.

Do not allow any cables, particularly power cords, to trail across the floor where they can be snagged by people walking past.

Warning

The computer uses the system unit AC power cord as its “disconnect device”. Ensure that the system unit is positioned close to the AC power outlet, and that the plug is easily accessible.

To prevent fire and electric shock, do not expose any part of the system unit to rain or moisture.

Connecting the components

See Chapter 1, “Introducing...”, if you need help identifying the various ports on the system unit.

Checking the AC power supply

When the computer is delivered, it is ready for the commercial AC power supply generally available in the country in which it is first sold. It has been set for the correct voltage range, and is supplied with an AC power cord and plug which comply with the relevant safety standards.

Before using the computer in a country *other than that in which it was originally sold*, you must check the voltage and frequency of that country’s AC power supply, and the type of power cord required there. Check the power rating labels on the rear of the computer’s system unit and its monitor to ensure that they are compatible with the AC power supply.

If necessary, the AC voltage setting of the system unit can be adjusted by the voltage selection switch on the rear of the system unit. Refer to the chapter entitled “Maintaining and Transporting”, for instructions on how to do this. It is likely that the monitor’s voltage setting will also need adjusting; consult the *User’s Guide* that accompanies the monitor, or ask your supplier for help.

The “Safety and Regulatory Notices” section at the start of this *Owner’s Handbook* includes advice about suitable power cords.

Installing add-on options

If the computer arrived with uninstalled add-on options, (such as expansion cards or memory modules) consult the relevant chapters in this *Owner's Handbook* for step-by-step installation instructions. Expansion cards may also have their own documentation that supplements or overrides the instructions in this manual.

Note that some options for which you have installation guides may have already been installed for you at the factory or by your supplier.

Connecting the components

Having assured yourself that the voltage settings and the AC power cords of the computer, the monitor and any other peripherals are correct, use the procedure below to connect these components together. It is important that you take each step in the order indicated.

1. If your AC power outlets have switches, set them to their Off positions.
2. Ensure that the system unit, the monitor, and any peripherals are turned off.
3. Connect the monitor signal cable between the monitor and the monitor port on the rear of the system unit.

If the monitor signal cable is connected *after* the computer is turned on, the display may appear in monochrome (or not at all).

4. Where appropriate, connect other signal cables between your peripherals and their respective ports on the system unit. Make sure the signal cables are connected securely.
5. Plug the keyboard cable into the keyboard port on the system unit. Be careful not to plug it into the mouse port by mistake.
6. Plug the mouse into the mouse port on the system unit.

Never connect either the keyboard or the mouse while the system unit is turned on.

7. Where appropriate, connect the computer to the network.
8. Connect the monitor power cord between the monitor and the AC power outlet on the rear of the system unit.
9. Connect the system unit power cord between the AC power inlet on the rear of the system unit and a nearby, grounded AC power outlet.
10. Where appropriate, connect power cords between your peripherals and nearby, grounded AC power outlets.
11. If your AC power outlets have switches, set them to their On positions.

The computer is now ready to use. The rest of this chapter tells you how to turn the computer on and off, and how to configure it using the BIOS Setup utility.

Turning on and booting the computer

Turning the power on

To turn on the computer, simply press the **POWER** button. The green indicator on the **POWER** button lights 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.

Always make sure that the system unit is turned on before turning on any attached peripherals.

If the computer does not start 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.

Power-on self-test

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.

The boot sequence

Provided that POST succeeds without discovering any serious errors or configuration discrepancies, the computer attempts to find an operating system; that is, it attempts to *boot*.

By default, the computer will first look for a system diskette, then for a bootable hard disk partition; this sequence can be changed with the BIOS Setup utility.

System diskette

A system diskette is a diskette bearing at least the rudiments of an operating system. If the computer finds such a diskette in the diskette drive, it boots from it. If it finds a non-system diskette, the computer invites you to replace it.

Hard disk partition

A hard disk may contain more than one bootable partition, for different operating systems, but only one of these can be active at any one time. The computer loads its operating system from the currently active partition.

Computers with a hard disk normally arrive with the Microsoft MS-DOS/Windows operating system already in place or *pre-installed*.

If necessary, your operating system manuals should tell you how to create a system diskette or how to partition and format a hard disk.

Caution

Partitioning or formatting a hard disk erases all the programs and data recorded on that disk. Always make a backup copy of the contents of the hard disk before you start.

Turning the power off

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

- Quit or exit from the applications you are running; be sure to save any files you have altered. Any unsaved information still held in the computer's memory will be lost when you turn off the computer.
- If you are logged-in to a network, logout before turning off the computer. This gives the network operating system a chance to free up the network resources you've been using.
- Close down or quit any software that employs virtual memory or disk-caching (for example, Microsoft Windows with SMARTDrive).
- Always turn off any attached peripherals first. However, there's no need to turn off the monitor if it's being powered from the system unit.
- Wait until all the activity indicators on the front bezel are unlit.

To turn off the computer, simply press the POWER button again. The power indicator on the button 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 initialize itself properly if you turn it off then on again in quick succession.

Preparing a second hard disk

Some computers have two hard disk drives, known as master and slave.

The master drive is partitioned and formatted with Microsoft MS-DOS at the factory. The drive is given a single primary DOS partition, which is the active partition. When you turn the computer on, it will boot (load its operating system) from the master drive, which will appear as MS-DOS drive C.

The slave drive is not partitioned or formatted. You must partition the slave drive with the MS-DOS **Fdisk** program, and format the partitions with the **format** command. Until you do this, you will be unable to use the slave drive. See your MS-DOS manual for instructions on using **Fdisk** and **format**.

Caution

*When you run **Fdisk**, it assumes you want to work with the first, or master, drive (it says the "Current fixed disk drive" is "1"). To switch attention to the slave drive, choose Select next fixed disk drive (option 5) from the main menu.*

Of course, you may also want to use **Fdisk** to repartition the master drive. If you decide to do this, be sure to make a back up copy of *all* the information on the drive first, including MS-DOS itself, as repartitioning will cause the master drive's existing contents to be lost.

Backing-up the pre-installed software

All computers with a hard disk arrive with the Microsoft MS-DOS/Windows operating system pre-installed. The hard disk also contains a complete set of Cirrus Logic CL-GD543x Windows display drivers, although initially the computer is configured to use the standard VGA Windows driver. Additional software may be pre-installed by your supplier.

We recommend that you copy or *back up* any pre-installed software soon after setting up the system. This is particularly important for systems which are supplied without installation diskettes for the software on the hard disk. A back up copy will safeguard the pre-installed software against loss if the hard disk fails or if you accidentally overwrite or delete files.

- A disk imaging utility is included with all pre-installations of Windows. This allows you to create installation diskettes for DOS/Windows, and other software, from disk images pre-installed on the hard disk. See the utility's on-line help for more information.

- To back up other pre-installed software, use Backup for DOS or Backup for Windows as described in your MS-DOS manual. It is a good idea to begin by creating a bootable system diskette containing the programs needed to partition and format the hard disk and to restore the backed up copy. In this way, you should be able to recover any programs or data lost by a hard disk failure.

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.

Using the 3.5" diskette drive

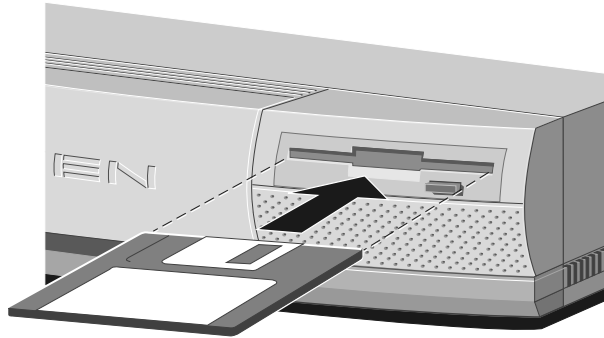
The 3.5" diskette drive can read and write double-sided diskettes with a formatted capacity of either 1.44 Mbytes (if marked "HD" or "high density") or 720 Kbytes (if marked "DD" or "double density").

Each diskette has a rigid plastic cover with a metal shutter that guards the disk surface. The drive automatically moves the shutter aside to read the diskette. Never touch the exposed surface under the shutter; you could deform the disk or leave a fingerprint that might make it difficult to read.

Keep diskettes well away from dust, moisture, magnetic objects, and equipment that generates magnetic fields. Also, avoid extremes of temperature and exposure to direct sunlight. Otherwise, data recorded on the diskette may become corrupted.

Inserting a diskette

A diskette is inserted into the diskette drive slot shutter-foremost, and with its label side facing up (see diagram). Some diskettes have a small arrow on the face of the diskette; this must point towards the drive when you insert the diskette.



Push the diskette all the way in until it engages with the drive mechanism. When the drive's **EJECT** button pops out, the diskette is fully engaged.

Removing a diskette

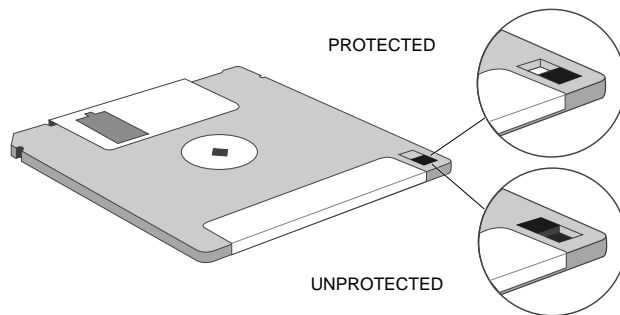
Before attempting to remove a diskette, make sure that the drive is not currently in use (the diskette activity indicator on the computer's front bezel must be unlit).

Press the **EJECT** button on the drive. The drive mechanism disengages and the diskette is ejected half-way out of the drive.

If a diskette becomes stuck in the drive, perhaps because its label has peeled back, do **not** attempt to remove it with tweezers or any similar implement; you risk damaging the drive. Call an authorized maintainer.

Write-protecting a diskette

A diskette can be write-protected by sliding a small tab towards the edge of the diskette to expose the little hole beneath it (see diagram). With the tab in this position, you can read, copy or print files from the diskette, but you cannot create, rename or delete any files.



The BIOS Setup utility can disable the diskette drive, or make it read-only.

Using the BIOS Setup utility

What is BIOS?

BIOS (pronounced “bye-oss”) stands for *basic input/output system*. The BIOS operates at the boundary between the computer’s hardware (the system processor, memory, diskette and hard disk drives, and so on) and its software (the operating system and applications), and effectively mediates between the two. The BIOS is permanently encoded in an area of read-only memory (ROM), although it can be modified if necessary by an authorized maintainer.

What is BIOS Setup?

BIOS Setup is a configuration utility programmed into the computer’s BIOS ROM. It can be invoked whenever you wish to reconfigure the computer. Its main purpose is to allow you to view and alter the computer’s configuration.

To configure (set up) a computer means to declare its hardware components and to say how you want them to behave. Configuring the computer is necessary to ensure that the software you use can recognise and exploit the hardware’s capabilities.

A record of the current configuration is kept in a special part of the computer's memory, known as CMOS memory. This type of memory is easily sustained by a small battery, so that its contents can be preserved while the computer is turned off.

The computer arrives already configured, but may need to be configured again after you add or remove add-on options such as memory modules or expansion cards.

Accessing BIOS Setup

The BIOS Setup utility can be invoked at any time from the operating system command prompt, by pressing the **CTRL+ALT+ESC** key combination.

Once you have reconfigured the computer and exited from BIOS Setup, the computer will automatically reboot to bring the changes into effect.

A full description of the BIOS Setup utility is given in the chapter entitled "Using the BIOS Setup Utility".

Caution

Because the computer reboots automatically on exiting, you should not invoke the BIOS Setup utility from the MS-DOS prompt within Windows.

Using Help

Along with the diskettes provided with the computer, or the software pre-installed on its hard disk, you will often find one or more Help files. These will explain any special features of the system, and tell you how to install the software needed to exploit those features.

For example, the files provided with this computer include help on:

- Cirrus Logic CL-GD543x EVGA video drivers
- The Energy Star Programme

Help may be supplied in various forms, depending on the intended operating system; for the Microsoft MS-DOS/Windows operating system they are usually Windows help files or ASCII text files.

Viewing Windows help files

Windows help files can be displayed only by the Microsoft Windows Help program (v3.1 or later). Windows help files may be identified by their *.HLP* file extensions, although this is not an infallible guide as some other help formats also use the *.HLP* extension. They are often accompanied by *.ICO* icon files of the same name.

If the computer has a hard disk on which Microsoft Windows has been pre-installed, copies of some Windows help files may already be available as icons in Windows. To view the help file simply double-click on its icon, or select the icon and press **ENTER**. For more information about using Help, see your Windows documentation.

If the Windows help file you want to view is not already installed, or if for any other reason you need to view a Windows help file directly from a diskette:

1. Insert the diskette into a suitable drive.
2. Use Windows File Manager to view the contents of the diskette.
3. Choose the *.HLP* help file you want either by double-clicking on its filename or by selecting the filename with the cursor and then pressing **ENTER**.

The Windows Help program starts, displaying the first topic in the help file. For more information about using Help, see your Windows documentation.

Alternatively, you can copy the Windows help file from the diskette to a hard disk or network drive, and create a program item for it using Program Manager. The help file can then be viewed at any time simply by double-clicking on its icon. To do this:

1. Insert the diskette into a suitable drive. Copy the *.HLP* help file, and its associated *.ICO* icon file if it has one, from the diskette to a hard disk or network drive.
2. Choose New from the File menu in Program Manager. Select the Program Item option in the New Program Object dialog box, then choose OK. The Program Item Properties dialog box appears.
3. In the Description text box, type a suitable title for the help file.
4. In the Command Line text box, type the path and filename of the help file (including its *.HLP* extension). Alternatively, choose the Browse button, find the help file, and choose OK.

Skip the next step if the help file doesn't have an associated icon file.
5. Choose Change Icon. The Change Icon dialog box appears. In the File Name text box, type the path and filename of the *.ICO* file. Choose OK.
6. In the Program Item Properties dialog box, choose OK.

Viewing text files

ASCII text files, identified by their *.TXT* file extensions, can be read by most text editors and wordprocessing programs. Alternatively they can be displayed, one screenful at a time, using the DOS commands **type** and **more**; for example:

```
type helpfile.txt | more
```

Version numbers

All the help files have a version number so you can tell whether you're looking at the most up-to-date version. You can discover the version number of a Windows help file by viewing it with Help and choosing About Help from the Help menu.



BIOS Setup is a utility programmed into the computer's read-only memory (ROM). Its main purpose is to allow you to view and alter the computer's 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 that the configuration is preserved even while the computer is switched off.

Accessing BIOS Setup

The BIOS Setup utility can be invoked from the operating system command prompt by pressing the CTRL+ALT+ESC key combination.

You must always ensure that you have closed all files and quit all application programs before invoking BIOS Setup, because on exiting the utility the computer is rebooted automatically. In particular, you should not invoke BIOS Setup while running the Microsoft Windows application environment.

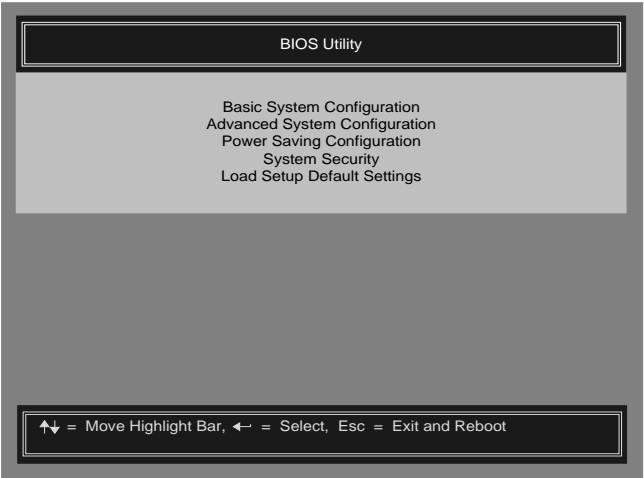
A number of keys are used to move around the BIOS Setup utility, select screens and change the configuration. See the table below for more information. Some of the keys work only on certain screens; the keys available in each screen are shown at the bottom of the screen.

If a key works on the current screen, but not for the currently-highlighted item, its entry at the bottom of the screen is dimmed or greyed-out.

Press ESC at the main menu to exit from the utility. You are asked whether or not you want to save any changes you have made to the configuration in the computer's CMOS memory. Note that even if you do not make or save any changes, the computer will still reboot on exiting the utility.

Press	To
UP ARROW DOWN ARROW	Move the highlight bar around the screen from one line or one field to another.
ENTER	Choose or select the currently-highlighted item.
LEFT ARROW RIGHT ARROW	Scroll through the possible selections for the currently-highlighted item.
PAGE UP PAGE DOWN	Move between the pages of the current screen.
ESC	Exit the current screen. You may be prompted to confirm whether you want to save any changes you have made. To exit BIOS Setup, press ESC in the main menu screen. Every time you exit BIOS Setup the computer reboots.
F1	View a pop-up help dialog on the currently-highlighted item. Press F1 again to close the help dialog.

