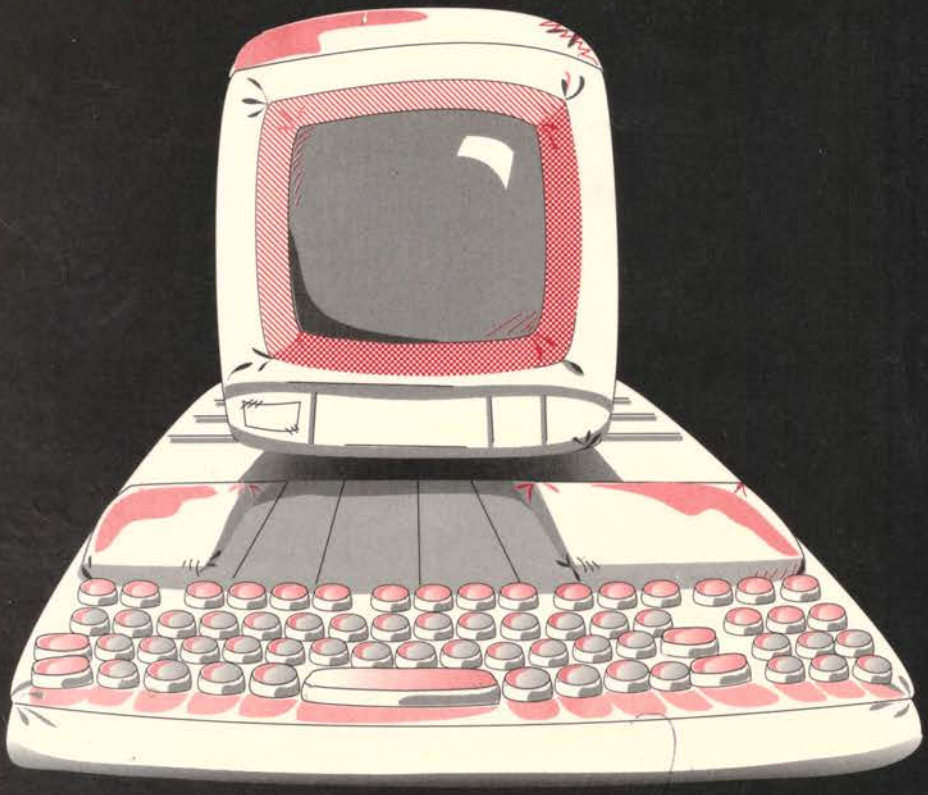
A Dabhand Guide

ANNE ROONEY

ARCHIMEDES FIRST STEPS

Beginners Guide to Using the Archimedes



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Introduction

This book will be invaluable in guiding you through the first few months of using your Archimedes. It's also essential if you have just bought the RISC OS upgrade kit for a machine you already had. It doesn't matter whether you have a 300 or 400 series machine or an A3000, it will be equally valuable as you learn about how to use your RISC OS computer and how to get the best from it.

You can use this book alongside the *User Guide* issued with your computer. You will probably find the *User Guide* a useful reference source, especially once you have mastered your new machine, but this book is more of a step-by-step guide to using the Archimedes and the applications that come with it.

This book goes beyond describing the applications, though. It also tells you how to begin using RISC OS, how BASIC V differs from BASIC IV, how to choose and fit additional hardware and what types of software you can run on your machine.

Above all, this book is accessible and easy to understand. Everything is fully explained and complex tasks are broken down into stages. There are lots of examples and screenshots to show you what to do. All new terms are explained as they occur and there is a full glossary at the back. Even if you have never used a computer before, you can use this book and the *Welcome Guide* you got with your machine to start using it immediately.

Conventions

We have tried our best to lay out this book in a manner which will make it easy for you to understand. The conventions have been kept to a minimum so as not to confuse.

Archimedes

The term 'Archimedes' is used to refer to all configurations and series. Where any differences may occur then these are clearly defined.

Menus and Commands

To distinguish the menus and various commands from the main body text, they are placed inside single quotes. For example:

Select the 'Print' option from the 'File' menu. In chapters when Archimedes commands are used these are spelt using capital letters throughout. Similarly capital letters are used to represent key presses. For example:

Type *STATUS and then press the RETURN key.

Disc and Disk

There are two conventions for the spelling of disc. Here we use the English spelling. However, the use of disc and disk is fully interchangeable.

Listings

There are very few listings within this book. However, when they are encountered they are shown in a special 'courier' typeface to distinguish them. For example:

```
| This is the boot file
```

1 : Desktop and WIMPs

Two terms that go side-by-side with your Archimedes (and the majority of computers these days for that matter) are 'Desktop' and 'WIMP'. They are two words of computer jargon that you will have to get used to if you plan to make effective use of your Archimedes. However the tools they represent make your computer more friendly and easier to use, so they can't be too bad!

What is a WIMP?

WIMP is an acronym for:

W indows
I cons
M enus
P ointer

These four items form the basis of your means of controlling and communicating with the Archimedes and they are all accessed from the Desktop.

The Desktop

When you turn on your Archimedes, it comes up with a screen display which will look something like that shown in Figure 1.1 overleaf.

What you have before you and illustrated in Figure 1.1 is the Desktop. The Desktop is divided into two distinct working areas. The largest part of it is the work area. This is where you will do the majority of your computing work: you can run programs, perform administrative tasks and even play games on the Desktop.

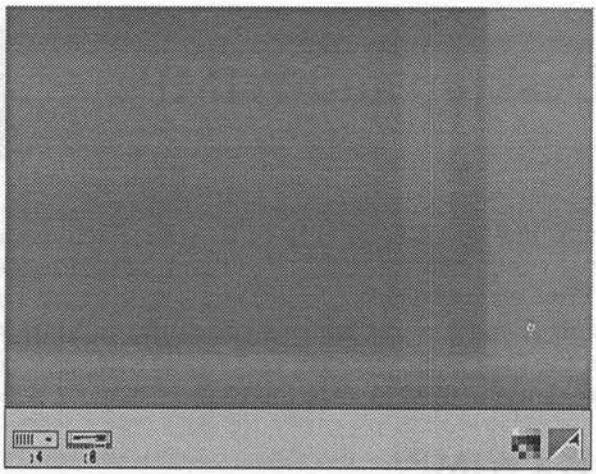


Figure 1.1. The Archimedes Desktop.

Across the bottom of the Desktop, and immediately below the work area is the 'Icon Bar'. This holds illustrations, called icons (the 'I' from WIMP), which represents the programs the computer has in its memory, and the 'hardware' (eg, disc drives) you have attached to the computer, and so on. Exactly what you see on the icon bar when you first switch on your computer depends on the 'set-up' you have, but there will always be at least:

- a floppy disc drive icon
- the Palette icon
- the System icon (the A at the extreme right)

The System icon is also often referred to as the 'Task Manager'.

We will return to the Icon Bar soon, but to understand how the Desktop works, and how to use it to best effect, we need first to turn to the components of the WIMP environment. We shall begin with the pointer, because you need to know how to use this before you can try out any other features or techniques.

The Pointer and Mouse

As soon as you switch on the Archimedes the Desktop appears, and you will see an arrow – this is called the pointer (the P in WIMP). This pointer moves around the screen as you move the mouse (the M in WIMP) over a firm surface. Try moving the mouse over your desk or table to see how the movement of the pointer corresponds to it. If you run out of space, pick up the mouse and move it to a more convenient place. The pointer will not move while the mouse is not on a firm surface. It is activated when the ball underneath the mouse is moved round (you can test this with your fingers and see the pointer move). If you find that your mouse doesn't respond well on your desk seek out a suitable mouse mat. This is a specially designed piece of plastic and foam which form the ideal surface for the mouse. Beware, there are many types and some are better than others, so do try out the one you intend to buy first.

The Archimedes mouse has three buttons. These are named by the function they perform. The buttons and their functions are listed in Table 1.1.

Button	Function
Left	Select
Middle	Menu
Right	Adjust

Table 1.1. The Mouse button functions.

Those you will use most are 'Select' and 'Menu'. You use the mouse and pointer to indicate items on the screen you want to use or select. When the pointer is over the item you want, you select it by pressing the select (left) button on the mouse and quickly releasing it again. You can try this in a minute! To display menus, move the pointer over an icon and press the menu button (this is described later in this chapter). Pressing and releasing a mouse button is called 'clicking'. There are two other techniques you need to be able to use: 'double-clicking' and 'dragging'. To double-click, press and release the Select button twice in rapid succession. To drag, press down the Select button and keep it held down while you move the mouse, then release the button when the pointer is in the final position for the icon or graphics. (None of

these actions will have any effect on an empty Desktop.) Dragging is used for moving icons and drawing graphics. You can practise using these mouse techniques as you read the rest of this chapter. They are quite easy, but it is important that you master them fully as the mouse provides your main means of communicating with your Archimedes.

Windows

To work on the Desktop, you need to open 'windows' (the W in WIMP). A window is an area designated for a particular task or function. It might hold the document you are writing with a wordprocessing program, a picture you are drawing or a game you are playing. It can also be used to show the files you have in a directory – but we are jumping ahead and these items are explained in Chapter Four. You can open several windows at once and switch between them as you like. Figure 1.2 shows how several typical windows appear after being opened on the Desktop. Note how windows can overlay other windows.

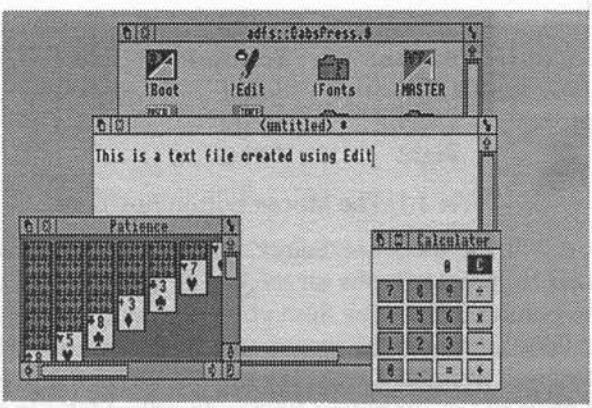


Figure 1.2. Windows open on the Desktop.

You can open a window which shows the contents of a disc. Try this by putting 'Applications Disc 1' into the floppy drive (drive 0 if you have more than one floppy drive) and clicking on the floppy disc drive icon displayed on the Icon Bar. Figure 1.3 shows roughly what you should see.

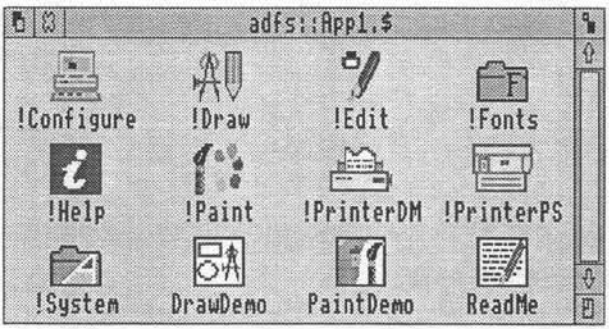


Figure 1.3. Applications Disc 1 window.

What is displayed on screen (as shown in Figure 1.3) is called a 'directory window' or 'directory viewer' because it shows a catalogue of the contents of the disc directory.

Every window has certain features which are common to all windows and which allow you to move it around on the Desktop, change its size, hide it behind other windows, and display different areas of the work in the window. Figure 1.4 shows the features that are common to all windows.

Running along the top of a window is the title bar. This displays the name of whatever the window is displaying: perhaps the name of a document or picture, or of a directory. In Figure 1.3 the title bar is used to show the name of the disc, 'App1'. If you are creating a new document or picture and have not yet given it a name, this is shown in the title bar as 'untitled'. If you have changed the work in the window since saving it (or opening it, if it's new) there will be a '*' after the title.

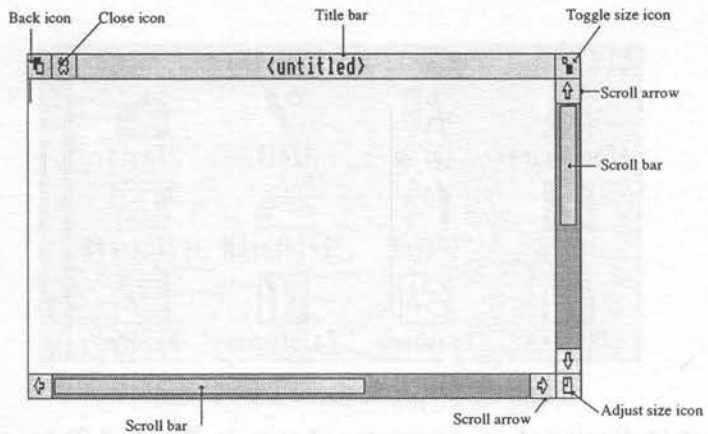


Figure 1.4. Window features.

In the top left-hand corner of each window are two small icons, the 'back icon' and the 'close icon'. These are illustrated in Figure 1.5.

Figure 1.5. The back and close icons.

If you move the pointer over the back icon and click the select button on the mouse, the window moves behind any other windows that overlap it. (If no windows overlap it, this has no effect.) To try this out, double-click on the icon labelled Modules in the disc directory window (which should be showing the Application Disc 1 files). A new window opens, showing the contents of the directory Modules (we'll explain the concept of 'directories' shortly). Click on the back icon to hide it behind the disc directory window, and on the back icon of this to bring the Modules window to the front again. You can also bring a window to the front by clicking on its title bar (providing you can see it of course!).

If you click on the close icon that window will be closed, ie, removed from the Desktop. Click on the close icon of the Modules directory window to see how this works.

Note: If you are running a program and have not saved the work you have done in the window, the computer may display a message warning you that your work will be lost and giving you the chance to cancel and save it first.

To the right of the title bar is the toggle size icon which is shown in Figure 1.6.

Figure 1.6. The window toggle size icon.

The toggle size icon lets you switch between two sizes of window: the largest size the desktop can take, ie, covering it all except the Icon Bar, or the size needed to display all the window contents at once, and the last size used. Figure 1.7 illustrates differing size windows which have been toggled in this manner.

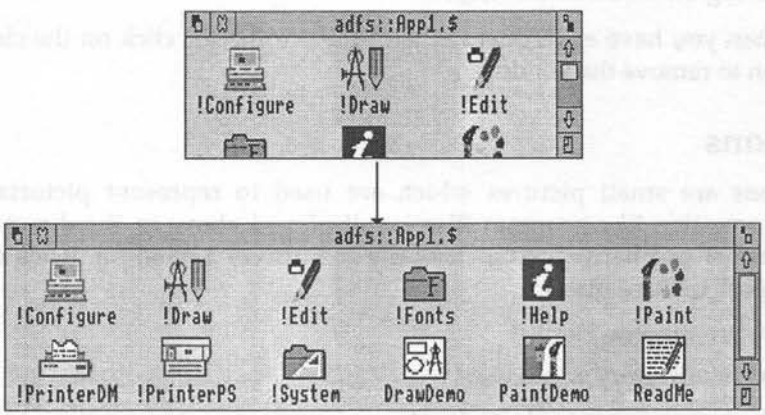


Figure 1.7. Toggling window sizes.

You can also change the size and shape of a window using the adjust size icon which is located in the bottom right-hand corner of the window. To alter the size and shape of the window, move the pointer over this icon, then press and hold down the select button on the mouse. Keeping the button pressed, move the mouse to drag the icon,

and with it the bottom right-hand corner of the window, to define a new size. When you release the button, the window will be redrawn using the shape you have defined.

Along the bottom and right-hand edges of the window are the scroll bars, with the scroll arrows at each end. In many cases a window will not be able to show all of the information available to it – just in the way that it is not possible to see the whole sky through a telescope: you have to move the telescope to take in other parts of the sky. The scroll bars allow you to move through the contents of the window, displaying different areas of the document, picture, directory or whatever. To see how they work, display the disc directory window again. Now drag the adjust size icon to make the window smaller so that all its contents no longer fit. Notice how the scroll bar changes so that the light area only occupies part of the space? To display a different part of the window contents, drag the light bar along the shaded area. A different part of the window contents is displayed. You can move through the window contents by small increments by clicking on the scroll arrows, too.

When you have experimented with the scroll bars, click on the close icon to remove the window.

Icons

Icons are small pictures which are used to represent pictorially information like program files (as displayed above in the directory viewer) and hardware (such as the disc drive) and so on. Icons can appear in three places:

- on the icon bar
- in directory windows
- as components of windows

We have already looked at the icons which let you use windows. The icons on the Icon Bar and in directory windows are rather different. The design of an icon usually shows you what sort of thing it represents. Some typical examples are shown in Figure 1.8.

Figure 1.8. Typical icon types.

Let's look at the icons on the Icon Bar first. On the left of the Icon Bar you will have icons showing the storage methods your computer has. These can be:

- a hard disc drive
- one or more floppy disc drives
- a micro chip (representing a RAM disc, described in Chapter 11)

If your computer is attached to a network, there will be an icon to show this, too.

At the right of the icon bar are the System icon and Palette icon, and these are shown in Figure 1.9.

Palette Task Manager

Figure 1.9. The System and Palette icons.

The System icon or Task Manager allows you to alter the way in which the Archimedes allocates its memory. This is not as difficult or frightening as it might sound and will become a feature of your use of the Archimedes; it is detailed later in Chapter 10. The Palette icon lets you change the colours or grey tones used for the screen display and this also is discussed fully in Chapter 10.

As you work, you will automatically add more icons to the Icon Bar. When you load a program, or more correctly an application, an icon representing it will appear on the Icon Bar. This process is generally referred to as 'installing an application'. You can then invoke the program simply by clicking on its icon. Loading a program is simple: you need to display the directory window containing the program's icon and double-click on it. The program is loaded in from the disc and

within a few moments will have installed itself on the Icon Bar. The amount of time taken for an icon to appear will depend on the size of the program itself. The bigger the program, the longer it takes to be loaded into memory from the disc.

You can try installing an application from 'Applications Disc 1'. With the disc in place in the drive, click on the floppy disc drive icon to display the directory viewer again and then double-click on the icon labelled '!Edit'. The icon soon appears on the icon bar. (If the icon remains highlighted, but nothing appears on the icon bar, you clicked too slowly; double-click again, but leaving less time between the two clicks.) Edit is one of several mini-applications that comes supplied free with your Archimedes and is a useful text editor. If you want to use it you can do so by opening an Edit window. To do this click on the Edit icon now installed on the Icon Bar and the new window appears on the Desktop almost immediately. Close it again by clicking on its close icon. Edit is covered in Chapter Five so we'll leave it for now.

The icons we have seen in the directory windows so far have all been displayed as small pictures, but it is possible to alter how they are displayed. To do this, you need to use a menu.

Menus

In computer parlance a menu (the M in WIMP) is a list of options from which you can select one by 'clicking' on the appropriate option. Menus are fundamental to the operation of the Desktop and they form your connection to the computer. They are a much easier way of telling the computer what your requirements are than having to type in special commands. A menu appears when you move the pointer over an icon or window and press the Menu (middle) button on the mouse. You don't need to hold the button down, the menu will stay on screen until you click Select. A typical menu is illustrated in Figure 1.10 opposite.

Figure 1.10. A typical menu.

You will notice that many of the items on the menu have arrows to their right pointing off the menu list itself. If you move the pointer over the arrow and then off to the right of the menu a second 'sub-menu' will appear with a further selection of items which relate to the main menu item. It is not uncommon to find several sub-menus strung together in this way. To select an item from any menu, move the pointer over it and then click Select. Sometimes a menu will also have a space for you to type something, such as a file name for example. This is illustrated in Figure 1.11.

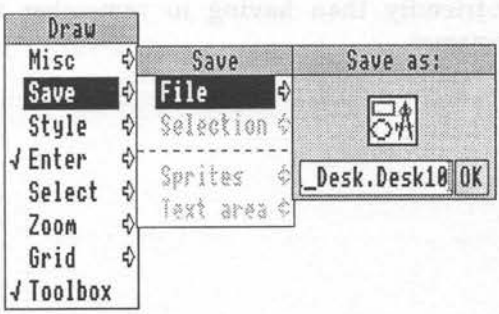


Figure 1.11. Some menus have spaces for you to type into.

If you don't want to choose any item from the menu, click anywhere off the menu to remove it from the screen. You can click with Adjust instead of Select to choose an option, then the menu remains on screen for you to choose further operations.

You can use a menu to change the display of icons in a directory window. Display the directory window for 'Applications Disc 1' again, move the pointer over the window and press the Menu button on the mouse. When the menu appears, move the pointer over the line 'Display' and off to the right over its arrow. You can choose to display large or small icons, or small icons with full information about each file or directory, and can arrange the files and directories alphabetically by name, in order of size or date last altered, or organised into groups according to their type. Move the pointer over the line you want and click select. The screen display will be redrawn using the option you have chosen. You can easily change it back to Large icons using the same menu. Notice that the options you are using are indicated in the menu by a tick.

Summary

The Archimedes uses a Desktop and WIMP environment. The basis of this is the combination of windows, icons, menus and the pointer. Once you have mastered the mouse techniques of clicking, double-clicking and dragging, you can use the WIMP environment easily. It is much more user-friendly than having to remember and type commands and file names.

2 : The Applications Discs

With your Archimedes you will have been supplied with three discs, titled:

- Support Disc
- Applications Disc 1
- Applications Disc 2

We have already encountered Applications Disc 1 but we shall be looking at it and the other two discs in more detail in this chapter. All three discs contain a wealth of programs, routines and information for you to use with yours Archimedes and exploring this is a worthwhile pastime.

The Support Disc

The Support Disc supplies information and special routines for you to use with programs you may have already purchased for use with Arthur under RISC OS, the 'new' Acorn Operating System. If you have had no experience with Arthur (the original Archimedes Operating System) then you are unlikely to make much use of this disc.

The disc includes upgrade material from Acorn and other software houses. If you haven't already bought the packages, you can't run them just from the upgrade material! The directory of Acorn upgrade materials includes information on running the PC Emulator, the 6502 Emulator and the View family of products. These are dealt with later in this guide.

The Applications Discs

The two applications discs hold a number of programs, some useful and some just amusing. The most important applications are Edit,

Draw and Paint; these and some of the others are described in detail later in this book. The more serious applications are mostly on Applications Disc 1, which holds these applications and demonstrations. To help you identify what each program does and where you can find out more about them, the following list will be of help. You may find it useful to have the directory viewer of the relevant disc open. Some of the descriptions may contain the odd word or term that is new to you. Don't panic! These terms will be described during the pages that follow when all will become crystal clear.

Applications Disc 1

!Configure — Allows you to set the configuration of your machine. This is explained in Chapter 10.

!Draw — This is a drawing program which allows you to incorporate text and Paint images in your graphics; this is described in Chapter Seven.

!Edit — This is a simple text editor (as opposed to a fully fledged wordprocessor); this is described in Chapter Five.

!Fonts — This is a selection of fonts (type styles) you can use with Edit, Draw and some wordprocessing programs. Fonts are described in Chapter Nine.

!Help — An interactive Help system. Double-click on this to install the Help icon on the Icon Bar, and then click on the icon to display a Help window. As you move the pointer around over the Desktop and over applications windows, information about what the pointer is passing over is displayed. You can try this out even just moving the pointer over the Help window itself and seeing information on the title bar and so on. This can be useful while you are getting used to the WIMP environment and Desktop. When you use the interactive Help system with a (compatible) application, it takes Help text from the application, so it can tell you how to use it. To remove it, click in the close icon of the window. (Some applications

also offer Help as menu command, with areas on which Help is available listed in a sub-menu.)

!Paint — This is a graphics program of the 'painting program' type; this is described in Chapter Six.

!PrinterDM — This is a printer driver program which allows you to run a dot-matrix printer correctly with the Archimedes. Printers and printer drivers are described in Chapter 17.

!PrinterPS — This is a printer driver allowing you to run a PostScript printer or to send print output to a PostScript file. This is described in Chapter 17, too.

!System — This holds special programs called 'modules' which are used by several of the applications programs. The modules are described in Chapter 14.

DrawDemo — This is an example of the type of graphics you can create using Draw to mix text and graphics. Double-click on it to display it. Close the window when you have finished and quit from the Draw application which will have installed itself on the Icon Bar quite automatically!

PaintDemo — This is an example of the type of graphics you can create using Paint. Double-click on it to display it. Close the window when you have finished and quit from the Paint application which will have installed itself on the Icon Bar quite automatically!

Readme — This is a text file listing the data on both applications discs and telling you how to display other Readme files relating to the different applications. You can load this into Edit and read it.

Applications Disc 2

Applications Disc 2 contains some more lighthearted material, including games, and some 'desk accessories' – useful, small programs that can be run from the Desktop. You can try out some of these immediately.

!65Host This emulates a BBC model B and lets you run programs you have written for your BBC micro. It is described in Chapter 15; don't open this one yet!

!Alarm This is a clock and alarm you can set. Double-click to add the clock icon to the Icon Bar.

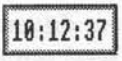


Figure 2.1. The clock and alarm icon.

You can then click Select over it to display a window. This has fields for you to type into, and boxes to click. It lets you set the time and date for an alarm and a message to be displayed when the alarm goes off.

Click on the arrows to set the time and date for your alarm to go off, and type the message in the field below. You can click on Urgent to get the prefix Urgent! for your message, and in the repeat box and then give an interval for the alarm to repeat at. When you have set the alarm, click in the close icon of the window.

When the alarm goes off, a window appears showing your message. Click in the close icon to turn the alarm off, or press the Menu button with the pointer over the window to display a menu which allows you to defer the alarm for as long as you like or to cancel it (which will stop any repeats). You can set several alarms by re-using the Set alarm window.

Press Menu with the pointer over the clock to display a list of format options; the clock can be analogue (which is how it appears at first – called the 'default' setting), or digital showing hours and minutes, or hours, minutes and seconds, or you can define your own format using system variables (see Chapter 12). You can also set, alter or cancel the alarm from the menu. Your alarms and clock format are not forgotten if you turn off the

computer; if an alarm should have gone off while the Archimedes was turned off, it will go off as soon as the computer is turned on again.

!Calculator This is a calculator you can display on the Desktop and use for simple calculations. Click with select on each button you want to press and your calculation appears in the display.

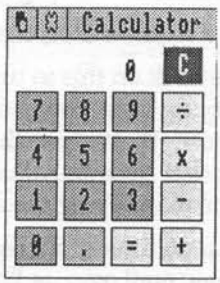


Figure 2.2. The Calculator.

!Clock This is an analogue clock you can position on the desktop. Click on the close icon to remove it.

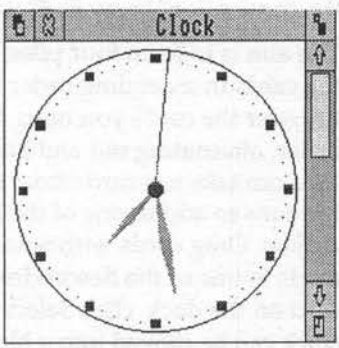


Figure 2.3. The analogue clock.

!Lander This is a game with three-dimensional animated graphics. Double-click on the icon to start it: you have a craft which you can fly over the terrain and from which

you can shoot. Press Select to accelerate fast, Menu to accelerate less rapidly, and Adjust to fire. Move the mouse to control the direction and orientation of your craft. To stop the game, press the Escape key, then click a mouse button or press the Space bar.

!Madness — Double-click on this and the windows on your Desktop move around maddeningly! (To stop them, click in the close icon of the little Madness window in the lower left of the screen.)

!Maestro — This is a music editor; this is described in Chapter Eight.

!Magnifier — Double-click on this to turn the pointer into a magnifying glass you can move around the screen with the mouse. To increase the magnification click on Select; to reduce it click on Adjust. When you have finished with the magnifying glass, click Menu to get rid of it.

!Mailman — This is a mail program that lets you send and receive electronic mail over an Econet network. You can only use this if your computer is linked into a network.

!Patience — An electronic version of the card-game. Double-click to load the icon onto the Icon Bar, then click on the icon when you want to start patience. The game is laid out in the conventional way as illustrated in Figure 2.4.

The aim is to form four piles, one for each suit, stacking the cards in ascending order from ace to king. To uncover the cards you need, build up runs in descending order, alternating red and black, on the stacks on the left. You can take top cards from the uncovered stack or from the runs to add to one of the four piles by clicking on Adjust. Drag cards with Select to add a card or run of cards to one of the descending runs. To turn over a new card on the deck, click Select on the deck. A king and his stack can be moved into a blank space.

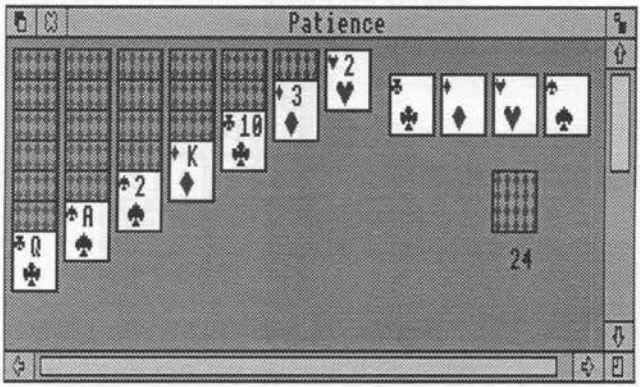


Figure 2.4. Patience and the Desktop!

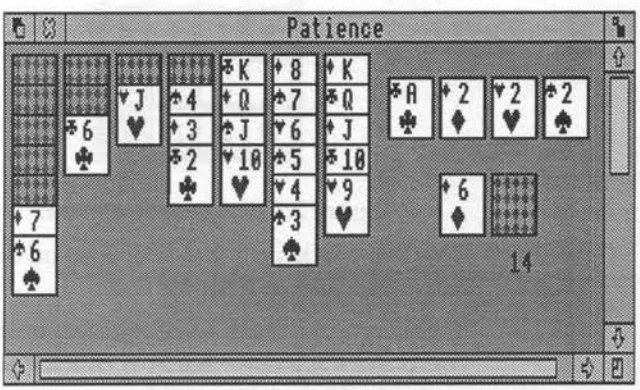


Figure 2.5. Developing the game.