When you invoke BIOS Setup the main menu contains several choices as shown below:

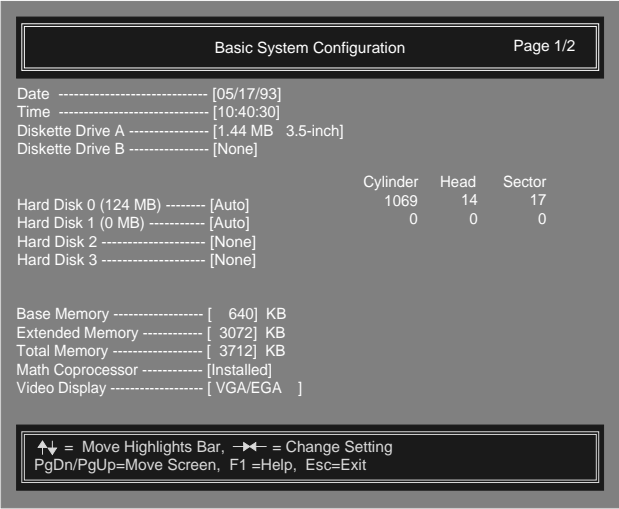


Use the UP ARROW and DOWN ARROW keys to move the highlight bar to the item of your choice, then press the ENTER key to select that item.

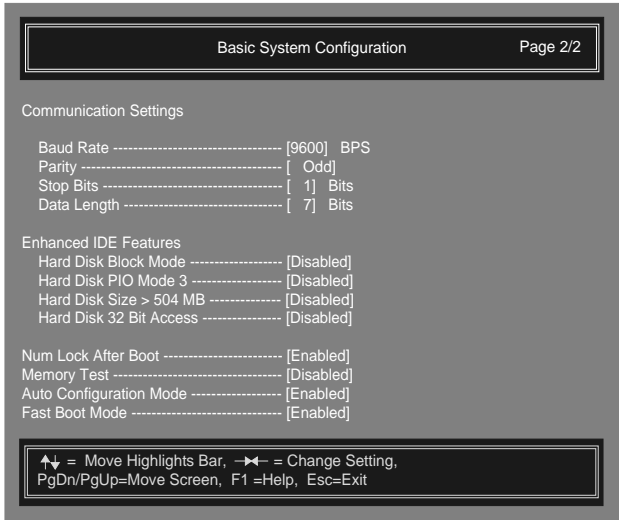
- **Basic System Configuration** uses a two page screen that allows you to modify settings for date and time, drive types, serial port characteristics and so on.
- **Advanced System Configuration** allows you to modify settings for shadow RAM, internal and external caches, system speed and so on.
- **Power Saving Configuration** allows you to configure the power management features which make the computer Energy Star compliant.
- **System Security** allows you to configure the motherboard security features. These include setting passwords, restricting access to diskette and hard disk drives, and configuring the serial and parallel ports.
- **Load Setup Default Settings** resets all settings (except power management and security) back to their default settings. The default settings are the ones shown on the example screens in this chapter. You can use this option if the battery sustaining CMOS memory loses power, or if the memory itself becomes corrupted.

Basic System Configuration

If you select Basic System Configuration the following screen appears:



There is a second page to this screen, accessed by pressing the PAGE DOWN key, which looks like this:



Date

The BIOS Setup utility shows the system date in *month/day/year* format.

To alter the date:

1. Use the UP ARROW and DOWN ARROW keys to select the field you want to change (month, day or year).
2. Use the LEFT ARROW and RIGHT ARROW keys to scroll through the field's possible values until you reach the correct one.

Once the correct date is set you should not need to set it again. The computer accounts for leap years automatically.

Time

The BIOS Setup utility shows the system time in 24-hour *hours:minutes:seconds* format.

To alter the time:

1. Use the UP ARROW and DOWN ARROW keys to select the field you want to change (hour, minutes or seconds).
2. Use the LEFT ARROW and RIGHT ARROW keys to scroll through the field's possible values until you reach the correct one.

Once the correct time is set you should not need to set it again, except at the start and end of daylight saving time.

Diskette Drive

The computer supports up to two diskette/floppy-disk drives. Both have several possible settings:

- None
- 360 Kbyte, 5.25 inch
- 1.2 Mbyte, 5.25 inch
- 720 Kbyte, 3.5 inch
- 1.44 Mbyte, 3.5 inch
- 2.88 Mbyte, 3.5 inch

To alter the diskette drive settings:

1. Use the UP ARROW and DOWN ARROW keys to select the field you want to change.
2. Use the LEFT ARROW and RIGHT ARROW keys to scroll through the possible values until you reach the correct one.

Diskette drive A is always a 1.44 Mbyte, 3.5" drive.

Diskette drive B (if fitted) will usually be a 1.2 Mbyte, 5.25" floppy disk drive.

Hard Disks

The motherboard's two ATA/IDE (AT Attachment/Integrated Drive Electronics) interfaces support a total of four drives (that is, two drives per interface). However, the computer itself can accommodate at most two IDE hard disk drives plus one ATA removable-media drive. The hard disk drives should be connected to the primary interface, and any removable-media drive connected to the secondary interface.

Configuring hard disk drives

It is important that you select the correct drive type for each hard disk drive. The BIOS Setup utility provides three methods of specifying drive type information:

- The simplest method is to set Hard Disk 0 (or Hard Disk 1) to "Auto", meaning "auto-detect". The BIOS interrogates the drive and, if it is recognised, automatically sets the drive type information. Most drives can be interrogated in this way.
- You can make a selection from one of BIOS Setup's pre-defined drive types, numbered 1 to 99.
- You can manually enter parameters by setting the drive type to "User" and pressing the ENTER key. Use the LEFT ARROW and RIGHT ARROW keys to move along the line of parameters, entering Cylinder, Head and Sector numbers as you go. When you have finished, press ESC.

If auto-configuration is not possible, drive type information can be obtained from your supplier, the drive manufacturer's documentation, or the label attached to the drive.

The Hard Disk 0 and Hard Disk 1 entries are greyed-out if you enable the Auto Configuration Mode option (described below). In this mode the BIOS always auto-configures the drive types.

Caution

If the drive is already formatted, selecting the wrong drive type may result in loss of data. If the drive is not formatted, selecting the wrong drive type may mean that the drive's full capacity is not used. We recommend that the first time you turn on the computer you invoke BIOS Setup and make a note of the drive type parameters. This will ensure that you can always reconfigure the drive type correctly.

Configuring an ATA-PI CD-ROM drive

Assuming that the CD-ROM is connected to the secondary ATA/IDE interface, as recommended, set the Hard Disk 2 drive type to "CD".

If there is no ATA device fitted, the Hard Disk 2 drive type should be "None". Obviously, Hard Disk 3 drive type should *always* be "None".

System Memory

The BIOS automatically detects the total amount of system memory and shows this in the BIOS Setup utility. The three system memory parameters (Base, Extended and Total) are displayed for information only and are not user-adjustable. If you install additional memory, the BIOS updates the memory parameters accordingly.

Parameter	Meaning
Base Memory	The first 640 Kbytes of system memory. Also known as conventional memory.
Extended Memory	The amount of memory over and above the first 1 Mbyte of system memory.
Total Memory	The total amount of memory, excluding the 384 Kbyte upper memory area (typically reserved for system and video BIOS, and expansion card memory).

Math Coprocessor

The BIOS automatically detects the presence of a coprocessor and shows this in the BIOS Setup utility.

Video Display

The BIOS automatically detects the video mode of your primary display and shows this in the BIOS Setup utility.

Communication Settings

This option allows you to set the baud rate, parity, stop bit and data length for serial port 1.

To alter the communication settings:

1. Use the UP ARROW and DOWN ARROW keys to select the field you want to change.
2. Use the LEFT ARROW and RIGHT ARROW keys to scroll through the possible values until you reach the correct one.

The default values for the port are 9600 baud, odd parity, 1 stop bit and 7 bit data word.

Enhanced IDE Features

These options control a set of performance-enhancing features for hard disk drives. Most drives nowadays support these features, although some depend on what operating system you are using.

Hard Disk Block Mode

This option enhances performance for drives that support block mode. When enabled, it allows the computer to read and write more information at one time. (If the computer no longer boots after enabling this option, it is likely that the master hard disk does not support this function. Run BIOS Setup and disable the option.)

Hard Disk PIO Mode 3

This option enhances performance for drives that support polled input/output (PIO) modes. PIO mode 3 is the fastest mode. Disable this option if the master hard disk does not support this function.

Hard Disk Size > 504 MB

Enable this feature if the computer has a hard disk with a capacity greater than 504 megabytes *and* you are using the MS-DOS/Windows operating system. For hard disks of lesser capacity, or if you are using another operating system, this option should be disabled.

Hard Disk 32-Bit Access

This option enhances performance for drives that support it. However, the feature currently works only under the MS-DOS/Windows and NetWare operating systems. If your operating system or hard disk does not support 32-bit access, this option should be disabled.

Num Lock After Boot

If this option is enabled, the numeric keypad on the keyboard is automatically set to provide numeric keys rather than cursor control keys at boot time. The default setting is disabled.

Memory Test

If this option is enabled, the POST (power-on self-test) routines test the system memory at boot time.

If you enable the Fast Boot Mode option (described below), Memory Test is disabled automatically, and the entry greyed-out so that you cannot re-enable it without first disabling Fast Boot Mode.

Auto Configuration Mode

If this option is enabled, certain BIOS Setup options are returned to their default settings and/or greyed-out so that they cannot be altered:

- The Hard Disk 0 and Hard Disk 1 entries in the Basic System Configuration screen are set to “Auto” (meaning “auto-detect”).
- Shadow RAM (for system and video BIOS), Internal Cache and External Cache are all “Enabled”, and System Speed is set to “High” in the Advanced System Configuration screen.

Auto Configuration Mode is enabled by default.

Fast Boot Mode

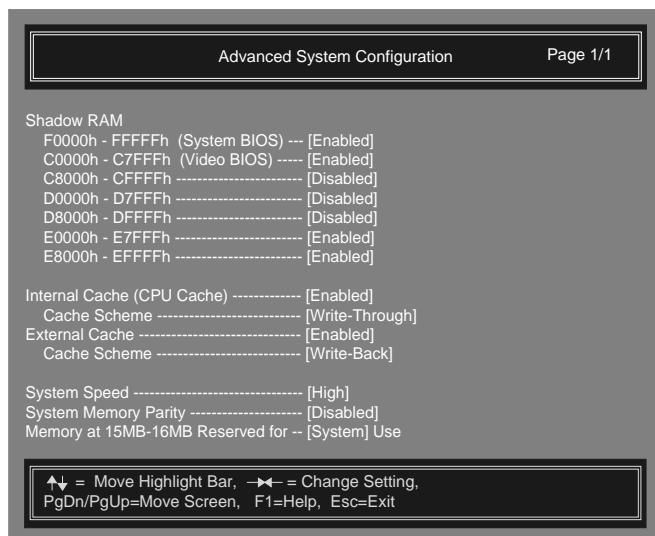
If this option is enabled, certain BIOS Setup options are set to ensure that the computer boots as quickly as possible and then greyed-out so that they cannot be altered until Fast Boot Mode is disabled again.

- Memory Test is set to “Disabled” in the Basic System Configuration screen.
- Shadow RAM (for system and video BIOS), Internal Cache and External Cache are all “Enabled”, and System Speed is set to “High” in the Advanced System Configuration screen.

Fast Boot Mode is enabled by default.

Advanced System Configuration

If you select Advanced System Configuration the following screen appears:



Shadow RAM

This option allows you to shadow the computer's system and/or video BIOS read-only memory (ROM). You can also shadow individual 32 Kbyte (8000h) areas of expansion card ROM addressed between C8000h and EFFFFh. See the chapter entitled "Adding ISA Expansion Cards" for more information about addressing expansion card memory.

To "shadow" ROM means to copy its contents into the computer's system or random-access memory (RAM). This is beneficial for two reasons: ROM has (relatively) long access times and the processor can access RAM faster than ROM; second, the contents of RAM can be cached (see below) for even greater performance.

Note that the two 32 Kbyte areas from E0000h to E7FFFh and E8000h to EFFFFh cannot be shadowed independently of the system BIOS ROM.

Caution

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

Internal Cache (CPU Cache)

This option enables or disables the internal memory cache (that is, the cache within the processor itself). There should normally be no reason to disable this cache, as this will result in poorer performance. Some old software which is speed sensitive may not work properly with the cache enabled, but this is very rare nowadays.

Cache Scheme

If the internal cache is enabled, and the processor allows, you can set the cache scheme to "Write Back" or "Write Through."

These are two alternative ways the cache controller can work. The write-back method updates the cache but not the system memory when there is a write instruction; it updates the memory only when there is an inconsistency between the cache and the memory. The write-through method updates both the cache and the memory whenever there is a write instruction.

The write-back method is quicker, but the write-through method is slightly safer (there is less chance of the contents of the cache getting out of step with the contents of system memory). For most everyday computing needs, you should set the Cache Scheme to “Write Back”.

Some types of processor have a fixed cache scheme (usually write-through) that you can’t change. In this case the Cache Scheme option is greyed-out.

External Cache

This option enables or disables the external memory cache (if any). If an external cache is fitted, there should normally be no reason to disable it.

An *external cache* is an area of dedicated memory with significantly faster access times than the computer’s system memory. A cache controller ensures that the cache always contains a copy of the most recently accessed areas of system memory, so that the processor is able to read it much more quickly.

An external cache is sometimes called a second-level cache, to distinguish it from the internal or first-level cache contained within the processor itself.

For more information about fitting or upgrading an external memory cache, see the chapter on “Upgrading” later in this manual.

Cache Scheme

If the external cache is enabled, you can set the cache scheme to “Write Back” or “Write Through” (see the section on the Internal Cache option for a definition of these terms). For most everyday computing needs, you should set the Cache Scheme to “Write Back”.

System Speed

This option allows you to set the speed of the ISA (expansion card) bus

Setting	Meaning
High	ISA bus runs at 10 MHz. This is the default setting.
Low	ISA bus runs at 8 MHz. Select this only if you have an old expansion card that will not operate with the ISA bus running at the higher speed.

System Memory Parity

This option enables or disables parity checking of random-access memory for those systems that support it (most systems do not).

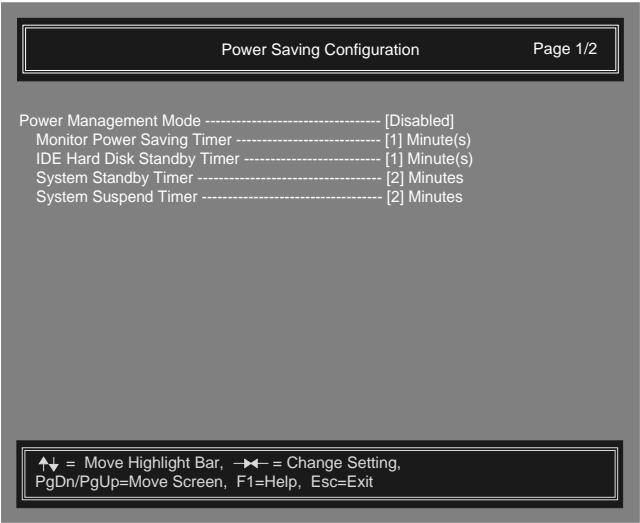
Memory at 15MB-16MB

This option allows the memory address range from 15 Mbyte to 16 Mbyte (F00000h to FFFFFFFh) to be reserved for use by system memory or an ISA expansion card.

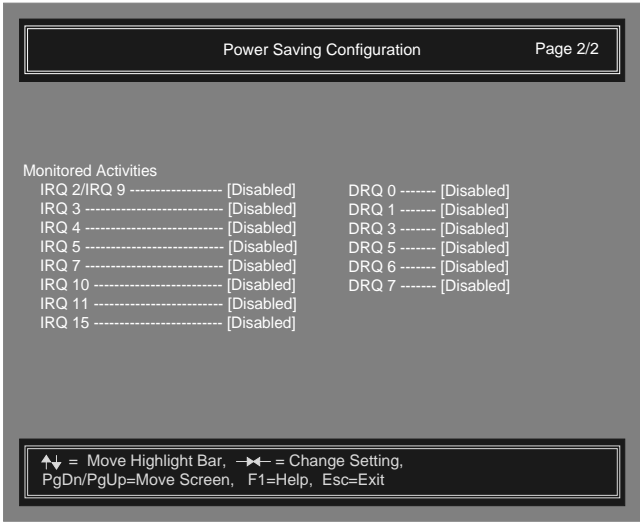
Setting	Meaning
System	The range F00000h to FFFFFFFh is used for system memory (if more than 15 Mbytes is fitted).
Add-on Card	The range F00000h to FFFFFFFh is used for expansion card memory.

Power Saving Configuration

If you select Power Saving Configuration the following screen appears:



There is a second page to this screen, accessed by pressing the PAGE DOWN key, which looks like this:



Power Management Mode

Power Management Mode may be enabled or disabled. If enabled, the following options apply. Note that these options are not affected by the Load System Default Settings option of BIOS Setup.

Monitor Power-Saving Timer

This option is intended to be used only with monitors that support Display Power Management Signalling (DPMS).

You can specify an inactivity timeout between 1 and 15 minutes. If the display does not change in this time, the monitor enters a power-saving Suspend mode. The monitor returns to full power when you move the mouse or press any keyboard key.

IDE Hard Disk Standby Timer

This option is intended to be used only with hard disk drives that support ATA/IDE Power Mode commands.

You can specify an inactivity timeout between 1 and 15 minutes. If there are no hard (fixed) disk read/writes during this time, the drive enters a power-saving Standby mode (the drive is spun down). The drive is spun up again when it is next accessed. Depending on the drive, it can take several seconds for the drive to spin up.

System Standby Timer

This option is a combination of the first two options, but extended to cover system activity.

You can specify a system inactivity timeout of up to 120 minutes. If there is no system activity during this time, the monitor enters Suspend mode and the hard disk drive(s) enter Standby mode. The monitor and hard disk drive(s) return to normal operation when you move the mouse or press any keyboard key.

System Suspend Timer

This option provides the maximum power savings.

You can specify a system inactivity timeout of up to 120 minutes. If there is no system activity during this time:

- The monitor enters the DPMS Off mode (that is, the monitor is effectively turned off).
- The hard disk drive(s) enter Standby mode (they are spun down).
- Several motherboard components are put into a power-saving mode.
- The processors' internal clock is stopped.

The system returns to normal operation when you move the mouse or press any keyboard key.

Caution

*Do **not** use this option if the computer is connected to a network. When the computer enters System Suspend mode, the network will think it has been turned off and terminate the network connection.*

Monitored Activities

You can use these options to enable or disable system activity monitoring and so specify what you mean by “system inactivity” in relation to the System Standby and System Suspend modes. You can tell the BIOS to monitor selected interrupt requests (IRQs) and direct memory access requests (DRQs). Activity on any one of the enabled IRQs or DRQs resets the system inactivity timer and keeps the system out of the power-saving modes.

The computer's use of interrupts and DMA channels is documented in the chapter entitled “Adding ISA Expansion Cards”. You should also note the IRQs or DRQs used by any expansion cards installed in the computer, and enable monitoring of these too if you consider it appropriate.

Note that network adapters are often working almost continually, even when the computer is itself not sending or receiving information over the network. If you enable monitoring of the interrupts or DMA channels used by a network adapter, you may find that the computer *never* goes into a power-saving mode.

System Security

If you select System Security the following screen appears:

System Security		Page 1/1
Disk Drive Control		
Diskette Drive	-----	[Normal]
Hard Disk Drive	-----	[Normal]
System Boot Drive	-----	[Drive A then C]
On Board Communication Ports		
Serial Port 1	-----	[3F8h]
Serial Port 2	-----	[2F8h]
Parallel Port	-----	[3BCh]
Operation Mode	-----	[Standard and Bidirectional]
Setup Password	-----	[None]
Power On Password	-----	[None]
↑↓ = Move Highlight Bar, ←→ = Change Setting, PgDn/PgUp=Move Screen, F1=Help, Esc=Exit		

These options are not affected by the Load System Default Settings option of BIOS Setup.

Disk Drive Control

These options allow you to control access to diskette/floppy disk drives and hard disk drives, and to specify where the BIOS should look for an operating system when the computer boots. Use these options to reduce the risk of computer viruses being introduced into the computer.

Diskette Drive and Hard Disk Drive

Both these options have the same four possible settings:

Setting	Meaning
Normal	The computer can read from and write to the drive.
Write Protect All Sectors	The computer can read from but not write to the drive.
Write Protect Boot Sector	The computer can read from the drive, and write to all sectors except the boot sector.
Disabled	The computer can neither read from nor write to the drive.

Note that write-protection inhibits write accesses through the BIOS, therefore these options work only for operating systems which use the BIOS to access the drives (for example, MS-DOS).

System boot drive

This option specifies where the BIOS looks for an operating system.

Setting	Meaning
Drive A then C	The BIOS looks first for a system diskette in drive A and, if one is present, boots from that. If drive A is empty the system attempts to boot from drive C (the first hard disk drive). If there is no active, bootable partition on drive C, the computer cannot boot locally.
Drive C then A	The BIOS looks first for an active, bootable partition on drive C and, if present, boots from that. If none exists, the BIOS looks for a system diskette in drive A. If drive A is empty, the computer cannot boot locally.

Setting	Meaning
Drive A	The BIOS looks for a system diskette in drive A and, if one is present, boots from that. If drive A is empty, the computer cannot boot locally.
Drive C	The BIOS looks for an active, bootable partition on drive C and, if present, boots from that. If there is none, the computer cannot boot locally.

Note that if the BIOS finds a non-system diskette in drive A, you will be prompted to replace it.

On-Board Communication Ports

Serial Port Base Addresses

These options allow each of the two serial ports to be disabled, or to configured as COM1, COM2, COM3 or COM4.

Setting	Meaning
3F8h	COM1 at I/O port address 3F8h
2F8h	COM2 at I/O port address 2F8h
3E8h	COM3 at I/O port address 3E8h
2E8h	COM4 at I/O port address 2E8h
Disabled	Serial port is disabled

The two serial ports must be set to different COM ports. Attempting to configure both serial ports to the same COM port will result in one port being disabled.

Parallel Port Base Address

This option allows the parallel port to be disabled, or to configured with the I/O port base addresses shown below.

Setting	Meaning
3BCh	I/O port address 3BCh (usually LPT1)
378h	I/O port address 378h (usually LPT2)
278h	I/O port address 278h (usually LPT3)
Disabled	Parallel port is disabled

If you install an expansion card with a port that uses the same I/O port address as the parallel port, the parallel port is disabled automatically.

Parallel Port Operation Mode

This option allows you to set the mode of the parallel port:

Setting	Meaning
Enhanced Parallel Port (EPP)	Allows bi-directional parallel port operation at maximum speed. Compatible with the Enhanced Parallel Port standard.
Extended Capabilities Port (ECP)	Allows the parallel port to operate in bi-directional mode and at a speed higher than the nominal maximum data transfer rate. Compatible with the Microsoft/Hewlett Packard Extended Capabilities Port standard.
Standard and Bi-directional	Allows normal speed operation in both directions.

Passwords

These password options are intended for computers that lack more sophisticated security systems. You should not attempt to use these options on an Apricot XEN-PC^{LS} computer with a built-in LOC Technology security system.

Some caution is required when using these options. At the factory, a jumper on the motherboard is set to “Bypass” password checking. With the jumper in this position, you can define passwords, but the computer will not prompt for them. To enable password checking you must move the jumper to the “Check” position.

Important

If the Password Checking jumper is moved to the “Check” position while no passwords are defined, you will be unable to invoke the BIOS Setup utility.

See Appendix A, “Inside the System Unit”, for more information about locating and adjusting motherboard jumper settings.

Setup Password

This option allows you to set a password for the BIOS Setup utility. When this option is in operation only people who know the password can run the BIOS Setup utility and reconfigure the system. A small “key” icon appears in the top left-hand corner of the screen. The person wanting to run BIOS Setup must then type the password and press ENTER. Three attempts are permitted, after which the computer is disabled and must be turned off then on again.

To enable the BIOS Setup password:

1. Move the highlight bar to Setup Password.
2. Press the RIGHT ARROW key.
3. Type a password of up to seven characters, then press the ENTER key.

Type the password carefully, as the characters do not appear on the screen as you type them.

4. Type the password again to confirm it, then press ENTER.

The password status changes to “Present”.

To disable the BIOS Setup password:

1. Move the highlight bar to Setup Password.
2. Press the RIGHT ARROW key.

The password status changes to “None”.

After enabling a password you should move the Password Checking jumper to the “Check” position (unless you have already done so). Similarly, after disabling a password you should move the jumper back to the “Bypass” position if no other password is defined. See Appendix A, “Inside the System Unit”, for more information about locating and adjusting motherboard jumper settings.

Power-On Password

This option allows you to set a password that is requested every time the computer is turned on or rebooted. Only people who know the password can use the computer. A small “key” icon appears in the top left-hand corner of the screen. The person wanting to use the computer must then type the password and press ENTER. Three attempts are permitted, after which the computer is disabled and must be turned off then on again.

To enable the password:

1. Move the highlight bar to Power-On Password.
2. Press the RIGHT ARROW key.
3. Type a password of up to seven characters and press ENTER.
4. Type the password again to confirm it, then press ENTER.

The password status changes to “Power-on”.

To disable the password:

1. Move the highlight bar to Power-On Password.
2. Press the RIGHT ARROW key.

The password status changes to “None”.

To change the password at boot time:

1. Turn on or reboot the computer.
2. When the key icon appears, type the password, followed by a forward slash character “/”, followed by the new password, then press `ENTER`.

Type the new password carefully, as the characters do not appear on the screen as you type them.

To disable the password at boot time:

1. Turn on or reboot the computer.
2. When prompted, type the password, followed by a forward slash character “/”, then press `ENTER`.

The next time anyone turns on or reboots the computer, they will not be asked for the password. To set the password again you must run the BIOS Setup utility.

After enabling a password you should move the Password Checking jumper to the “Check” position (unless you have already done so). Similarly, after disabling a password you should move the jumper back to the “Bypass” position if no other password is defined. See Appendix A, “Inside the System Unit”, for more information about locating and adjusting motherboard jumper settings.



4

USING REMOVABLE-MEDIA DRIVES

This chapter contains information about the various removable-media drives that are available.

Using a 5.25" floppy disk drive

This drive can read and write double-sided disks with a formatted capacity of either 1.2 Mbytes (if marked "HD" or "high density") or 360 Kbytes (if marked "DD" or "double density").

Each floppy disk is sealed into a flexible plastic envelope with a long, rounded aperture through which the read/write heads of the disk drive can meet the disk surface. You must never touch the exposed surface of the disk yourself.

Keep floppy disks well away from dust, moisture, magnetic objects, and equipment that generates magnetic fields. Also, avoid extremes of temperature and exposure to direct sunlight. Otherwise, data recorded on the disk may become corrupted.

Inserting a floppy disk

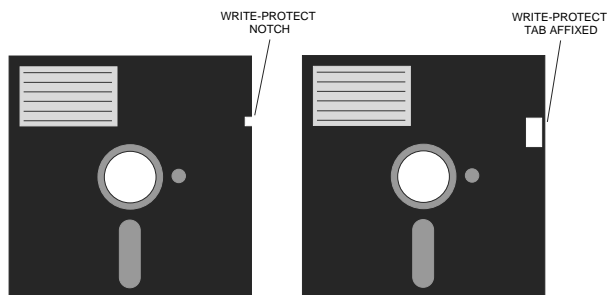
1. Insert the disk into the drive slot with the read/write aperture foremost.
2. When the disk is fully inserted, turn the locking lever one-quarter turn clockwise to engage the drive mechanism.

Removing a floppy disk

1. Before attempting to remove a disk, ensure that the drive is not currently in use (the drive's LED must be unlit).
2. Turn the locking lever one-quarter turn counter-clockwise to disengage the drive mechanism. The diskette is ejected halfway out of the drive.
3. Pull the disk completely out of the drive.

Write-protecting a floppy disk

A floppy disk can be write-protected by covering the small notch in the edge of the disk envelope with a self-adhesive tab (such tabs are typically supplied with new floppy disks). With the tab in this position, you can read or print files from the disk, but you cannot create, rename or delete any files.



Using a CD-ROM drive

CD-ROM drives are of two main types:

- **Direct loading drives**, in which the compact disc is placed directly on to the open platter of the drive.
- **CD caddy drives**, which use a caddy to hold the compact disc inside the drive.

These two types are described separately in this chapter, starting with direct-loading drives.

With the appropriate software support, a CD-ROM drive can retrieve multimedia data from CD-ROM discs and multisession Photo-CD discs. It can also play commercial audio CDs.

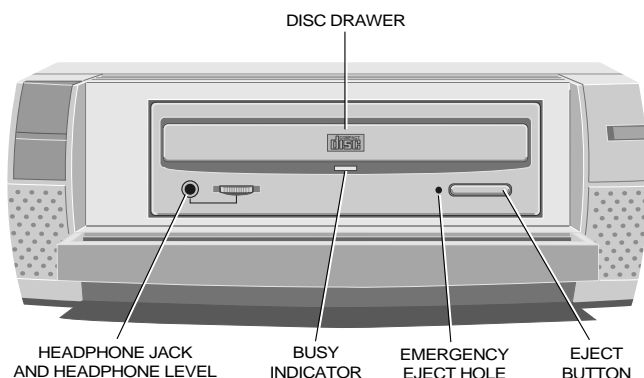
The software required to control the drive depends on the type of drive and the operating environment; see the Help provided with the computer or ask your supplier for details.

The drive has its own headphone jack with associated volume level control. Alternatively, on multimedia systems, sound can be played through the computer's internal stereo speakers or the audio output socket.

Do not attempt to move the computer while a CD is in the drive, especially if the CD is being played at the time.

Warning

The laser beam inside the CD-ROM drive is harmful to the eyes. Do not attempt to disassemble the CD-ROM drive. If a fault occurs, call an authorized maintainer.

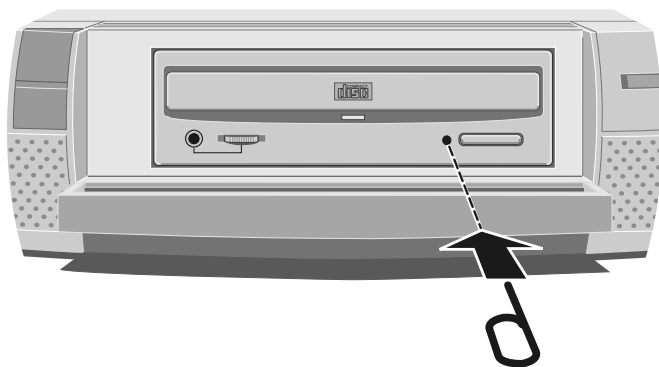
Using a direct-loading drive**Inserting a compact disc**

1. Press the **EJECT** button on the front of drive; note that the **EJECT** button will not work unless the computer is turned on.
2. If the platter only ejects halfway out of the drive, pull it out to its fullest extent.
3. Place the CD face up on the platter.
4. 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. If the platter only ejected halfway, push the platter in until it engages with the drive mechanism.
5. Wait for the CD to spin up to speed before attempting to read from it.

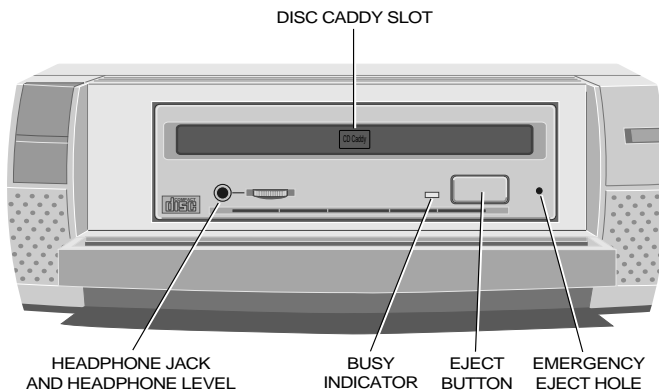
Removing a compact disc

1. Before attempting to remove a CD, ensure that the computer is turned on (otherwise the **EJECT** button will not work) and that drive is not currently in use (the drive's activity indicator must be unlit).
2. Press the **EJECT** button. The drive mechanism disengages and the platter is ejected. (The **EJECT** button can be disabled by the software controlling the CD-ROM drive. In this case pressing the **EJECT** button will have no effect.)
3. If the platter only ejects halfway out of the drive, pull it out to its fullest extent.
4. Remove the CD from the platter.

To eject the platter manually (for example, during a power failure) you must first ensure that the computer is turned off. Then insert a thin metal rod (such as an unwound paper clip) into the emergency eject hole and push hard (see below).



Keep CDs well away from dust and moisture, and avoid touching the surface of the CD. Also, avoid extremes of temperature and exposure to direct sunlight.

Using a CD caddy drive

Caddy CD-ROM drives use a special removable disc caddy to hold the CD within the drive mechanism. The caddy has a metal shutter that guards the disc surface; the drive automatically moves the shutter aside to read the disc. One disc caddy is provided free with the drive; more can be obtained from your supplier. Use only approved disc caddies.

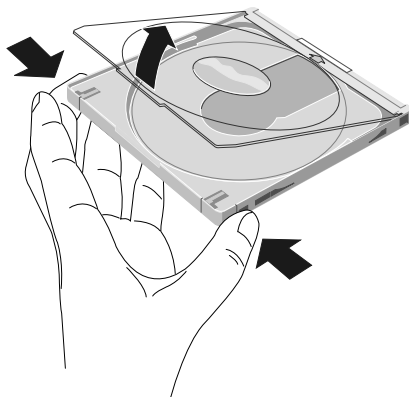
Caution

Do not confuse a CD's storage case with a proper disc caddy; if you attempt to insert a disc storage case you will damage the drive.

Caddy drives have a flap over the drive slot. When the drive is empty the legend **CD CADDY** is visible on the flap; when a CD caddy is loaded the legend **CADDY LOADED** is visible.