!Puzzle — This is a number puzzle; double-click on the icon to display the puzzle, then click on a number to move it into the blank space.

Figure 2.6. Random puzzle numbers.

The aim is arrange the numbers in order as shown in Figure 2.7 below:

Figure 2.7. The puzzle solved!

!TinyDirs — This lets you keep a directory icon on the icon bar and is fully described in Chapter Four.

!Usage — This displays a small window that constantly shows the computer's activity – see how much effort it takes the computer to do your work!

Modules — This holds two 'modules'. It also contains a program to make your Archimedes emulate a 6502 Second Processor on a BBC micro. The modules are described in Chapter 14.

Tunes — This directory holds some music you can use with Maestro (see Chapter Eight).

Summary

You can now use the desk accessories and play the games supplied on the applications discs. Chapters Five to Eight explain how to use the more complicated applications. The 'modules' and 'systems directories' are described later. The next couple of chapters explain how to use discs, and what files and directories are. This is important material, and you need to understand it before you can use any applications and save your work.

3 : A Bit About Discs

Before you start to use the applications and support discs supplied with your Archimedes you really ought to make copies of them. Then you can put away the originals safely, and just use your 'backup' copies. This is important, because a power failure while you are using the discs could erase the information on them. Also, the disc material itself is, like any magnetic tape, subject to the trials and tribulations of the surroundings. A misplaced cup of coffee, cigarette smoke and plain airborne dust can occasionally render the disc, and the information it contains, useless. If you were using the originals you might lose them for good. By creating a backup you are able to re-create working copies should you ever need to.

In this chapter we will look at a few simple disc operations:

- Formatting a floppy disc.
- Copying information from one floppy disc to another, and from a floppy disc to a hard disc.
- Making a backup copy of a disc.
- Checking how much space is free on a disc.
- Naming a disc.

Hard Discs and Floppy Discs

Your Archimedes will have:

- a hard disc and a single floppy disc drive, or:
- two floppy disc drives, or:
- a single floppy disc drive.

If you have a hard disc (see Chapter 19), you will almost certainly want to keep your application programs and the files that you create

with them on it, using floppy discs only occasionally, for introducing new programs and transferring information from one Archimedes to another. A hard disc is usually given the drive number '4'. Its icon on the Icon Bar differs slightly to that of a standard floppy disc, and is illustrated in Figure 3.1.

Figure 3.1. A hard disc icon.

You will definitely have a floppy disc drive, drive 0, and this icon is shown in Figure 3.2:

Figure 3.2. The floppy disc drive icon.

If you have a twin floppy machine, ie, an Archimedes with two floppy drives attached, then one will be drive 0 and the other drive 1.

If you have a single floppy disc drive, you will need to swap discs over frequently when you are doing operations such as copying from one disc to another. The computer will prompt you to change discs as necessary. The drive number of a single floppy drive is 0.

Floppy discs are susceptible to corruption by electromagnetic fields and dust, moisture and other pollutants. Keep your discs safely, away from telephones, televisions and other sources of electromagnetic radiation.

Formatting a Floppy Disc

Before you can store any information on a floppy disc you need to prepare it. This preparation is called 'formatting'. Different computers need discs to be prepared in different ways, so discs are sold 'unformatted'. It is a good idea to format all your discs as soon as you buy them, then they are ready for use when you need them.

To format a new floppy disc follow these steps:

1) Check that it is not 'write-protected'. If you examine the disc you will find a plastic tab in a hole in one of the lower corners of the disc. Push the tab across so that the hole is covered; the disc is not then 'protected'. If a disc is protected it cannot have new information written to it.
2) Put the disc into the drive (drive 0 if you have more than one disc drive). There will be an arrow moulded on the disc to show you which way round to insert it.
3) Move the pointer over the drive icon and press Menu.
4) Move the pointer across the option 'Format' and select 'E – 800K, new map'. When prompted, click Select to start the formatting process.
5) The disc drive will operate for a couple of minutes while your disc is formatted and then verified. (It is verified to check that all 'sectors' – areas of the disc used to store data – are properly formatted and usable.) Click a mouse button to complete the operation when prompted.

You can re-format discs you have used before if you are *absolutely certain* you don't need the information they contain. Formatting completely erases everything on the disc – you can't retrieve it if you change your mind later.

Do not reformat your hard disc – all your data will be irretrievably lost.

The format option sub-menu prompted in step 4 offered three formats: L – 640k, D – 800k, E – 800k. The one you will want to use with most of your discs is 'E'. This is the most advanced, and automatically 'compacts' your data to use space as economically as possible. The 'L' format is the same as ADFS discs for the Master and Master Compact

computers, so if you have discs you use or want to use with one of these computers, they will be (or need to be) 'L' format. The 'D' format was used by Arthur, the first Archimedes Operating System. If you have Arthur discs, you can still use them without alteration, but if you want to use new discs with a machine running Arthur, make them 'D' format. When you use a disc, you do not have to specify the format you have used – your Archimedes will sense this quite automatically.

Copying Information Between Discs

To copy information between discs, you first need to open a directory viewer for each disc. Then click on the item you want to copy; this selects it, and the icon is shown highlighted. Then you drag the icon from one window to the other (the original copy will still remain in the first window). If you are using a machine with a single floppy drive, you will need to insert the destination disc into the drive and open the directory viewer for this to create the second window. You can then proceed but you will need to switch discs at intervals. The computer will prompt you when it is time to switch discs.

You can select several items at once by clicking with Adjust on each item. When all those you want to copy are highlighted, move the pointer over one of the highlighted items, press Select, and drag the whole group to the other window.

You can select all the items in a window using the mouse menu. Move the pointer into the window, press the Menu button, and choose 'Select all'. Again, drag the whole group into the other window, using Select.

If you want to copy everything on one disc onto another disc, and the second disc doesn't have anything on it you want to keep, you can use the 'Backup' option instead.

Making a Backup

A backup of a disc is an exact copy. All the information on the disc is copied onto another disc, overwriting anything that might already be on the second disc. You should make backup copies of your work

frequently, so that you always have a recent copy if you lose, corrupt or accidentally erase a file on your working disc.

To make a backup, you need a formatted disc. Follow these steps:

1) Write-protect your source disc by sliding the plastic tab back to reveal the hole, then put the disc in the disc drive; use drive 1 if you have a machine with two floppy drives, and put the destination disc in drive 0 (this must not be write-protected).
2) Press Menu with the pointer over the disc drive icon and select 'Backup'.
3) Click Select to start the backup procedure.
4) If you have a single floppy machine, you will have to swap the source disc for the destination disc when prompted (it must not be write-protected).
5) Click a mouse button or press the space bar when the operation is finished.

Use this procedure to make backup copies of the Support and Applications discs before you use them any further. Backup, like formatting, destroys any data on the destination disc. If there is anything you want to keep on the disc, use 'Select all' from the menu in the directory window and copy the files instead.

If you have a hard disc, you ought to make back-up copies of your data frequently in case a power or machine failure corrupts your data. You can do this by copying work you have altered recently at frequent intervals. If you copy all the data at one go, you will need a stack of formatted floppies before you start. The computer will prompt you each time a disc becomes full. You can calculate very roughly how many you will need by looking at the free space (see next section), and dividing the amount of space used by the 800k you can get onto a floppy. Add quite a few extra floppies to the pile, though, because the computer will not be able to use absolutely all the space on each floppy, and you will want to divide up your files sensibly. (Example: if a 20Mb hard disc shows 15Mb used – about 15,000,000 bytes – you will need at least nineteen 800k floppies to back it up!)

What the k?

We have referred to the term 'k' or 'K', eq, 800K, on a few occasions. 'K' is shorthand for kilobytes and it is a measurement of storage. One kilobyte (1k or 1K) equates to 1024 bytes. A byte is a standard computer unit, and it may be easier to think of a byte as being equal to a character. Thus the alphabet can be stored in 26 bytes. Therefore an 800k disc can store:

800*1024 characters = 819200 characters

For very large storage measurements the 'Megabyte' is used. One Megabyte (1Mb) is equal to 1,048,576 bytes or 1024k.

Checking the Free Space on a Disc

You can check to see how much space is left free on your floppy or hard disc by displaying the disc icon menu and choosing 'Free'. This shows how much space is used and free, measured in bytes.

Naming a Disc

When you format a floppy disc, it is given a name by default, which is the time and date at which you formatted it. You can give a more useful name to your discs using the disc menu command 'Name disc'. Move the pointer over this menu option, and then type the name you want to give your disc and press RETURN. This name will be used if the computer needs to prompt you to insert the disc in the disc drive, and will be shown at the top of directory viewers for that disc. You will be warned if you use a name that the computer recognises from a previous disc you have used since turning on the computer (it remembers about six disc names). It is a good idea to write the name you have given the disc on its label, then it is easy to find it when the computer asks for it, and it enables you to identify it in a pile of discs!

Summary

The basic operations with discs described in this chapter are the only ones you are likely to need on a regular basis. However, if you find that one of your discs has a damaged sector, you can use the RISC OS command '*Defect' to mark the sector so that it is not used. This is described in Chapter 12.

Make copies of your Support and Applications discs before you go on to the next chapter which explains files and directories.

4 : Files and Filing Systems

Before you can use any of the applications to create and save documents and pictures, you need to understand how the Archimedes filing systems work. This chapter explains:

- What a filing system is.
- How to create a directory.
- Creating a file and adding it to a directory.
- Copying and moving files and directories.
- Deleting files and directories.
- How to lock your files so that they cannot be deleted.

About Filing Systems

A filing system is a way of organising information held on a disc in such a way that you can easily find what you want. It is similar to an ordinary, paper, filing system. Imagine a filing cabinet with three drawers. Each drawer has a label, and inside each is a series of folders. Each folder contains files and papers. To get to the paper you want, you need to:

- open the right drawer.
- open the right folder.
- open the right file(s).

The paper might be in one file inside another, and then in the folder – you have to keep opening files until you reach the paper you want.

The filing system the Archimedes uses mimics this type of familiar everyday system. The one you will use most is called ADFS, the Advanced Disc Filing System. ADFS allows you to name each of your discs (analogous to the label on a filing cabinet drawer), and to keep a

collection of folders (directories) to hold your work and programs. Directories may be nested – that is, one may be placed inside another, just as files in a filing cabinet may be placed inside one another. A directory that is within another directory is normally called a 'sub-directory'. Most directories are shown on screen by a folder icon similar to that show in Figure 4.1.

Figure 4.1. A folder icon.

(Applications directories, however, have special icons.) Inside a directory, you can keep other directories, programs, documents, drawings and any other work you do with your computer. The general term for the documents, drawings and so on is a 'file'. Different types of file have different icons, so you can easily see what type each is.

Just as folders in a conventional filing system have labels to show what they contain, directories in ADFS have names. You can give the precise location of a file by listing the directories that need to be opened to find it. This full name is called its 'pathname' or 'path'; it is the path which has to be taken through the filing system to find the file.

It is important that you give your directories sensible names and build them into a logical structure. If you don't do this, it will be difficult to find the files you want. For example, if you wanted to keep records of different sporting activities, you might structure your filing system like the one shown in Figure 4.2.

If the disc you kept these directories on was named 'Sport', the pathname for the document showing the croquet results for 1989 would be:

```
adfs::Sport.$.summer.croquet.results89
```

The different elements of a pathname are separated by fullstops ('.'), except that the filing system name and the disc name are separated by two colons ('::'). The disc name is the first element of the pathname, and this is followed by '.$', which shows that 'summer' is in the root

directory. The 'root directory' is the first level in the filing system; it is displayed when you click on the disc drive icon.

To look at 'results89', you would need to open a directory viewer for the disc, then for the directory 'summer' (by double-clicking on the directory icon), and then for 'croquet'.

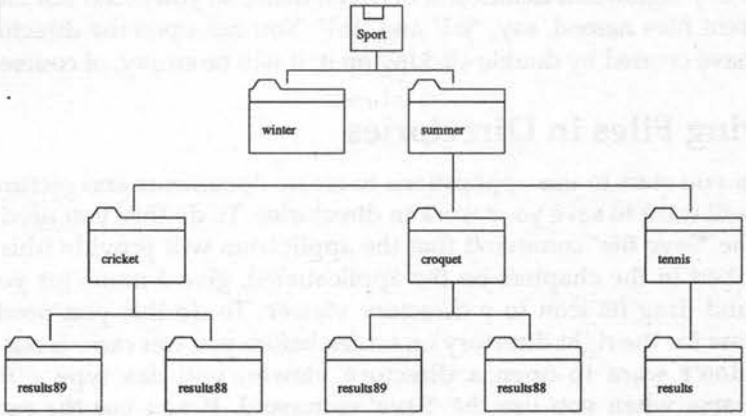


Figure 4.2. A sporting structure to the filing system.

Creating a Directory

You need to create a directory before you can save anything in it; you can't give a pathname and expect the directories to be created automatically. If you use a directory name that does not exist then an error will occur. The Archimedes will not be able to locate it and will inform you so!

To create a directory, you first need to display a directory viewer of the directory it will be in. This can be the root directory. If you have a floppy system, you will need to put a disc in the disc drive. You can use your copy of one of the applications discs for this. Move the pointer over the directory viewer and press the Menu button. One of the menu options is 'New directory'. Move the pointer over this to the right to display the field for you to give a name for the directory. If there is already a name in the field, it is because you pressed the Menu button when the pointer was near an icon in the window. Use the

BACKSPACE key to delete the name and type the name you want to use, then click the Select button or press RETURN. The name can be up to ten characters long; don't use spaces, angle brackets, fullstops or commas. The new directory will appear in the window, with its name displayed below it. You can mix upper and lower case letters in the name, and the computer will recognise and use these, but it does not make any significant distinction between them, so you could not have different files named, say, 'jo1' and 'Jo1'. You can open the directory you have created by double-clicking on it; it will be empty, of course.

Saving Files in Directories

When you start to use applications to create documents and pictures, you will want to save your work in directories. To do this, you need to use the 'Save file' command that the application will provide (this is described in the chapters on the applications), give a name for your file, and drag its icon to a directory viewer. To do this you need a window for the right directory on screen before you can carry it out. If you don't want to open a directory viewer, you can type a full pathname when you use the 'Save' command. If you use the same name as an existing file has, the first file will be overwritten and lost. Some – but not all – applications warn you if you are about to do this. We'll come back to this subject as we discuss each of the applications supplied on the applications discs.

Copying and Moving Files Between Directories

You use the same procedures to copy files between directories as you do to copy them between discs. You need to open directory viewers for the directory you are copying from and the destination directory.

- To copy one item, select it and then drag the icon into the window of the destination directory.
- To copy several items, select them all by clicking with Adjust on them in turn, then drag any one (the others will follow) into the window of the destination directory.

If you copy files or directories, the original copy is unaffected. You can also move a file or directory from one place to another. To do this, use the same procedure as to copy, but hold down the SHIFT key while you drag the icons.

To try these procedures, open the directory you have just created and drag other icons into the window. If you move any icons, be sure to move or copy them back again. Use your copies of the applications discs to practise this; *do not use the originals*.

If you try to copy a lot of data, the computer may display an error message reporting that the disc is full. An error message is always displayed in its own window, which is a type of dialogue box. You will not be able to continue working until you click on a box marked 'Cancel' or 'OK'. This will remove the error message window from the screen.

Deleting Files and Directories

If you made extra copies of some of the files on your disc, you can now delete them. You can also delete the folder you created, if you wish.

To delete an item in a directory:

1) Select it.
2) Press the Menu button on the mouse.
3) Move the pointer over the name of the selected item, in the second line, and off to the right.
4) Click on the option 'Delete'.

You can delete several things in a single go by selecting them all at once and using the options 'Selection' and 'Delete' in the menu. If you ever want to delete everything in a directory, you can use 'Select all' and 'Delete' instead of clicking on each item.

If you delete a directory, all its contents are deleted, too.

Protecting Your Work Against Deletion

If you want to protect your work so that you don't accidentally delete it, you can lock it against deletion. You then have to unlock it before you can delete it. To lock (or unlock) a protected file or directory:

1) Select the file or directory.
2) Press Menu and move across the second line to show the sub-menu.
3) Move across the last option, 'Access'.
4) Click in the box marked 'Lock...' and then in the box marked 'Update'.

When the file or directory is locked, a star shows in the Lock box.

If you try to delete a locked file, you will not succeed. If you delete a directory containing locked files, the directory will remain, and only the unlocked files in it will be deleted.

If you select several directories, the Access status shown is that of the first directory you selected.

You can also turn off 'owner write-access' if you don't want to be able to alter a file. This is turned off when there is no star in the box.

It you wish to protect all the files on a disc from deletion, then you can do so simply by using the disc's write protection tab. Just move the small plastic slider on the disc to expose the hole.

TinyDirs

The application called 'TinyDirs' on Applications Disc 2 allows you to load your directories onto the Icon Bar as icons. This makes it easy to look in a directory without having to go through all the other directories to locate it. To use TinyDirs, double-click on its icon. A folder icon appears on the Icon Bar. You can now drag the icons of directories you want to use frequently onto this icon, and they will be added to the Icon Bar. You can drag more than one directory icon – just drag subsequent directories onto the directory icon already there (Figure 4.3).

Figure 4.3. Directories installed on the Icon Bar.

When you want to look in a directory, just click on its icon on the Icon Bar. You can even look in a directory on a disc which is not in the disc drive as long as you have already displayed its contents once: the computer stores the directory catalogue in its local memory, so it can show the contents immediately without needing to refer to the disc again.

Summary

Now you know how to create a directory and how to organise your filing system, you are ready to start using the applications and save your work. The following chapters explain how to use the programs on the applications discs. It is a good idea to format a disc and create some empty directories before you start, then you can save your work into them easily, and won't have to save your work on the applications discs. (They will soon become full if you do.) And remember that you should be working with your backup copies from now on.

5 : Edit

Edit is a simple, but effective, text editing program. You can use it to create text files, but remember that it is not a fully-featured wordprocessor. This chapter explains how to use Edit and save your work. When you want to print out your work, you will need to consult Chapter 17 which explains how to use a printer.

What Can You Use Edit For?

Edit creates ASCII text files. ASCII is an acronym for American Standard Code for Information Interchange. It is a recognised standard for text which contains no control characters – these are special codes which are embedded within the text and which have special meanings, for example a wordprocessor will use these to signify italic or bold text etc. Providing you have discs of the right format, you can use ASCII text you have created in Edit with a wordprocessing program on the same or a different computer, and can use ASCII text you have created with a wordprocessing program in Edit. (You can also use Edit to create some different types of files; this is described later in this chapter.)

Edit is most useful for:

- Writing text to use in a desktop publishing program, such as Acorn DTP (see Chapter 18)
- Writing a 'boot file' to set up your machine when you turn it on (see Chapter 12)
- Preparing text to use as a text column object in a Draw picture (see Chapter Seven)
- Stripping out 'control characters' from text you have prepared with one wordprocessor and want to use with a desktop publishing package or a different wordprocessor

- Writing and altering configuration files (these are files that tell the computer how to run applications, what settings to use, and so on)
- Writing source for programming languages such as Acorn's Ansi C and Dabs Press Cambridge Pascal Compiler.

Using Edit

Before you can open a new Edit file, you need to load Edit onto the Icon Bar by double-clicking on its icon. The !Edit file can be found on (your backup copy of) Applications Disc 1 Then click on the icon in the Icon Bar. An empty Edit window appears. This is shown below in Figure 5.1.

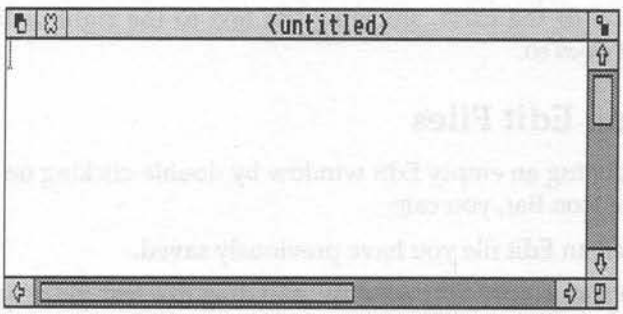


Figure 5.1. An empty Edit window.

The vertical bar in the top lefthand corner of the window is called the 'caret'. This indicates the point at which text you type will appear. Type a few letters and see how the caret moves across the screen. When you get to the edge of the window, the window scrolls across so that you can still see the caret. If you want to be able to see the whole line all the time, and save scrolling across, click on the toggle size icon so that the window fills the screen, or display Edit's menu and select 'Wrap' from the 'Display' sub-menu. This makes the text fit the window size, so the whole line is visible, even if you re-size the window. (You can also use the 'Format text' option to control the width of the text column; this is described below.)

When you reach the right-hand edge of the window at full size, the caret automatically moves to the start of the next line; you don't need to press RETURN to start a new line as you do with a typewriter, though you can if you don't want words split over a line break. (Don't do this if you are going to use the text with a wordprocessing program which will retain single RETURNs.) When you want to start a new line before the caret reaches the end of the current one, press RETURN. (Press it twice to leave a blank line and prevent lines being run together if you want to use the text with a desktop publishing program later.)

If you want to insert some text in the middle of that you have already typed, use the mouse to move the pointer to the right place, then click Select to place the caret. You can type the new text immediately; Edit does not over-type the words already there, but inserts the new text at the position of the caret, shuffling the text to the right of the caret along as it does so.

Opening Edit Files

Besides opening an empty Edit window by double-clicking on the Edit icon on the Icon Bar, you can:

- Open an Edit file you have previously saved.
- Open an empty Edit window, and drag in a text file of another kind.
- Use Edit to create files of special types.

To open an Edit file you have saved, you can double-click on its icon in the directory viewer if you have either already displayed a window for the directory holding Edit (so that the computer knows where to load Edit from) or loaded Edit. Alternatively, drag the file icon onto the Edit icon on the Icon Bar.

If you want to use a different text file in Edit, open a new Edit window, and drag the file icon into the window. There may well be a lot of peculiar characters from the program you used to create the file originally, but you can delete these later. You can also use this technique to add one file onto the end of another. If you drag a file

icon into a window which already contains text, the new text is inserted at the position of the caret.

You are not limited to having a single Edit file open. If you wish you can have several files open at any one time (subject to having enough memory available on your Archimedes).

You can also use Edit to create special types of files. This is described at the end of this chapter.

Selecting Text

Although Edit is not a wordprocessor it does have a number of wordprocessor-type features. These features normally act on selected areas of text, called 'blocks'. To select a block of text, place the cursor where you want the block to start, then press and hold down the Select button and drag until the pointer is at the end of the block and all the text you want to select is highlighted. The text is highlighted by being shown in inverse video – this means that it is shown as white on black, rather than black on white. A selected block of text is shown in Figure 5.2. Note that a block of text can be a letter, a word, a sentence, several sentences, a paragraph, in fact just about any amount of text.

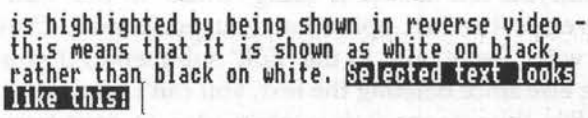


Figure 5.2. A block of text, when selected, is displayed in inverse video.

You can now place the cursor somewhere else and this text will remain highlighted. You can use the commands in the 'Select' sub-menu with the selected text.

You can also select a single word by double-clicking on it, or a whole line by clicking on it three times in rapid succession.

Editing Text

You can perform these types of text editing operations:

- Delete single characters or blocks of text.
- Move blocks of text.
- Copy blocks of text.
- Search and replace words and characters.

All these operations are available from the menu, but there are also key combinations which are quicker to use than the menu once you are used to them. The key combinations are shown next to the commands on the menus, and are given in this chapter alongside the menu commands. All but the last of these, and deleting single characters, use selected text.

Editing Tasks with Selected Text

To delete single characters one at a time, use the BACKSPACE or DELETE key. To delete a block of text, first select the block and then choose 'Delete' from the 'Select' sub-menu, or use the key combination 'Ctrl-x'. If you change your mind, and you haven't done anything else since deleting the text, you can restore it using 'Undo' in the 'Edit' sub-menu. This reverses the last operation you performed. (You can reverse 'Undo' with 'Redo', also in the 'Edit' sub-menu.) If you have done something else since deleting the text, you can't reinstate it – it's lost for good. For this reason it is a good idea to save your text regularly and always before deleting a block of text – saving is covered later in this chapter.

To move a block of text, first select the block, position the caret where you want the text to be moved to, and then choose use 'Move' from the 'Select' sub-menu, or the key combination 'Ctrl-v'. The selected block will appear after the caret position.

Note: The term 'Ctrl-v' means depress the Ctrl key and then press the 'v' key before releasing both keys together. Ctrl is pronounced as 'control'

To copy a block of text, first select the block, then place the caret where you want the copy to appear, then choose 'Copy' in the 'Select' sub-menu, or use the key combination 'Ctrl-c'. This places a copy of the block after the caret position. You can carry on adding copies of the block by positioning the caret and using 'Copy' or 'Ctrl-c'. The block will remain highlighted until you select other text, but if you want to turn the highlighting off, use 'Clear' in the 'Select' sub-menu or 'Ctrl-z'. You can also save a copy of part of your text to a different file. This is explained later in this chapter, in the section about saving your work.

Sometimes, you will want to move or copy chunks of text between places that are not both visible in the window at the same time. You can either move between places using the 'Goto' command (or function key F5), giving a line number, or you can display two windows onto the same file. The 'Goto' command is in the 'Edit' sub-menu; the only drawback is that you need to know the line numbers of the areas you want, and since Edit does not display line numbers, this might take quite a lot of guesses. Displaying two windows is often better. To do this, do not open the file twice – that will give you two copies, with no link between the two – but use the command 'New view' in the 'Misc' sub-menu. Initially, this shows the same view in both windows, and you can see that they are linked by typing something in one window and seeing it appear in both. However, you can use the scroll bars of each window to move around the file and show different areas of it in each window. It is then easy to select text in one window, place the caret in the other, and copy or move the selected text.

Search and Replace

Searching and replacing are slightly different; they don't use selected blocks of text. Instead, they search for a word or a string of characters from the *current* position of the caret to the end of the file.

Edit allows you to search and replace ordinary characters, and also some special characters and combinations. Let's look at ordinary characters first.

There are two stages to searching for and replacing characters. The first defines the search, and the second is to specify whether characters are to be replaced or left as they are in each instance as they are found. To search for a character or word, use 'Find' in the 'Edit' menu or just press the red F4 'function key'. (The function keys are red on the BBC A3000 and 310 Archimedes and grey on 400 series Archimedes.) This displays a special window called a 'dialogue box'. A dialogue box provides you with a means of supplying information to the application you are using. The search and replace dialogue box has two text fields: one for the characters you are searching for, and one for the characters you want to replace them with. This can be clearly see in Figure 5.3.

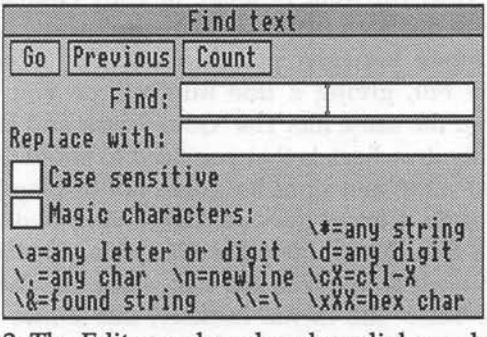


Figure 5.3. The Edit search and replace dialogue box.

If you leave the replace field blank, the characters will be deleted and nothing put in their place. But you can choose not to replace the characters when you come to them in the file. Fill in both fields and then click on 'Go'. The search starts from the position of the caret and goes forward through the file. When the program finds the characters you are searching for, it displays another dialogue box with these options:

Stop	don't replace the characters, and cancel the search.
Continue	don't replace the characters, but continue searching and stop again at the next instance.
Replace	replace the characters, and continue searching.
Last replace	replace the characters, but stop the search afterwards.

End of file Replace
: replace all instances of the characters, including the first, from the current position to the end of the file without further prompting (this is sometimes called a 'global' replacement).

Undo
: cancel the last replace or global replace.

Redo
: redo a cancelled operation.

Besides the 'Go' box, there are two other options: 'Previous' and 'Count'. You can use count to see how many times you use a word or character. You can leave the 'Replace' field blank if you are going to use 'Count'; the second dialogue box does not appear, but the number of instances found is reported in the top right-hand corner of the first dialogue box when the search is complete. 'Previous' allows you to return to the last search and replace strings you typed in the fields without having to retype them. Each time you choose the 'Find' command, the fields are blank, but you can restore the strings you used last by clicking on 'Previous'. You can use this if, for example, you started your search in the middle of a file and want now to search from the start of the file: move the caret to the start, use the 'Previous' option with 'Find', and then click on 'Go'.

You can make your searches 'case sensitive' by clicking in the box marked 'Case sensitive'. This means that only instances of the characters which match the upper and lower case combination you type in the 'Find' field will be included in the search. For example, if you search for 'Chicken' with case sensitive turned off (no star in the box), all instances of chicken, CHICKEN, ChiCKen, chickEN, and so on will be found. If you turn case sensitive on, only Chicken will be found, and all other combinations ignored.

As well as searching for ordinary words and characters, you can use the 'magic characters' option to search for RETURNs, hexadecimal numbers and special combinations. The first two of these are straightforward, and you may well want to use them alone, but the others you are more likely to want to use in combination with other, ordinary, characters. The options are:

\a This searches for any single letter or number. For example:
Find 1\a0

finds 100, 110, 120, 130, 140, 150, 160, 170, 180, 190 (and any combinations with letters in the second position). It will not find instances where there is more than one character between the '1' and the '0' (but it will find 1001, 18092, etc).