Inserting a compact disc

1. Ensure that the computer is turned on and that the drive is empty (the legend **CD CADDY** should appear on the flap covering the drive slot).
2. If there is a protective film on the centre of the caddy lid, remove it before using the caddy.
3. To open the caddy, press the tabs on both edges at the end opposite the shutter.



4. Place the disc, with its label upward, in the caddy. Handle the disc only by its edge.
5. Close the lid of the caddy firmly.
6. Insert the caddy into the drive slot with the disc's label facing up and the arrow on the caddy pointing toward the drive (that is, shutter end foremost). Push the caddy in until it is completely swallowed up by the drive.

The drive's activity indicator lights while the disc's table of contents is read. When the activity indicator goes out, the drive is ready for use.

If the activity indicator remains on, this may indicate that the disc is not properly positioned within the caddy. In this case, press the **EJECT** button to remove the caddy and try again. If the problem persists, consult your supplier or an authorized maintainer.

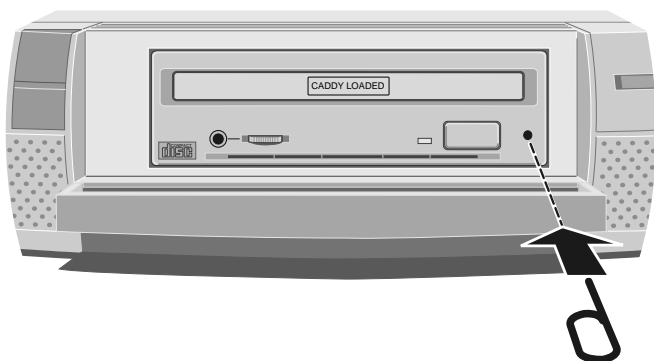
Note too that the software controlling the CD-ROM drive may be able to prevent the insertion of a disc.

Removing a compact disc

1. Before attempting to remove a CD, ensure that the computer is turned on (otherwise the **EJECT** button will not work) and that drive is not currently in use (the drive's activity indicator must be unlit).

2. Press the EJECT button. The drive mechanism disengages and the caddy is partially ejected from the drive. (The EJECT button can be disabled by the software controlling the CD-ROM drive. In this case pressing the EJECT button will have no effect.)
3. Pull the caddy completely out of the drive.

To eject the caddy manually (for example, during a power failure) you must first ensure that the computer is turned off. Then insert a thin metal rod (such as an unwound paper clip) into the emergency eject hole and push hard (see below).



Keep CDs and caddies well away from dust and moisture. Avoid touching the surface of the disc; for example, when the disc is inside the caddy, do not open the shutter manually and touch the disc. Also, avoid extremes of temperature and exposure to direct sunlight.

Using an FTD tape drive

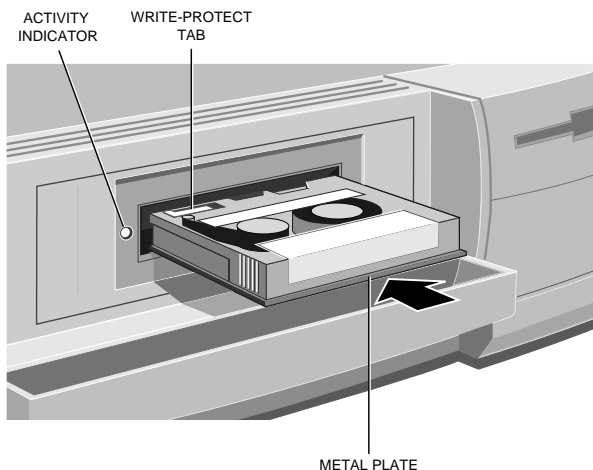
The FTD (floppy tape drive) is so called because it uses the on-board diskette/floppy disk interface and so does not require an additional drive controller card like most other tape drives.

The software required to control the tape drive depends on your operating environment; ask your supplier for details.

The tape drive can be damaged by incorrect insertion or removal of cartridges, so always observe the following procedures:

Inserting a cartridge

1. Remove the cartridge from its plastic holder.
2. Hold the cartridge so that the metal plate faces downwards, as shown below. Slide the cartridge into the drive slot until you feel a slight resistance.



3. Carefully push the cartridge in a bit further until it engages with the drive mechanism.

Removing a cartridge

1. Check that the cartridge is not being accessed by the computer (the drive's activity indicator must be unlit).
2. Pull the cartridge carefully out of the drive slot, holding it between thumb and forefinger.
3. Return the cartridge to its plastic holder. This protects the cartridge and prevents dust from collecting on the surface of the tape.

Write-enabling a cartridge

A cartridge is normally write protected but can be write-enabled by sliding the tag labelled <RECORD in the direction of the arrow (that is, to the left). A cartridge must be write-enabled if you intend to write data onto the tape.

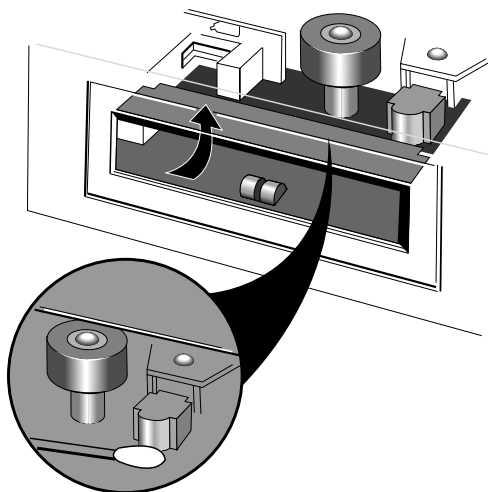
Keep tape cartridges well away from magnetic objects, and equipment that generates magnetic fields. Avoid extremes of temperature and exposure to direct sunlight; otherwise, the data recorded on the tape may become corrupted.

Cleaning the drive

You should clean the read/write head and the capstan of the FTD frequently to prevent the accumulation of dust and metallic particles.

If you notice read or write errors, or many bad blocks when using the drive, be sure to clean the head and capstan thoroughly before concluding that the drive or your tapes are defective.

The read/write head and the capstan are accessible through the flip-up drive door, as shown below.



Although it is possible to use special kits to clean the drive, we recommend the use of 90% isopropyl alcohol and several non-abrasive, lint free swabs, as follows:

1. Turn off the system unit and unplug all power cords.
2. Gently rub an alcohol-dampened swab against the surface of the read/write head. If the swab becomes too discoloured, use additional swabs until there is no further discoloration.
3. Rub an alcohol-dampened swab against the surface of the capstan using an up and down motion. Gently rotate the capstan and continue rubbing until the entire surface is clean.
4. Wait for at least one minute before using the tape drive. This allows any residual alcohol to evaporate.

If you clean the read/write head first, and the swab is not too discoloured, you may use the same swab to clean the capstan. But if you clean the capstan first, you must not use the same swab to clean the read/write head.

Using a SCSI QIC tape drive

A SCSI QIC tape drive uses quarter-inch tape cartridges. The software required to control the QIC tape drive depends on your operating environment; ask your supplier for details.

Currently 150 Mbyte and 525 Mbyte QIC tape drives are available. However, these capacities depend on the type of cartridge and the recording format used.

- The 525 Mbyte drive can use either DC6320 (600 ft, 320 Mbyte) or DC6525 (1000 ft, 525 Mbyte) cartridges and can read and write in QIC-525, QIC-150 and QIC-120 formats.
- The 150 Mbyte drive can use DC6150 (600 ft, 150 Mbyte) cartridges and can read and write in QIC-150 and QIC-120 formats.

Both drives can also read from (but not write to) a QIC-24 formatted tape.

The drive automatically senses the cartridge type and uses the maximum density QIC format possible for that cartridge (thereby giving its nominal capacity) unless the cartridge has already been used in a lower-density format.

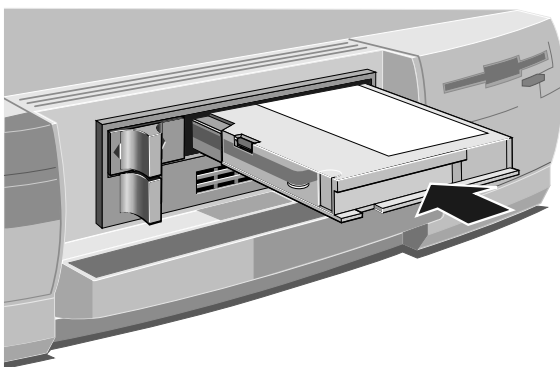
Caution

The use of 1000 ft, 250 Mbyte cartridges with the 150 Mbyte drive is not supported or recommended. If you must use 1000 ft cartridges with the 150 Mbyte drive, do not use 600 ft cartridges on the same drive. The different cartridges produce different patterns of wear on the read/write heads, resulting in increased error rates and reduced head life. Standardize on one length only (preferably 600 ft) to get the best performance from your drive.

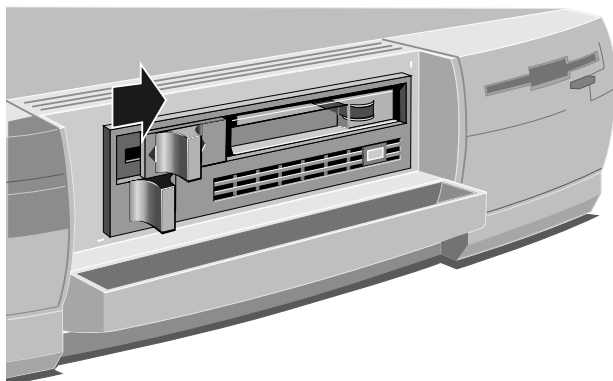
The tape drive can be damaged by incorrect insertion or removal of cartridges, so always observe the following procedures.

Inserting a cartridge

1. Check that the green indicator on the tape drive is not lit. This indicates that the drive is ready to accept a cartridge.
2. Remove the cartridge from its plastic holder.
3. Insert the cartridge as shown below. Push the cartridge gently into the drive as far as it will go.

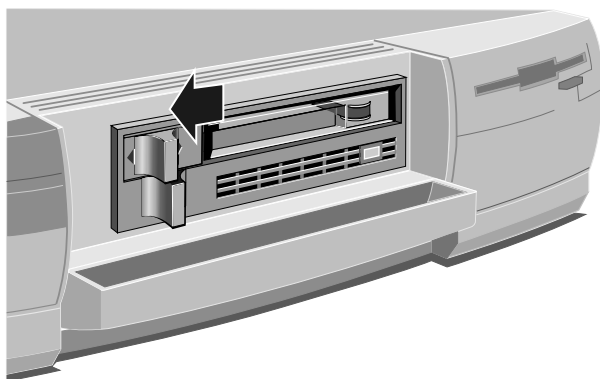


4. Push the control lever to the right to engage the mechanism.



Removing a cartridge

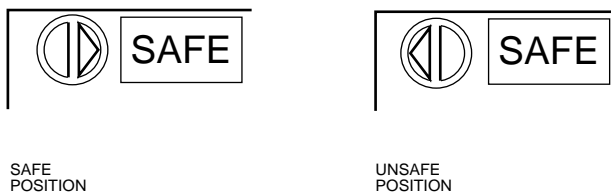
1. Do not attempt to remove the cartridge while it is being accessed by the computer (that is, while the green indicator is lit).
2. Push the control lever to the left to release the mechanism.
3. Push the control lever further to the left (you will feel a slight resistance as you do so) until the cartridge springs a short way out of the drive.



4. Pull the cartridge out of the drive slot.
5. Return the cartridge to its plastic holder. This protects the cartridge and prevents dust from collecting on the surface of the tape.

Write-protecting a cartridge

A cartridge can be write-protected by turning the circular plastic plug in the top left corner of the cartridge so that it points to **SAFE**. The plug can be turned with a screwdriver or the edge of a coin.



With the plug in this position, data can be read from the tape but not written to it.

Keep your tape cartridges well away from magnetic objects, and equipment that generates magnetic fields. Avoid extremes of temperature and exposure to direct sunlight; otherwise, the data recorded on the tape may become corrupted.

Cleaning the drive

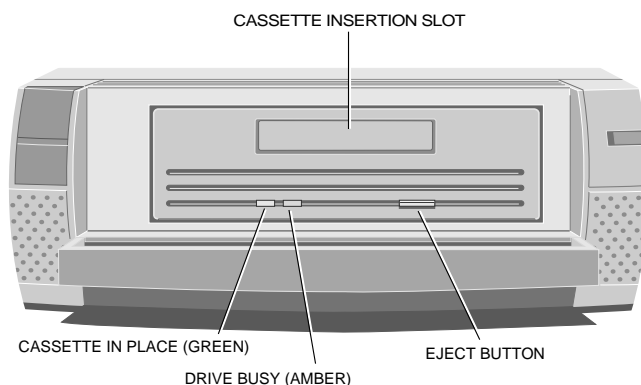
You should clean the SCSI QIC tape drive after every 8 hours' use, using the special cleaning kit available from your supplier. Full instructions for cleaning are provided with this kit.

It is also advisable to clean the tape drive after the first use of a new tape.

Using a SCSI DDS-DC tape drive

The computer may be configured with a SCSI DDS-DC (Digital Data Storage with Data Compression) tape drive. The software needed to control the drive depends on your operating environment; ask your supplier for details.

The DDS-DC drive has a built-in compression algorithm which can typically double, and in some cases quadruple, tape capacity. Data compression and decompression is transparent to the host software.



The DDS-DC drive uses standard 60-metre or 90-metre digital cassettes bearing the DDS symbol. The drive writes compressed data by default, unless it finds uncompressed data already on the cassette. The drive can also write uncompressed data under software control. When reading a cassette, the DDS-DC drive automatically distinguishes compressed and uncompressed data and either decompresses it or passes it through unaltered as appropriate.

Caution

Use only cassettes bearing the DDS symbol; you cannot play audio DAT cassettes with these drives, even on multimedia systems.

The DDS-DC drive writing uncompressed data has a nominal capacity of 1.3 Gbytes on a 60-metre cassette or 2.0 Gbytes on a 90-metre cassette, with a sustained transfer rate of 366 Kbytes/

second. At a data compression ratio of 4:1 the DDS-DC drive has a nominal maximum capacity of 5.2 Gbytes on a 60-metre cassette or 8.0 Gbytes on a 90-metre cassette; the sustained transfer rate is increased by the same ratio. However, the actual compression ratio and transfer rate achievable in any particular case depend on the characteristics of the data being compressed, and may be higher or lower than these nominal figures.

Interpreting the LED indicators

There are two LED (light-emitting diode) indicators on the drive's front panel. The Cassette in Place (green) and Drive Busy (amber) LEDs show the status of the drive:

Green	Amber	Drive status
On	Off	Cassette inserted
On	On	Cassette inserted: tape being read or written
Flashing slowly	On/Off	Media warning
Flashing rapidly	On	Drive could not write to tape correctly
On/Off	Flashing rapidly	Hardware error or high humidity

Media warning

A media warning, when the Cassette in Place (green) LED flashes slowly, indicates that the tape may be becoming unreliable, although at this point no data has been lost. First, clean the tape head cylinder with the special cleaning cassette, then try the data cassette again. If the warning persists, copy the data onto a new cassette and discard the old one.

A media warning can also indicate that a prerecorded audio DAT cassette has been inserted by mistake.

Drive could not write to tape

If the Cassette in Place (green) LED flashes rapidly, this means that the drive could not write to the tape correctly, and indicates that the tape has become unreliable. Remove the cassette and use another.

Hardware error or high humidity

If the Drive Busy (amber) LED flashes rapidly, this indicates either a hardware error or dew (high humidity). If this happens soon after powering-up the computer, the drive's diagnostic test may have failed, in which case the drive will not operate. Request help from your supplier or an authorized maintainer.

If the drive detects high humidity, the tape is automatically ejected. As soon as the drive detects that the humidity is at an acceptable level, it will return to normal operation.

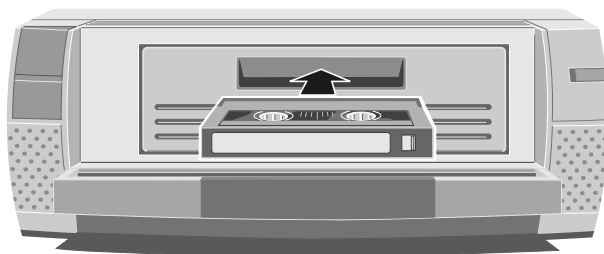
Automatic drive operation

To prolong the life of the tape and the drive mechanism, the drive "relaxes" during periods of inactivity (no read or write operations):

- After 30 seconds, the capstan and pinch roller are released and tape tension is removed.
- After 90 seconds, the tape is pulled away from the head cylinder, and the cylinder stops rotating.

Inserting a cassette

Insert the cassette into the slot with the triangular arrowhead on the cassette pointing towards the drive. As the tape is inserted, the drive takes it and automatically loads it into the drive mechanism. A load sequence checks ambient humidity, the tape format and data integrity. Unless the tape is blank the tape log, which contains a history of usage of the tape, is read into the drive's memory.



The drive will automatically format a blank tape when data is first written to it. Remember to allow time for the formatting process when you use a new tape.

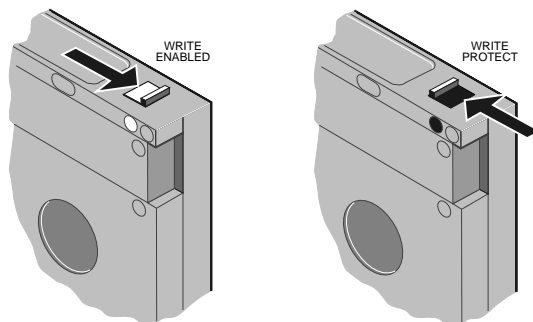
Removing a cassette

Before attempting to remove a cassette, ensure that the drive is not currently in use (the amber Drive Busy indicator must be unlit).

Press the **EJECT** button on the front of the drive (depending on your operating environment, the **EJECT** button may be disabled while the drive is in use). If the tape is write-enabled, a copy of the tape log, held in the drive's memory, is written back to tape. The drive rewinds to the beginning of the tape, unthreads it, and ejects the cassette. Several seconds may pass between the button being pressed and the cassette being ejected, so be careful not to turn off the computer before the operation is completed.

Write-protecting a cassette

A cassette can be write-protected by sliding the white tab on the cassette so that the recess is revealed. In this position, data can be read from the tape but not written to it.



The tape log, which includes a record of data integrity failures, cannot be updated while the cassette is write-protected. It follows that the tape log becomes inaccurate if a cassette is used while write-protected, and the media warning LED status cannot be relied upon to determine if the cassette needs to be copied and replaced.

Keep your cassettes well away from magnetic objects, and equipment that generates magnetic fields. Avoid extremes of temperature and exposure to direct sunlight; otherwise, the data recorded on the tape may become corrupted

Cleaning the drive

The read/write heads in the DDS-DC tape drive are protected during normal operation by a built-in cleaning roller. In addition, a special cleaning cassette is available from your supplier. This cassette should be used:

- Every 25 operating hours.
- When a media warning status is indicated.

When you insert the cleaning cassette, the drive recognises it as a cleaning cassette, runs it for about 20 seconds, then ejects it automatically. Each time the cleaning cassette is used the tape advances over an unused portion of the tape. If the drive ejects the cleaning cassette immediately after you insert it, this means that the entire tape has been used and a new cleaning cassette is required. You cannot rewind a cleaning cassette.

Caution

*Do **not** attempt to use an ordinary audio DAT cleaning cassette. The drive will be unable to recognise it as a cleaning cassette.*



5

MAINTAINING AND TRANSPORTING

This chapter provides information on how to care for the computer (excluding the removable-media drives). You'll find that it requires little physical maintenance other than occasional cleaning. But you must take care when transporting it to avoid damage to its delicate components, particularly the hard disks.

Warning

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

Cleaning the computer

The system unit

Do not use sprays, solvents or abrasives that might damage the system unit surface. Do not use cleaning fluids or sprays near air vents, ports, or removable-media drives.

- Occasionally wipe the system unit with a soft, slightly damp, lint-free cloth.
- Occasionally wipe the air vents on the rear and sides of the system unit. Dust and fluff can block the vents and limit the airflow.
- Occasionally clean the diskette drive using a proprietary head cleaner.

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, but 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.

Take care not to spill any liquid onto the keyboard. Follow these steps if you spill something on the keyboard and it stops working:

1. If the liquid is viscous, unplug the keyboard and call your supplier or an authorized maintainer.
2. 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 still won't work, call your supplier or an authorized maintainer.

If a solid object drops between the keys, turn the keyboard upside down and shake it; do not probe between the keys as this may cause further damage.

The mouse

Dust and dirt may accumulate in the ball tracking mechanism of the mouse. To clean the mouse:

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 will 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 plastic 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 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.

Replacing the configuration battery

The computer keeps a record of its current hardware configuration in a CMOS memory chip which is sustained by a small battery.

This battery has a life of 3-5 years. When the battery is discharged the contents of the configuration memory will not be maintained while the computer is turned off. If you have to reconfigure the computer every time you turn it on, the battery has discharged and needs to be replaced.

The battery holder is located on the motherboard behind the removable-media drive tray. If the battery holder is accessible you can replace the battery yourself using the procedure described below.

Caution

If the battery holder is obscured by a multimedia daughterboard, the battery can be replaced only with the assistance of your supplier or an authorized maintainer. Do not attempt to remove the multimedia daughterboard yourself.

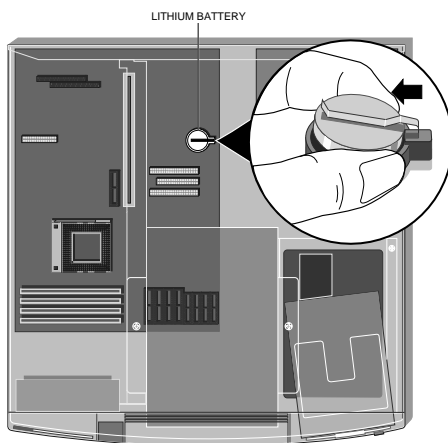
The battery is a 3 volt lithium type (BR2335 or equivalent) typically used in calculators and other small, battery-powered electronic items.

To replace the battery:

1. Turn off the computer and unplug all power cords.
2. Take suitable anti-static precautions and remove the system unit cover.

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 from the following illustration:



4. Lift the left edge of the battery far enough to clear the base of the holder, then slide the battery out.

Warning

*You **must 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, the battery may explode.*

5. Check that the replacement battery is identical to the battery you have removed.
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 left.
8. Replace the system unit cover.

The next time you turn on the computer you will have to run the BIOS Setup utility to reset the hardware configuration.

Warning

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

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 (copy) the contents of the hard disks to tape or diskettes before moving the computer.

Don't try to move the computer while it is plugged into the AC power supply or with any other cables, including network cables, still attached.

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

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

If you intend to use the computer in another country, see the next section for some important advice.

Using the computer in another country

The computer arrives ready to work with the commercial AC power supply available in the country in which it is first sold.

If you plan to use the computer in another country, you should first check the following facts about your destination:

- The voltage and frequency of the commercial AC power supply.
- The type of plug required for the AC power outlets.

AC power supply

Check the power rating labels on the rear of the computer's system unit and its monitor to ensure that they are compatible with the AC power supply.

Warning

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

The computer can function within two alternative AC power supply ranges, according to the position of the voltage selection switch on the rear of the system unit:

Switch setting	AC power supply (voltage and frequency)
115	100 - 120 volt AC, 50 - 60 Hz
230	220 - 240 volt AC, 50 - 60 Hz

The voltage setting of the monitor must always be the same as the voltage setting of the system unit. See the *User's Guide* that accompanies the monitor or consult your supplier to find out how to change the voltage setting.

Make sure that the system unit and the monitor are returned to their original voltage settings when you return home.

AC power cord

The AC power cord and plug supplied with the computer comply with the safety standards applicable in the country in which it is first sold. If you plan to use the computer in another country, you must get a power cord that complies with the safety standards of the destination country. For further details, see the "Safety and Regulatory Notices" section at the start of this handbook.



Expansion cards (also known as *expansion boards* or *adapter cards*) are small self-contained circuit boards which extend the capabilities of the computer. Here are just two examples:

- A graphics card can provide more specialized video functions than those offered by the on-board EVGA system.
- A modem card can provide a connection to the Internet via a telephone line.

The computer has three 16-bit Industry Standard Architecture (ISA) expansion card slots: two full-length slots and one half-length slot.

If the computer has a Small Computer Systems Interface (SCSI) removable-media drive, one of these slots will be occupied by an SCSI adapter card. Other cards may be pre-installed at the factory or by your supplier.

Configuring the card

Part of the installation procedure for Industry Standard Architecture (ISA) expansion cards involves setting up or configuring the card so it works correctly in the computer. To configure, you assign values to various settings on the card, which enable the card to communicate with the computer.

Most 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 important thing to understand is that the settings used by

the card must be different from the settings used by the other hardware devices in the computer, whether by another card or by a component on the computer's motherboard. In other words, the settings must not conflict.

The documentation accompanying the card should tell you how to configure it. Remember to check any diskettes supplied with the card for README or other help files.

Some ISA cards require you to manually move jumpers or set switches on the card to configure them. This is best done *before* installing the card in the computer. Other cards can be configured by running a configuration program *after* installing the card. Some cards use a mixture of both methods.

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.

Note

With the advent of expansion cards and operating systems that support Plug and Play (PnP), there should be fewer conflicts between resources required by expansion cards and those used by motherboard components.

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.

Every ISA-based computer has interrupt levels numbered IRQ0 to IRQ15. Most of these are reserved for components on the computer's motherboard. Some of these interrupts are fixed; others can be re-assigned, or freed by disabling the component with BIOS Setup.

The following table lists the interrupts used by the computer and shows which are available for use by expansion cards. See the notes below the table for further explanation.

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

Notwithstanding its default assignment, IRQ2 can be used if IRQ9 is not in use, and *vice versa*.

IRQ3 is available if you disable serial port 2 with the BIOS Setup utility. Similarly, IRQ4 is available if you disable serial port 1. Obviously, you shouldn't disable either one unless you have no intention of using the affected port.

If you set the mode of the parallel port to "Standard and Bi-Directional" with the BIOS Setup utility, IRQ7 can usually be used by an expansion card without affecting the operation of the parallel port. This is less likely to be possible if you use the parallel port in either "Enhanced Parallel Port" (EPP) or "Extended Capabilities Port" (ECP) mode. If you experience problems, you will have to reconfigure the card to use a different interrupt. If you have no intention of using the parallel port, you can disable it with the BIOS Setup utility, completely freeing IRQ7 for use by an expansion card.

Direct memory access (DMA) channel

Some hardware devices can use a *DMA channel* to access system memory without directly burdening the processor.

Every ISA-based computer has 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. See the notes below the table for further explanation.

DMA	Default assignment	Available?
DMA0		Yes
DMA1	Enhanced Capabilities Port (alternate)	Optionally
DMA2	Diskette/floppy disk controller	No
DMA3	Enhanced Capabilities Port (default)	Optionally
DMA4	System	No
DMA5		Yes
DMA6		Yes
DMA7		Yes

Motherboard jumper settings determine whether the parallel port in ECP mode uses DMA1 or DMA3. See Appendix A, “Inside the System Unit”, for more information.

Base input/output (I/O) port address

I/O ports are used by the processor to communicate with hardware devices. Each port appears to the processor as an address low down in its address space, usually below 3FFh.

Some expansion cards are also controlled by I/O ports. 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. Any ports not listed below may be used by an expansion card.

I/O ports	Default assignment
000h-01Fh	DMA controller 1
020h-021h	Interrupt controller 1
022h-023h	ALI configuration port
034h, 038h, 03Ch	Local bus ATA/IDE (alternate)
040h-05Fh	System timer
060h-06Fh	Keyboard controller
070h-07Fh	Real-time clock, NMI mask
080h-09Fh	DMA page register
0A0h-0A1h	Interrupt controller 2
0B4h, 0B8h, 0BCh	Local bus ATA/IDE (default)
0C0h-0DFh	DMA controller 2
0F0h, 0F1h	Math coprocessor busy (clear/reset)
0F8h-0FFh	Math coprocessor
1F0h-1F7h	Hard disk drive controller
200h-207h	Game I/O
278h-27Fh	Parallel port 2
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

Motherboard jumper settings determine which I/O ports are used by the ATA/IDE interfaces. See Appendix A, "Inside the System Unit", for more information.

Base memory address

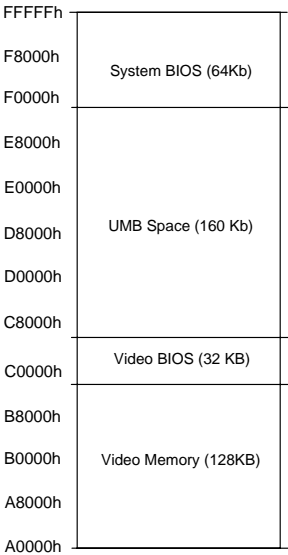
The first megabyte (1024 kilobytes) of the computer's memory is divided into 640 kilobytes (Kbytes) of so-called *conventional memory* and 384 Kbytes of *upper memory*.

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 "seen" 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. The map below shows the layout of the upper memory area.

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. (Some cards allow you to specify the amount of memory you want to map, but usually this is fixed.)



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 C800h. 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

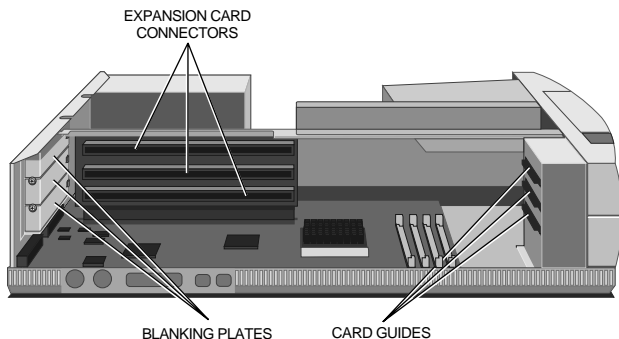
Installing the card

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.

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. Use the following illustration to locate the ISA expansion card slots.



The slots are fixed to a *backplane* that rises perpendicularly from the motherboard.

At the rear of the system unit are three metal blanking plates, one for each expansion card slot. Opposite the blanking plates, at the front of the system unit, are three card guides. These ensure that the front edge of a full-length card is held securely.

4. Use the following table to decide in which of the available slots you wish to install the card. In general it is easiest to start with the lowest slot (Slot 1) and work upwards.

Slot	When to use
Slot 3 (top)	If you are installing a drive controller card that you want to connect to a drive in the removable-media drive bay, it is easiest to install the card in the top slot.
Slot 2 (middle)	Use this slot if the bottom slot is occupied or if it will not accommodate the length of card you want to install.
Slot 1 (bottom)	This is the half-length slot. Use this slot if you are installing a card that uses the video feature connector on the motherboard.

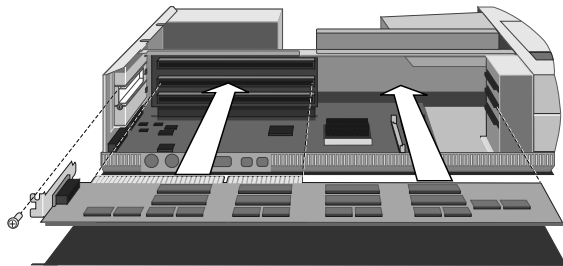
5. Remove the blanking plate of the chosen slot by removing its securing screw, then sliding the plate out of its slot. Keep the screw, you will use it later to secure the card.
6. If the card you are installing is configured by the means of jumpers or switches, check that it is correctly configured before proceeding.
7. Before installing a video controller card you will probably have to disable the on-board EVGA video controller by moving a jumper on the motherboard (check the

documentation that came with the card to make sure). If you do not move this jumper, it is possible that neither the card or the motherboard video controller will work correctly.

In addition, if the card uses the video feature connector on the motherboard, you must plug the video feature cable into the motherboard *before* you install the card (otherwise, the card will get in the way of the connector).

Refer to the motherboard layout diagram in Appendix A, “Inside the System Unit”, to locate the On-board EVGA jumper and the video feature connector.

8. 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.
9. Slide the card into the slot ensuring that the card edge connector engages correctly with the backplane.



10. Secure the card by replacing the screw that you removed in Step 5.
11. Connect any necessary signal cables to the card.
12. If the card you have just installed is intended to control a removable-media drive, turn to the next chapter for instructions on installing the drive itself. Otherwise, replace the system unit cover.



This chapter contains instructions on installing upgrades or additions in the computer (with the exception of ISA expansion cards which are dealt with in the preceding chapter).

Read this chapter before purchasing an upgrade. If, having read the relevant instructions, you are not confident about installing the upgrade, you may wish to have your supplier or service organization install it for you.

Before you start installing any upgrade you should be thoroughly familiar with all the relevant instructions.

Appendix A, "Inside the System Unit", provides an overview of anti-static precautions, instructions on removing the system unit top cover, and information on motherboard jumpers.

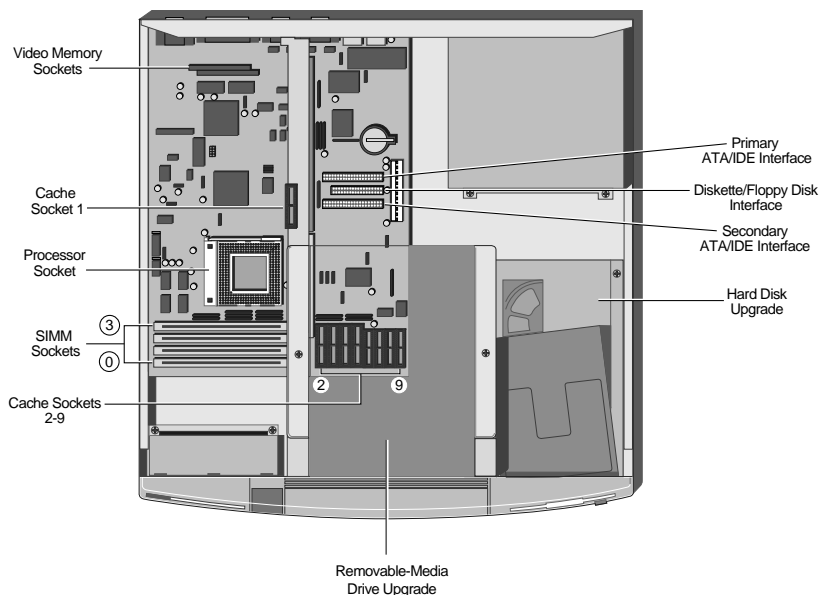
The only tool required to complete the installation of any of the upgrades is a small cross-head screwdriver.