* This searches for any string (series of characters) of any length. For example:

```
Ref. \*A
```

will find all references ending in A, including Ref.1A, Ref./567/RG/A, and so on.

\d This searches for any single digit. For example:

```
Find £\d
```

will find all prices in pounds.

\. This searches for any single character: a number, letter, space or punctuation mark. For example:

```
Find chicken\.
```

finds chicken , chickens, chicken2, chicken;, chicken., chicken', chicken?, and so on. It is often quicker to use this, together with 'Continue' and 'Replace' in the second dialogue box, to find and change several slightly different versions of something. You could then change chicken; chicken. and chicken: without needing to search three times.

\n This searches for RETURN characters. For example:

```
Find \n
```

with:

```
Replace \n\n
```

will change all single RETURNs to double RETURNs, which might be useful if you want to use your file in a wordprocessing or desktop publishing program and want to prevent the lines running together across single RETURNs.

\cX This searches for any uses of control (CTRL) with another character. For example, if you use CTRL-p together in Edit, '[10]' appears on the screen. These are not ordinary text characters. You will often find control sequences like this if you take text from a

wordprocessing program into Edit. For example, a VIEW file uses these control sequences to mark changes to bold text, and so on. You can use 'Find \cX' to remove control sequences (if you know which letter corresponds to the sequence you want to remove). If you don't know the character corresponding to the sequence, you will need to use \x:

\x This searches for hexadecimal numbers. If you have brought a file in from a wordprocessing program and have control sequences of the type [00], or [1b], the numbers in the square brackets are hexadecimal numbers (base 16). You can find these using \x. For example:

Find \x00

finds [00] – you don't need to type the square brackets. You can use this with the Replace field left blank to delete control sequences.

\& This is used in the Replace field, since it stands for the Find string. You can use it to incorporate the characters you have searched for in the replacement string. It is useful if you have used magic characters in the Find field. For example, you could use:

Find Ref. *A

with:

Replace \&/1989

to add /1989 to the end of each reference.

\\ This allows you to include a backslash character in the Find or Replace fields while you are using magic characters. (If you aren't using magic characters, '\' is treated like any other character.) For example, to add '\1989' to the end of each reference found with:

Find Ref. *A,

you would need to use:

Replace \&\\1989

Trick

Edit does not include a word count facility, but, you can get a rough indication of the number of words in a document by counting the

number of spaces in a file. To do this, place the caret at the start of your document and then press 'F4' to display the dialogue box. The caret should be positioned in the 'Find' field. Press the space bar once and then select 'Count'. Of course this assumes that you have not used spaces for anything else. To be sure you could first replace all double spaces with single space. To get an even more accurate word count add the number of RETURN characters in the document.

Formatting and Displaying Text

Edit allows you some control over the appearance of your text. You can:

- Indent parts of it.
- Control the typeface used to display it.
- Set a left margin.
- Alter the line spacing.
- Choose different colours for the text and background.
- Switch over the text and background colours.
- Control the width of the line.
- Switch between RETURN and line-feed characters (explained below).
- Expand tabs with spaces to tabulate your text.

The last two of these are only really useful with text you have brought in from another wordprocessing program. Of the others, only indents are saved with the text and affect how it is printed out; the other settings are used only for display.

Indents

To indent part of the text, first select it and then use 'Indent' in the 'Select' menu. This has a text field and three rather obscurely-worded options. You can:

- Give a positive number in the field, and this number of spaces will be inserted before the line.

- Give a negative number, and this number of characters will be stripped from the start of the line (use this to reduce an indent).
- Give text (such as WARNING) and this will be inserted at the start of the line.

Any indents are saved with your file.

Typeface

By default, Edit uses the system font (typeface) as the text style. You can use a different font to display your text if you wish, but you can only use one font at a time, and the different font will not be used to print your work. There is more about fonts in Chapter Nine. If you want to display fonts other than system font, you need to click on the directory '!Fonts' on Applications Disc 1 before you load Edit. This lets the computer see where the fonts are; if you don't do this, system font will be the only font available.

If you are using a font other than the system font, you can choose its size. Fonts are measured in points (see Chapter Nine). You can choose a font size, and also a height. The font size will be used for the width and height unless you choose a different height, when the font size will be used only for the width. If you want different heights and width, set the height after you have set the font size, because changing the font size automatically resets the height.

Left Margin

You can set a left margin to insert some space between the text and the lefthand edge of the window. This makes no difference to the printed text. Use the command 'Margin' in the 'Display' sub-menu; this has a text field for you to type a figure. The margin is measured in pixels. A pixel is one of the dots which make up the screen picture. If you use the magnifying glass (this is found on Applications Disc 2), you can see that images on the screen are actually made up from coloured or shaded squares. Each square is a pixel. It is the smallest unit that can be used on the screen. Consequently, a margin of one pixel will not be noticeable. If you want to try this command, use a margin of 20 pixels or more to experiment with.

Line Spacing

You can set the line spacing for the screen display, but again this will not be used when you print the file. Line spacing is set with the command 'Line spacing' in the 'Display' sub-menu. As with Left Margin it is measured in pixels. Try a spacing of 10 or more pixels to make a noticeable difference.

Colours

If you have a colour monitor and you don't want your text to be displayed in black on white, you can choose a different colour for the text (foreground) and background. If you have a monochrome monitor, you can choose shades of grey for the display. To set the colours, use the commands 'Foreground' colour and 'Background' colour in the 'Display' sub-menu. These commands show a strip of different colours or grey shades. Click on the one you want.

Whatever colours you have used for the text and background, you can swap them over using 'Invert' colours in the 'Display' sub-menu. So if you start with the usual display of black text on white, 'Invert' colours gives you white text on a black background. Invert the colours again to return to the first setting.

Hint

A restful colour combination for text is white text on a blue background.

Line-feed, Return and Tabs

Two further commands in the 'Edit' sub-menu are useful when you are using text you have created with a wordprocessing program. These are 'Expand tabs' and 'CR<->LF'. They affect the display on the screen, and their effects are saved with the file and used when it is printed out.

'Expand tabs' replaces tab characters in the file with a number of spaces. You can use this to return tabulated text to something closer to its original format.

'CR<->LF' switches between line-feed characters and RETURNs at the end of lines. When you first open a wordprocessed file in Edit, you may find that it is shown as one long paragraph, with no line breaks. Instead it will have a control sequence, like [0d], to indicate where a RETURN should come. This is a line-feed character imported from the word-processing file. You can switch them to RETURNs and have the text displayed normally by using CR<->LF (Carriage Return to Line-feed). Click on this command again to turn them back if you want to. This changes the whole file; if you are building up a long Edit file by dragging several file icons into a window, wait until you have brought them all in before you use this.

Line Width

Finally, you can use the command 'Format text' in the 'Edit' sub-menu to change the width of the text column. By default, the Edit text column is 76 characters wide. This makes the text wider than the size of the window when you first open it. If you don't want to enlarge the window so that it occupies the whole width of the screen, but you do want the whole line to be visible, either use 'Wrap' or use 'Format text' to reduce the line width. 'Format text' displays a field for you to type a width; use the BACKSPACE key to remove the value in the field, and then type in the size you want to use. You can use this to leave a margin on the right of the text in the window.

If you already have text in Edit that you wish to re-format, set the width as described above and place the caret at the start of the paragraph you wish to format. Then double-click on 'Format text'.

Saving Your Work

You can save all your work at once, or a portion of it. If you want to save the whole file, open a directory viewer, and then use the 'Save' command. This displays an icon representing your work, and has a field for you to type a name for it. If it is a new file, it will have the default name 'TextFile' in the field. Use the BACKSPACE key to remove this and type the name you want to use. Then use Select to drag the icon into the directory window you have opened. The icon, with the name you have given, will appear in the window. If you don't want to

open a directory window, you can type a full pathname instead. If the file is not new, and you opened it by dragging an Edit file to the Edit icon or double-clicking on an Edit file icon, the Save field will show the file's original name. If you click on 'OK' the file will be re-saved with the same name, overwriting the original copy. If you want to keep the original copy, delete the name from the field and give a new name. You can just delete the last element of the name and replace this if you want to save the new version in the same directory, then you can click OK rather than drag the icon to a directory viewer.

If you want to save only a part of your file, select the part you want to save and then use the 'Save' command in the 'Select' sub-menu. This too displays an icon and text field, and you use it in the same way as the 'Save' command in the main menu.

Printing Your Work

If you want to print out the work you have done with Edit, you will need to load a suitable printer driver and make sure your printer is properly connected to the computer. This is described in Chapter 17. When your printer and printer driver are properly set up, drag the icon of your file from the directory viewer it is in, or from the 'Save' command, to the printer icon on the Icon Bar. Dragging the icon from the 'Save' command does not save the file at the same time.

File Types and the Edit Icon Menu

You can use Edit to create files of special types. If you move the pointer over the Edit icon on the Icon Bar and press Menu, and then move the pointer over 'Create' and off to the right, you will see a sub-menu offering different types of file: text, data, command or obey files, or a new task window. A 'task window' allows you to run non-desktop tasks; this is described in Chapter 12. A text file is the type of file created by default when you click on the Edit icon; it is ordinary ASCII text. A data file is a file which can be read by a program; use this option if you want to create text which will later be read by one of your own programs. A command file holds a string of commands to be executed by the computer. In Chapter 10, you will see how to create a boot file which uses this file type. An obey file is very similar to a

command file, but is interpreted slightly differently by the computer. Once you have opened Edit with one of these options, use all the Edit commands as usual. When you save one of these files, it will have a different icon from the icons of other Edit files. The top left-hand corner will show DATA, E* or * depending on the file type.

If you want to create a file of one of these types, use the option in the Edit icon menu. However, you can also change the type of a file later if you want to. This is described in Chapter 12.

Summary

You can use Edit to create and edit text, and can alter the layout on the screen. However, if you want to do more sophisticated textual work and editing, you will need to buy a wordprocessing program. You can use a desktop publishing program for laying out your work, too. There is some information on wordprocessing and desktop publishing programs in Chapter 18.

6 : Paint

Paint is, as the name suggests, a painting program. With it you can draw freehand and 'impressionistic' pictures by colouring individual bits of the screen display. If you want to draw something more precise, with the graphic elements properly aligned, you will need to use Draw (described in the next chapter). Paint allows you to work to 'pixel' level. A pixel is the smallest individual item on the screen and it comes from the two words 'picture element'. The size of the pixel will vary depending on the screen 'mode' you are using (more on this later), but after you have drawn something, examine it with the Magnifying Glass (Applications Disc 2) and you should be able to pick out the painted pixels.

In Paint, you use a series of 'brushes' and 'tools' to paint on the screen and create a 'sprite'. A sprite is simply a collection of coloured pixels making up a picture or graphic shape. Each sprite is stored in a 'sprite file'; a sprite file may contain more than one sprite.

Paint Windows

Paint uses a more complex arrangement of windows than the other applications on the applications discs, but you will quickly get used to them.

You can look at the 'PaintDemo' sprite by double-clicking on its icon in the directory viewer for Applications Disc 1. (Because the directory viewer contains the Paint icon, the computer knows where to look to find Paint and can load it automatically when you double-click on the PaintDemo icon.) The window that appears is called a 'sprite file window'. This shows you the sprites stored in that file. There are two sprites in PaintDemo, called 'archimedesa' and 'riscos'.

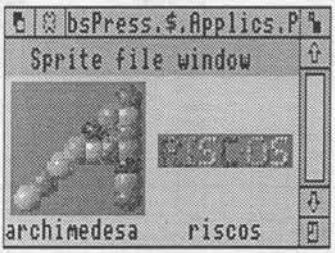


Figure 6.1. The 'archimedesa' and 'riscos' sprites.

To look at either of these, double-click on it in the sprite file window. A new window opens, called a 'sprite window'. This shows the sprite at its full size. You can edit this sprite if you like; details of the tools and brushes you can use are given later in this chapter.

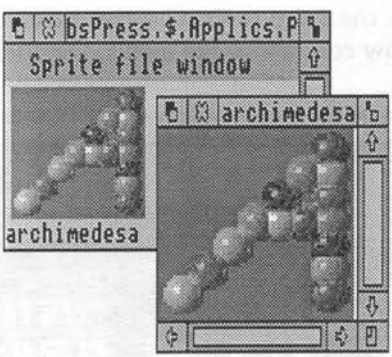


Figure 6.2. The fullsize 'archimedesa' sprite.

There are two further windows associated with the sprite: the 'colours window' and the 'tools window'. The colours window shows all the colours which can be used in the sprite. To display it, move the pointer over the sprite window and press the Menu button, then move the pointer across 'Paint' and select 'Show colours'. The colours window appears.

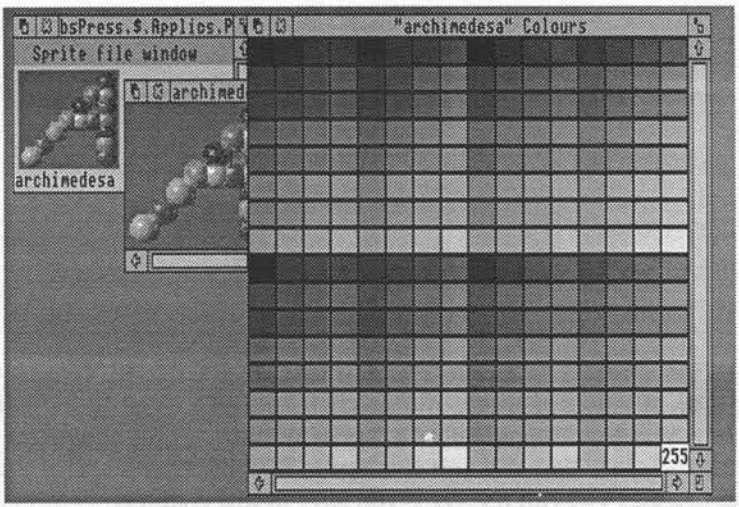


Figure 6.3. Displaying 'archimedesa' colours.

You can also display the Paint tools. Use the command 'Show tools', directly beneath 'Show colours' in the menu. The tools window is the same for all sprites.

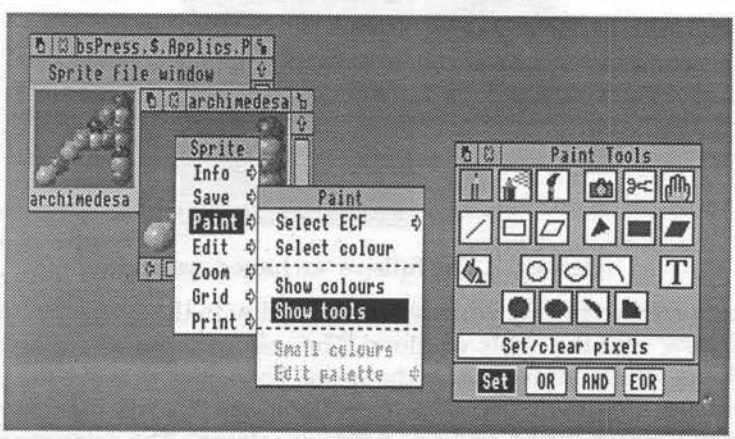


Figure 6.4. The Paint Tools window.

Creating a New Sprite

The Paint icon must be on the Icon Bar before you can create a new sprite. If you displayed the PaintDemo sprite, it will already be on the Icon Bar, but otherwise you will need to double-click in the Paint icon in the directory viewer for Applications Disc 1.

Click on the Paint icon on the Icon Bar to display a new sprite file window. This is shown in Figure 6.5.

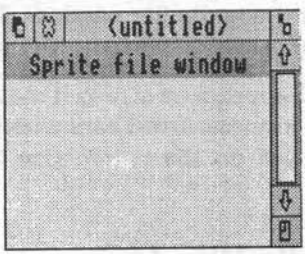


Figure 6.5. A new sprite file window.

Now move the pointer into this window and press Menu. Move the pointer over the command 'Create' to display the dialogue box. You need to give the following information:

- A name for the sprite, 1-10 characters long.
- A size for the sprite. This is measured in pixels. The default is 100 x 50, which is small – about 4.4cm by 2.2cm. Try 350 x 250 to start with.
- Screen mode: this will show the screen mode you are already using. Screen modes are described fully in Chapter 10. You can leave the screen mode as it is if you have not altered it since starting the machine. Otherwise, Mode 12 lets you use 16 colours, and Mode 15 lets you use 256 colours; Mode 15 uses more memory than Mode 12. (If you have a black and white monitor, you can only use shades of grey, of course.)
- Whether to use a mask: a 'mask' gives your sprite a transparent background. Effectively, it allows you to have a non-rectangular sprite, because the rectangular area on which you have drawn it is not visible if you superimpose the sprite on

anything else. The pointer on the Desktop is a rectangular sprite drawn with a mask, so that the only part of the sprite that is opaque is the arrow itself. You can add or remove a mask later if you change your mind.

- Whether to use a palette: setting a 'palette' allows you to define a colour palette specifically for use with the sprite you are creating. Palettes are described in more detail later in this chapter. You can add or remove a palette later, too.

When you have made the settings you want, click on 'OK' and a sprite window icon appears in the sprite file window. To display the sprite window, double-click on its icon in the sprite file window.

When the sprite window appears on screen it may not be displayed at its full size. You can see from the scroll bars whether or not the whole window is displayed; click on the toggle size icon if you want to display all of it.

Painting in a Sprite Window

You can start painting in your sprite window immediately. If you hold down Select and slowly drag the pointer across the window, a thin coloured line appears, following the course of the drag. The default tool is a pencil, which draws a thin line, one pixel wide. If you drag quickly, the line will be broken. To change to a different tool, use 'Show tools' in the 'Paint' sub-menu. The tools you can choose from are detailed below.

Pencil

Draws a line one pixel wide following the path of a drag. This changes a pixel to the current colour.

Spray Can

Like a spray can of paint, this 'sprays' on colour, several pixels at a time – see Figure 6.6. Move the mouse slowly to get dense coverage, or quickly to spray an area lightly with colour.

You can set the density of spray and the radius of the area covered using the boxes at the bottom of the tools window.

Figure 6.6. The effect of the spray can – OK!

Paintbrush

This uses a sprite as a brush. The tools window extends when you choose this tool to let you set brush parameters. A default brush shape is supplied, called 'brush'. You can alter the shape of the brush by changing the X and Y ratios. When you move the pointer over the sprite window, the brush sprite is visible. There are two ways of using the brush. With Shape set on, you can drag the sprite to paint a line, as though the sprite were a paintbrush charged with paint. With Shape turned off, you can click in the window to place images of the brush sprite. (If you drag with Shape turned off, you get an 'outline' line, with the brush sprite image at the end of the drag.) You can use the paintbrush as an eraser, too: if you drag with Adjust with Shape turned on, the pixels the brush crosses are changed to the background colour.

Figure 6.7. Painting with the Paintbrush.

Camera (copy block)

This makes a copy of a block of your picture. You can make copies to add to the current sprite with the lower box set to 'Local', or take the copy out to a different sprite with it set to 'Export'. Use Local to see how the tool works. To define the block you want to copy, position the pointer at the top lefthand corner of the block, hold down Select and drag to the bottom righthand corner. When you release Select, the outline of the rectangle you have drawn with the drag follows the pointer around the screen. When you want to position the copied block, click Select. You can carry on positioning copies by placing the pointer and clicking Select. When you have finished placing copies, click on another tool. (You can click on the camera again if you want to define another block to copy.) You can use this tool to build up a repeated pattern (Figure 6.8a and Figure 6.8b).

Figure 6.8a. Using the camera the picture can be 'snapped'.

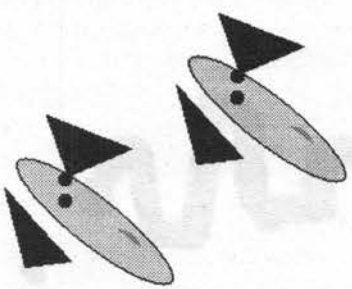


Figure 6.8b. And then reproduced at will.

If you place copies so that they overlap the area you are making the copies from, all new copies will show the altered version of the area as shown in Figure 6.9a and Figure 6.9b.

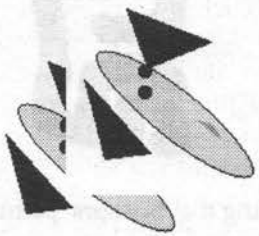


Figure 6.9a.

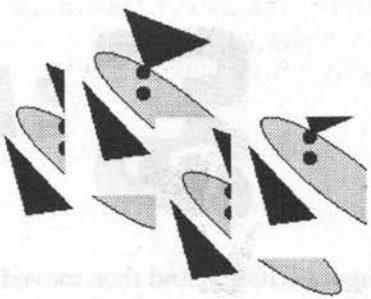


Figure 6.9b.

You can copy a section of the picture to form a new sprite on its own using the option 'Export' at the bottom of the tools window. Switch to export before defining the area you want to copy. When you release Select, a Save dialogue box appears. Type the name you want to give the sprite, and then drag the icon into a sprite file window or into a directory viewer. If you drag it to a directory viewer, a new sprite file window will be set up to hold it.

Scissors (cut block)

The scissors allow you to cut out a block from your picture and paste it in elsewhere. Use the same procedures to define the block as with the copy tool (camera). Click Select to place the cut out block. When you place the cut out portion, it disappears from its original position.

Figure 6.10a. Using the 'Scissors' pictures can be cut...

Figure 6.10b. ... and then moved.

Again, you can use 'Local' to cut and paste a block within the same picture, or 'Export' to save a piece as a new sprite. The piece saved is not removed from the sprite.

Hand (move sprite)

With this you can move the whole sprite around inside its window. This is useful if, for example, you created an image in the middle of the window, and then decide you want to move the whole lot up into a corner so that there is room for something else beneath it. Move the pointer over the sprite window a hold down Select while you drag the sprite. You can watch the sprite's position in the window by looking in the sprite file window to see how it changes. When you release Select, the sprite stays in its new position. If you move any part of the sprite off the edge of the window, it will be permanently lost.

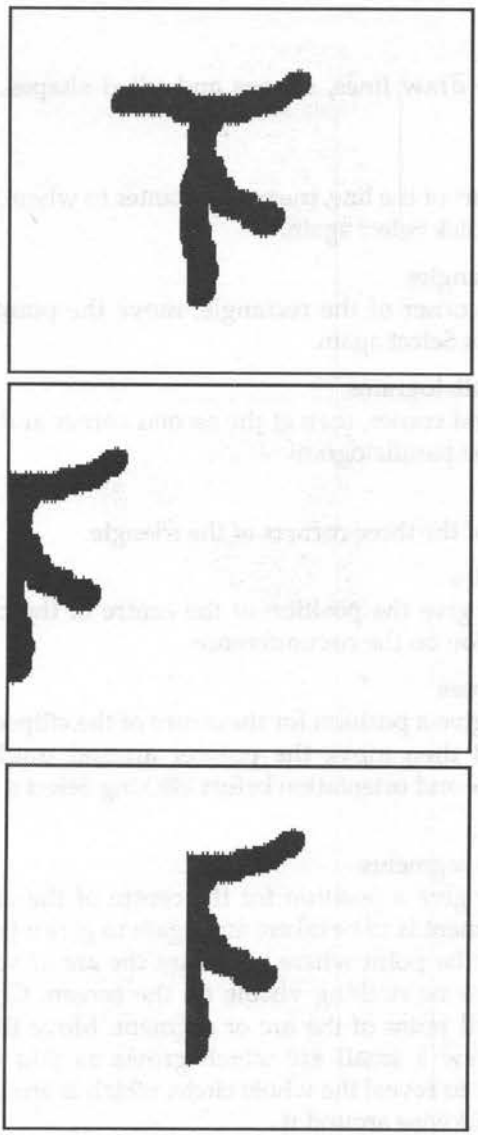


Figure 6.11 a,b,c. The selected area can be moved around the frame (a and b). But watch out for the edges, paintings can go missing! (c).

Shape tools

These allow you to draw lines, shapes and filled shapes. You can draw:

Straight lines
Click Select at the start of the line, move the pointer to where you want the line to end, and click Select again.

Outline or filled rectangles
Click Select at one corner of the rectangle, move the pointer to the other corner and click Select again.

Outline or filled parallelograms
Click Select at the first corner, then at the second corner and finally at the third corner of the parallelogram.

Filled triangles
Click Select at each of the three corners of the triangle.

Outline or filled circles
Click Select once to give the position of the centre of the circle, and again to give a position on the circumference.

Outline or filled ellipses
Click Select once to give a position for the centre of the ellipse, again to give its width, and then move the pointer around until you are satisfied with the size and orientation before clicking Select a final time to place the ellipse.

Arcs and filled circle segments
Click Select once to give a position for the centre of the circle from which the arc or segment is to be taken, and again to give a position on its circumference at the point where you want the arc or segment to start. There will now be nothing visible on the screen. Click Select again to give the end point of the arc or segment. Move the pointer anticlockwise to draw a small arc which grows as you move the pointer, or clockwise to reveal the whole circle, which is eroded as you move the pointer clockwise around it.

Circle sectors
Define these in the same way as arcs and filled segments. Give a position for the centre, a position for the first position on the

circumference, and a position for the final position on the circumference.

Paint can (floodfill)

This replaces one colour in a sprite with another. You can switch floodfill to 'Global', in which case all areas of the colour you click on will be changed, or 'Local', which will only change the enclosed area you click on. The effect is to 'pour' a different colour into connected areas. An area is made up of adjoining pixels of the same colour, so all pixels in an enclosed area would be changed, or all the background except any parts bordered all round by pixels of a different colour. If the current colour is the same as the colour of the area you click on, the tool will have no effect. You can use this tool if you draw something in one colour and then change you mind about it, or to change anything you don't want back to background colour.

Text

To add text to your painting, give the spacing, horizontal (X) and vertical (Y) dimension in pixels of the type size you want to use, and type the text in the field at the bottom of the tools window. Then click Select in the sprite window where you want the centre of the text to be; the text follows the pointer around the window as you move the mouse. You can place as many copies of the text as you want by clicking repeatedly.

Using Colours

The number of colours you can use in a sprite depends on the mode you chose when creating it. You can see the colours available by choosing 'Show colours' in the 'Paint' sub-menu. To make a colour current, click on it in the colours window. When a colour is current, its number is shown and it has a white outline. The current colour is used by all the tools.

You are likely to want to keep the colours on screen for a lot of the time. If you are using a screen mode that gives you a lot of colours, the colour window takes up a lot of space. You can use the command 'Small colours' in the 'Paint' sub-menu to shrink the colours window

so that it obscures less of your picture. You can still choose colours from it when it is small.

You can change the colours in the colour window by editing the sprite palette. You can set a sprite to have a palette when you create the sprite, or use the command 'Palette' in the 'Edit' sub-menu. This 'toggles' the palette on and off; when the command is ticked, the sprite has its own palette (click to remove it) and when it is not ticked it has no palette (tick to give it a palette).

To adjust the colours, use the command 'Edit palette' in the 'Paint' sub-menu to display the palette window. This shows all the colours along the bottom, and three bars, marked 'R' (red), 'G' (green) and 'B' (blue) along the top. The shading in the bars, and the numbers to their left show the proportions of red, green and blue that make up the current colour. The figures go from 0 (none of a colour) to 255 (saturated with that colour). Drag the bars, or click on the up or down arrows to adjust the proportion of red, green and blue making up the current colour. To alter another colour, click on its box. When you have finished altering the colours, click on 'OK' to update the palette. Any areas of the colour you have changed will be updated to the newly, defined colour.

You can save your newly-defined palette using the 'Save' command. Give a name for the palette and drag the icon to a directory viewer. You can then use your palette outside Paint. Palettes are described in Chapter 10.

So far you have probably just used the tools with the option 'Set'. The other options – 'OR', 'AND', 'EOR' – use the binary (base-two) equivalents of the numbers of the colour you are painting with and the colour you are painting onto and perform logical operations to achieve a new number, defining another colour. It is not easy to work out what will happen, since you first need to translate the numbers into binary, then perform the mathematics, and then know what colour the result indicates! Experiment with them to see what happens. The most interesting results come when you draw over areas of several different colours.

Adjusting Sprites

As well as moving a sprite around with the move sprite tool (the hand), you can:

- Invert a sprite horizontally or vertically.
- Rotate a sprite through a given angle.
- Alter the size of a sprite.
- Insert or delete columns or rows of pixels.
- Turn a mask on and off.
- Turn a palette on and off.

The commands to perform all these actions are in the 'Edit' sub-menu. Use:

Flip vertically to invert the sprite vertically as shown in Figure 6.12.

Figure 6.12. Flipping vertically: a) before b) after.

Flip horizontally to invert it horizontally as shown in Figure 6.13.

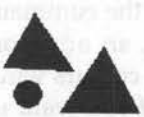


Figure 6.13. Flipping horizontally.

Rotate, giving an angle in degrees, to rotate the sprite anticlockwise as shown in Figure 6.14.

Figure 6.14. Rotate through an angle – 45 degrees here.

'Adjust size' displays a dialogue box reporting the current size of the sprite. Use the arrows to increase or decrease the sizes by one pixel at a time. The sprite is resized when you click 'OK'.

Insert columns, Insert rows, Delete columns and Delete rows operate on vertical columns and horizontal rows of pixels. They each display a dialogue box allowing you to give a number of columns or rows. This number of columns or rows, each one pixel wide, will be inserted into or deleted from the sprite at the last point you edited the picture. Inserted columns and rows will be in the background colour. When you use this command, a column or row is shown at the position to be affected. Instead of giving a number to the dialogue box, you can move the pointer off the dialogue box onto the sprite window – without crossing any menu options – and move the pointer to show the extent of the portion you want to add or remove. A vertical or horizontal line follows the pointer as you move it. When you are happy with the size of the portion to be added or deleted, click Select or press the RETURN key.