Warning

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

Inside the system unit

The illustration below identifies the major components inside system unit that are affected by the installation instructions in this chapter.



Adding more system memory

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

The SIMM sockets are located at the front of the motherboard, and are labelled Bank0 to Bank3. Each socket can be empty, or fitted with a SIMM. SIMMs with capacities of 4, 8 or 16 Mbytes are supported, giving a maximum capacity of 64 Mbytes. (Note that Bank0 and Bank1 accept double-density SIMMs provided that Bank2 and Bank3 are unused.) The table below identifies the possible memory configurations. No other combinations are supported.

Total memory	Bank0	Bank1	Bank2	Bank3
4 Mb	4 Mb	-	-	-
8 Mb	4 Mb	4 Mb	-	-
8 Mb	8 Mb	-	-	-
12 Mb	4 Mb	4 Mb	4 Mb	-
12 Mb	4 Mb	8 Mb	-	-
12 Mb	8 Mb	4 Mb	-	-
12 Mb	8 Mb	-	-	4 Mb
16 Mb	16 Mb	-	-	-
16 Mb	8 Mb	8 Mb	-	-
16 Mb	4 Mb	8 Mb	4 Mb	-
16 Mb	4 Mb	4 Mb	4 Mb	4 Mb
16 Mb	8 Mb	4 Mb	-	4 Mb
20 Mb	16 Mb	4 Mb	-	-
24 Mb	8 Mb	16 Mb	-	-
24 Mb	16 Mb	8 Mb	-	-
24 Mb	8 Mb	-	-	16 Mb
24 Mb	16 Mb	4 Mb	-	4 Mb
28 Mb	4 Mb	8 Mb	16 Mb	-
28 Mb	16 Mb	8 Mb	4 Mb	-
28 Mb	4 Mb	4 Mb	4 Mb	16 Mb
28 Mb	8 Mb	4 Mb	-	16 Mb
28 Mb	8 Mb	16 Mb	-	4 Mb
32 Mb	16 Mb	16 Mb	-	-
36 Mb	16 Mb	4 Mb	-	16 Mb
40 Mb	16 Mb	8 Mb	16 Mb	-
40 Mb	4 Mb	4 Mb	16 Mb	16 Mb
40 Mb	8 Mb	16 Mb	-	16 Mb
48 Mb	16 Mb	16 Mb	16 Mb	-
52 Mb	4 Mb	16 Mb	16 Mb	16 Mb
64 Mb	16 Mb	16 Mb	16 Mb	16 Mb

Installing and removing SIMMs

To locate the SIMM sockets:

1. Turn off the computer and unplug all power cords.
2. Take suitable anti-static precautions and remove the system unit cover.

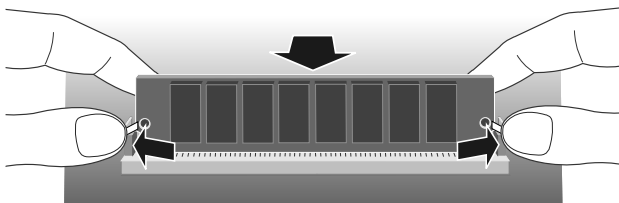
If you are unfamiliar with the recommended anti-static precautions and/or the process of removing the system unit cover, refer to Appendix A, "Inside the System Unit".

3. Use the illustration at the beginning of this chapter to locate the SIMM sockets.
4. Remove any any ISA cards that could restrict access to the SIMM sockets: disconnect any cables connected to the cards, remove the screws that secure the cards to the rear of the system unit, then remove the cards from the system unit.
5. Compare the current configuration of SIMMs with the configuration for the memory upgrade you intend to install. If necessary, remove one or more of the existing SIMMs, before going on to install the new SIMMs.

You cannot easily install a SIMM in a socket while next socket is occupied. For this reason, it is best to install SIMMs starting at Bank0, even if this means removing some SIMMs first.

To remove a SIMM:

1. Disengage the metal holding clips on each side of the socket using your thumbs. Place your forefingers on the top edge of the SIMM and tilt the SIMM forward to about 15° to the vertical.



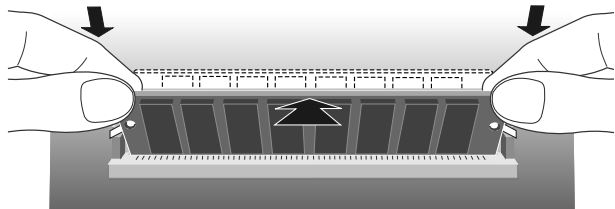
2. Lift the SIMM out of its socket. Hold the SIMM by its edges and avoid touching the metal contacts.

To install a SIMM:

1. Take the SIMM out of its anti-static packaging. Hold it by its edges and avoid touching the metal contacts.

Note that the SIMM is not symmetrical; there is a small notch in one edge.

2. Place the SIMM in the socket at a 15° angle to the vertical, with the notched edge pointing towards the centre of the machine.
3. Pushing gently on its top corners, lean the SIMM upright in the socket until the pegs of the socket engage the holes on the SIMM and the metal clips hold both ends the SIMM in position.



Do not use excessive force. If the SIMM will not fit easily, remove it and start again.

Repeat these steps for each SIMM you want to install.

When you have finished, replace any ISA cards you removed earlier, then replace the system unit cover.

Reconfiguring the system

The first time you turn on the computer after adding or removing SIMMs a POST error message appears, indicating that the amount of memory does not match the value stored in CMOS. You must use the BIOS Setup utility to confirm the new memory configuration. See the chapter on “Using the BIOS Setup utility” for more information.

Adding more external cache memory

An *external cache* is an area of dedicated memory with significantly faster access times than the computer's system or random-access memory (RAM). A cache controller ensures that the cache always contains a copy of the most recently accessed areas of RAM, so that the processor is able to read it much more quickly.

An external cache is sometimes called a second-level cache, to distinguish it from the first-level cache contained within the processor itself.

You can improve the performance of the computer significantly by adding or augmenting cache memory.

To decide if an upgrade is possible:

- Read the BIOS sign-on messages (displayed when the computer is turned on or rebooted) to find out how much cache memory the computer already has.
- Check with your supplier to find out what upgrade kits are available.

To fit cache memory:

1. Turn off the computer and unplug all power cords.
2. Take suitable anti-static precautions and remove the system unit cover.

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. If there is a removable-media drive fitted, unplug its power and signal cables from the rear of the drive. Remove the two screws that secure the removable-media drive tray, then slide the tray backwards slightly and lift it out of the system unit. Put it down on a flat, anti-static surface.
- 4. Use the illustration at the beginning of this chapter to identify the nine cache upgrade sockets. Depending on how much cache memory is already fitted, some of the sockets may be occupied.

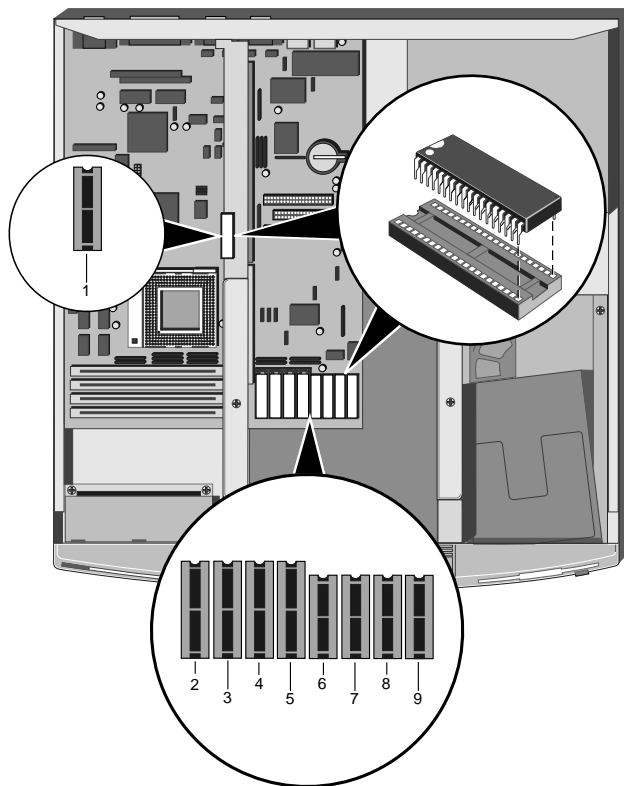
Different upgrade kits have different numbers of chips. Use the following table to discover where they must be fitted.

Cache upgrade	Number of chips in kit	Where to fit them
From none to 256 Kb	9	Cache sockets 1 to 9
From none to 128 Kb	5	Cache sockets 1 to 5
From 128 Kb to 256 Kb	4	Cache sockets 6 to 9

- 5. To fit a chip in cache socket 1, you will have to remove any ISA cards that are fitted: disconnect any cables connected to the cards, remove the screws that secure the cards to the rear of the system unit, then remove the cards from the system unit.
- 6. Unpack the upgrade kit and lay the memory chips out on an anti-static surface. Hold each chip by its edges and be careful not to touch the metal pins.
- 7. One by one, insert the chips in the sockets. Press the chips firmly to make sure they are correctly seated.

It is important that the chips are fitted the right way round. Each chip has a small semi-circular notch or recess in one end, which matches a similar V-shaped notch on the socket.

Where the socket is bigger than the chip, the chip should be positioned as shown on the following page.



8. Adjust the Cache Data Size jumpers on the motherboard to match the amount of cache memory now fitted.

See Appendix A, “Inside the System Unit”, for more information about locating and adjusting motherboard jumper settings.

9. Replace the removable-media drive tray.
10. If necessary, replace the ISA cards you removed earlier.
11. Replace the system unit cover.

Adding more video memory

Video memory is memory reserved for use by the on-board EVGA controller. More video memory provides more colours and/or higher resolutions (provided that your monitor can cope).

If your computer has only 1 Mbyte of video memory, you can upgrade it to the maximum of 2 Mbytes.

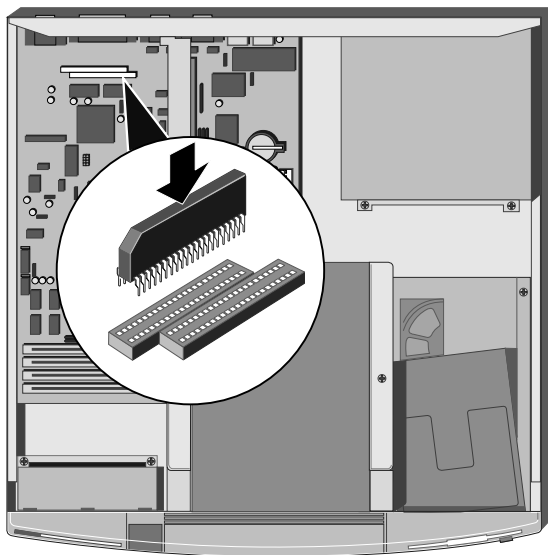
To add video memory:

1. Turn off the computer and unplug all power cords.
2. Take suitable anti-static precautions and remove the system unit cover.

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. If there are any ISA cards fitted, you will have to remove them: disconnect any cables connected to the cards, remove the screws that secure the cards to the rear of the system unit, then remove the cards from the system unit.
4. Use the illustration at the beginning of this chapter to identify the two video memory upgrade sockets.
5. Unpack the upgrade kit and lay the memory chips out on an anti-static surface. Hold each chip by its edges and be careful not to touch the metal pins.
6. One by one, insert the chips in the sockets.

It is important that the chips are fitted the right way round. Each chip has a small bevel at one corner. This corner must point towards the left-hand side of the computer when viewed from the front, as shown on the following page.



7. If necessary, replace the ISA cards you removed earlier.
8. Replace the system unit cover.

Upgrading the processor

The computer is supplied with an Intel486 or IntelDX4 processor.

The ZIF (zero insertion force) processor socket on the motherboard is designed to accept a variety of Intel processors. You can upgrade your processor by replacing it with one of higher performance.

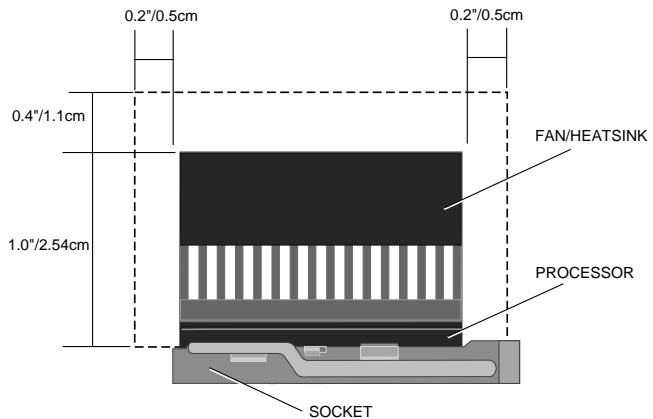
The system can automatically tell the difference between Intel processors that operate at 5.0 volts and those (like the IntelDX4) that operate at 3.3 volts.

The system also supports a range of *external clock speeds* from 25 to 50 megahertz (MHz). The clock speed is set by adjusting some jumpers on the motherboard. Note that the external clock speed is often lower than the processor's internal clock speed, which is usually the one advertised. The ratio of the internal and external clock speeds is known as the *processor clock multiplier*.

Intel Pentium OverDrive

When installing an Intel Pentium OverDrive processor, you must ensure there is sufficient air space around it. If you don't leave enough air space, the processor may overheat. So, ensure that no obstructions, such as cables or expansion cards, intrude upon the open air space shown below.

In most cases, you should be able to install a full-length expansion card in Slot 2 without intruding on the processor's air space.



Removing and fitting a processor

To remove the existing processor:

1. Turn off the computer and unplug all power cords.
2. Take suitable anti-static precautions and remove the system unit cover.

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

3. Remove any any ISA cards that could restrict access to the processor socket: disconnect any cables connected to the cards, remove the screws that secure the cards to the rear of the system unit, then remove the cards from the system unit.

4. If the computer was turned on prior to commencing this procedure, *wait for at least 15 minutes* for the processor to cool down before proceeding.

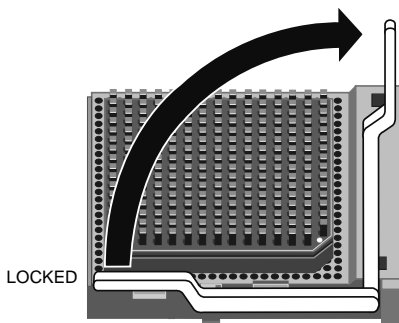
Warning

*The processor can get **very** hot. You may burn your fingers if you attempt to remove the processor before it has cooled down. Also, the processor's pins expand slightly when hot and this can prevent it being removed from the socket.*

5. Use the illustration at the start of this chapter to locate the ZIF processor socket.

A lever attached to the socket secures the processor in the socket.

6. Lift the lever from the locked position until it is upright (at right-angles to the motherboard). The first and last 15° of movement may require significant effort. Apply just enough pressure to overcome the resistance offered by the lever.



7. 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 the metal pins.

Caution

*If the processor does not lift easily out of the socket, do **not** attempt to force it. Wait for the processor to cool down.*

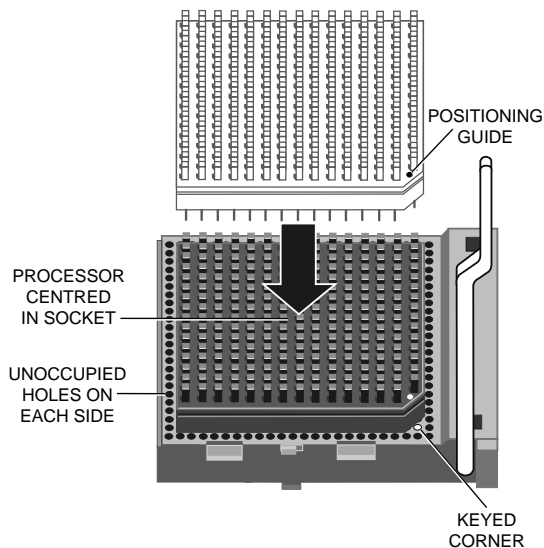
To fit the upgrade processor:

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. One corner of the socket has a key hole. The corresponding corner of the processor is slightly bevelled and has a positioning guide in the form of a coloured dot.

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.

If the upgrade processor is not big enough to occupy all four rows of holes in the socket it should be positioned centrally as shown below.



Caution

If the processor is misaligned it will not go into the socket, and any attempt to force it will damage the processor, or the socket, or both.

- 4. Move the securing lever to the locked position. Apply just enough pressure to overcome the resistance offered by the lever.
- 5. You may need to adjust the Processor Selection and/or External Clock Speed jumpers on the motherboard.

See Appendix A, "Inside the System Unit", for more information about locating and adjusting motherboard jumper settings.
- 6. Replace the system unit cover.

Adding a removable-media drive

The 5.25" drive bay can contain any half height 5.25" device. A range of removable-media drives are available for this bay.

Configuring the drive

Drives purchased from an authorized supplier should arrive pre-configured and ready for installation. The following table provides some general advice. See the documentation provided with the upgrade kit for more information.

Drive type	Configuration instructions
5.25" floppy disk drive or FTD drive	The only configuration required is to set the drive select jumpers at the rear of the drive. The jumpers should be pre-configured to Drive Select 1 (DS1).
ATA-PI CD-ROM drive	The ATA-PI CD-ROM drive should be configured as the <i>master</i> drive for connection to the <i>secondary</i> ATA/IDE interface.
SCSI CD-ROM, QIC tape or DDS-DC tape drives	Every SCSI drive must be assigned an identity on the SCSI bus, known as its SCSI ID. All removable-media SCSI drives should be pre-configured with SCSI ID 2, and fitted with termination resistors.

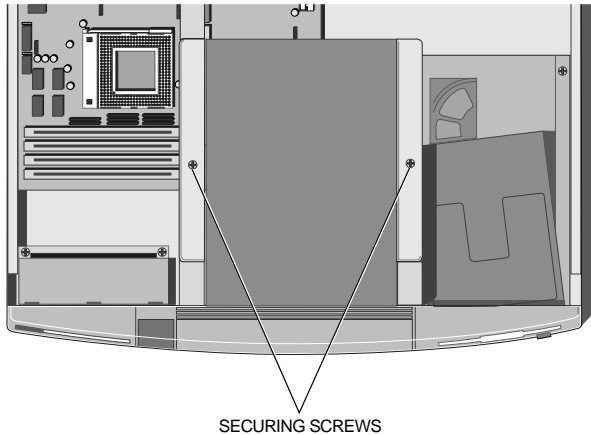
Installing the drive

To install a removable-media drive:

1. Turn off the system unit and unplug all power cords.
2. Take suitable anti-static precautions and remove the system unit cover.

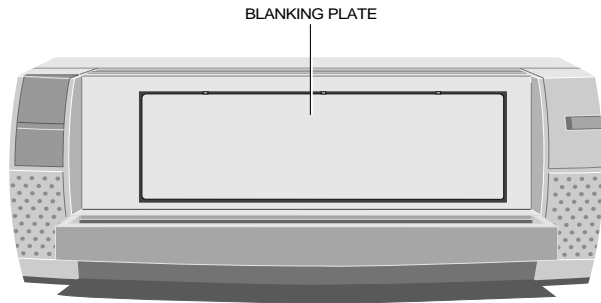
If you are unfamiliar with the recommended anti-static precautions and/or the process of removing the system unit cover, refer to Appendix A, “Inside the System Unit”.

3. Remove the two screws that secure the removable-media drive tray. Slide the tray backwards slightly and lift it out of the system unit.



4. Open the drive bay door.

The drive bay aperture is initially obscured by a blanking plate attached to the top of the metalwork. The blanking plate must be broken out in order to install a drive in the bay.

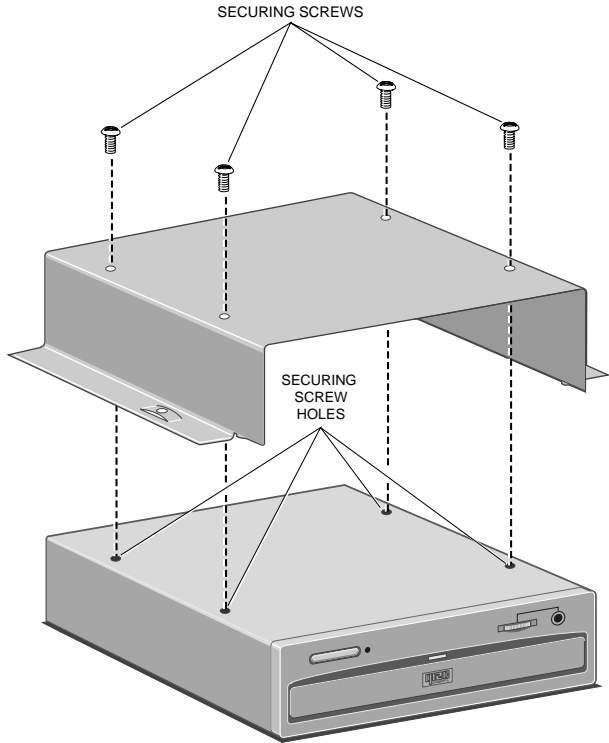


5. Break the blanking plate out by bending it backwards and forwards several times.
6. Remove the new drive from its packaging and ensure that it is correctly configured.

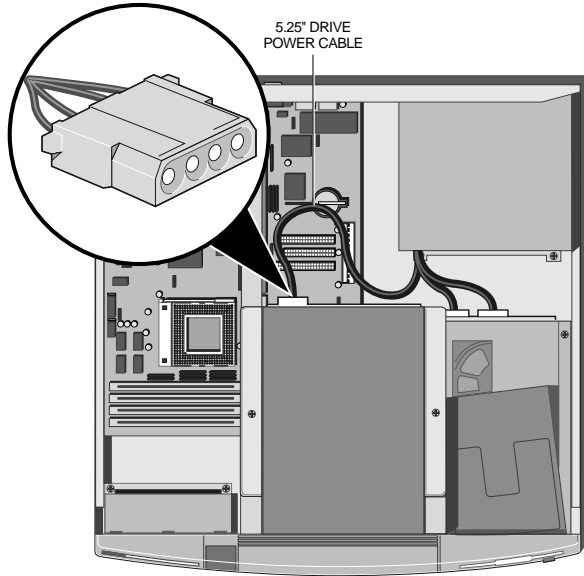
With the drive there should at least be four screws and a ribbon signal cable. Some drives may be supplied with additional screws or cables (some of which may not be required).

7. Place the drive, upside down, on a suitable anti-static surface, then place the drive tray over the drive.

Make sure that the tray and the drive are the same way round. Align the holes in the underside of the drive with those in the base of the drive tray.



8. Insert the four drive securing screws, and tighten them until they are finger tight.
9. Turn the drive tray over, and replace it in the system unit. Slide the tray forwards until the two holes in the tray line up with those in the hard drive assembly and the system unit brace. Replace the two screws that secure the drive bay.
10. Connect the spare power cable in the loom behind the drive to the drive's power connector.



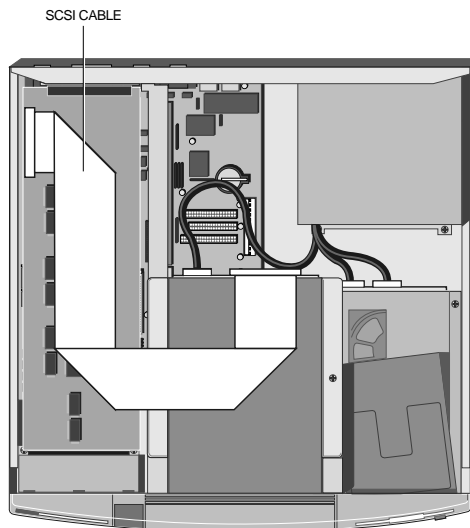
11. Connect the drive's signal cable(s). Use the following table as a guide. See the documentation provided with the upgrade kit for more information.

When installing a floppy disk drive, FTD drive or ATA-PI CD-ROM drive in an Apricot XEN-PC^{LS} system, you may find it easier to plug the drive's signal cable into the motherboard *before* putting the drive tray back into the system unit. Otherwise, the multimedia daughterboard might get in the way.

Before connecting any signal cable to the motherboard, check the label on the inside of the system unit cover to make sure that you are using the correct connector. Failure to do so may damage the drive or the motherboard or both.

12. Replace the system unit cover.

Drive type	Cabling instructions
5.25" floppy disk drive or FTD drive	These drives use a ribbon signal cable with three connectors. This signal cable must be connected between the signal connector on the rear of the floppy or FTD drive, the 3.5" diskette drive, and the diskette/floppy disk interface connector on the motherboard (usually marked FLOPPY).
SLCD CD-ROM drive	The drive is supplied with two cables: a ribbon signal cable and a CD-audio cable. These plug into connectors on the multimedia daughterboard in an Apricot XEN-PC ^{LS} system. See the <i>Networking, Audio and Security Supplement</i> for details.
ATA-PI CD-ROM drive	The drive is supplied with two cables: a ribbon signal cable (which connects to the motherboard's secondary ATA/IDE interface) and a CD-audio cable (which connects to the multimedia daughterboard in an Apricot XEN-PC ^{LS} system).
SCSI CD-ROM, QIC tape or DDS-DC tape drives	SCSI upgrade kits from authorized suppliers include a suitable ribbon signal cable. This cable should be connected between the SCSI adapter card and the rear of the drive. The illustration below shows a typical routing of the cable.



Adding a hard disk drive

The computer's 3.5" hard disk drive bay can accommodate one 1.6" high, or two 1" high, hard disk drives. In a system which has a primary and a secondary ATA/IDE interface, hard disk drives should always be connected to the primary interface.

Configuring the drive

Each ATA/IDE interface supports a maximum of two drives. These drives are known as *master* and *slave*. A single drive, or the boot device in a dual drive system, must be configured as master. The second, non-bootable, drive in a dual drive system must be configured as slave.

IDE drives are normally configured using jumpers on the drive. Configuration details may vary from drive to drive. Most drives are supplied with documentation describing how to configure the drive. If you are uncertain about configuring the drive consult your supplier.

Installing the drive

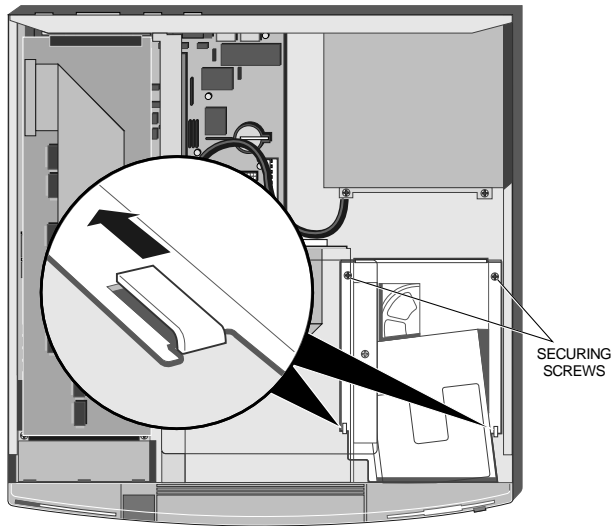
To install the hard disk drive:

1. Turn off the computer and unplug all power cords.
2. If there is a diskette in the diskette drive, remove it.
3. Take suitable anti-static precautions and remove the system unit cover.

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".

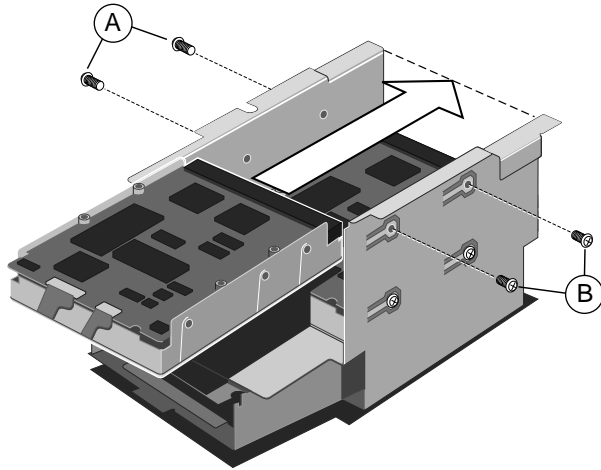
4. If there is a removable-media drive fitted, unplug its power and signal cables from the rear of the drive.
5. Remove the two screws that secure the removable-media drive tray. Slide the tray backwards slightly and lift it out of the system unit. Put it down on a flat, anti-static surface.

6. Unplug the power and signal cables from the rear of the diskette drive.
7. If one hard disk is already fitted, unplug its power and signal cables from the rear of the drive.
8. The hard disk drive bay is secured by two screws and held by two lugs in the base of the system unit. Identify the screws and lugs from the following illustration.



9. Remove the screws. Slide the drive bay backwards and lift it out of the system unit. Turn the drive bay upside-down and rest it on a flat surface with the front of the diskette drive towards you.
10. Ensure that the drive you are adding is properly configured as either master or slave.
11. Slide the hard disk drive into the bay from the front, with the drive's circuit board facing upwards and its connectors away from you.

12. Line up the mounting holes on the drive with those in the bay, insert the securing screws and tighten them until they are finger tight. Fit pair A first, then pair B.



If you are installing a hard disk drive in a system that previously had only a diskette drive there will be two sets of mounting holes available in the bay. Install the new hard disk drive in the position closest to the diskette drive.

Caution

Use only the mounting screws supplied with the drive. If you use any other screws you risk damaging the drive. If there is a drive in the bay already, try to ensure that the new drive does not touch it.

13. Turn the bay upright and replace it in the system unit. Align the flanges on the bay with the lugs in the base of the system unit, then slide the drive bay forwards slightly.

The bay is correctly positioned when the diskette drive EJECT button protrudes through the front bezel and the two screw holes in the bay line up with those in the base of the system unit.

14. Replace the hard disk drive bay's two securing screws.
15. Connect the hard disk(s) to their power cables and attach the signal cable.

The ribbon signal cable has three connectors. One plugs into the (primary) ATA/IDE interface on the motherboard. The other two connectors are for the master and (where appropriate) slave hard disk drives. In a single-drive system, use the connector at the end of the cable.

16. Reconnect the diskette drive's power and signal cables.
17. Replace the removable-media drive tray in the system unit. Slide the tray forwards until the two holes in the tray line up with those in the hard drive assembly and the system unit brace. Replace the two screws which secure the drive tray.
18. If there is a drive fitted in the tray, reconnect its power and signal cables.
19. Replace the system unit cover.



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 an authorized maintainer.

This chapter is concerned only with problems caused by the computer itself; remember that problems can also 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 United Kingdom, and some other countries, AC plugs contain fuses. If the fuse in the system unit's AC plug blows when you turn it on, 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 an authorized maintainer.

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

Power-on self-test

Whenever the computer is turned on, the power-on self-test (POST) routine test 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 a SIMM). In this case you may be prompted to invoke the BIOS Setup utility.

If POST detects a hardware fault, one or more error messages are displayed. 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 at least 30 seconds, and then turn it on again to see if the error is transient or persistent. Persistent POST errors may 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 continue with less memory).

If you get one of the following messages, run the BIOS Setup program to reconfigure the system:

```
CMOS Checksum Error
Equipment Configuration Error
Hard Disk 0 Extended Type Error
Hard Disk 1 Extended Type Error
Memory Size Mismatch
Parallel 1 Conflict, Disable Onboard Parallel 1
Parallel 2 Conflict, Disable Onboard Parallel 2
Parallel 3 Conflict, Disable Onboard Parallel 3
Real Time Clock Error
Serial 1 Conflict, Disable Onboard Serial 1
Serial 2 Conflict, Disable Onboard Serial 2
```

The following table lists some of the other messages that might appear during POST, and suggests some corrective action where possible. If you get a message that isn't listed here, or if the problem persists, call your supplier or authorized maintainer.

Message	Explanation
Bad CMOS Battery	The battery that sustains the configuration or CMOS memory needs replacing. See the chapter entitled “Maintaining and Transporting”.
Diskette Drive Controller Error	It is possible that the diskette drive’s signal cable is loose inside the system unit.
Diskette Drive Error	If this problem recurs with different diskettes, the diskette drive may need replacing. Call your supplier or authorized maintainer.
DRAM Configuration Error	SIMMs are installed in an unsupported configuration. See the table of supported configurations in the “Upgrading” chapter.
Hard Disk Controller Error	It is possible that the hard disk drive’s signal cable is loose inside the system unit.
Hard Disk 0 Error Hard Disk 1 Error	Check all cable connections inside the system unit. If everything seems in order, the hard disk may need replacing. Call your supplier or authorized maintainer.
Keyboard Error	It is possible that the keyboard’s signal cable is loose.
Memory Error RAM Parity Error System Memory Address Error	Try disabling the System Memory Parity option in BIOS Setup. Check that the SIMMs are correctly seated in their sockets. If everything seems in order, call your supplier or authorized maintainer.
Pointing Device Error	It is possible that the mouse’s cable is loose.

Beep codes

The computer uses special audio beep codes to signal certain hardware faults. If you hear a beep code which is not accompanied by a POST error message, call your supplier or authorized maintainer.

Failure to boot

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

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 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. If the problem persists, insert a system diskette, press F1, back-up 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. If the problem persists, consult your supplier or an authorized maintainer.

Troubleshooting checklist

If you encounter a problem with the computer the following sections suggest checks to make before you alert your dealer, authorized 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 are also 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 turned up.

Expansion cards

If an expansion card does not work, check: that all cables are securely connected to the card, that the card is configured correctly and does not “clash” with another card or motherboard component, and that software which drives or uses the card is correctly configured.

Diskette and floppy disk drives

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 operating system allow the intended access.

Hard disk drives

If you have problems accessing a hard disk drive, check: that the controller the drive is connected to is enabled, that the disk has been correctly formatted, and that the permissions assigned by the operating system allow the intended access.