To toggle a mask – a transparent background – on and off, click 'Mask' in the 'Edit' sub-menu. When the command is ticked, the sprite has a mask. If a sprite has a mask, an additional colour is shown at the bottom left-hand corner of the colours window. This colour, shown as grey shading, is transparent. If you want to create a sprite that can be superimposed on another sprite or a window by one of your own programs, use this colour for its background; only the opaque graphics will be visible when it is superimposed. For example, the sprites used as the text caret, screen pointer and so on are sprites with transparent

backgrounds. You can look at the sprites used by an application in a sprite window to check this. Hold down the SHIFT key and double-click on any of the files in the applications directories that starts with a '!' (eg, !Edit, !Draw). When the directory opens, double-click on !Sprites. This opens the sprite file window. Double-click on one of the sprites, and you will see that it has a transparent background. (You can edit the sprites if you like, but it is best to make a copy of or rename the original sprite file first in case you change your mind about your edits.)

Click on 'Palette' to toggle on and off the palette for the sprite.

Detailed Work

If you want to work closely on your picture, you can magnify it and look at individual pixels. To zoom in on an area of the picture, use the 'Zoom' command. Give a larger number before the colon than after it to enlarge the picture, or a larger number after than before to shrink it.

The pencil is most useful when you have zoomed in on an area of the picture and can see the effect of changing individual pixels. You can use this technique to tidy up your work, to correct slight errors and to add fine detail. Remember that when the picture is shrunk again, the changes will not be as noticeable as they seem on the enlarged portion.

Another use for detailed work with 'Zoom' is to design a pattern you can then use as a colour. The command 'Select ECF' (Extended Colour Fill) takes a portion from the lower left-hand corner of a sprite and uses it as a pattern which can be used with tools in the same way as a colour. The portion of the sprite it takes is always eight pixels tall. The width depends on the screen mode: it is eight pixels wide for 2-colour modes, four pixels for 4-colour modes, two pixels for 16-colour modes and one pixel wide for 256-colour modes. 'Select EOF' displays a dialogue box for you to give the name of the sprite the pattern is to be taken from. You can create a sprite specially to make a pattern from, or you can make it from the current sprite. Your pattern is added to the colours window in the lower left-hand corner. When you want to use the pattern you have defined, click on it in the colours window. It is treated in the same way as a colour.

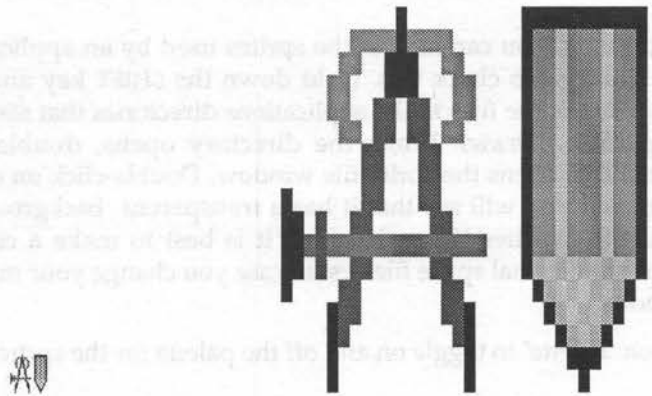


Figure 6.15a) The sprite at its usual size and ... 6.15b) ... Zoom! The sprite at 10:1.

You must use 'Select EOF' while using the sprite window you want to use the pattern in, so create your pattern, then open another sprite window, then use 'Select EOF' and use the pattern.

When you are doing detailed work on individual pixels, you might like to display a grid, which shows you where each pixel is. When you move the pointer over the 'Grid' command, a selection of colours for the grid is displayed. Click on the colour you want and the grid appears, using that colour.

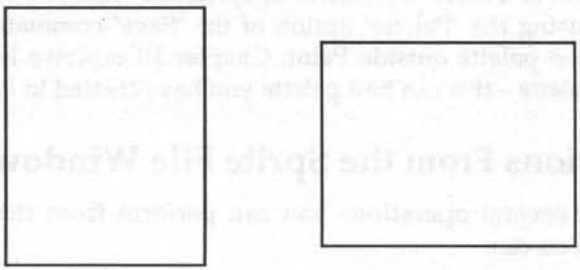
Printing Your Work

You can print out your work from within Paint, or by dragging the icon for the sprite onto the icon of a printer driver on the icon bar. A printer driver must be loaded, and a printer connected to the computer. Connecting printers and loading printer drivers are explained in Chapter 17.

If you want to print out your sprite from within Paint, use the 'Print' command in the menu. This lets you choose:

- How many copies you want to print.
- The units in which the measurement is given, inches or centimetres.

- Whether you want landscape or portrait orientation (illustrated in Figure 6.16).



Portrait Landscape

Figure 6.16. Portrait and Landscape – the difference.

- How you want the picture scaled (you can give different values for the X and Y scale to change the proportions of the picture).
- Where on the paper you want the picture printed – give a number of units for the horizontal and vertical position, measured from the bottom right-hand corner of the paper to the bottom right-hand corner of the sprite window.

When you are happy with the settings, click 'Print' and the picture will be sent to the printer. Once you have made these settings, they will stay the same for as long as you keep Paint on the Icon Bar. They will not be remembered after you remove Paint using 'Quit' in its Icon Bar menu or switch off the machine.

Saving Your Work

There are two ways of saving your work in Paint. The first is to use the 'Save' command, choosing the option 'Sprite'. Type a name for the sprite, and drag its icon to a directory viewer. A new sprite file window is created to hold the sprite. Alternatively, you can click on the close icon of the sprite window – this does not cause your work to be lost – to return to the sprite file window. You can then save the sprite file window by using the 'Save' command, giving a name and dragging the icon to a directory viewer (or giving a full pathname and clicking on 'OK').

You can also save parts of your picture using the 'Export' options of the copy and move tools. Again, give a name for the sprite file and drag its icon to a directory viewer or sprite file window. You can save a palette using the 'Palette' option of the 'Save' command. You can then use the palette outside Paint. Chapter 10 explains how to set a desktop palette – this can be a palette you have created in Paint.

Operations From the Sprite File Window

There are several operations you can perform from the sprite file window. You can:

- Delete a sprite.
- Make a copy of a sprite (supply a name for the copy).
- Rename a sprite (type the new name in the text field).
- Save the sprite into another sprite file, or with another name.
- Display information about the sprite's size, and whether it has a mask and/or palette.
- Print the sprite without opening its window.

You can also choose how to display the sprites in the sprite file window. You can toggle on and off the desktop colours, and choose to have just the drawing icon and its name or full information about each sprite.

Screen Snapshots

One other Paint function is available only from the Icon Bar menu. This allows you to capture part of the screen image and store it as a sprite file.

To do this, press Menu over the Paint icon, and select 'Get screen area'. The pointer turns to a camera, with an arrow to the top left of it. Position it so that the tip of the arrow is at the top left-hand corner of the area you want to capture, hold down Select, then drag so that the box encloses the whole area, and release Select. A 'Save' dialogue box appears. Type a name and drag the icon to a directory viewer, or give a full pathname. You need to open a directory viewer before you use Get screen area, unless you are going to give a full pathname, as if you

don't give the name and drag the icon to a directory viewer, the image will be lost and you will have to define it again.

Summary

As a pixel-based painting program, Paint allows you to produce coloured pictures and print them in black and white. (You can print them in colour if you have a suitable printer driver and colour printer.) Paint produces files that are of a standard form and are compatible with other pixel-based graphics programs, so you can use your Paint pictures with other systems, and use pictures you have created with compatible packages in Paint. You can also use sprites you have created with Paint in Draw. This is explained in the next chapter.

7 : Draw

Draw is an 'object orientated' program and is quite different from Paint. Instead of storing an image as a series of coloured or shaded pixels, Draw pictures are made up from graphic 'objects' – circles, lines, filled shapes, and so on. The program stores the picture by reference to the positions and sizes of the objects. This allows you to place and move objects precisely.

Draw has its own graphics tools, which allow you to create graphic objects. You can also bring in text you have created in Edit, and sprites from Paint (or other compatible systems).

Starting Draw

You can look at a Draw file immediately by double-clicking on the icon of 'DrawDemo' on Applications Disc 1. Because the !Draw icon is in the same directory viewer, the computer can find and load Draw when you click on the Draw file icon. DrawDemo is a picture made up from graphics drawn in Draw, a sprite created with Paint, and text from Edit. You will need to use the toggle size icon and the scroll bars to display all the picture. You need to load Draw onto the Icon Bar before you can use it. If you display DrawDemo from the same directory viewer as Draw, the icon will be loaded automatically. Usually, though, you will need to double-click on the !Draw icon to load it. Then click on the Draw icon in the Icon Bar to start a new drawing. The empty Draw window is illustrated in Figure 7.1 opposite.

The drawing tools are shown down the left-hand side, in a strip called the toolbox.

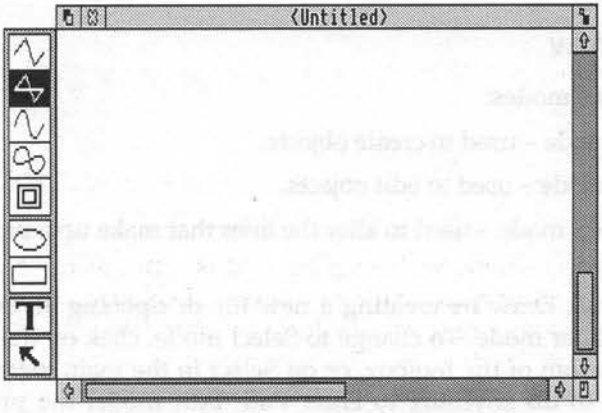


Figure 7.1. The empty Draw window.

Objects

As already mentioned Draw pictures are made up of objects. You can edit or move these objects after you have created them. Objects can be one of several types:

path	A sequence of one or more lines which may form a closed shape or may be open. Path objects are drawn using the first seven tools on the left of the window.
text line	A single line of text, created using Draw's text tool ('T').
sprite	An image created with Paint or another pixel-based drawing program.
text column	Several lines of text, created outside Draw.

You can group objects together and treat the whole group as though it were a single object to move it, delete it, and so on. You can 'ungroup' the objects again, too. However, you can't break up an object into its separate lines, characters, pixels, or whatever. This means that you can only use one line style, line colour or fill colour in each object. You can alter the lines that make up a path; this is described later in this chapter.

Using Draw

Draw has three modes:

- Enter mode – used to create objects.
- Select mode – used to edit objects.
- Path Edit mode – used to alter the lines that make up a path object.

When you start Draw by creating a new file or opening an existing one, it is in Enter mode. To change to Select mode, click on the arrow tool at the bottom of the toolbox, or on Select in the main menu. You do not need to do anything to enter Path Edit mode; the program switches to it as you start to edit paths, from either of the other modes. This is explained later in this chapter.

In Enter mode, the pointer changes to the shape shown in Figure 7.2 when you move it over the Draw window.

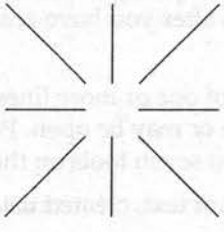


Figure 7.2. The 'cross-hairs' pointer of Enter mode.

The shape of this cross helps you to line up paths.

In Select and Path Edit mode, the pointer is an arrow.

Drawing Graphics

The quickest way to draw graphics is to choose tools from the toolbox on the left of the Draw window, but you can also select any of the tools from the 'Edit' sub-menu. The tools allow you to draw:

- Open-ended straight lines.
- Straight lines automatically closed to form a polygon.
- Open curved lines.

- Curved lines automatically closed to form a curved shape.
- A gap in a path (move).
- An ellipse.
- A rectangle.
- Text.

The final tool, the arrow, lets you switch to Select mode without using the menu.

To use any of the straight or curved line tools, click on the tool you want, then move the pointer to the starting position for the first line segment and click Select. Move the pointer to the first corner or curve and click Select again. Continue clicking Select at corners or to define curves, and then double-click Select or press RETURN when you have finished. If you have chosen one of the closed shape tools, the last line will be joined to the first to close the shape.

It is easy to see how the straight line tools work, but the curved lines take a little practice. When you start the first line, you will see that as well as the block which marks the starting position of the line, there is another block just after it, which moves around with the line. This is a control point. When you click Select and begin the second segment of the path, a second control point appears. The two control points are joined by a straight line, passing through the last point given with Select.

Curved lines are defined by their end points and these control points. A straight line drawn between the control points is a tangent to the curve you are drawing. The curve is drawn to fit between its two endpoints and so that the line defined by the control points is its tangent. As you draw the next line segment, the previous one alters again because the control point at its endpoint is now the control point for the start of the next segment, and so is movable.

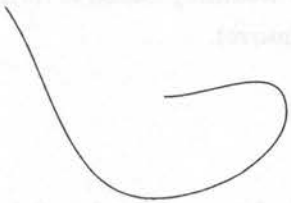


Figure 7.3.

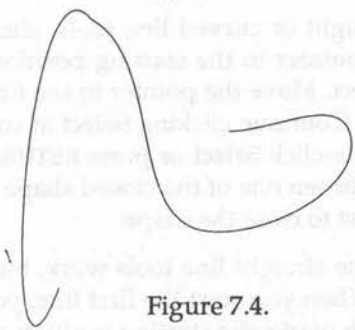


Figure 7.4.

The 'Move' tool allows you to put a gap in a line, but without breaking the path and starting a new object. This means that you can have an object with a discontinuous outline, or even comprising several elements which appear to be separate. If you use this tool with a closed shape tool, the shape will be closed, but the next item you draw will be part of the same object. You can switch to a different line tool after using move, and the new graphics will still be added to the same object. Only when you double-click will the object be completed. For example, all the shapes shown in Figure 7.5 opposite were drawn as a single object, by using 'Move' to close one shape and move the pointer to the start of the next without connecting the points with a line.

When you want to insert a gap, take the pointer over to the 'Move' tool and click on it. Although it looks as though Draw will add a line from the last endpoint you gave over to the toolbox, it won't. When you have clicked on the 'Move' tool, the pointer will lose its following line, and you can place it anywhere in the window and begin drawing again.

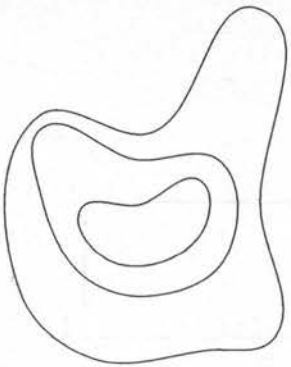


Figure 7.5. Moving between shapes without connecting points.

You can't use the 'Move' tool with the 'Rectangle' or 'Ellipse' tool.

To draw an ellipse, choose the 'Ellipse' tool, then click Select at the point where you want the centre of the ellipse. As you move the pointer, the ellipse you are defining moves with it. An ellipse is drawn using the vertical and horizontal distance between the pointer's position and the centre of the ellipse. Click Select when the ellipse is the size and shape you want.

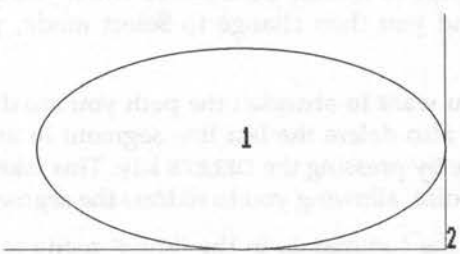


Figure 7.6. Drawing ellipses.

To draw a rectangle, choose the 'Rectangle' tool, click Select at the first corner of the rectangle, and then at the opposite corner. The size and shape of the rectangle you are defining are shown as you move the mouse around.

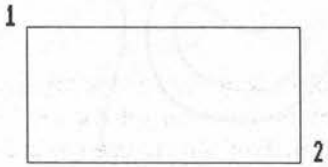


Figure 7.7. Drawing a rectangle.

To add text to the drawing, click on the text tool ('T') and then click to place the text caret in the window. The text will start at this position. When you have finished the line, press RETURN or double-click Select, or position the pointer and click Select again to start another text object. Each of these completes the text object, and you cannot then edit it. If you press RETURN, the caret goes to the start of the next line, and you can add more text, but this will be a new object.

You can place the caret and continue to add more text objects. If you do not press RETURN or double-click Select when you have finished the last object, and you then change to Select mode, your last text object will be lost.

If at any point you want to abandon the path you are drawing, press ESCAPE. You can also delete the last line segment in anything but a rectangle or ellipse by pressing the DELETE key. This takes you back to the previous endpoint, allowing you to redraw the segment.

You can also use the commands in the 'Enter' menu to draw any of these path objects. To draw an open straight or curved line, use 'Line' or 'Curve', with 'Auto-close' set off (not ticked). To draw a closed shape with straight or curved lines, use 'Line' or 'Curve' with 'Auto-close' on (ticked).

When you have finished drawing the object, use 'Complete' from the menu; this ends the path at the last endpoint you gave. Use 'Abandon' if you want to abandon the path and delete the parts of it drawn so far. (This has the same effect as pressing ESCAPE.) Use the commands 'Rectangle' and 'Ellipse' to draw these shapes, and 'Text' to add text

objects. If you are just using the menu commands to draw, you can remove the toolbox from the display by clicking 'Toolbox' in the main menu. Click on the menu line again to bring it back.

The Grid

To help you line up objects, you can display and lock graphics to a grid. The 'Grid' sub-menu lets you set the grid, and choose whether graphics are to snap to it. You can choose the colour, grid spacing and units, and whether to have a rectangular or isometric grid. The grid is only displayed if 'Show grid' is ticked. Click on this command to toggle the grid on and off. Colour is set with a colour dialogue box which allows you to choose a colour for the grid points.

You can choose to have the grid divided into inches or millimetres, and can also set the spacing of subdivisions. The spacing options lead to a submenu that sets the major spacing and any subdivision. This is shown in the form '1 x 10', for example. This means that the major divisions will be one (inch or centimetre) and the subdivisions will be a tenth of an inch or centimetre. Click on the divisions you want, or type them at the bottom of the sub-menu. You can use the 'y only' option with a rectangular grid to set different vertical and horizontal grid spacing.

If you set 'Auto-adjust' on, Draw will modify the grid if the grid points are too widely or closely spaced. If you don't want this adjustment to take place, turn auto-adjust off.

The grid may be rectangular or isometric. A rectangular grid has the same pattern as regular graph paper, with major grid points shown as crosses and subdivisions as dots. An isometric grid has a triangular pattern, again with crosses at the major grid points and dots at the subdivisions. Only the subdivisions on lines between major points are shown in an isometric grid, but graphics snap to other subdivision points, too. Some are missed out simply to clarify the screen display.

If you lock the grid, points on new graphic objects you define will snap to grid points. Existing graphics will not be affected. If you want to adjust existing graphics so that they are aligned with the grid, you can select the objects and use 'Snap to grid' in the Select sub-menu (described below). The grid is *never* printed out.

Object Styles

There are several style attributes you can set for objects. There are different style elements for path and text objects. You cannot set styles for sprite objects.

Path Objects

For suitable path objects you can choose:

- A line width.
- A line colour.
- A line pattern.
- A fill colour.
- How lines are joined.
- How the ends of lines are drawn.
- A winding rule (explained below).

All these are set using commands in the 'Style' sub-menu.

'Line width' is measured in points; a point is $^1/_{72}$ of an inch (in fact it is fractionally over this, but $^1/_{72}$" is generally used). You can choose one of the values shown on the menu, or type in your own value at the bottom of the menu. The option 'thin' uses the narrowest width the screen can display.

'Line colour' and 'Fill colour' both display a colour dialogue box. You can click on one of the colours shown along the bottom, or define your own colour (which will replace the current colour). To define a colour, drag the bars (or click on the arrows) to show how much red, green and blue you want to use in the colour. The bar of colour is updated as you change it. Click 'OK' when you are happy with the colour.

'Pattern' lets you choose a solid line or one of four broken line styles. Click on the one you want; the currently selected style is ticked.

'Join' allows you to choose how corners will be drawn. You can have mitred, round or bevelled joints as shown in Figure 7.8 opposite.

Figure 7.8. Mitred, rounded and bevelled joins.

'Start cap' and 'End cap' let you choose how the ends of lines will be drawn. 'Butt' draws the line square; the other options add 'caps' to the lines. The 'triangle' option has a sub-menu for you to set the size of the triangle; you can set the height and width separately, and both are set in multiples of the line thickness. Caps are added to the end of the line, and so increase its length (Figure 7.9).

Figure 7.9. Lines may be 'capped' in a variety of ways.

A winding rule is used to decide whether closed shapes should be filled with colour (when a fill colour is set). It is only relevant if you are drawing objects which have enclosed areas one inside another, as you might do using move to add a gap, or using the curved shape tool. For example, the shape illustrated in Figure 7.10 overleaf was drawn as a single object using the curved shape tool.

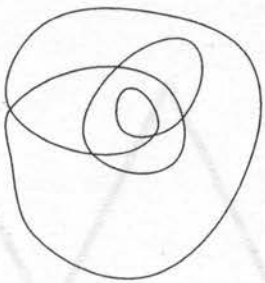


Figure 7.10. Creating single objects with the curved shape tool.

This has no fill colour set. If we set a fill colour, the way in which the shape fills is determined by the winding rule. With an even-odd winding rule, any areas enclosed by an even number of closed areas (including zero) are filled. Any number enclosed by an odd number of closed areas are not filled. With an even-odd winding rule, the shape fills like that shown in Figure 7.11.

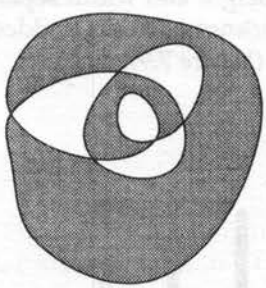


Figure 7.11. Filling using an even-odd winding rule.

A non-zero winding rule fills areas on the basis of the direction in which the paths enclosing them were defined. If the same number of the paths enclosing an area were defined clockwise as anticlockwise, the area is not filled. If there are different numbers of clockwise and anticlockwise paths, the area is filled. Figure 7.12 shows the same shape with a non-zero winding rule

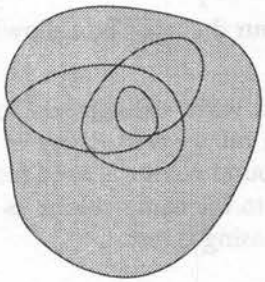


Figure 7.12. Filling using a non-zero winding rule.

All paths in this shape were drawn clockwise, so every area has an equal number of clockwise and anticlockwise paths around it (no anticlockwise paths, one to four clockwise paths).

Text Objects

For text objects, you can set:

- Font name.
- Font size.
- Font height.
- Text colour.
- Background colour.

The styles offered in 'Font name' are those which Draw had access to when you loaded it. By default, Draw uses the system font, but you can use other fonts. The other fonts will only be available if you had clicked on !Fonts before you loaded Draw. There is more information on fonts in Chapter Nine.

'Font size' is measured in points ($^1/_{72}$ inch). You can select one of the sizes shown, or type the size you want at the bottom of the menu.

'Font height' allows you to set the height separately. This means that you can make type taller and thinner, or shorter and squatter, than you could just using 'Font size'. 'Font height' is also measured in points. The height is reset when you use 'Font size', so set the size first, and then the height.

'Text colour' displays a colour dialogue box allowing you to choose or define a colour for the text.

'Background colour' is used with 'anti-aliased' fonts. An anti-aliased font uses shading to even out curves (there is more about this is Chapter Nine). The background colour is used for the shading. If you set the background colour to the same colour as the area behind the text, the effect of the anti-aliasing is lost.

Editing Graphics

Once you have drawn some graphic objects, you can work with them individually or in groups. Editing operations can be divided into those you do in Select mode, and those you do in Path Edit mode. Select operations are chosen from the Select sub-menu. You can use these with any type of object. Path editing is only possible with path objects. Let's look at Select mode first.

Selecting Objects

To enter 'Select' mode, click on the arrow at the bottom of the toolbox, or on Select in the main menu. You can then select the object you want to edit. To do this, click on the object. A selected object is shown with a dotted red rectangle around it, with two small red squares at its right-hand top and bottom corners. This rectangle is called the object's bounding box. To deselect an object, either select another by clicking Select over it, or use 'Clear' in the Selection sub-menu.

You can select several objects at once by using one of two methods:

- Hold down Select and drag a box around the objects, defining it from from the top left-hand corner to the bottom right-hand corner. Any objects which fall wholly or partially inside the rectangle are selected.
- Click on them in turn using Adjust.

You can select all the objects in the drawing using 'Select all' in the 'Select' sub-menu.

If you select several objects at once, they will be treated as a group while they are selected. Once you select something else, or use a

different mode, the objects will be ungrouped. You can group objects for longer using the 'Group' command in the 'Select' sub-menu. Select all the objects you want to group together, and then click on 'Group'. You will now be able to move, copy, delete and rotate all the objects together, but none of them separately. If you want to work with the objects separately again, select the group (you only need to click on one of the objects to do this when they are grouped) and choose 'Ungroup' from the 'Select' sub-menu.

When you draw graphics objects with overlapping bounding boxes, they are stacked in the order in which you draw them, with the first drawn at the back. When you click over superimposed objects, the one at the front is selected. As the selected object is shown by a red bounding box, you may not even know which object you have selected if they have coincident bounding boxes. (You can check before deleting an object by moving it first – see below.) If you can't select the object you want, you can either send the objects in front to the back of the stack, or double-click over the objects to go through to the one you want. Each double-click selects the object behind the last one selected. To send an object to the back of the stack, select it and use the command 'Back' in the 'Select' sub-menu.

Select Operations

Once you have selected one or more objects you can move, copy, or delete them, change an object's position in the stack, rotate and rescale them. All except moving an object are done using the commands in the 'Select' sub-menu, though you can rescale and rotate them using the boxes at their corners.

To move a selected object, move the pointer over the object and hold down 'Select' while you drag it to where you want it. Release Select and it will stay in its new position.

To copy an object or group, use 'Copy' in the 'Select' sub-menu. This makes a copy and places it next to the original. The new copy is selected and you can move it by dragging it to where you want it.

To delete an object, use 'Delete' in the 'Select' sub-menu.

You can re-order stacked objects using 'Front' and 'Back' in the 'Select' sub-menu. These are useful if you are using opaque filled shapes, since objects in a stack will be wholly or partially hidden behind others. Double-click to get to the object you want to select if it is not at the front of the stack.

There are two ways to rotate or rescale an object. You can either drag the boxes on the right of the selected object (or group), or use the commands 'Rotate', 'X scale', 'Y scale' and 'Line scale' in the 'Select' sub-menu. The menu commands allow you to specify the change you want precisely.

To rotate an object or group, drag the box at the top right-hand corner. The bounding box moves as you drag, so you can see the orientation the object will have. When you release Select, the object is redrawn at its new orientation, and a new bounding box is drawn, parallel with the window edges again.

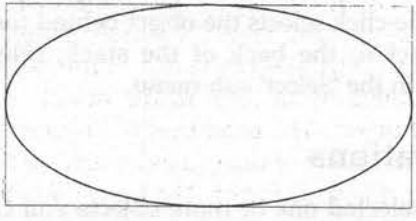


Figure 7.13. The object prior to rotation.

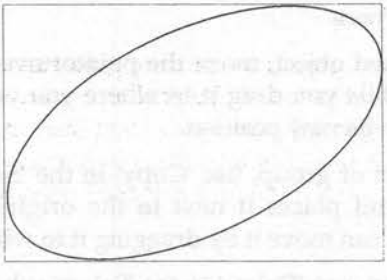


Figure 7.14. The object after rotation.

Alternatively, use the command 'Rotate'. Supply an angle in degrees to this command. Rotation is anticlockwise.

You can rescale an object precisely using the menu commands, but if you want to adjust it by eye, drag the box in the lower right-hand corner of the selected object or group.

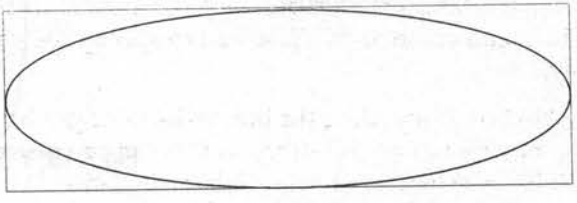


Figure 7.15. Rescaling the same object.

You can rescale objects more precisely using 'X scale', 'Y scale' and 'Line scale'. You need to supply a scale factor to each of these; scaling is relative to the current size. 'X scale' changes the horizontal dimensions, 'Y scale' changes the vertical dimensions, and 'Line scale' changes the thickness of all lines in the object. You can't use 'Line scale' with a text object. The examples in Figures 7.16, 7.17, and 7.18 (overleaf) shows the effect of using 3 as an X scale factor, 2 as a Y scale factor, and 20 as a line scale factor. The figure was the same as the first before each command was used.

If you want to enlarge or reduce all dimensions equally, use 'Magnify'. This uses the scale factor you give to adjust the X and Y scale and the line thickness (Figure 7.19).

If you have drawn graphics with the grid turned off, or not locked, you can make objects snap to the grid afterwards using 'Snap to grid'. This will cause slight adjustments in their size and shape as each point used to define the object is moved to the nearest grid point. You can only use 'Snap to grid' if the grid is locked on (Locked will be ticked in the 'Grid' sub-menu).

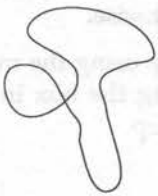


Fig 7.16: Original

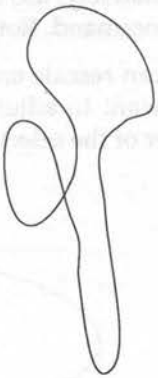


Fig 7.18: Y Scale = 2

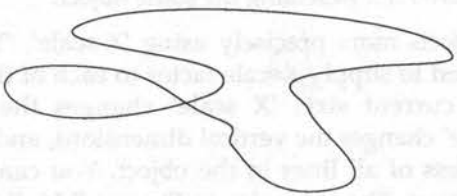


Fig 7.17: X Scale = 3

Figures 7.16 (top), 7.17, and 7.18 (bottom). The effect of using 3 as an X scale factor, 2 as a Y scale factor, and 20 as a line scale factor. The figure was the same as the first before each command was used.

Figure 7.19. Adjusting the line thickness.

If you have selected a group of objects, or have just formed a group by selecting several objects and using 'Group' to link them, you can alter the arrangement of the objects within the group using 'Justify'. This leads to a sub-menu allowing you to align the objects vertically and horizontally within the bounding box of the group. All the objects will be repositioned so that they come to the edge of the box. They can be positioned horizontally to the left, in the centre or to the right, and vertically, at the top, in the centre or at the bottom of the bounding box. This example shows how the objects in the group alter if Justify left (Figure 7.20) and bottom (Figure 7.21) are used.

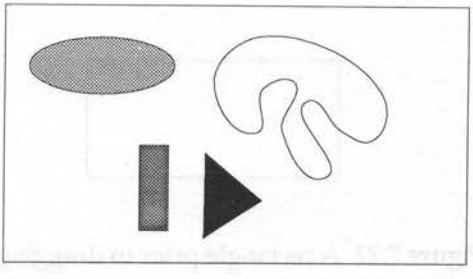


Figure 7.20. Justifing objects left.

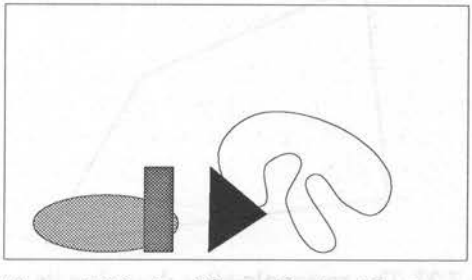


Figure 7.21. Justifing objects at bottom.

If you ungroup the objects, they remain in their new positions.

Path Editing

Path editing allows you to change the lines and points which make up a path object. You can start path editing in either of two ways:

- From 'Edit path' in the 'Select' sub-menu
- By clicking with Adjust on a path object.

You can't use path editing if you have selected more than one object, or a group of objects, or an object that is not a path object.

When you enter Path Editing mode, the points and control points in the object are shown. You can drag the points using Adjust to alter the lines. For example, a rectangle can be pulled out of shape by dragging its corners as illustrated in Figures 7.22 and 7.23.

Figure 7.22. A rectangle prior to dragging.

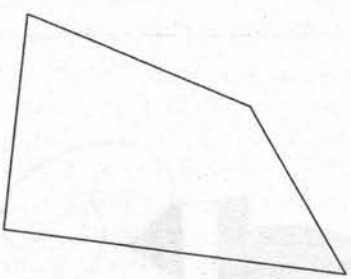


Figure 7.23. The rectangle after dragging its corners.

With curved shapes and ellipses, the control points are shown as well as the points, and the control points are joined to the points by lines which form tangents to the curves. You can edit these shapes by dragging points or control points with Adjust.

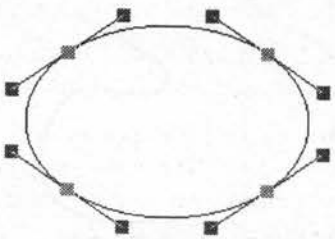


Figure 7.24. The control points on an ellipse.

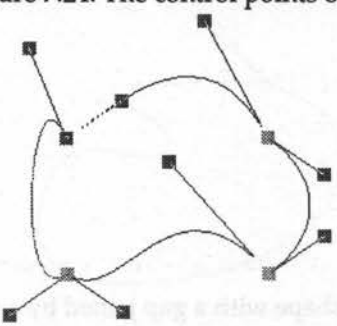


Figure 7.25. The same ellipse after dragging some control points.

Path editing also has its own menu. You need to select a path before you can use the menu commands. If you enter Path Editing mode by clicking with Adjust on an object, one of its paths may already be selected (it depends on whether you clicked near an endpoint). Otherwise, select a path by clicking on an endpoint or control point. On a colour monitor, the selected path is shown in red. Using the menu commands, you can (with a suitable path):

- Change a straight line to a curve.
- Change a curve to a straight line.
- Change a line to a move (insert a gap); in a closed shape, the starting points of the lines either side of the gap will be joined by a straight line (as shown in Figures 7.26 and 7.27 overleaf).

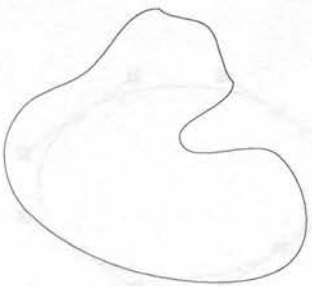


Figure 7.26. A curved shape prior to a 'move'.

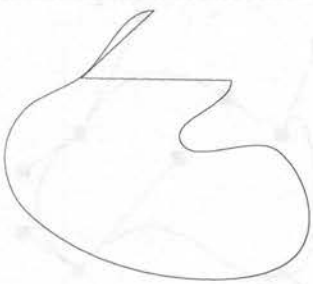


Figure 7.27. The same shape with a gap joined by a straight line.

- Add an endpoint – you can then position this wherever you want it, to add a new curve or corner to a shape.
- Delete a segment of the line: the endpoints either side will be joined by a single line.
- Open a path object: this breaks the line in a closed shape at the endpoint of the selected line segment – Figures 7.28 and 7.29.

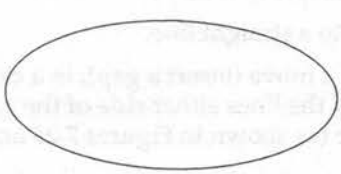


Figure 7.28. The closed shape.

Figure 7.29. The shape with a broken line.

- Close an open path object: this closes an open shape – Figures 7.30 and 7.31.

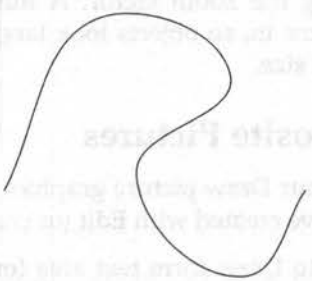


Figure 7.30. An open object path.

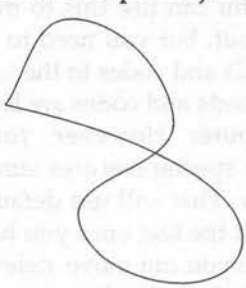


Figure 7.31. The same path closed.

- Enter a coordinate for the endpoint of the selected segment. You can give an X and Y coordinate, and choose whether to use centimetres or inches. Used with the grid, this allows you to place and alter graphic objects precisely.

When you have finished editing paths, click anywhere in the window with Select to go back to Enter mode.

Looking at Your Drawing

You can display a second view of your drawing using the command 'New view' in the 'Misc' sub-menu. You can use this to display two areas of the drawing together which would not fit on the screen in a single view. Any changes you make in either window affect the file just as if you had only one window open.

You can zoom in on areas of your drawing to work on them in detail, or zoom out to get an overall view of a large area. Use the 'Zoom' command, supplying the zoom factor. A number larger than one before the colon zooms in, so objects look larger. The zoom factor is relative to the current size.

Making Composite Pictures

You can bring into your Draw picture graphics you have created with Paint and text you have created with Edit (or compatible programs).

Text files brought into Draw form text area (or column) objects. The text can be arranged in one or more columns, flowing continuously from one to the next. You can use this to make a crude imitation of desktop publishing output, but you need to do all the text styling by adding control commands and codes to the text file before you bring it into Draw. These commands and codes are listed in the *User Guide* that comes with your computer. However, you can bring in a single column of text using no special features simply by dragging an Edit file into a Draw window. This will use default settings for the format and font. You cannot edit the text once you have taken it into Draw. It becomes an object, which you can move, delete, copy, rotate and so on, like any other object. If the default column is not large enough to accommodate all your text, select the text object and drag the box in the bottom right-hand corner to make it larger. More of your text will be read in. Enlarge the box until all the text fits (or you run out of window space!).

You can also take images you have created with Paint into Draw. Again, you cannot alter the picture you have brought in, but you can move it around, copy it, and so on.

Printing Your Picture

When you want to print out your picture, you will need to connect a printer and load a suitable printer driver. This is explained in Chapter 17. Then use the command 'Print' in the 'Misc' sub-menu. This lets you choose how many copies of the picture you want to print.

While you are designing your picture, you should remain aware of how it will fit on the paper you want to use to print it. You can set the window size to one of several standard sizes of paper using the command 'Paper limits' in the 'Misc' sub-menu; you can also choose whether to use landscape or portrait orientation.

You can display the limits of the size of the paper you are actually going to print on to remind you while you work of how much space you are using and where the graphics will appear on the page. If you have loaded a printer driver, the paper limits shown are taken from the printer driver settings as they were when you loaded Draw, otherwise they are for A4 landscape. Click on 'Show' to display the edges of the paper as a broad grey border. Anything which falls onto the grey border will be in the non-printing margins of the paper and will not be printed.

Summary

This chapter has explained the main features of Draw and how to use the program. You will need to practise and experiment to develop your skills with it and discover all that it is capable of. Instructions on preparing text to use in Draw, and using files from graphics packages which use DXF (data interchange) format can be found in the *User Guide* that accompanies your computer.

8 : Maestro

Maestro is a music editing program. It allows you to transcribe music onto staves, to edit music you have transcribed, and to play the music using a variety of instruments, volumes and tempos. You need to understand musical notation to be able to use Maestro fully, but you can use it to play the sample tunes without knowing anything at all about music. If you understand musical notation, you can compose your own tunes, or transcribe music by others and play it.

Starting To Use Maestro

There are several sample pieces of music on Applications Disc 2, in the directory called 'Tunes'. Double-click on one of these to load Maestro onto the Icon Bar and load a tune. (Maestro is also on Applications Disc 2, so the Archimedes can find and load it automatically when you choose a tune.) The window that appears will look something like that shown in Figure 8.1.

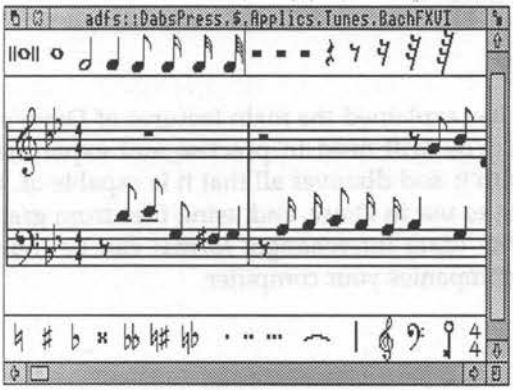


Figure 8.1. A tune loaded into Maestro.

To play the tune you have loaded, press the Menu button and choose the command 'Play' in the bottom line of the menu. After a few seconds, the tune begins. The score scrolls across the window as the tune plays. If you want to stop the tune, display the menu again and click on 'Play' to turn it off.

Varying the Sound

You can alter the sound of the sample tunes without editing the score at all. Even if you know very little about music, you can alter the tempo, the instruments used and the volume of the music. Experiment with these settings:

Instruments — You can set up to eight instruments in total. They will be divided roughly between the number of staves you have. Each of the sample tunes has two staves, so there will be four instruments allocated to each (though all the instruments will not be used unless they are needed). The instruments you can choose from are:

- string libretto soft, hard, steel, or pluck
- wave synthesizer beep.

You can also set the volume for each instrument, from 'fff' to 'ppp' (very loud to very soft), its stereo position from Full left to Full right (through Left, Centre left, Centre, Centre right, and Right) and MIDI to 1-16. To make these settings, click Select over the one you want to display the options in turn. Click Adjust to move backwards through the settings. The final setting, MIDI, is for a Musical Instrument Digital Interface. If you have one of these fitted to your computer to enable the computer to drive a musical instrument, consult the manual that accompanies the device to see which settings you should use.

Volume — You can set the volume for the whole piece to values between 'fff' and 'ppp'.

Tempo — You can choose from a range of tempos from largissimo (very slow) to prestissimo (very fast).

Writing Your Own Score

To write your own score, you need to start with a clear window. You can clear a tune from the window using 'Clear' in the menu, which deletes any tune you were displaying. If you have just loaded Maestro, click on the icon to display a new window, but if you have loaded a tune, this tune will be displayed in the window and you will need to clear it.

You can have up to four staves for your score, plus a percussion line. Use the menu command 'Staves' and type the number you want. Click on '+percussion' if you want the percussion line. (Click on it again to turn it off.)

Once you have set up the staves, you can start to build up the score. To add anything to the score, click on its icon in the top or bottom panel of the window, then move the pointer onto the score. An icon roughly follows the pointer, but only appears in valid positions, so it will jump from one place to the next as you move the pointer.

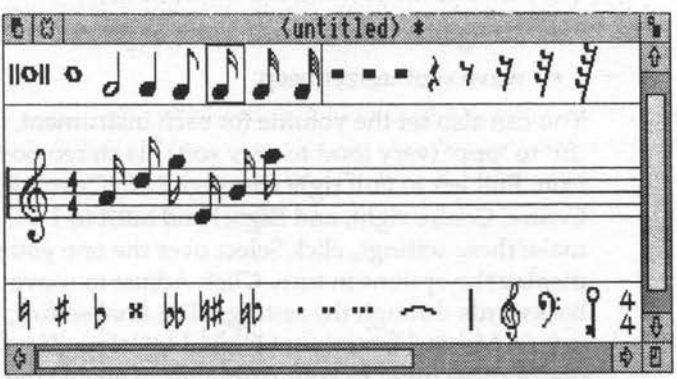


Figure 8.2. Building up your own score.

When it is where you want it, click Select to position the icon. The icon appears on the stave when you move the pointer away (out of the bar, for clefs, key signatures and time signatures). Notes can be placed anywhere, but some other icons will only appear in their valid places. For example, a rest will always appear in the middle of the stave, and a clef at the beginning of a bar. Once you have picked up an icon, it will continue to follow the pointer so that you can use it repeatedly. It

will remain with the pointer until you choose another icon or display the menu.

To set the key and time signature, you first need to use the menu options to give values for these. The time signature submenu shows values for the upper and lower numbers; click on Select or Adjust to display the options in turn. 'Key signature' displays the minor and major keys – click on the ones you want. Once you have set the values with the menu, you can add the key and time signatures to the score using the key icon and the 4/4 icon at the extreme right of the lower panel.

To add a bar, use the bar icon to the left of the treble clef. This adds a bar across all the staves.

Notes with tails are drawn with the tail going up or down depending on the direction in which the pointer drags the icon. If the pointer is dragged downwards, the tail will point upwards; if the pointer is dragged upwards, the tail will point down. To reverse the direction of the tail, drag the pointer in the appropriate direction before placing the note. Notes create their own ledger lines if you place them above or below the stave.

You can add dots and ties to the notes in the same way. A tie icon is of a fixed length, but this makes no difference when the notes are played: the tie has the right effect, even though it may not appear to join the notes together.

Editing the Score

You can continue to add to your score, and can place new notes, rests and so on anywhere in the score. You can also delete items from the score (see below). If you need to move to a different area of the score for your editing, use the menu command 'Goto', which has a field for you to type the number of the bar you want to move to.

To delete anything from the score, click on the same icon in the top or bottom panel, and drag the icon over the one you want to remove. When they are superimposed, the icon on the stave disappears. Click to remove it permanently. With icons that can only be placed at the start of a bar, such as clefs, moving the same icon into the bar makes

that on the stave disappear before the two are superimposed. This is why a clef does not appear immediately when you click in a bar – the shadow icon following the pointer is still in the same bar. You can delete ties and dots separately, but if you are going to delete the note, you don't need to – they will be deleted automatically with the note.

To change one type of note (or other icon) for another, delete the original and place the new one.

Plug It In!

To improve the sound quality, you can plug the computer into your stereo system or headphones and play the music through that, or use a Musical Instrument Digital Interface board to drive a musical instrument from the computer (see Chapter 19). Plug headphones or a stereo system into the socket at the back of the computer marked 'Headphones 32ohm'.

Saving Your Work and Closing the Window

You can close the Maestro window at any time without losing your work. The current score reappears next time you click on the Maestro icon on the Icon Bar. However, your work will be lost if you turn off the computer or use 'Quit' in Maestro's Icon Bar menu. If you try to use 'Quit' when you have unsaved work, an alert appears giving the chance to cancel the 'Quit'.

To save your score, use the 'Save' command, giving a name for the file, and then drag the icon to a directory viewer.

Summary

You can use Maestro to play music, even if you don't understand musical notation. You can use the tunes supplied on Applications Disc 2, and choose how they are to be played. You can also transcribe sheet music and play this, or compose your own music and play it.

9 : Fonts

A font is a set of characters of a particular design. Your Archimedes comes with a system font, which is used by the Desktop and by applications unless you choose another font, and three further fonts, called 'Corpus', 'Trinity' and 'Portrhouse' (which is pronounced 'porterhouse').

This text is in system font

This text is in Corpus

This text is in Portrhouse

This text is in Trinity

Figure 9.1. The four 'standard' Archimedes fonts.

This chapter explains how to use fonts, and what the difference is between these fonts.

A Bit About Fonts

The fonts supplied with the Archimedes can be distinguished from one another by two over-riding factors. These are:

- The font may be proportionally spaced or fixed-pitch.
- The font may be anti-aliased.

A fixed-pitch font is one that allows the same amount of space for each character. This means that there is a lot of spare space around thin characters, such as 'i' and 'l', and very little spare space around fat characters like 'm' and 'w'. A proportionally spaced font, on the other

hand, allocates different amounts of space to different characters. Thin characters then take up less space than fat ones.

This is proportionally spaced text

```
This is text in a fixed pitch font
```

Figure 9.2. The difference between proportionally and fixed spaced fonts.

The system font and Corpus are fixed-pitch fonts. Trinity is a proportionally spaced font.

An anti-aliased font is one which uses shaded pixels to even out curves. This gives the characters a better appearance on screen, because the 'squareness' of the outline is blurred. Figure 9.3 shows how an anti-aliased font character might look if you examined it closely.

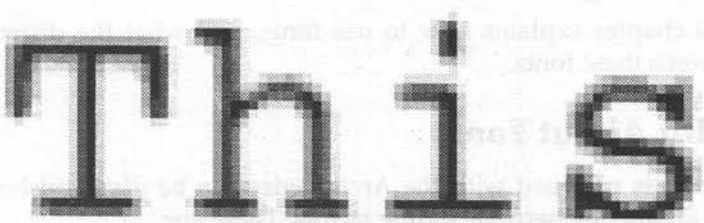


Figure 9.3. An anti-aliased font has blurred edges.

Using Fonts

In some applications, you can choose to use a font other than the system font. In Edit, another font can be used only for display, it won't be used if you print out the file. In Draw, the fonts will be used when you print the file.

The applications on the applications discs use the system font as a default style. If you want to use another font, the computer needs to know where to find it. You therefore need to open the !Fonts directory before you load the application. You can either click on !Fonts to list the fonts available, then click the mouse or press the space bar to close the window again, or double-click on it, then close it using the close icon. If the font option on an application menu only shows system font, it is because the computer is not able to find any other fonts. Save your work, quit the application, open !Fonts, then reload the application and your work. The font option in the menu will now offer all the fonts the computer found in the directory.

Font Size

Edit and Draw allow you to select a size for the font you are using if it is not system font. (System font always uses the same size.) Font size is measured in points. A point is $^1/_{72}$ fr an inch. The text usually used for the body text in books is 10, 11 or 12 point. Set the point size using the 'Font size' command in the menu. Figure 9.4 shows some examples of text in different point sizes.

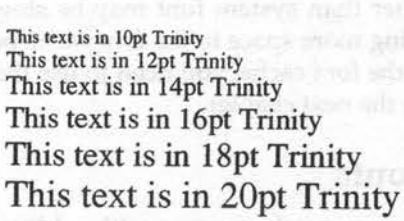


Figure 9.4. Different point sizes.

These applications also allow you to set a font height separately. This does not change the width of the characters, but lets you change their proportions, so that you can have tall thin letters, or short squat letters as shown in Figure 9.5 overleaf.

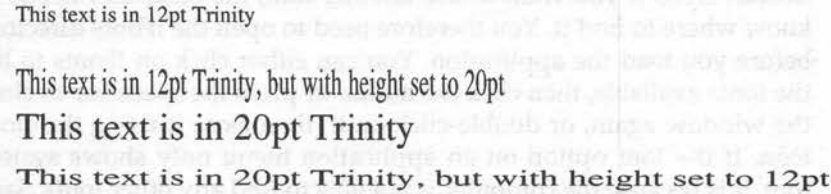


Figure 9.5. Changing the height of a font.

The font height is also measured in points. When you set the font size, this resets the height and width to the same values, so if you want characters with different height and width values, set the size first and then the height.

Paint is rather different, as it measures character size in pixels, and you need to give values for both the X and Y dimensions.

Font Cache

The computer stores as many fonts as it can in a section of the memory allocated to font storage. This is called the 'font cache'. If you have a small amount of memory allocated to the font cache, screen redraws involving fonts other than system font may be slow. You can speed them up by allocating more space to the font cache before you start an application. To set the font cache, you need to use the 'Task Manager'. This is described in the next chapter.

Additional Fonts

Some applications you can buy come with additional fonts. Acorn Desktop Publisher, for example, uses Trinity and Corpus and another three fonts. These come in a directory called !Fonts with which you can replace the !Fonts supplied on Applications Disc 1. You can then use them with other applications, too! It is likely that in the relatively near future Acorn (or someone else) will bring out additional fonts which we will be able to buy individually or in groups without having to buy an applications package. The new fonts supplied with Acorn Desktop Publisher are 'outline' fonts and are not anti-aliased. Outline fonts are

more sophisticated and, in theory, can be edited, so it may be possible in the future to buy and even customise outline fonts.

Summary

Fonts other than system font are accessed through !Fonts, so you must display the contents of this directory before loading an application in which you want to use the fonts. In Edit you can only use one font at a time, and it is used only for the screen display; it is not saved with the file or printed out.

Look out for extra fonts coming on the market in the future!

10 : Tailor Made

Customising your Archimedes

There are several settings you can make to control the way your Archimedes behaves and what it does when you turn it on. Some of the settings you will need to make – such as telling the computer you have a hard disc, or a special type of monitor – others are options which let you choose the type of default actions you prefer.

This chapter looks at:

- Setting the palette.
- Setting the screen mode.
- Using the configure program.
- Using the *CONFIGURE commands.
- Using the Task Manager to set memory allocations.
- Writing a boot file.
- Resetting the computer and its configuration.

What Settings Can You Make?

The settings you can make can be divided into information about the hardware of the machine, preferences about the display, behaviour of the mouse, keyboard, and so on, and the allocation of memory. You can also write a 'boot file' to load applications onto the Icon Bar, or start non-desktop programs when you turn on or reset the computer.

We will start with creating a palette – a set of colours the Desktop will use for all its displays.

Creating a Palette

A palette is a set of colours used for the screen display. When you turn on the computer, it uses a 'default palette'. If you don't like the colours it uses, you can create your own palette, in fact you can create as many palettes as you like.

To define a palette, use the palette icon at the right of the Icon Bar (next to the system icon). Click on this to display a palette window similar to that shown in Figure 10.1.

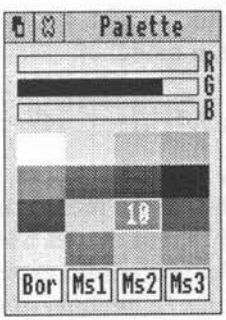


Figure 10.1. A typical palette window.

Use this to define colours by setting the proportion of red, green and blue for each. To set a colour, click on its box. A border and a number appear, and its proportions of red, green and blue are shown by the shaded bars at the top of the window. Drag the bars, or click in the unshaded areas, to adjust the proportions.

The boxes along the bottom, 'Bor' to 'Ms3', let you define the colours used for the screen border and the pointer. The function of each box is as follows (Table 10.1.):

Box	Function
Bor	Colour of the screen border around the Desktop.
Ms1	Colour of the border of the arrow.
Ms2	The fill colour of the arrow.
Ms3	An alternate colour used by some special pointers.

Table 10.1. The palette options.

The screen display is updated as you drag the bars. When you have finished setting the palette, you can click the 'Close' icon to keep the colour settings, but this does not save your palette. If you want to save your palette to use again later, press Menu with the pointer over the palette window or palette icon on the Icon Bar, and use the 'Save' command. Give the palette a name, and drag its icon to a directory viewer. When you want to use the palette, double-click on its icon in the directory and the screen will be redrawn using the new colours.

Other options on the 'Palette' menu (either from the palette window or its icon on the Icon Bar) are 'Invert', which reverses black and white and shades of grey, 'Default', which resets the default palette, and 'Mode', which sets the screen mode.

Setting the Screen Mode

The screen mode is a setting which controls the display on the monitor. It affects the quality of the picture and the number of colours used in the display, and different modes use up different amounts of the computer's memory. As you would expect, a high quality display with lots of colours uses more memory than a two- or four-colour display. There are 28 modes, numbered 0—21 and 23—28; different screen modes are appropriate for different monitors. The modes you are most likely to want with various monitor standards are listed below in Table 10.2.

Monitor	Colours	Mode
Standard	16	12
Standard	256	15
Multisync	16	20
Multisync	256	21
VGA	16	27
VGA	256	28
Hi-Res Mono	n/a	23

Table 10.2. Monitors, colours and modes.

To change the screen mode, use the 'Mode' command in the Palette menu; click on the mode you want, or type it at the bottom of the sub-menu and then press RETURN. The screen will be redrawn using the mode you have chosen.

Screen redraws (ie, the time it takes the screen to be redrawn if you move a window, for example) are slower in 256-colour modes than in modes that use fewer colours.

You can choose a mode for each of your pictures in Paint as you create the new sprites. This allows you to have, say a sprite with 256 colours in its palette while you are using a 16-colour screen mode. The 256 colours will be available only for the sprite.

Configuring Your Archimedes

You can configure the computer in one of two ways. You can use the 'Configure' program on Applications Disc 1, or use the *CONFIGURE commands outside the Desktop. You can make more settings with the *CONFIGURE command than with the Configure program, but when you first start using the computer you will probably not need much more than you can do with the program. We will look at the program first, then at some of the more useful *CONFIGURE options.

The Configure Program

To use the Configure program, double-click on its icon in the directory viewer for Applications Disc 1 to load it onto the Icon Bar. Then click on the icon to display the configure window – shown overleaf in Figure 10.2.

For the settings that show a shaded box, click in the box for the setting you want. For those that show a star, or have a single white box, click to toggle the setting on (star showing) or off (no star). For Sound voice, click repeatedly to scroll through the options. You need to type the setting you want in all the other text fields. The parameters you can set with this window are detailed below.

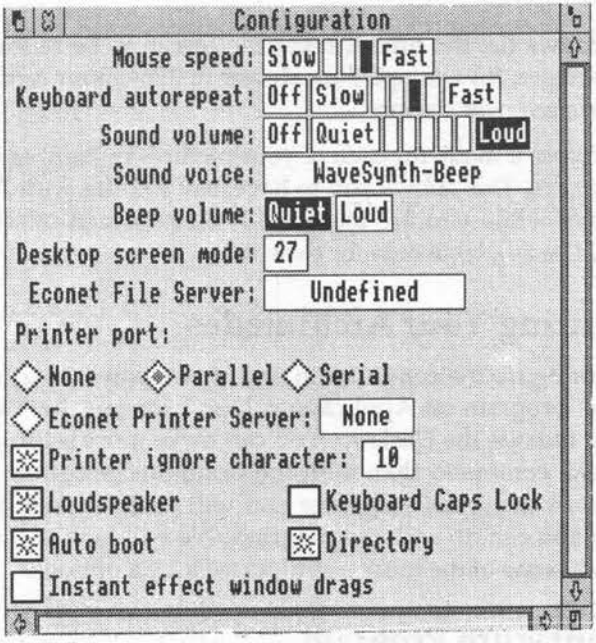


Figure 10.2. The configure window.

Mouse speed

This controls how quickly the pointer moves across the screen as you move the mouse. You might like to set this to a fairly slow speed until you are used to the mouse and pointer, and increase it as you come to find it irritatingly slow!

Keyboard autorepeat

This controls how long you have to hold down a key on the keyboard before the character is repeated (called the 'auto-repeat rate'). How you set this will depend on your typing speed and habits. If you set it to 'Off', you need to press a key each time you want to use a character, and you cannot add multiple copies of a character by holding the key down. If you touch-type, you almost certainly strike a key twice to use the character twice anyway, but don't turn it off just for this reason: it can be useful to have autorepeat on for adding rows of dots, for example, or lots of spaces.

Sound volume

This controls the volume of sounds other than the 'beep' you hear when an error box is displayed. For example, the volume of the music or noises used by games is controlled by this setting. You can try out different settings using the next option, Sound voice, since this plays a sample of each voice at the current volume.

Sound voice

This sets the voice used for the error beep. The default is the wave synthesizer sound characteristic of computer beeps, but you can choose from a variety of string and percussion sounds.

Beep volume

This sets the error beep to loud or quiet. When you click on each of these, the current beep is played at the appropriate volume.

Desktop screen mode

This sets the screen mode from start up. You can change the screen mode while you are using the computer with the 'Mode' command in the 'Palette' menu.

Econet file server

This sets the name of the file server used with an Econet network. The computer will look for a file server with the name you give. If your computer isn't connected to a network, leave this as 'Undefined'.

Printer port

This tells the Archimedes whether a printer is connected to the serial or parallel port (or whether there is no printer connected). If you choose the wrong setting, your text *will not* be printed out. Look at the back of the computer and see whether a printer is plugged into either socket. If you have not fitted a printer, and want information on this, consult Chapter 17.