A

INSIDE THE SYSTEM UNIT

This appendix provides step-by-step instructions on obtaining access to the inside of the system unit for the purposes of maintaining or upgrading the system. Details of all relevant motherboard jumper settings are included.

Warning

Turn off the computer 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.

Anyone can generate static electricity 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 ambient 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 impair an electronic component.

The computer is at risk from static discharge while the top cover is off. This is because 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 minimize 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.

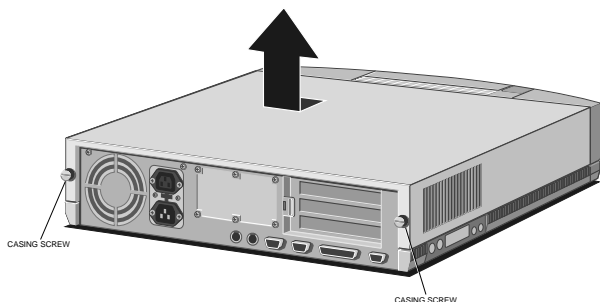
Keep all conductive material, and food and drink, away from your work area and the open computer.

Opening the system unit

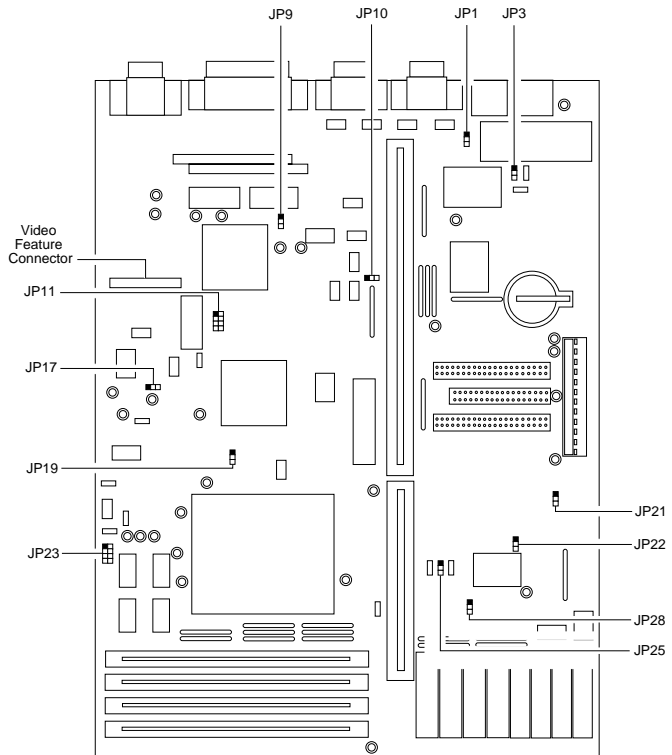
To remove the system unit cover:

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. If the system unit has a caselock (on the right-hand side), turn the caselock key to the unlocked position.
5. Remove the two casing screws.
6. Slide the top cover rearwards slightly, then lift it off.

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



Changing jumper settings



The black squares represent pin 1.

There are several jumpers on the motherboard that you may need to alter, affecting the following aspects:

- Enhanced Capabilities Port DMA channel
- Password checking
- On-board EVGA controller
- External clock speed
- System processor type
- ATA/IDE interface
- Cache data size

In this section, “1-2” means the jumper should be fitted across pins 1 and 2, “2-3” means the jumper should be fitted across pins 2 and 3, and so on. “Open” means that no jumper should be fitted; “Closed” means that all jumpers should be fitted.

On the motherboard, pin 1 of each jumper is marked by a thickening of the line that outlines the jumper block.

Caution

*Do **not** alter any jumpers or switch settings other than those identified here, unless told to by your supplier or an authorized maintainer. Otherwise, you may damage the system processor, the motherboard, or both.*

Setting the ECP DMA channel [JP1, JP10]

These jumpers set the DMA channel used by the parallel port when configured in Extended Capabilities Port (ECP) mode by BIOS Setup

ECP DMA channel	JP1	JP10
DMA1	1-2	1-2
DMA3 (default)	2-3	2-3

By-passing passwords [JP3]

This jumper allows you to by-pass the power-on and BIOS Setup passwords.

With the jumper in the “Bypass” position, you can define passwords, but the computer will not prompt for them. To enable password checking you must move the jumper to the “Check” position. If the Password Checking jumper is moved to the “Check” position while no passwords are defined, you will be unable to invoke the BIOS Setup utility.

Password checking	JP3
Check	1-2
Bypass (default)	2-3

Disabling the motherboard EVGA video controller [JP9]

You may need to disable the motherboard EVGA video controller and video BIOS if you add a video adapter expansion card. Check the documentation that came with the card to make sure.

On-board EVGA	JP9
Disable	1-2
Enable (default)	2-3

Setting the external clock speed [JP11, JP17]

You may need to change the external (system) clock speed after upgrading the processor.

External clock speed	JP11	JP17
25 MHz	1-5	2-3
33 MHz (default)	2-6	2-3
40 MHz	3-7	1-2
50 MHz	4-8	1-2

Setting the system processor type [JP19, JP23]

You may need to alter these jumpers after upgrading the system processor.

Processor selection	JP19	JP23
Intel486 or IntelDX4 (default)	2-3	Open
Intel Pentium OverDrive (P24T)	1-2	Closed
Intel486 DX2 with write-back cache (P24D)	1-2	Closed

Configuring the ATA/IDE interface [JP21 and JP22]

You can use these jumpers to disable the ATA/IDE interface or switch to an alternative (lower) set of I/O port addresses.

Local bus ATA/IDE	JP21
Disable	2-1
Enable (default)	2-3

ATA/IDE I/O addresses	JP22
034h, 038h, 03Ch	1-2
0B4h, 0B8h, 0BCh (default)	2-3

Setting the cache data size [JP25, JP28]

Use these jumpers to specify the size of the external (second-level) cache.

Cache data size (if fitted)	JP25	JP28
128 Kbytes	1-2	1-2
256 Kbytes (default)	2-3	2-3



B

TECHNICAL INFORMATION

This appendix provides some technical information about the computer. More detailed information is available from your supplier.

Specifications

General

<i>Processor</i>	Types	Intel486 or IntelDX4
	Clock speeds	25, 33, 40 or 50 MHz
	Operating voltages	3.3 V / 5.0 V autosensing
<i>BIOS ROM</i>		128 Kb Flash programmable
<i>Memory</i>		Four 36-bit 70 ns SIMMs (64 Mb maximum)
<i>Video</i>	Chipset	Cirrus Logic CL-GD543x/VL VESA local bus
	Video RAM	1 Mb or 2 Mb
	Resolutions	EVGA 1280 x 1024
		EVGA 1024 x 768 SVGA 800 x 600 VGA 640 x 480
<i>I/O ports</i>	Serial	Two 9-way male D-type RS-232
	Parallel	25-way female D-type EPP/ECP compatible
<i>Keyboard</i>		102 key AT-compatible
<i>Mouse</i>		PS/2-compatible two-button
<i>Diskette</i>	Capacity	1.44 Mb
	Access time	94 ms (average)
<i>Hard disk interfaces</i>		Dual AT-Attachment/Enhanced IDE VESA local bus
<i>Hard disk drive bay</i>	Capacity	One 1.6" drive or Two 1" drives
	Form factor	3.5"
<i>Removable-media drive bay</i>	Form factor	Half-height 5.25"

ATA-PI CD-ROM drive (Sony CDU55E)

<i>Discs</i>	Acceptable discs	CD-ROM mode 1 data discs CD-ROM mode 2 data discs CD audio discs Audio-combined CD-ROM Multisession Photo-CD
	Disc diameter	12 cm, 8 cm
<i>Transfer rate</i>	Sustained	300 Kbyte/s (Mode 1) 342.2 Kbytes (Mode2)
	Burst	4.0 Mbyte/s
<i>Access time</i>	Full stroke	450 ms (typical)
	Average (random)	250 ms (typical)
<i>Audio output</i>	Line	0.75 V at 47 kOhm
	Headphones	0.55 V at 32 Ohm
<i>Host interface</i>		ATA-PI
<i>Power specification</i>	Voltage	+5 V dc + 5% +12 V dc + 10%
	Ripple	+5 V: 100 mVp-p +12 V: 200 mVp-p
	Current (max)	+5 V: 800 mA at tray open/close +12 V: 1.8 A at tray open/close
<i>Reliability</i>	MTBF	100,000 power-on hours
<i>Laser</i>	Type	GaAlAs semiconductor
	Wavelength	780 nm
	Output power	0.6 mW

SCSI CD-ROM drive (Sony CDU55S)

<i>Discs</i>	Acceptable discs	CD-ROM mode 1 data discs CD-ROM mode 2 data discs CD audio discs Audio-combined CD-ROM Multisession Photo-CD
	Disc diameter	12 cm, 8 cm
<i>Transfer rate</i>	Sustained	360 Kbyte/s (Mode 1) 410.6 Kbytes (Mode2)
	Burst across the SCSI bus	2.5 Mbyte/s (asynchronous) 4.0 Mbyte/s (synchronous)
<i>Access time</i>	Full stroke	450 ms (typical)
	Average	220 ms (typical)
<i>Audio output</i>	Line	0.75 V at 47 kOhm
	Headphones	0.55 V at 32 Ohm
<i>Host interface</i>		SCSI-2
<i>Power specification</i>	Voltage	+5 V dc + 5% +12 V dc + 10%
	Ripple	+5 V: 100 mVp-p +12 V: 200 mVp-p
	Current (max)	+5 V: 800 mA at tray open/close +12 V: 1.8 A while seeking
<i>Laser</i>	Type	GaAlAs semiconductor
	Wavelength	780 nm
	Output power	0.6 mW

SLCD CD-ROM drive (Sony CDU33A)

This drive may be pre-installed in XEN-PC^{LS} or XEN-PC^M systems.

<i>Discs</i>	Acceptable discs	CD-ROM mode 1 data discs CD-ROM mode 2 data discs CD audio discs Audio-combined CD-ROM Multisession Photo-CD
	Disc diameter	12 cm, 8 cm
<i>Transfer rate</i>	Sustained	150 Kbyte/s (single) 300 Kbyte/s (double)
<i>Access time</i>	Full stroke	0.65 s (typical/single) 0.60 s (typical/double)
	Average (random)	0.40 s (typical/single) 0.35 s (typical/double)
<i>Audio output</i>	Line	0.7 V at 47 kOhm
	Headphones	0.5 V at 32 Ohm
<i>Power specification</i>	Voltage	+5 V dc + 5% +12 V dc + 10%
	Ripple	+5 V: 0.05 Vp-p at 250 mA +12 V: 0.1 Vp-p at 500 mA
	Current (max)	+5 V: 800 mA at Seek +12 V: 1300 mA at Seek or Spin up
<i>Laser</i>	Type	GaAlAs semiconductor
	Wavelength	780 nm
	Output power	0.6 mW

SCSI DDS-DC tape drive (Conner 4324RP)

Performance specifications apply when using data compression.
Power specifications are measured at the tape drive power connector and are nominal values.

Nominal capacity	60-metre cassette	1.3 Gbyte (1:1 base) 2.6 Gbyte (2:1 typical) 5.2 Gbyte (4:1 max ¹)
	90-metre cassette	2.0 Gbyte (1:1 base) 4.0 Gbyte (2:1 typical) 8.0 Gbyte (4:1 max ¹)
Transfer rate	Sustained	366 Kbyte/s (1:1 base) 732 Kbyte/s (2:1 typical) 1464 Kbyte/s (4:1 max ¹)
Unrecoverable errors		Less than 1 in 10 ¹⁵ data bits
Recording format		ANSI/ECMA Digital Data Storage with Data Compression (DDS-DC)
Power specification	Voltage	+12 V dc + 10% +5 V dc + 7%
	Ripple	+12 V: 100 mVp-p +5 V: 100 mVp-p
	Current (max)	1.40 A @ +12 V dc 1.30 A @ +5 V dc

¹ Nominal maximum only; can be exceeded for highly-compressible data.

Physical characteristics

Weight and dimensions

Component	Height	Depth	Width	Mass
System unit	94 mm	430 mm	428 mm	9.5-12 kg ¹
Keyboard	40 mm	205 mm	488 mm	1.4 kg

¹ Depending on configuration

Temperature and humidity ranges

The computer is designed to operate in a normal office environment, but during storage and transportation the system is more tolerant of environmental factors.

Range	Temperature	Relative humidity with no condensation
Storage/Transport	0 to +55°C	20% to 80%
Operational	+10 to +35°C	20% to 80%

Electrical characteristics

Voltage range

The PSU voltage range is initially set to that appropriate for the county in which the computer is first sold.

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

The voltage range setting of the monitor must always agree with that of the system unit PSU.

Power cords

The power cord supplied with the computer complies with the safety standards applicable in the country in which it is first sold. If you wish to use the computer in another country, you must ensure that you use a power cord which complies with the safety standards of that country.

PSU current ratings

PSU AC power inlet	4.5 A at 100-120 V
	3.0 A at 220-240 V
PSU AC power outlet	1.5 A at 100-120 V
	1.0 A at 220-240 V

Connect only manufacturer-approved monitors to the power supply unit's AC power outlet.

Expansion slots

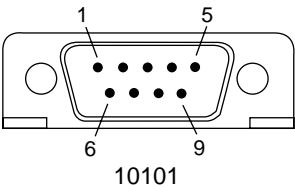
Total available power for all three ISA expansion slots:

8.0 A at 5 V	0.3 A at -5V
1.0 A at 12 V	0.3 A at -12V

Port characteristics

Serial ports

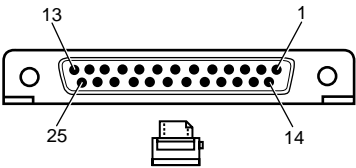
9-way male D-type (COM1/COM2)



Pin	I/O	Function
1	I	Data carrier detect
2	I	Receive data
3	O	Transmit data
4	O	Data terminal ready
5	-	Signal ground
6	I	Data set ready
7	O	Request to send
8	I	Clear to send
9	I	Ring indicate

Parallel port

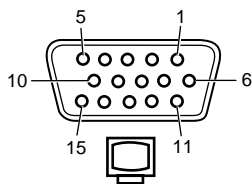
25-way female D-type



Pin	I/O	Function
1	I/O	-STROBE
2	I/O	Data bit 0
3	I/O	Data bit 1
4	I/O	Data bit 2
5	I/O	Data bit 3
6	I/O	Data bit 4
7	I/O	Data bit 5
8	I/O	Data bit 6
9	I/O	Data bit 7
10	I	-ACK
11	I	BUSY
12	I	PE
13	I	SLCT
14	O	-AUTO FEED
15	I	-ERROR
16	O	-INIT
17	O	-SLCT IN
18	-	Ground
19	-	Ground
20	-	Ground
21	-	Ground
22	-	Ground
23	-	Ground
24	-	Ground
25	-	Ground

Monitor port

15-way female D-type (VGA)

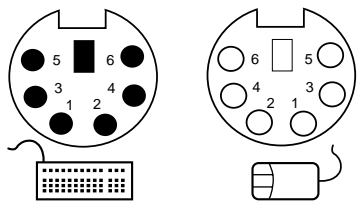


Pin	I/O	Output	Monochrome	Colour
1	O	Red	No pin	Red
2	O	Green	Mono	Green
3	O	Blue	No pin	Blue
4	-	Reserved	No pin	No pin
5	-	Digital G	Self test	Self test
6	-	Red Rtn	Key pin	Red Rtn
7	-	Green Rtn	Mono Rtn	Green Rtn
8	-	Blue Rtn	No pin	Blue Rtn
9	-	Plug	No pin	No pin
10	-	Digital G	Digital G	Digital G
11	-	Reserved	No pin	Digital G
12	-	Reserved	Digital G	No pin
13	O	Hsync	Hsync	Hsync
14	O	Vsync	Vsync	Vsync
15	-	Reserved	No pin	No pin

Red Rtn, Green Rtn, Blue Rtn = Analog grounds
Digital G = Digital ground for sync returns and self test.

Keyboard and mouse ports

Both the keyboard and mouse ports accept 6-pin miniature DIN connectors. The voltages and signals are the same for both connectors.



Pin	I/O	Function
1	I/O	Data
2	-	Reserved
3	-	Ground
4	-	+5 Vdc
5	I/O	Clock
6	-	Reserved

Although the keyboard and mouse ports are physically and electrically compatible, neither the keyboard nor the mouse will operate if plugged into the other's socket.

Video feature connector

The motherboard video adapter provides a video feature connector. The connector on the motherboard uses a standard pinout and a standard cable may be used to connect the feature connector to an expansion card. In case you have difficulty obtaining a cable the pinout of the motherboard connector is given in the following table.

Pin	Function	Pin	Function
1	Ground	2	P0
3	Ground	4	P1
5	Ground	6	P2
7	-EVIDEO	8	P3
9	-ESYNC	10	P4
11	-EDCLK	12	P5
13	No connect	14	P6
15	Ground	16	P7
17	Ground	18	DCLK
19	Ground	20	-BLNK
21	Ground	22	HSYNC
23	Ground	24	VSYNC
25	Ground	26	Ground

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