Loudspeaker

This controls whether the loudspeaker is connected. If you set this off, you will not hear any beeps or music.

Keyboard Caps Lock

This sets whether the computer starts up with the 'Caps Lock' light on (bottom left-hand corner of keyboard), forcing you to type in capitals. If there is a star in the box, the computer will come up with capitals locked on. You can press the 'Caps Lock' key to turn them off, of course, but if you never or rarely use capitals for all your text, turn it off in this window.

Auto boot

This tells the computer to execute a file called '!boot' (a boot file) when it is turned on or after a reset. Boot files are described below.

Directory

This selects the 'root directory' of the current filing system when you turn on the computer or reset it. If you have a boot file in the root directory, you will need to set Directory on, otherwise the computer will not look in the directory and find and execute the boot file.

Instant effect window drags

This sets whether windows are continuously redrawn as you drag them, or whether an outline follows the pointer as you drag the adjust size icon or title bar, and the window is only redrawn at the end of the drag. With Instant effect turned on, the window is updated as you drag. This can be slow, and the flickering as it redraws is irritating to many people.

The settings you make take effect *immediately*, even before you close the window. Close the window when you have finished making your settings. You do not need to save the window explicitly, the new settings are saved automatically, and are preserved even when you turn the power off.

*CONFIGURE Command

The *CONFIGURE command has many options, which are fully documented in the *User Guide* issued by Acorn with your computer. It allows you to set the same things as the configure program, and more besides. One important difference is that whereas settings made with

the program take effect immediately, settings made with the command only take effect after you reset the Archimedes, or turn it off and on again.

To use the '*CONFIGURE' command, you need to leave the Desktop. The most convenient way to do this is to use the function key 'F12' (the extreme right key at the top of the keyboard). When you press this, a new area appears below the Icon Bar. This has a star prompt ('*'), the standard prompt from RISC OS, the Operating System. (RISC OS is described further in Chapter 12.) This window is often referred to as the 'Command Line' or 'Command Line Interface' (CLI). You can start typing RISC OS commands immediately. Alternatively, you can use the command '*COMMANDS' in the Task Manager menu. To display this menu, move the pointer over the system icon at the extreme right of the Icon Bar. It has the same effect as pressing F12. To return to the Desktop, press RETURN. The Desktop will go blank for a moment, but don't worry, it will return with all your windows intact.

If you want to leave the Desktop for longer, use 'Exit' in the Task Manager menu. This closes down all Desktop windows, though, so save any unsaved work before you use this or it will be lost.

Before you start setting the configuration with *CONFIGURE, you should check the current settings, or the computer's 'status'. To do this, type 'STATUS' or 'ST.' in the command line (the text will appear after the '*' prompt). Press RETURN and you will be presented with a display which is a status report showing all the current *CONFIGURE settings. If the text does not all fit on the screen, hold down the SHIFT key to scroll to the next lot of text. The '*' prompt reappears at the end of the list.

The *CONFIGURE options are listed by command name in the *User Guide* issued by Acorn. Unless you already know the name of the command you need to use, this is not very useful. In this Guide the function of the command is shown on the left, and the command you need to use on the right. The list omits some of the less commonly used options. Computer behaviour options come first, then hardware settings. To make any of the settings, type the command as it is shown on the right. The '*' is added automatically, so you don't need to type it even though it is shown in the Acorn manual. You can abbreviate

'CONFIGURE' to 'CO.' or type it in full, and you can use any combination of upper and lower case (for instance 'CO.' or 'co.'), it makes no difference.

The *CONFIGURE options have been divided into three headings:

- Preferences
- Hardware
- Memory

Many of these you will not wish to use during your first few weeks of use of your Archimedes, but as you come to run more advanced applications you may need to make changes. For this reason do read briefly through the descriptions below, and don't worry if some of them seem alien at present. At least you will know they are there and they will make more sense when you come to use them for a practical purpose at some stage in the future.

Preferences

Run a boot file
Syntax: `Co. Boot`

Do not run a boot file
Syntax: `Co. NoBoot`

Lock Caps on at reset
Syntax: `Co. Caps`

Do not lock Caps on at reset
Syntax: `Co. NoCaps`

Lock Caps on, but with Shift used to generate lower case letters
Syntax: `Co. ShCaps`

Set delay before keys autorepeat
Syntax: `Co. Delay <no>`

Notes: The number must be a value between 0 and 255; it sets the auto-repeat time in hundredths of a second, ie, if you set it to 100, you need to hold a key down for one second before the character is repeated.

Set the interval between autorepeats
Syntax: `Co. Repeat <no>`

Notes: The interval between subsequent repeats need not be the same as the delay between the first key press and the first repeat. The number is in hundredths of a second again.

Set the root directory of the filing system as the current directory
Syntax: `Co. Dir`

Do not set a root directory as current
Syntax: `Co. NoDir`

Set the filing system to be used
Syntax: `Co.FileSystem <no/name>`

Notes: The number, must be '8' for ADFS, or '5' for NetFS (the Network filing system); the <name> can be ADFS, RAM or Net.

Set the beep volume to loud
Syntax: `Co. Loud`

Set the beep volume to quiet
Syntax: `Co. Quiet`

Set the screen mode
Syntax: `Co. Mode <no>`

Notes: The number must be a valid screen mode number, suitable for your monitor type.

Set the mouse speed to control how quickly the pointer moves
Syntax: `Co. MouseStep <no>`

Notes: The number can be '1', '2' or '3'; '1' is the slowest.

Scroll to next line when a character appears at the end of a line
Syntax: `Co. Scroll`

Do not scroll to a new line
Syntax: `Co. NoScroll`

Redraw a window continuously as it is resized or moved

Syntax: `Co. WimpFlags <5 bit-number>`

Notes: The number has these elements:

bit 0 The window is updated as it moves.

bit 1 The window is updated as it is resized.

bit 2 The window contents scroll horizontally as the caret (or other cursor) moves across the window.

bit 3 The window contents scroll vertically as the caret or other cursor moves up and down the window.

bit 4 No beep sounds when an error box is displayed.

A 5-bit number is a binary number made up of five digits, each of which must be '0' or '1', so it can be 00000 to 11111. In decimal notation, this is 0—31; the setting is shown as the decimal value by *STATUS, and you need to supply it as a decimal value to this command. To work out the number you need to give for the settings you want, draw up a table like this:

16	8	4	2	1
bit 4	bit 3	bit 2	bit 1	bit 0

Now put a '1' under each bit you want to 'set'. Add up the numbers at the top of the columns you have put 1's in, and the total is the number you need to give to WimpFlags. For example, if your table looks like this:

16	8	4	2	1
bit 4	bit 3	bit 2	bit 1	bit 0
1	0	0	1	1

The number you need to use is 16+2+1=19.

Set the default screen mode for the desktop

Syntax: `Co. WimpMode <no>`

Notes: The number must be a valid screen mode, suitable for your monitor. You can use this and 'Co. Mode' to set different screen modes for Desktop and non-Desktop operations.

Hardware Settings

The hardware settings tell the Archimedes about the peripherals you have attached: disc drives, monitor and printer.

Disc Drive Options

The number of floppy disc drives attached

Syntax: `Co. Floppies <no>`

Notes: The number must be between '0' and '4' inclusive.

The number of hard disc drives attached

Syntax: `Co. HardDiscs <no>`

Notes: The number may be '0', '1' or '2'

Choose the disc drive to be selected at power on

Syntax: `Co. Drive <no>`

Notes: The number must be in the range 0—3 for a floppy drive, 4—7 for a hard disc drive. It must correspond to a drive you actually have. If you want to run a boot file when you turn on or reset the computer, the disc holding the boot file must be in the drive you specify with this command.

Monitor Options

Set the default monitor type

Syntax: `Co.MonitorType <no>`

Notes: The number must be in the range 0-3, and corresponds to these monitor types:

0 50Hz standard colour monitor (screen modes 0—17 and 24).

1 Multiscan colour monitor (screen modes 0—21, 24—28).

2 High resolution 64Hz monochrome monitor (screen mode 23 only).

3 60Hz VGA colour monitor (screen modes 25—28).

If you set the wrong type, you will not be able to see anything when you turn the machine on. If this happens, look at the

section on resetting the computer at the end of this chapter to see what to do.

Adjust the screen alignment and screen ' interlace'

Syntax: `Co.TV <no>, <no>`

Notes: The first number must be in the range 0—3 (move vertical alignment up 0—3 lines) or 255—252 (move the alignment down 1-4 lines). You can set just this part of the command, or give a comma and then a second number, which must be '0' or '1'. The second number turns interlace on ('0') or off ('1'). With interlace off, the horizontal rows of pixels are drawn one after another from the top of the screen. With interlace on, alternate rows are drawn from the top of the screen, and then the missing rows in between are filled in.

Set the synchronization for vertical output

Syntax: `Co. Sync <no>`

Notes: The number must be '0' (vertical synchronization) or '1' (composite synchronization). You will only need to change his if you buy a non-Acorn monitor (see Chapter 19).

Printer Options

Set the destination of output sent to the printer

Syntax: `Co. Print <no>`

Notes: The number must be in the range 0-7. You are most likely to want to set it to '1', for a printer connected to the parallel port, or '2', for a printer connected to the serial port. You might also need to reset the baud rate and/or the data format for a serial printer.

Set the baud rate

Syntax: `Co. Baud <no>`

Notes: The number must be in the range 0—8, corresponding to these baud rates:

No.	Baud
0	9600
1	75
2	150
3	300
4	1200
5	2400
6	4800
7	9600
8	19200

Look in the manual supplied with your printer to see which setting you need. The default value is '4'.

Set the serial data format

Syntax: `Co. Data <no>`

Notes: The number must be in the range 0—7, corresponding to these formats:

No.	Word	Parity	No. Stop bits
0	7-bit	even	2 stop bits
1	7-bit	odd	2 stop bits
2	7-bit	even	1 stop bit
3	7-bit	odd	1 stop bit
4	8-bit	none	2 stop bits
6	8-bit	even	1 stop bit
7	8-bit	odd	1 stop bit

Consult your printer manual to see which you need to use. The default value is '4'.

Memory Options

There are several *CONFIGURE options that allow you to control how the computer uses its memory. When deciding values for these parameters, you should think about which tasks you want to give priority to – for example, if you want to use a lot of fonts and want the screen to redraw quickly, allocate extra memory to the font cache.

You can set and examine memory allocation and usage with the Task Manager (described below), but if you consistently want extra memory

allocated to the same areas, you can use the *CONFIGURE options so that the computer comes up with these allocations when you turn it on or reset it. Values set with the Task Manager are reset to the defaults or the values set with *CONFIGURE when you reset the machine or turn it off and on again.

The memory options you are most likely to want are:

Allocate memory for the font cache
Syntax: `Co. FontSize <no>`

Notes: Number is the number of kilobytes allocated.

Allocate memory to the RAM filing system
Syntax: `Co. RamFsSize <No>`

Notes: Number is the number of kilobytes ('k') allocated. The RAM Filing System is described in the next chapter. If you allocate memory to a RAM Filing System, the RAM icon appears on the Icon Bar near the disc drive icons.

The Task Manager

The Task Manager allows you to set memory allocations temporarily. To display it, press 'Menu' over the system icon at the extreme right of the Icon Bar, and choose Task Manager. The Task Manager window will appears. This is shown in Figure 10.3 opposite.

You can alter any of the settings which show red bars; you *cannot* alter the green ones. To alter a setting, click after or drag the bars until they show the values you want.

The task display is divided into three parts:

- Application tasks
- Module tasks
- System memory allocation

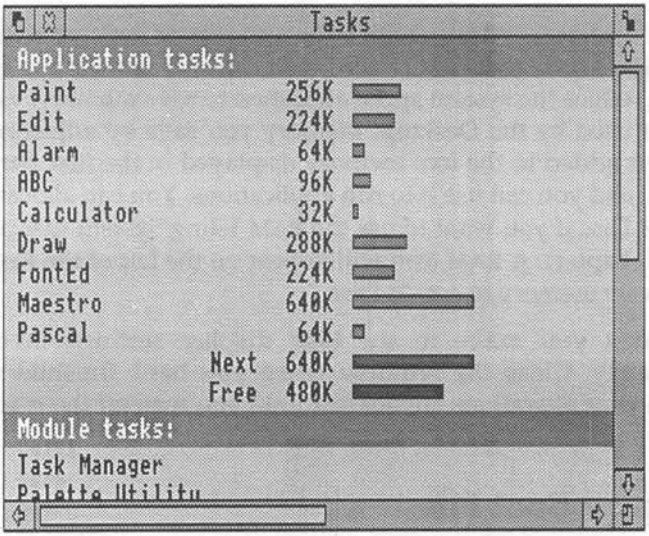


Figure 10.3. The Task Manager window.

The 'Applications tasks' section shows how much memory is currently in use by any different applications you are running. There are two bars you can change, the 'Next' and 'Free' allocations. 'Next' shows the amount of memory that will be made available to the next application you load. Some applications override the setting if it is too small, but it is useful to set extra memory if you know you want to use an especially large file. When you add memory to 'Next', you take it away from 'Free', which is completely unallocated. If you use 'Quit' in the Icon Bar menu of any of the applications you have loaded, you can see the 'Free space' increase and the bar for the application you have removed disappear.

The 'Modules tasks' section shows how much memory is being used by tasks running as modules, and how much space is free for more modules. Modules are described in Chapter 14.

The 'System allocation tasks' section of the task display shows how much memory is allocated to different areas of the system. This corresponds to the settings of some of the *CONFIGURE options. The only ones you are likely to want to alter are the font cache, the RAM allocation and the system sprites space. You can increase the font cache

to speed up screen redraws with large numbers of fonts, or reduce it to save space. If you reduce it to zero, you can *only* use the system font. You can reduce the system sprite allocation to save memory, too, since this isn't used by the Desktop. Memory you save by adjusting these settings is added to the free memory displayed in the first part of the window, and you can use it to run applications. You can allocate space to a RAM Disc if you want to use the RAM Filing System (described in the next chapter). A RAM icon will appear on the left of the Icon Bar if you allocate memory to a RAM Disc.

Alterations you make to the task display settings take effect immediately. Close the window when you have finished making settings; your alterations are not lost until you turn off the machine or reset it.

Writing a Boot File

A 'boot file' is a file which is executed when you turn on or reset the machine. You can think of it as a text file which contains a number of commands which are executed, one after the other, as if they had been typed in at the keyboard. You can have a Desktop boot file, too, and use this to load applications onto the Icon Bar. Your boot file *must* be in the root directory, which must be set to current when the machine starts up, and on a disc in the current disc drive. It must have the name '!Boot', and you must configure the system to run the boot file. The following instructions show you how to write a boot file with a single line, which runs a Desktop boot file. You need to plan the names you are going to use for your disc and Desktop boot file before creating them so that you can use their names in the !Boot file.

Writing the Files

You can use Edit to write your boot file and your Desktop boot file. To write the boot file, you need to start Edit first. Once the text editor has been installed on the Icon Bar move the pointer over it and press Menu. Select the option 'New command file' from the 'Create' sub-menu. Then type a line in the new file to run your Desktop boot file. You need to use the command:

```
*Desktop -file <pathname>
```

If you have a Desktop boot file called DeskBoot in the root directory of a hard disc, this would be:

```
*Desktop -file adfs::4.$.!DeskBoot
```

If it were in a directory called EachDay on a floppy disc called Bootdisc in drive 0, the line would be:

```
*Desktop -file adfs::Bootdisc.$.EachDay.!DeskBoot
```

Save this file in the root directory, calling it '!Boot'. It will have the command file icon illustrated in Figure 10.4.

Figure 10.4. The !Boot command file icon.

(You can add other *commands to this file if you want to, in which case, put the *Desktop command last. Refer to Chapter 12 for details of some other *commands you might want to use.)

This boot file just tells the computer to run a Desktop boot file, '!DeskBoot'. You now need to write the '!DeskBoot' file.

Open a new Edit window (an ordinary text file this time). Before the computer can load the Desktop applications programs mentioned in the file, it needs the command file '!run' in '!System', so the first line of the file must give the pathname of '!System.!run'. !System is on Applications Disc 1. If you are using this disc in the current floppy drive, the first line would need to be:

```
adfs::App1.$.!System.!run
```

If you have the applications on a hard disc in a directory called 'App1', the first line would be:

```
adfs::4.$.App1.!System.!run
```

Now give the full pathnames of all the applications you want to load onto the Icon Bar. Give each one in the same form as the first line, ending each with '!run', because it is the !run command file that the computer needs to use to load the application. Don't forget to separate the elements of the pathnames with fullstops.

As an example, here is my !DeskBoot file which is executed from my hard disc:

```
| Boot file for the Desktop
adfs::4.$.App1.!System.!run
adfs::4.$.App1.!Edit.!run
adfs::4.$.App2.!patience.!run
adfs::4.$.App2.!Alarm.!run
adfs::4.$.App1.!Draw.!run
adfs::4.$.App1.!Configure.!run
adfs::4.$.App2.!Calc.!run
adfs::4.$.App1.!PrinterLJ.!run
adfs::4.$.App2.!TinyDirs.!run
```

(The first line is a comment line; it has no effect on the running of the file. You can include a comment line by starting the line with |.) This file loads Edit, Patience, the alarm clock, Draw, the configure program, the calculator, TinyDirs and the laserjet printer driver supplied with Acorn Desktop Publisher. Together these use up a total of 832k, so this file is not suitable for a small machine.

A boot file can only run from one disc. If you have a hard disc, this is no problem, because you can refer to different directories on the same disc in the '!DeskBoot' file. However, if you are using a floppy drive, you will need to make sure everything you want to load is on the same floppy. The best thing to do is to make up a disc containing '!System' and all the applications you want to load (it's a good idea to put !Fonts on it as well). Give the disc a name, and don't forget to include this in the pathnames.

Using the Boot Files

Once you have written the files and saved !Boot in the root directory and !DeskBoot in the right place for the pathname you give in !Boot, you need to configure the computer so that it runs the boot file.

You can use the configure program to set 'autoboot on' and set the 'root directory' to the current directory. If you have two floppy drives you will need to put the disc in drive 0 when you start the machine (or in whichever drive you have set to be current, if you have changed this setting).

To check that your boot file runs, hold down the 'CTRL' key while you press and release the 'RESET' button near the mouse lead socket at the back of the keyboard. If the Desktop does not come up, type 'Desktop' at the star prompt. If the Desktop does come up but you get the error message 'System resources cannot be found', it is because the computer could not find '!System.!run'. You will not be able to open any Desktop applications. Press F12 to escape to the command line and type 'Co. NoBoot'. This turns off the boot file execution, and you can do a 'CTRL-RESET' again to restore the Desktop normally. Then edit your boot files and correct the errors!

Resetting and Restoring Defaults

The last paragraph tells you how to 'reset' the computer using the reset button. You may need to do this if one of your programs fails, and you can't use the desktop or keyboard. This is called a 'hard reset', and resets the computer to the same state as if you had just turned it on, and runs your boot file if it is configured to do so. If you don't want to run the boot file, use the RESET button on its own.

Sometimes you may want to run programs or applications which do not run on the Desktop and do not return you to the Desktop. To stop these, you may need to reset the computer. You can do this by holding down the CTRL key and pressing the BREAK key; since there is no corrupt data, you do not need to take the precaution of a hard reset. If you hold down SHIFT and BREAK or CTRL and BREAK, the boot file will run.

The various ways of resetting the computer reset different proportions of the settings. The mildest reset is an 'Escape', which you can use to exit from routines which have gone wrong. For example, if you try to copy a directory into itself, it will continue attempting the copy until the disc is full. You can stop it by pressing the ESC key. ESC will also get you out of some programs. It does not reset the computer to a

default state, though, it just abandons the current operation. Resets with the BREAK key reset the computer, but reset less of it than the RESET button. If things go badly wrong, use the RESET button or turn the power off to make sure you have cleared out all the corrupt data.

It is possible that while you are experimenting with *CONFIGURE options you may configure your computer in such a way that you can't use it at all, not even enough to reset the configuration (for example, you might set the auto-repeat on the keys to such a short time span that it is impossible to type only a single letter). If this happens, turn the computer off, then turn it back on again, holding down the DELETE key while you do it. This resets all the configuration settings to the original defaults. If you choose a monitor setting that does not suit your monitor and you cannot see the display, you can reset the monitor configuration only by turning the power off and then turning it on again while you hold down '0', '1', '2' or '3' on the numeric keypad – use the number that corresponds to the monitor setting you want (the settings are described above, in the section on *CONFIGURE).

Summary

This chapter has shown you how to configure the computer, using the Configuration program and the *CONFIGURE command. There are further *CONFIGURE options, which are documented in the *User Guide* issued by Acorn with your computer. You are not very likely to need the other options as a new user, but may want them one day. There are other commands you might want to use in your boot file, too. Some of these are described in Chapter 12.

11 : The RAM Filing System

So far we have concentrated on using the discs to store data, and on the Advanced Disc Filing System, ADFS. But there are two further filing systems: the Network Filing System (NFS), and the RAM Filing System (RFS). The Network Filing System will be of no interest to you unless your computer is connected to others by means of an Econet network. (There is a little about networks in Chapter 19.) However, anyone can use the RAM Filing System.

The RAM Filing System is unlike ADFS in that it doesn't use any special hardware. RAM is an acronym for Random Access Memory, and the RAM Filing System just uses an area of the computer's memory to store information. You can use it as though it were an extra disc drive. However, you need to be careful: anything stored in RAM is *totally lost forever* when you turn the machine off or reset it, unlike data stored on a disc. You will notice that in the task display, the area allocated to the RAM Filing System is labelled 'RAM Disc'; there is not really a disc for RAM, but it is a useful analogy. Because memory is used to act as the 'disc drive' a RAM Disc is also often referred to as a 'Silicon Disc'.

Why Use RAM?

Because RAM is a part of the computer's resident memory, it is very quick to access it as there is no mechanical activity involved, as there is in moving the read-heads of a disc drive over the disc. This means that you can load a program from RAM much more quickly than you can read it from a disc.

It is also useful if you have only a single floppy disc drive and want to copy between two discs. You can copy the information from the first disc onto the RAM Disc, then switch the discs in the drive, and copy the information from the RAM Disc onto the second floppy. This is much

quicker – and less frustrating – than switching the discs constantly as the copying proceeds.

How to Use RAM

To set up a RAM Disc, use the Task Manager. In the third part of the task display, 'System memory allocation', there is a line for RAM Disc. By default, there is no memory allocated to a RAM Disc, so there won't be a bar there. Click in the space where the bar would be, and a short bar will appear. You can drag this to the size you want. when you have done this a RAM icon, similar to that shown in Figure 11.1, will appear on the Icon Bar.

Figure 11.1. The RAM Disc icon.

Click on this icon to open a directory viewer for the RAM Disc. It's empty, of course. You can now drag file and application icons into this window, and the files and applications will be stored in the area of the memory allocated to RAM. It is quicker to load something stored in RAM than from a floppy or hard disc. You can test this using one of the applications on the applications discs. For example, if you load the Calculator onto the Icon Bar from Applications Disc 2, it takes a couple of seconds to appear. If you now drag the calculator icon from the applications disc window into the RAM Disc window, and load it by double-clicking on the icon in the RAM Disc window, you will find that it takes less than a second to load. Figure 11.2 shows some files already transferred to the RAM Disc awaiting use.

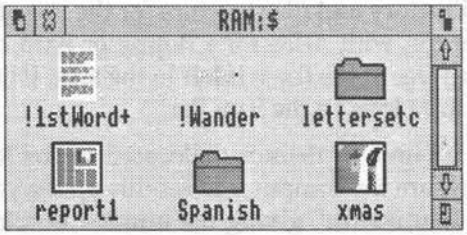


Figure 11.2. The directory viewer shows files in place.

Remember that anything saved only on the RAM Disc will be lost if you turn off or reset the computer. It is very easy to forget that you have information on the RAM Disc, and turn off the computer without thinking. For this reason, it isn't a suitable way of storing anything you are working on and changing. You should use it only to store programs and applications you are using (not developing), and keep your own files on hard or floppy disc, using ADFS.

You will probably find the RAM Disc most useful when you are copying from one floppy disc to another and have only a single floppy drive. Even if you have a hard disc, it is quicker to copy information onto the RAM Disc and then onto another floppy than to copy it onto the hard disc as an intermediate stage. This is what you need to do:

1) Put the source floppy in the disc drive and display a directory viewer for the files you want to copy.
2) Create a RAM Disc and/or display a directory viewer for it.
3) Drag the icons of the files and directories you want to copy from the floppy window to the RAM window.
4) Replace the floppy in the drive with the destination floppy and open a directory viewer for it.
5) Use 'Select all' and drag the icon group from the RAM window to the floppy window.

6) Delete the files and directories from the RAM window. You can remove the RAM Disc if you have finished with it by dragging its bar in the Task Manager back to 0k.

You can build up a directory and file structure for the RAM Disc in just the same way as you can with ADFS for a floppy or hard disc. If you want to see how much free space there is left in the RAM Filing System, press menu over the RAM icon on the Icon Bar.

If you always want an area of memory allocated to the RAM Filing System, you can configure the computer to set this up for you. Use the *CONFIGURE option 'RamFSSize', giving the number of kilobytes you want to allocate. The format is, for example:

```
Co. RamFSSize 128K
```

The RAM icon will then appear on the Icon Bar when you switch the computer on or reset it.

Summary

The RAM Filing System allows you to allocate an area of computer memory as a temporary storage place for files and directories. It is a useful way of speeding up disc copying if you have only one floppy disc drive, but you must be very careful that you don't store unsaved work in RAM and lose it when you turn off or reset the machine.

12 : RISC OS

RISC OS is the Archimedes 'Operating System'. An Operating System is a piece of software resident in the computer which controls how the computer runs programs, communicates with peripherals such as the monitor, disc drives and printers, and tells the computer how to run the filing systems. The Operating System is stored on a microchip (the ROM – Read Only Memory) in the machine, so you don't need to do anything to load it when you turn the machine on.

Usually, you are protected from direct contact with the Operating System because you use the Desktop as an interface. However, Desktop operations are converted by the computer into Operating System commands, so you are still using the Operating System though in a roundabout way. You can also use the Operating System directly if you want to, by accessing it with the '*' prompt. The *CONFIGURE command detailed in Chapter 10 is an example of an Operating System command. This chapter describes some of the RISC OS commands you might want to use; more commands are described in the *User Guide* issued with your Archimedes.

RISC OS and Arthur

RISC OS has replaced 'Arthur' as Acorn's Operating System. If you have any programs or applications you wrote using Arthur, these will still run under RISC OS. RISC OS includes some commands which are included just for backwards compatibility with Arthur.

One of the biggest innovations of RISC OS is that it introduced what Acorn calls 'co-operative multi-tasking'. This means that you can have several applications open and 'working' so that you can switch between each one in turn. For example, having Edit and the calculator open together. To take full advantage of this 'co-operative multi-tasking' programs and applications must be written in a special way.

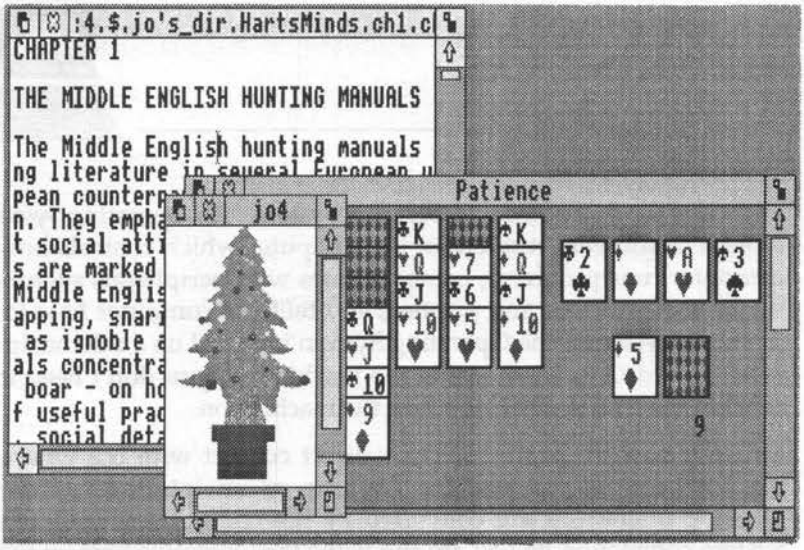


Figure 12.1. Co-operative multi-tasking allows several applications to be 'open' at once.

Not all programs are, and certainly programs written for Arthur only cannot be run 'on' the Desktop. However if you experience problems in this area with a commercial program examine the RISC OS Support Disc as this may include notes on how to get it to work. If not then contact the software house that produced it.

Some applications – such as the original version of First Word Plus – will run (albeit with horrible colours!), but not as windows on the Desktop. Control is returned to the Desktop when you close the application, though.

On the whole, RISC OS runs more quickly than Arthur, and the Desktop operations are neater and easier to use. They take up more memory, though, and a one megabyte machine can quickly run out of space. Trying to do something for which there is insufficient memory available can 'crash' the machine – remove applications from the Icon Bar when you are not using them. This will speed up response, too. Chapter 19 has some information on how to add extra memory.

*Commands and the Desktop

You can use RISC OS *commands in the command line or you can open a window for a non-Desktop task using a suitable *command, or you can leave the Desktop completely and use *commands.

To escape from the Desktop to the command line, press the function key F12, or use '*Commands' in the system icon menu. The command line appears below the Icon Bar, starting with the *prompt.

You can open a task window using the 'New task' command in the system icon (Task Manager) menu and giving the *command for the task you want (eg, BASIC), or you can open a new task window using the Edit icon menu and choosing 'Create' and 'New Task window'.

The task window opened from the Edit Icon Bar menu is the same as any other Edit window; you can move it around, resize it, and use other windows on the screen at the same time. The window opened by the Task Manager menu command is not a real Desktop window; you can't carry on using other Desktop windows until you have closed it. Each of these three methods preserves your desktop work and unsaved files. If you want to leave the Desktop work and use just the command line for a considerable period, save all your work and choose 'Exit' from the system icon menu. Any unsaved work will be lost.

If you have used F12 to access the command line, you can return to the Desktop display by pressing the RETURN key. (You might have to close whatever you are doing first, such as using QUIT to finish BASIC, because RETURN brings back the Desktop only from *command level.)

To close a task window you have opened from the Edit Icon Bar menu, click on its close icon. The computer asks you to confirm that you want to 'kill' the current task; any unsaved work you have done in the window is lost. To close a window opened using the 'New task option' in the task manager menu, close the task (eg, QUIT from BASIC) and then click a mouse button or press the space bar.

If you used 'Exit' to escape from the Desktop, you need to type 'Desktop' after the '*' prompt to re-start the Desktop. This will not run your 'DeskBoot' file (use *EXEC to do this, see below).

Useful *Commands

Besides *CONFIGURE, described in Chapter 10, those described here are the *commands you are most likely to find useful – but there are plenty of others, documented in the *User Guide*.

Command Format and Syntax

Commands are shown here using the combination of upper and lower case that Acorn uses. However, RISC OS is *not* case sensitive – you can use any combination of upper and lower case you like and the commands will still work.

Most commands can be abbreviated. The abbreviation must be unambiguous and must be followed by a fullstop.

Many commands take parameters which either tell the computer what to apply the command to, or which modify its meaning. For example, '*COUNTRY' takes as a parameter the country you want to set the machine for. '*COUNTRY FINLAND' sets a Finnish character set, for instance. (*COUNTRY on its own, without the parameter, sets it back to the default, UK.) If a parameter is optional, it is shown here in square brackets ([]). Some commands do not take effect until the computer has been turned off and on again, or reset.

You can use two 'wildcards' with RISC OS commands:

'*' to stand for any number of characters (even zero)
'#' to stand for a single character.

So, 'do#' could stand for 'dog' or 'dot' (but not 'dogs' or 'dotted'), and 'do*' could stand for 'do', 'dog', 'dogs', 'doodle' and so on.

All commands are given the '*' automatically, so you do not need to type this and it therefore isn't shown here. (It doesn't matter if you do type it: extra *'s are ignored.)

Commands

Execute a file

Syntax: `Exec <filename>`
Example: `Exec !Boot`

Notes: You can use this to restart the Desktop, using your !Boot file.

Change the type of a file

Syntax: `SetType <filename> <filetype>`
Example: `SetType :4.$.DTP_doc Text`

Notes: Use this to change the type of a file. For example, you can write a !Boot file in Edit as an ordinary text file (opened by clicking on the Edit icon) and then change its 'filetype' to 'Command' afterwards. Another use is if you take a file from a wordprocessing or desktop publishing program, read it into Edit and strip out the control characters, and resave it; unless you change the filetype to 'Text', the file icon will still show it as a DTP file, or whatever, though you won't be able to load the file back into the program you originally used to develop it. To avoid confusion, use '*SetType' to change the filetype (and therefore the icon used to show the file on the Desktop) to 'Text'. Use '*Show File$Type' to display a list of valid filetypes. (Some filetypes are identified only by a code, others can also be identified by a name – such as 'Text', 'Command' and 'BASIC' – it doesn't matter which you use.)

Show the contents of a file

Syntax: `Type <filename> [-TabExpand]`

Notes: Displays the contents of a file on the screen. The optional parameter '`-TabExpand`' expands tab characters with spaces to improve the layout and readability of the display.

Show the contents of a file, numbering the lines

Syntax: `List <filename> [-TabExpand]`

Notes: Displays the contents of a file on the screen, numbering each line. The optional parameter '`-TabExpand`' expands tab characters with spaces to improve the layout and readability of the display. The line numbers enable you to refer to a line if you want to alter or replace it, for example.

Load a file

Syntax: `Load <filename> [hex address]`

Notes: Use this to a load a program (or other file). You can give a hexadecimal address if you want to specify where the file is to be loaded.

Load and execute a file

Syntax: `Run <filename> [parameter]`

Notes: Use this to load and run a program (or other file). You can give as a parameter a command line tail (described in the Acorn *Programmer's Reference Manual*).

Compact a floppy or hard disc

Syntax: `Compact <drive no or disc name>`

Notes: Use this command to re-order the files on a disc to free unused space between files. The command regroups files in the most space-efficient way possible. You can use this with a hard or floppy disc, but you don't need it with 'E' format floppy discs because these compact data automatically. If you have 'D' or 'L' format floppies because they contain data used with Arthur, you can use *COMPACT with these without harming your data.

Mark a defective area of a disc

Syntax: `DEFECT <drive no or disc name> <disc address>`

Notes: Use this if there is a defective sector (section) on a disc you want to continue using. The defective sector is marked,

and the computer will not use it, but you can continue to use the rest of the disc as usual. The storage capacity of a disc will be reduced if it has defective sectors. The address of a defective sector is reported by the *VERIFY command (see below) or 'Verify' chosen from the disc drive menu on the icon bar.

If the defective sector is being used, *DEFECT tells you which file(s) are affected, and gives you the chance to try to salvage your data. You might also have to move other files. When you have done this, use the command again to make that area of the disc inaccessible.

Verify a disc

Syntax: `VERIFY <drive no or disc name>`

Notes: This verifies the disc and reports the address of any defective sectors. Use it with *DEFECT to make defective sectors of a disc inaccessible.

Display help information

Syntax: `HELP <parameter>`

Notes: The parameter can be a command name, an abbreviated command name (including wildcards, or an abbreviation short enough to cover more than one command), or one of the options 'Commands', 'FileCommands', 'Syntax' and 'Modules'. It gives you information on the command or area you specify.

System Variables

When you start the computer it starts up by following a predefined series of events. Some of these 'events' require information and this information is kept in a series of system variables. These include storing the format of the *prompt, the format of the time and date display, and which command name calls up which action. There are many system variables, most of which you will probably never want to use. But you can change them, and some of those you might want to change are described here. More information on system variables and

how to change them can be found in the User Guide for your computer.

The system variables you are most likely to want to alter are:

- The format of the command line prompt.
- The date and time format.
- The names of commands.
- The action of copying operations on the Desktop (or at the command line).

These are all changed using the '*SET' command. This has the general format:

```
SET <variable name> <variable value>
```

Before you change a variable, you may want to see what it is (though this is obvious for some, such as the command line prompt). Use the command '*SHOW'. This has the format:

```
SHOW <variable>
```

Use Show on its own to list all the system variables.

Change the format of the command line prompt

Syntax: `SET CLI$Prompt <new value>`

Example: `SET CLI$Prompt hello Jo!`

Notes: You can set the prompt to a message, perhaps including your name. You can also set it to another system variable, such as the time or date. You need to give the name of the system variable you want to use in angle brackets ('<' and '>'), otherwise it will just use the text of the variable name. If it is a variable which constantly alters (such as the time) use the command '*SetMacro' instead of '*SET' so that the system checks and uses the current value each time. For example:

```
SetMacro CLI$Prompt <Sys$Time> *
```

uses the current time followed by a '*' as the prompt, and:

```
SetMacro CLI$Prompt <Sys$Date> *
```

uses the current date followed by a * as the prompt, and:

```
SetMacro CLI$Prompt <Sys$Time>, <Sys$Date>
```

uses the time and date, separated by a comma.

Even if you change the prompt so that it doesn't contain a '*', you don't need to type a '*' before any comand names.

Looking at the format for the date and time

Syntax: `SHOW Sys$DateFormat`

Notes: This displays the format used for the display of the date and time. The default format is:

%24:%mi:%se %dy-%m3-%ce%yr

This displays a time and date in the form:

13:28:31 03-Aug-1989

The % character instructs the computer to check the current value for the next part of the variable and use that.

Setting the format for the date and time

Syntax: `SET Sys$DateFormat <parameters>`

Notes: The parameters you can use are:

cs (hundredths of a second (centi-seconds))
se (seconds)
mi (minutes)
12 (hour, 12-hour format)
24 (hour, 24-hour format)

AM or PM (shows whether it is am or pm; you can add either am or pm to the format and, provided it is preceded by %, the computer will use the right one each time.)

we (weekday, full name)
w3 (weekday, abbreviated to three characters)
wn (weekday as a number, starting with Sunday as 1)
dy (day of the month)
st (appends st, nd, rd or th as appropriate to the number of the day of the month (eg: 1st, 23rd))

mo (month name in full)
m3 (month name abbreviated to three characters)
ce (century)
yr (year in century)
wk (number of week in the year)
dn (number of day in the year)
z add this as a prefix to omit any leading zeros in a figure.

Build up your format using these parameters; you can use as many or as few as you want. If you include a 'z' after the '%', any leading zeros will be omitted, otherwise you will be shown dates like '05 December'.

Here are some examples of formats and the kind of display they produce:

```
%ce%yr:%zm3:%dy %z12.%zmi %am
```
1989:8:25 2.20 pm

```
Day: %dn, Week: %wn
```
Day: 324, Week: 46

```
%24:%mi:%se:%cs
```
14:22:30:09

Give a new name for a command

Syntax: `SET Alias$<new name> <old name>`

Example: `SET Alias$Verify Check`

Notes: You can use this to supply extra names (called 'aliases') for commands. The original command names still work, and you can give several aliases for any command. This allows you to set as acceptable any names you automatically use for commands, perhaps because you are used to using them on a different computer. For example, if you are used to using a MacIntosh, you will be used to initializing discs rather than formatting them. If you use the *FORMAT command to format discs from the command line, you can give this the alias *Initialize so that the command will work whichever word you use.

Set copy options

Syntax: `SET Copy$Options <parameters>`

Example: `Set Copy$Options ~C ~S V`

Notes: You can use this to set options for the copying command. The options will be used whether you use the *COPY command from the command line, or use the Desktop to copy files and directories. The parameters you are most likely to want are:

C Confirm copying, issuing a prompt.

F Force copying to overwrite existing files or directories with the same name.

N Make the copy only if the source is newer than the existing file or directory of the same name.

P Prompt for the next disc as necessary when copying between discs – useful if you have a single floppy drive.

R Copy all directories and their contents inside the directory copied.

S Label the new copy with the date and time of copying.

V Report full information on the files and directories copied.

If you want to set an option to 'ON', include it in the list of parameters. If you want to set it to 'OFF', prefix it with the character '~'.

The example shown above does not prompt for confirmation, does not label the copy with the date and time, but does report information on the items copied.

The system variable settings you make with *SET are valid only until you turn off or reset the machine. If you want to use the same options every time you use the computer, put them in your boot file.

Adding to Your Boot File

So far we have looked at a boot file that contains a line to start up the Desktop and run a Desktop boot file. You can also add RISC OS commands to your boot file. They must come before the *Desktop command. You *do* need to type the '*' at the start of a command if you are using it in your boot file (or any other command file).

For example, you can set the command line prompt, the date format and the copy options in your boot file. This is my boot file:

```
| > $.!Boot
*Set CLI$Prompt hello jo!
*set sys$dateformat %w3, %dy %m3 %ce%yr %z12:%zmi am
*set copy$options ~C ~D F ~N ~P Q ~S ~T ~V
*Desktop -file adfs::4.$.!DeskBoot
```

Remember, the first line is a comment (the file name) because it starts with a '|'.

It doesn't matter that the file mixes upper and lower case in the command and system variable names, but it is important to put the stars at the start of the commands, since they are not automatically supplied this time.

Summary

If you intend to work outside the Desktop a lot, you will need to consult the *User Guide* issued with your computer for details of the large number of RISC OS commands not covered in this chapter. However, anyone – even someone who only wants to run applications – can use RISC OS commands to set a few simple system variables or to build a boot file that sets them each time the computer is turned on or reset.

13 : BASIC IV & BASIC V

The Archimedes uses a version of BBC BASIC, called BASIC V, which is considerably more powerful than the BASIC IV written for Acorn's Master series computers. BASIC V is documented in the Acorn *BBC BASIC Guide*, in the *User Guide* issued with Arthur 1.2 machines and *BASIC V: A Dabhand MiniGuide* from Dabs Press. This chapter outlines the changes that have been made since BASIC IV. Because BASIC programming is such a vast subject and has its own publications devoted to it, I shall just outline these major areas of change and will assume that you have had some experience with BBC BASIC before. There is also some information on using the BASIC Editor in the next chapter.

Areas Of Improvement

The availability of more memory for BASIC under RISC OS has allowed considerable enhancements. There are many new statements, condition handling is greatly improved, procedure and function calls have been improved, there are new array operations, operators, functions and commands, the assembler accepts the full ARM instruction set, and the error messages are now more informative.

Memory

BASIC IV was limited to total code size of 16k; the BASIC V interpreter uses 64k.

Help

BASIC V includes substantial built-in help text. To display information on the status of BASIC, type:

```
*HELP
```

To display information about a particular command, statement of function, type:

```
*HELP <keyword>
```

where <keyword> is the name of the subject on which you require help, eg:

```
*HELP INSTALL
```

to show information on the keyword INSTALL.

To display a list of valid keywords, type:

```
*HELP .
```

You can use unambiguous abbreviations with HELP, eg:

```
*HELP INSTA.
```

for information on INSTALL.

Condition Handling

There are three new constructs, which make it much easier to avoid GOTOs. These are:

WHILE...ENDWHILE
This is similar to REPEAT...UNTIL except that it repeats while the test condition is TRUE, and performs the test at the start of the loop; REPEAT...UNTIL performs the test at the end, and repeats while the condition is FALSE.

IF...THEN...ELSE...ENDIF
This adds a new condition to IF...THEN.

CASE...OF...WHEN...OTHERWISE...ENDCASE
This is rather like multiple IF...THENs but testing the variable against several values. You can use several variables at once after WHEN.

For the syntax of these constructs, use *HELP with the first keyword.

New Statements

You can find out about the syntax of new keywords by using HELP and the appropriate keyword. New keywords or those which have been extended are listed below with a brief description.

Graphics Statements

CIRCLE LINE ELLIPSE
POINT RECTANGLE

These draw the appropriate figure. Parameters give positions and dimensions.

COLOUR (or COLOR)
This will set text colour or alter palette settings.

FILL
Floodfill an area using the current foreground colour.

GCOL
Set the colour and plot mode.

ORIGIN
Move the graphics origin to the position given.

OFF, ON
Turn the graphics cursor off or on.

WAIT
Wait until the end of the current display frame, maximising the time available for drawing objects.

Sound and Music Statements

BEATS, TEMPO
Return or alter the beat counter and beat counter rate.

SOUND
Generate, allow or suppress sound.

STEREO
Set the stereo position of a channel.

VOICES
Set the number of sound channels to use.

Variable and Array Handling Statement

SWAP
Switch the values of two variables or arrays.

String Handling Statements

LEFT$, MID$, RIGHT$
Return or alter the leftmost, middle or rightmost character(s) in a string.

Error Handling Statement

ERROR
Generate an error message.

Input and Output Statements

INPUT
Prompt for and retrieve a value from the input stream.

MOUSE
Set or retrieve mouse position and buttons pressed.

File Commands

BPUT#
Write a byte or string to a file.

EXT#
Return or set the length of an open file.

Program Statements

END
End a program.

QUIT
Leave BASIC and return to RISC OS.

Assembly Language

SYS
Call an Operating System routine.

New Commands

Two commands, SAVE and LISTO have been improved, and these new commands introduced:

APPEND
Add a file to the end of a BASIC program.

LVAR
List the values of all variables, size of arrays, procedures and functions, and first line of all libraries loaded.

TWIN/TWINO
Convert a program to text and call the Twin editor.

New Functions

The following new functions have been introduced (to see the syntax, use HELP <function name>):

For sound:

BEAT/BEATS	Beat value and beat counter value.
TEMPO	The rate at which beat counter counts.

For arrays:

DIM	The number of dimensions in an array.
SUM	The sum of elements in an array.
SUMLEN	The sum of lengths of all strings in an array.

For variables:

END	The address of the end of BASIC variables.

String functions:

GET$#	Retrieves an ASCII text string from a file.
LEFT$/RIGHT$	Left-hand or right-hand end of a string.
REPORT$	Give the last error message as a string.

For screen display:

MODE	Screen mode.

New Operators

There are these new operators:

<<	left shift
>>	arithmetic right shift
>>>	logical right shift
|	floating point indirection

+	increment assignment
–	decrement assignment
%	binary constant (equivalent to '&' for hex constant).

Using BASIC

To use BASIC you can:

- Use F12 to escape from the command line, but leave the Desktop intact so that you can return to your work later.
- Open a new task window using the 'Create' command in the Edit icon window. This opens a normal Desktop window.
- Open a non-Desktop window using the 'New task' command in the Task Manager menu.
- Leave the Desktop using 'Exit' from the Task Manager window. Any unsaved work on the desktop will be lost.

Type 'BASIC' from the command line, or '*BASIC' in a task window to start BASIC.

When you have finished using BASIC, type 'QUIT' and press the RETURN key. Then, to get back to the Desktop:

- Press RETURN again if you used F12 to escape from the Desktop, or:
- Click the close icon in the Edit menu, or:
- Click a mouse button or press the space bar to close a non-Desktop window, or:
- Type 'Desktop', or 'Exec. !Boot' if you had left the Desktop using 'Exit'.

You can carry out only minimal editing to your programs without using the BASIC Editor. This is described briefly in the next chapter.

Summary

BASIC V is compatible with BASIC IV, but greatly enhanced. The changes outlined here are documented fully in the *BBC BASIC Guide* (Acorn) and *BASIC V: A Dabhand MiniGuide* (Dabs Press).

14 : Modules

A 'Module' is a special format program that can be loaded into a special area of memory and will often provide facilities and commands which can be used by other programs and yourself! If you are familiar with BBC Micros then you can think of a Module as being the Archimedes equivalent of a Sideways RAM image. Modules come in two forms, those that are stored permanently in the Archimedes (in ROM) and those which are loaded in from disc when you need them. Modules that are stored in ROM use memory all the time, whereas a Module on disc only uses memory space when you load it for use.

In this chapter we are interested in the three Modules that are supplied on disc. They are:

- 65Tube
- BasicEditor
- Hardcopy

They can be found on Applications Disc 2 in the Modules directory. The function of each of these Modules is as follows:

65Tube	This 'emulates' a 6502 second processor on a BBC micro.
BasicEditor	This is a screen editor.
Hardcopy	This allows you to print out a screen image on a dot-matrix printer.

If you have used Arthur 1.2 then you might be aware that 'BasicEditor' and 'Hardcopy' were stored in ROM, so you could use them immediately, but now you need to load them from the Modules directory before you can use them.

65Tube

This Module allows you to emulate a BBC Micro with a 6502 Second Processor. In other words it makes your Archimedes act like a BBC micro! This means that you can use it to run standard BBC-based language ROM images. Note you cannot use it to run 'double' ROM systems. The Module contains a copy of 'HIBASIC 4.3'. This is the version of BASIC that was stored on the Second Processor; you can use it in exactly the same way as BASIC, all the keywords are the same.

The application disc contains two BBC emulators, the second is 6502Host. Both are described fully in the next chapter. 65Tube generally runs more quickly, and will be adequate for many applications and programs, but only those which are completely 'legal', ie, those that are written according to the guidelines laid down by Acorn. If you find that one of your programs doesn't run using 65Tube, try it with the slower 6502Host. Any programs which used the hardware facilities of the BBC will not run under 65Tube – this includes most games; they stand a better chance with !65Host.

To start 65Tube, double-click on its icon. An area of the screen which looks like a window appears. This is *not* a Desktop window, though. You *cannot* use other Desktop windows or icons while 65Tube is in use, and you can't move this 'window' around. When you have finished with 65Tube, type *QUIT, press RETURN, and then press the space bar or a mouse button to close it down.

BasicEditor

The BasicEditor Module is a screen editor you can use with BASIC programs. It provides many facilities for editing your BASIC programs. If you edit them just using BASIC, you can only delete, add or replace lines and parts of lines using elementary commands and the cursor keys (between the keypad and typewriter keys). However the BasicEditor allows you, for example, to search for and replace strings of characters, to move or copy blocks of lines, to mark blocks so that you can find them again easily, and to indent the lines automatically. A function key strip for the Editor is supplied with your computer; this shows you the function keystrokes for the various operations. Its use is described fully in the *BBC BASIC Guide* issued by Acorn.

You need to load the Module before you can use the editor. You can do this by double-clicking on its icon in the directory viewer (no icon appears on the Icon Bar). Then, when you want to use it, enter the editor from BASIC, by typing 'EDIT'. Alternatively, you can load and enter it from the command line, by giving its directory pathname after the star prompt, eg:

```
App2.Modules.BasicEdit
```

if it is in the current root directory, or:

```
adfs::0.$.App.Modules.BasicEdit
```

if it is on a disc in drive 0 and drive 0 is not the current drive.

If you enter it from BASIC, and you have been writing or editing a program, the editor comes up with your program already on the screen. If you were not using a program, or have loaded it from the Desktop or command line, the screen editor comes up with a default first line number of 10, and an otherwise blank screen. You can begin to type a new program immediately.

When you want to leave the editor, press F1 to return to *command mode.

HardCopy

HardCopy allows you to print the screen image (called a 'screen dump' on a dot-matrix printer. There are three commands, to cater for different printers:

```
*HardCopyFX
*HardCopyRX
*HardCopyMX
```

These are used for Epson FX compatible, RX compatible and MX compatible printers respectively. You can also specify a series of parameters thus:

```
*HardCopyFX <orientation> <x> <y> <margin> <threshold>
```

These have the following meanings:

<orientation> may be '0' or '1' and is used to set the orientation to portrait (0) or landscape (1)

<x> and <y> these are scale values for the horizontal (x) direction and vertical (y) directions

<margin> is a number which defines, in pixels, how wide a margin to leave when printing.

<threshold> is a value for colours to be printed in black. The range of valid values depends on the number of colours the screen mode you are using can display (eg, 0—15, 0—255). Any colour with a logical number higher than the threshold value will be printed in black. If you set the threshold to zero, the whole image will be printed in black.

You can use these parameters in certain groups. You can use:

- orientation alone
- orientation and x-scale
- orientation, x and y scales
- orientation, x and y scales, margin and threshold value.

You are not very likely to use HardCopy, since you can now capture the screen using the 'Get screen area' command in Paint's icon menu. However, HardCopy can be used from within BASIC programs (for example), while the Paint option cannot. The image captured by HardCopy can only be sent to an Epson-compatible dot matrix printer, whereas a sprite from Paint can be sent to a PostScript printer (or a Laserjet or colour dot-matrix if you have the right printer driver).

Summary

Of the Modules in the directory on 'Applications Disc 2', that which will probably be most useful is the BasicEditor. This is documented in full in the *BBC BASIC Guide* published by Acorn. 65Tube will allow you to run some BBC programs, but for others you may need to use !65Host; 6502 emulation is described in the next chapter. HardCopy is really only useful from within non-Desktop programs.

15 : 6502 Emulation

You can use your Archimedes to emulate a BBC micro and so continue to use files and programs that you may have used with a BBC. This chapter explains the two types of 6502 emulation, the hardware you need to run BBC programs on some disc formats, and the limitations of the emulator.

65Tube and 65Host

There are two types of 6502 emulation, both of which let you use your Archimedes as though it were a BBC micro. The two types are the 65Host, found on Applications Disc 2, and 65Tube, in the Modules directory on Applications Disc 2.

While both emulators would, on the surface, appear to be the same they operate in different ways. 65Tube emulates a 6502 Second Processor and interprets machine code instructions intended for a BBC in a way that the Archimedes can understand, while 65Host also attempts 'hardware emulation', so programs which address hardware memory addresses directly are more likely to run. 65Tube runs more quickly than 65Host, because it is attempting less. Some programs that will not run successfully under 65Tube may run under 65Host, so experiment with both if you are trying to run your own programs.

What You Can Do

6502 emulation allows you to run programs for the BBC B micro. So, if you have been using VIEW, for instance then you continue to do so providing you have the right software and hardware. There are two aspects to consider:

- Whether you can run a program you have bought on ROM or disc.

- Whether you can use your own data files (such as VIEW files): you might need to change the disc format, for example.

For the purposes of discussion we'll stick to the use of VIEW under the emulator. However the principles involved can be applied to any other similar software.

ROM and Disc

If you have a BBC micro with a program you want to use stored on a ROM, you can use the same ROM in your new computer. You need to have a 'ROM expansion card' for the Archimedes (described in Chapter 19). Remove the ROM from your Beeb or Master and plug it into your Archimedes ROM expansion card. When you run 65Host or 65Tube, the computer is able to recognise and use BBC ROMs. You can check that it recognises the ROM you have fitted using the command '*ROMS' once you have loaded 65Host, or '*LISTROMS' with 65Tube, and it will list all the ROMs it recognises. (You need to use different commands because 65Host emulates and understands the BBC Operating System, while 65Tube recognises the RISC OS command *LISTROMS.)

If you have a Master Compact, VIEW will not be on a ROM, but supplied on floppy disc. The emulator does not 'understand' or recognise DFS (unless you have ArcDFS installed – see Chapter 18), only ADFS, so you may need to change the format of your discs. You need to do the same to run a program from floppy disc as to use data files on floppy disc, so read the next section to see what to do with your discs.

Once you have fitted the ROMs with your software on, you will be able to use the programs to create new files, using all the same commands and procedures as you used with the old computer. However, before you can use your existing VIEW files and other data files, you may need to change the disc format, fit an external disc drive, or connect your old and new machines using a serial cable and adaptor and suitable software. This is what you will need to do for different disc formats:

Master or Master Compact, ADFS 3.5" Discs

The Archimedes can read Master Compact 3.5" discs directly. These correspond to the 'L' format (640k, old map) offered by the floppy disc 'Format' command (from the Icon Bar menu). If you have a Master Compact disc, just put it into the Archimedes disc drive and you will be able to open a directory viewer for it immediately. You should have no problem reading data files for programs like VIEW, ViewSheet and so on from a Master Compact disc, but because the 6502 emulator mimics a BBC Model B micro, it does not understand some of the Master commands, so you may not be able to run programs written for the Master.

Master or BBC Model B, ADFS 5.25" Disc

ADFS discs may be 5.25", and obviously these are not compatible with the 3.5" drive of the Archimedes. There are three possible routes. Firstly, combined 5.25" and 3.5" drives are now available and the transfer could be performed at the Beeb end. Secondly, a 5.25" disc drive can be connected to the Archimedes via an external disc drive expansion card (see Chapter 19). Finally, you can buy a cable to link the two computers together and run them side by side, with the BBC or Master acting just as a disc drive (see next paragraph).

BBC Model B, DFS 5.25" Disc

The emulator cannot read DFS format discs. If you want to read data files from discs of this format, you need a serial cable and adaptor to link the two machines, and suitable software to transfer and interpret the data. Such transfer kits will cost about £15-20. You can also buy a utilities disc with software which allow the Archimedes to interpret data on a DFS format disc in an external disc drive. You can use this without needing to have the BBC and the Archimedes side by side, but you need an expansion card and external 5.25" disc drive. Alternatively, if you can transfer the data onto a 3.5" DFS disc then you can use ArcDFS can be used to read the files.

Loading the Tube and Host

When you have installed your ROM and/or connected an external disc drive or serial data link cable, you should be able to run BBC programs after loading the 65Tube or 65Host. Many programs will run using the Tube. To load this, double-click on its icon in the 'Modules' directory on Applications Disc 2. A non-Desktop window appears. Remember that you can't use this window with 'multi-tasking', or do any other Desktop tasks while it is displayed. Use it for running your BBC programs in exactly the same way as you would use the BBC. (Remember that the computer will look first at the disc in the current drive for any files, so you will have to give a pathname including the disc drive number if you want to load from or save to an external drive, or any drive other than the current one.) When you have finished with the emulator, type '*QUIT' and press the space bar or click a mouse button to remove the window.

If your programs do not run on the 65Tube, try using the 65Host. This runs more slowly, but its emulation of a BBC is more rigorous. It also uses 128k of memory, so you might need to remove some applications to free space for it. To load 65Host from the Desktop, double-click on '!65Host' in the Applications Disc 2 directory viewer. The Desktop disappears, and a BBC-type screen replaces it. You can also load 65Host from the command line, using the command '*EmulateBBC'. 65Host comes up with caps locked on, and you can use other BBC screen modes (features which come with the hardware emulation this option provides). Use the emulator just as you would use a BBC; it will retrieve programs from ROM if you give the appropriate *command (eg, '*WORD' to run VIEW). When you have finished with it, type '*QUIT', then press the space bar or click the mouse to return to the Desktop.

Limitations of 6502 Emulation

65Host in its original form does not attempt to emulate the sound system or the printing facility of the BBC micro. Any software that uses sound – such as many games – may not run at all. There is no emulation of the BBC's floppy disc controller either, so copy-protected discs will *not* run. (This means programs with an encoded protection

to prevent them being copied, not discs with a write protect tag.) If your computer is connected to a network, you will also find that some Econet calls from the emulator won't work.

Acorn are improving the emulator, though, and hope to release a version with sound and printing implemented by early 1990. It is also hoped that it will be able to support some educational software which does not run on the current emulator. Ask your dealer or phone Acorn's Customer Support department to find out the current situation.

The *User Guide* issued with your computer explains some restrictions to 65Host's behaviour when you are using it to run programs that use direct low level I/O.

Running View Family Software

There are two ways of running the View family of programs under the emulator; you can run it from a ROM, or from disc.

If you had VIEW on a ROM in BBC micro, you can fit it to an Archimedes ROM expansion card and fit this into your new computer – but not into an A3000, which does not have the space (see Chapter 19). If you have VIEW on a ROM in the computer, you need to run it under 65Host.

You can also buy VIEW emulation software, which still needs the 6502 emulation, but which is already on discs which the RISC OS computer can read. (If you have the VIEW emulator for an Archimedes running Arthur, use the upgrade material on the Support Disc.) If you have VIEW on disc, you need to run it under 65Tube. You can also buy other BBC emulation software, such as the Inter family (Interword, Interbase, InterSheet and Interchart) from Computer Concepts. Again, you still need to run these programs under 6502 emulation.

If you have a Master Compact version of VIEW then this can be run without any further modification. To do this, first run the 65Tube emulator and then load the VIEW image as follows:

```
*LOAD VIEW 8000
```

Once the file has loaded, VIEW can be run by typing:

```
*GO 8000
```

If you press BREAK and exit VIEW, you can re-enter it in the same way and your text should still be intact – no guarantees though! Other compatible disc-based Sideways RAM image type software, such as ViewSheet, can be run in this manner as well. If in doubt, just try it!

Note: If you own both a Master Compact and an Archimedes then there should not be any copyright problems. However, this may not be the case in a multi-user environment such as a school or college. If in doubt you are advised to contact Acorn Computers directly. This advice also applies for other software packages ported from the BBC to the Archimedes.

Summary

65Host and 65Tube between them allow you to run a lot of BBC micro software, but it will not all run. Anything which uses sound, addresses memory locations directly, or uses hardware features not implemented will not run. Most programs stand more chance of running under 65Host, which is a more thoroughgoing emulation, but if you can run a program under 65Tube, more memory will be available. It is worth experimenting, and keeping up to date with improvements in the emulator.

16 : The PC Emulator

The most popular computer in the world is the PC running an Operating System called MS-DOS. Because of the vast number of PCs already installed in homes and offices – around 10 million – there is an awful lot of good software available for it. Because of its popularity as a business machine, anybody using a computer at work will undoubtably come into contact with a PC and MS-DOS at some time. And as computers become more and more important to us, a working knowledge of MS-DOS is equally important. For this reason Acorn have produced the 'PC Emulator'. Just like 65Tube and 65Host, this software makes your Archimedes mimic another computer – in this case it's a PC running MS-DOS.

The PC Emulator pack comes with two discs: one contains the MS-DOS Operating System itself and the other the boot program which starts the ball rolling ready for MS-DOS to be loaded. The MS-DOS Disc also contains the usual MS-DOS utilities for disc formatting, copying and so on. You do not need any additional hardware to run the Emulator.

What the PC Emulator Does

The PC Emulator lets you set up your machine as though it were a PC. It emulates PC hardware and software, and it is fairly robust – there are few things it cannot do. You can then run PC software and copy data files onto PC-format discs. When you use the PC Emulator, the mouse behaves like a 'Microsoft' mouse (a standard PC mouse), and a colour graphics adaptor display standard is used for the screen display. If you have a hard disc, you can set aside an area of its memory to act as a PC hard disc (you can choose how much of the memory to use). On a 2Mb or more machine, the PC Emulator mimics 640k; on smaller machines, it may mimic a PC with less memory. On a 1Mb Archimedes around 507k is free for PC programs.

The PC Emulator takes over control of the computer *completely* while it is running; you *cannot* run other tasks at the same time. To escape from the emulator, you need to reset the machine, so you must save all your Desktop work before you start it. The Support Disc contains a file with an icon so that you can load the PC Emulator onto the Icon Bar and run it by clicking on the icon, but once running it is *not* a Desktop operation any more.

What Software?

You can use the emulator to run programs sold for use with PC-compatible machines. You can also use one of the utilities provided on the MS-DOS disc to transfer your own data to and from PC format discs. This means that you can use text, figures and so on that you have generated using an Archimedes application with a PC program, providing your data is in a suitable format for transfer. It is also useful if you want to print text you have prepared with a wordprocessor or desktop publishing package on someone else's printer.

At least 95% of PC software runs acceptably under the PC Emulator, and all the major packages run, including WordPerfect, Aldus Pagemaker, Lotus 1-2-3, Ventura Publisher, Word, Displaywrite and Supercalc. Some of these run rather slowly, but they are acceptable.

Programs that won't work are those that are often pushing even a top of the range PC to its limits. Similarly if you are using a 1Mb machine and therefore have only 507k of memory available under MS-DOS, then programs that insist on a full 640k won't run.

Limitations of the PC Emulator

The only drawback most users will encounter is that the PC Emulator sometimes runs software more slowly than a dedicated PC. This isn't really surprising when you consider what it is doing. It is best to turn the auto-repeat option for the keyboard off before you load the PC Emulator and PC software, as some packages repeat an error beep for several minutes if auto-repeat is left on. The PC serial port is not fully emulated, and consequently much communications software does not run. However, these are only minor problems for most of us.

Shareware

PC software can be expensive but there is a vast library of 'free' PC software available in the form of 'Shareware'. This software is often as good as similar products costing hundreds of pounds. Appendix A contains information about Shareware – what it is and how to obtain it.

Summary

The PC Emulator is a great addition to any Archimedes system which enables you to run a vast range of software, making up somewhat for the more limited range of dedicated RISC OS programs. You shouldn't buy an Archimedes intending to run it like a PC all the time, because it's slow – your money would be better spent on a low-price PC – but the Emulator is perfectly good for occasional use, and is the ideal way to learn how to use the industry standard Operating System – something that will stand you in good stead for years to come.

17 : Printers

This chapter explains how to connect a suitable printer to your computer, and how to choose and set up a 'printer driver'. It does not provide details on the different types of printers and how they work – for that you are referred to your printer manual. The applications discs provide two printer drivers you can use to run standard printers with your Archimedes. You need to load a printer driver before you can print anything out, because the printer driver tells the computer what format data the printer expects to receive and so enables it to send data the printer can understand.

Which Printer?

The printer drivers on Applications Disc 1 support dot matrix printers and PostScript laser printers. The dot matrix printers supported are:

- Epson FX compatible
- Epson LQ compatible
- NEC PinWriter p6 plus

PostScript laser printers compatible with the Apple LaserWriter are supported.

If you buy Acorn Desktop Publisher, you will get an additional two printer drivers that run Integrex colour dot matrix printers and LaserJet compatible laser printers. It is quite likely that these or other printer drivers will be sold separately in the near future and more will no doubt be added: check the computer press, or with your dealer, or with Acorn to see what the present situation is.

The applications supplied on the applications discs do not support the use of a daisywheel printer. Neither can you use any dot matrix printer that is not compatible with the Epson LQ or FX series, or (without the printer drivers supplied with Acorn Desktop Publisher)

any non-PostScript laser printer – unless your printer has an Epson compatible emulation mode.

Additional applications written by Acorn and other third party software houses do support different printers and do not use the Acorn printer drivers. For example, First Word Plus allows you to print to a daisywheel printer. If you buy Acorn Desktop Publisher, you can use the printer drivers supplied with it to print files created with Edit, Paint and Draw. Remember, though, that the Epson printer, and in particular the Epson FX, has become a *de facto* standard and virtually all printer manufacturers support the special printer control codes that it understands.

Getting Ready to Print

Before you can print anything you need to:

- Connect up a suitable printer.
- Tell the computer the printer is connected.
- Load and set up a suitable printer driver.
- Select any necessary printer driver settings.

How to Connect Your Printer

Printers have either a 'parallel' or 'serial' connection to the computer. The most common is a parallel connection (also called a 'Centronics interface'). This is also the simplest to set up. You will need a standard IBM PC parallel printer cable. You can get this from a shop, or by post from a dealer. The printer cable has a plug at each end; plug one into the socket on the printer, and the other into the socket marked 'Parallel Printer' on the back of the computer. It is easy to see which plug to fit into which socket, as the two are different, and you can only connect them the right way round.

If you have a printer with a serial interface, you will need a different cable with a '9-way D-type'. You will need to obtain this from your Acorn dealer, though you could construct one yourself if you want to. Figure 17.1 shows how the pins are arranged (called the 'pin-out'), and their functions are listed overleaf.

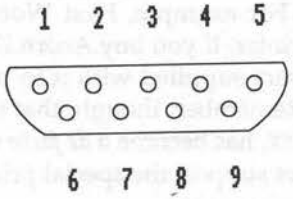


Figure 17.1. The serial pin-out.

Numbering the pins from the top left, 1–9, the function of each is detailed below in Table 17.1.

Pin	Function
1	Connect to pin 4
2	Received data
3	Transmitted data
4	Data terminal ready
5	Common return, or signal ground
6	Clear to send
7	Request to send
8	Connect to pin 4
9	Ring indicator

Table 17.1. Serial pin-out functions.

Consult the manual that accompanies your printer for information on making the connections to the plug for the printer's end of the cable.

When you have made up the cable or purchased one, plug one end into the computer and the other end into the printer.

Here I Am!

If you have a parallel printer, all you need to do to tell the computer the printer is connected is use the Configure program (see Chapter 10) and click on the box for Parallel printer connection. This is the default setting, so unless you or someone else has changed it, you won't need to change this anyway. This is the only configuration setting you might need to make for a parallel printer. (If you prefer, you can make this setting from the command line, using '*CONFIGURE Print 1'.)

For a serial printer, use the Configure program and click on the Printer port box marked 'Serial'. (Or you can use '*CONFIGURE Print 2' from the command line.) There are two other settings you might need to make as well, and you can use configuration commands to make them, or set them from the printer driver menu (described below). Setting the options from the printer driver menu does not change the configuration of the computer, though, and if you want to use a different printer driver, the settings you have made will not be used. To use configuration commands, press F12 to escape from the Desktop.

You might need to set the serial data format and the baud rate. Set the serial data format with the command '*CONFIGURE Data <number>'. The number must be in the range 0—8 and more details on this can be found in Chapter 12.

To set the baud rate, use the command '*CONFIGURE Baud <number>'. The number must be in the range 0—8; see Chapter 12 for details.

You will need to look in the manual supplied with your printer to see which settings you need.

Loading a Printer Driver

If you have an Epson-compatible or NEC PinWriter P6 dot matrix printer, you should use the printer driver called '!PrinterDM' on Applications Disc 1. If you are using a PostScript-based laser printer, you should use the '!PrinterPS' printer driver also on Applications Disc 1. You load a printer driver like any other application – just double-click on its icon in the applications disc directory viewer. The printer driver icon appears on the Icon Bar, on the left by the disc drive icons.

Next you need to 'set' the printer driver for your particular printer. Click on the printer driver icon to display a window. Figures 17.2 and 17.3 show both of these icons.

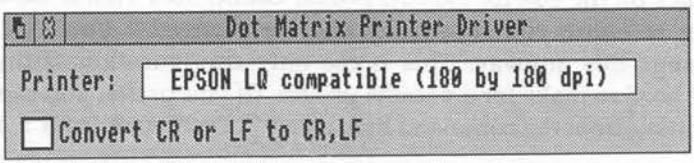


Figure 17.2. The dot matrix printer driver window.

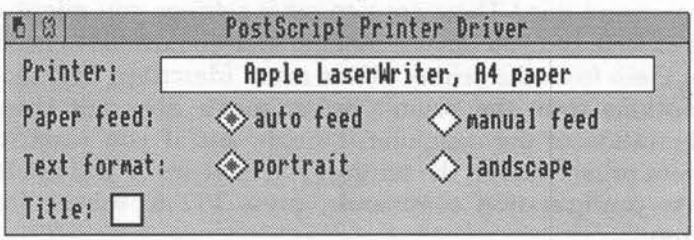


Figure 17.3. The PostScript printer driver window.

Dot Matrix Printer Driver Settings

You have to make settings suitable for your printer. Click Select over the printer icon and then in the field marked 'Printer'. As you do so the text in the box will change to reveal the different options in turn. These options allow you to choose different printer types, and different qualities of print. The print quality is normally expressed in terms of 'resolution' and this is shown as two figures giving the density of printing in 'dpi' (dots per inch). The higher the number of dots per inch, the greater the density of printing and so the better quality output you will get. However, more dots per inch take longer to print, so you need to balance quality and speed. You might want to use a medium resolution for draft copies, and a high resolution to produce good final copies of your work. The printer types and resolutions you can choose are listed in Table 17.2.

Printer type	Resolution	
Epson LQ compatible	60 by 60 dpi	
	120 by 60 dpi	
	90 by 180 dpi	
	120 by 180 dpi	†
	180 by 180 dpi	
	360 by 180 dpi	
Epson FX compatible	60 by 72 dpi	
	90 by 72 dpi	
	120 by 144 dpi	†
	240 by 144 dpi	
	240 by 216 dpi	
Epson LQ-850 compatible	360 by 360 dpi	
NEC PinWriter P6 Plus	360 by 360 dpi	

† quite acceptable output for everyday use

Table 17.2. Printer settings available under PrinterDM.

If you need to, you can also click in the box to convert carriage returns (CR) or line feed (LF) characters to begin a new line. You may not need to use this box, but if you start printing and find all the lines are printed on top of each other, click this box to solve the problem.

Most modern dot matrix printers are compatible with one of those offered by the printer driver. Consult your printer manual for details of the printer's compatibility, or try the options in turn (begin with FX or LQ).

Laser Printer Driver Settings

If you click in the 'Printer' field with the PrinterPS driver installed on the Icon Bar you can switch between Apple LaserWriter A4 paper and Apple LaserWriter B5 paper. You can also click in a box to choose automatic or manual sheet feeding, and portrait or landscape orientation. If you click so that a star appears in the 'Title' box, a title will be printed on each page giving the page number and full pathname of the file you are printing.

The PrinterPS printer driver is in fact two programs, ora single program with two halves. A driver will consist of a Module and the 'application' part which sits in the Desktop memory. For some applications, only part of 'PrinterPS' is needed. You can print files from Draw, for example, with only the relocatable module loaded. This allows you to save memory space by removing the part of the printer driver you don't need. To do this, load the printer driver and make your settings as usual, then use 'Quit' in the printer driver menu to remove the icon from the Icon Bar. The printer driver is removed, but the module you need to print Draw files remains behind. You can't print Edit files without the whole printer driver, though.

When you have made the settings you want for PrinterDM or PrinterPS, click the close icon; the printer driver will use these settings until you change them, remove the printer driver, reset the machine or load another printer driver.

The Printer Driver Menu

If you press the Menu button with the pointer over the printer driver icon on the Icon Bar, a menu appears which allows you to make other settings.

You can set printing to a parallel or serial printer, to a printer on a network (if your computer is connected to a network), or to a file. You can specify a network printer in a sub-menu, and give data format and baud rate for serial printers. If you choose to send print output to a file, you need to give a name for the file in the sub-menu. You can give a full pathname, or a short name, in which case the file will appear in the root directory of the current disc. If you send print output to a file, you can print the file later, or take the disc to another computer with a different printer attached. This allows you, for example, to send output to a PostScript file even if you don't have a PostScript printer. You can then take your disc to a computer which does have a PostScript printer attached. This might be useful if you are using Acorn DTP and do not have access to a laser printer. You could produce proof copies on a dot matrix and the final 'master' copy on a laser printer by using a suitable laser printing bureau. (You might have to transfer the PostScript file

onto a PC-format disc first using the PC Emulator, however, as the bureau might not have the facility to read Archimedes discs.)

The option 'Save choices' allows you to store the settings you have made for future use; next time you load the printer driver, it will come up with the settings you have made and saved. 'Stop printing' is only available when you are actually printing something; click on it to interrupt the printing if you need to. Use 'Quit' to remove the printer driver from the Icon Bar when you have finished with it or need the memory space for something else.

Editing PrinterDM

It is possible to edit a copy of the dot matrix printer driver if you want to run a dot matrix printer that is not supported. To do this, display 'PrData' (in !PrinterDM) as an Edit file by double-clicking on '!PrinterDM' while holding down the SHIFT key. and drag the PrData icon onto Edit in the Icon Bar.

You will see that each printer definition has the same format. Here's an example:

```
printer_name: EPSON LQ compatible (60 by 60 dpi)
printer_number: 4
pxres: 60 ; dots per inch
pyres: 60
pxres_halftone: 60/4
pyres_halftone: 60/4
dump_depth: 8 ; 8 pin mode
line_prologue: "<27>K" ; select appropriate mode
line_epilogue: "<27>$<0><0><27>J<24>" ; move down 24/180
inch
```

You can create additional printer definitions using the same format. The first line gives the name of the printer as it appears in the printer driver window. The second line gives its number in the list, and so its position in the sequence displayed. The next four lines give the print resolution, and the resolution used for showing half-tones. The remaining lines give the mode (8-pin, 24-pin, etc), set the interlace, and give the control codes that appear at the start and end of lines and pages. The fields you can use are:

```
dump_depth: 24
interlace: 0
line_prologue: ""
line_epilogue: ""
line_interlace: ""
job_epilogue: ""
job_prologue: ""
```

You do not need to use them all. You will need to consult your printer manual to find out the control sequences you need to include. (<27> is the code for Escape.) Appendix B contains information on how to interpret printer codes.

If you make a mistake when editing PrData remember that you can always restore its original contents by replacing it with the Prdata file on your original master copy of Applications Disc 1. Remember – always use your backup files!

Printing Files

There are two ways of printing files. Some applications allow you to use either method, some will only let you use one or the other.

You can print a file directly from within some applications using a 'Print' command. This often allows you to choose how many copies you want to print, and sometimes offers other options, such as orientation of the image on the paper, the scale of the image, a range of pages to print, and so on. Give the print command, with any necessary settings, when a printer driver is loaded, and the file will be sent to the printer. Paint files can only be printed from within Paint using the 'Print' command in the menu; you can use this command from the sprite window or the sprite file window.

You can also print files by dragging the file icon from a directory viewer or 'Save' dialogue box onto the printer driver icon on the Icon

Bar. This is the only way to print Edit files.

If you have sent output to a printer file, you can later print this file by dragging its icon onto the printer icon on the Icon Bar.

Summary

The printer drivers supplied on Applications Disc 1 support most common dot matrix printers, and PostScript laser printers. You need to connect your computer and make sure the configuration gives the computer accurate information about the printer, then load and set options for a printer driver before you can print any files. Not all applications use the printer drivers supplied on the applications disc, and it is also possible to add your own printer definitions to PrinterDM. Appendix B contains details on how to interpret the codes detailed in printer manuals.

18 : Software for the Archimedes

Once you are familiar with your RISC OS computer (if not before!), you will probably want to buy extra software to run on it. You can continue to use packages for the BBC micro if you run them under the 65Tube or 65Host emulators, and of course there is a lot of PC software which will run under the emulator, but to get the most from your machine, you really need to try some of the software written especially for it. The range is increasing all the time, and this chapter can only give a taster of the type of programs you can buy. We've tried to include a spread – text handling, graphics, utilities, languages, music – but there are more: look in the computer press and go to shows to keep up with developments (see Chapter 20).

As prices can vary I have not included any here. If a particular product catches your eye then have a look in an Acorn magazine or give contact your local Acorn dealer for friendly and informative advice.

Wordprocessing and Desktop Publishing

Text processing could at one time be divided into whole separate areas of wordprocessing – getting the words on the page (or screen) right – and layout. There are still no programs which combine all the features of a top-quality wordprocessor with full layout facilities, but the gap is beginning to close. You may like to compromise with a package that has some layout facilities and reasonable wordprocessing power, or keep the two tasks separate still and prepare text with one program to be laid out with another. There is no truly excellent wordprocessor for the Archimedes yet; First Word Plus will handle footnotes, but for automatic section-numbering, or generation of indexes and tables of contents, you'll have to wait a while (or use PC software with the emulator).

Acorn Desktop Publisher

This program, produced by Acorn, allows you to combine text and graphics with a range of layout features. You can set any page size, then arrange 'frames' which are to hold text and graphics on the page. You can type directly into these frames or bring in text you have prepared with a wordprocessor There is no spelling checker. Text will 'flow' between frames, so you can edit the text or move or re-size the frames and the text will re-order itself automatically. You can draw very simple graphics, or import pictures from Draw, Paint, other compatible graphics packages, or scanned images (see Chapter 19 on image scanners). Frames can also be given tints and borders.

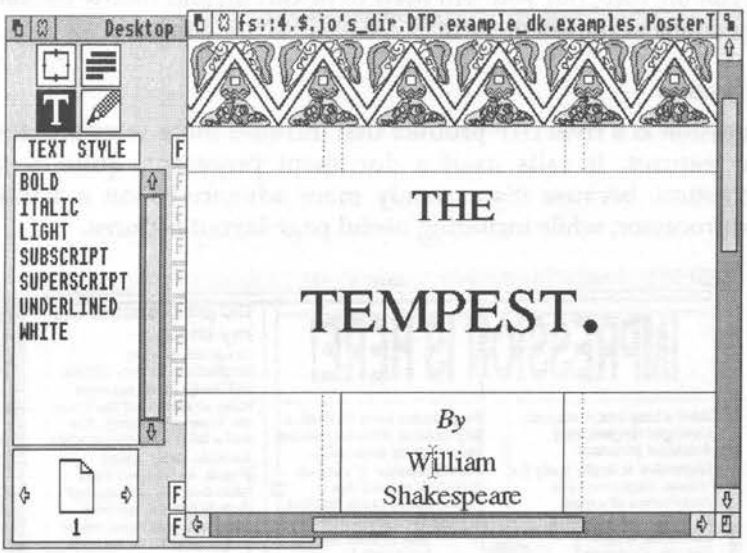


Figure 18.1. Acorn Desktop Publisher.

Layout features allow you to choose font, point size, text style (bold, italic, etc.), and text format – justified, right- or left-aligned, centred, tabulated and so on. You can design one or two master pages, so that you can have all pages alike or different left and right pages, and every new page you create copies the frame arrangement, text or graphics on the master page. This means, for example, that you can have a logo on each page, or a vertical rule between text columns, without having to add it to each page individually. One of the most useful features is the

ability to save style sheets. A style sheet stores all your text style definitions (each of which is 'tagged' with a name), the master page, any header and footer text, and page size. You can then re-use the style sheet for other documents, and so easily give separate documents an identical format.

Acorn DTP comes with new printer drivers, including one for LaserJet compatibles and one for Integrex colour dot-matrix printers. You can use these – and the additional fonts – with other applications too: a nice bonus.

Acorn DTP uses up a lot of memory. It is not ideal for 1Mb machines; it will run on 1Mb, but you will need to be careful and follow the set-up instructions to the letter.

Impression

Impression is a rival DTP product that includes more wordprocessing type features. It calls itself a document processor, quite a good description, because it's certainly more advanced than a standard wordprocessor, while including useful page-layout features.

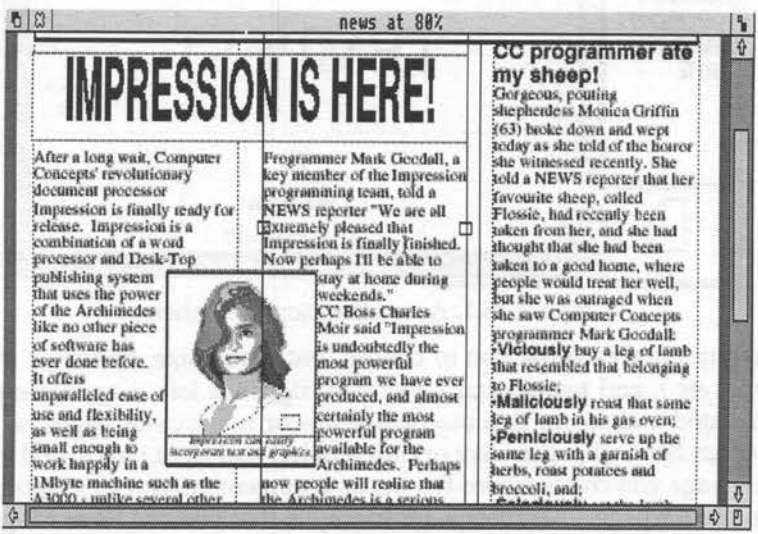


Figure 18.2. Impression.

It combines wordprocessing facilities with the ability to display and print text in different fonts and sizes, and to incorporate graphics drawn with Paint or Draw. Its layout system is frame-based; text can flow between frames and around pictures, and frames can have borders and tints. It also includes a spelling checker. You can hold several documents in memory at the same time, and you can have more than one window onto a document at once, so you can cut and paste between different areas easily. The desktop publishing features include paragraph styles with names for quick text styling, and master pages.

Impression uses the printer drivers for Epson compatible dot-matrix printers, PostScript laser printers, and LaserJet-compatible printers. It also uses less memory than Acorn Desktop Publisher, leaving 300k free on a 1Mb machine.

PipeDream 3

PipeDream is an 'integrated' package which combines a word-processor, spreadsheet and database in one program. It offers the usual basic wordprocessing facilities, but in the same window allows you to keep 'live' calculations in a spreadsheet-type format. This means that you can use it to build up a database which is constantly updated. All recalculations are performed in the background as you work on the document. You can have several windows onto different documents at the same time, and can pass numbers between documents.

PipeDream 3 comes supplied with a spelling checker which checks words as you type. The program uses a 93,000 word master dictionary, plus user dictionaries so that names, product names, foreign words and so on can be recognised and accepted.

You can use some layout effects, like bold text and multiple columns, different fonts and foreign characters. You can also drag in pictures created in Draw or Paint. It uses the RISC OS printer drivers, or its own printer drivers that won't reproduce pictures, but will support a Juki 6100 printer.

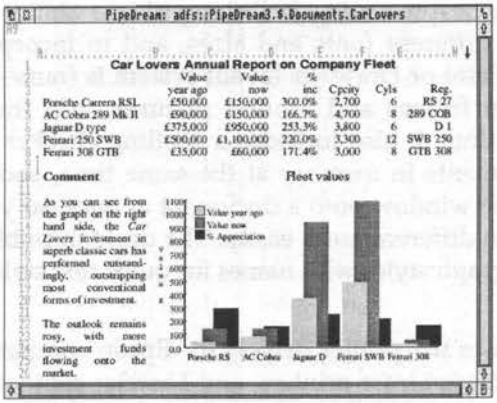


Figure 18.3. PipeDream.

First Word Plus

First Word Plus is a slightly old-fashioned wordprocessing program, but is adequate if you don't want to do fancy layouts, or if you want to prepare text to use in a desktop publishing program. If offers all the usual editing operations – cutting, copying, moving blocks, searching and replacing. You can display several text styles on screen: bold, light, italic, underline, super- and sub-script, or a combination of these. You can set rulers and tabs, define headers, footers and margins, set the text format, check spelling and add footnotes. The last of these is the most advanced of First Word Plus's features. Footnotes are numbered automatically, and if you re-order the text, the footnotes are renumbered and re-ordered to follow.

A slight drawback with First Word Plus is that it only drives dot-matrix or daisywheel printers; you can't use PrinterPS with it to produce PostScript output. Of course, if you have a daisywheel printer, this is a godsend, as it's the only Archimedes wordprocessor that will run a daisywheel at all. And if you have a dot-matrix, it doesn't matter anyway.

Graphics

If Paint whets your appetite, there are several good graphics packages for the RISC OS computers. Which you choose will depend on exactly which features you are looking for. Here's a selection in different price ranges.

Artisan2

Artisan is the next step up from Paint. It provides flipping and rotation of blocks, various pen shapes and sizes, full sprite handling, including drawing with a sprite, and a pixel mixing facility to give full colour control. You can distort an image for special effects, and use a quick-scrolling zoom to make editing easy. You can print out all or part of the screen image in black and white, or print on an Integrex colour dot-matrix printer.

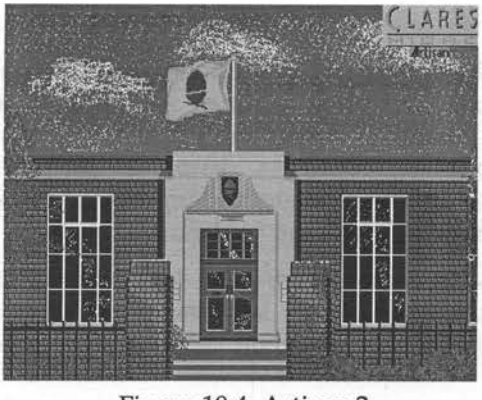


Figure 18.4. Artisan 2

Artisan2 is the RISC OS version of Artisan; there is upgrade material for Artisan on the support disc. Artisan2 uses a series of menu blocks with icons for different functions, some of them rather obscure. It has on-screen help (which you can turn off), and its own fonts.

Atelier

Atelier's particular strong points are its graduated shading fills, and its ability to 'wrap' a two-dimensional graphic image around a three-dimensional shape – wrapping a label around a wine bottle, for

example. The shaded fills allow you to mix up to sixteen colours in a shaded area; the program will automatically calculate intermediate shades and place them to give the best effect. You can shade in a variety of styles, using this to make convincingly shaded spheres, for example. You can also 'smudge' the image, and paint new elements on a layer between existing ones – such as a sun in front of the sky but behind a tree.

Atelier provides its own printer drivers, supporting Epson JX80, LaserJet-compatible laser printers and the Integrex 132 colour dot-matrix printer.

Although Atelier does not run in a Desktop window, you can return to the Desktop and continue with other tasks while you have Atelier loaded, and then return to your Atelier picture, with the press of a function key.

ProArtisan

ProArtisan is the upgraded and more expensive version of Artisan. It offers all the usual graphics facilities, with additional features that allow detailed control of colour and pattern. You can set graduated fills with colours and patterns, distort an image, cut and paste irregular shapes and manipulate colours with a 'magic brush'. It has useful on screen help (which can be removed).

ProArtisan has twenty-six fonts, and a font editor. It also has its own printer drivers, supporting the Integrex colour printers, Xerox 4020, Hewlett-Packard Paintjet, Epson printers and LaserJet compatibles.

Fun Programs

Render Bender

Render Bender is the first 'ray-tracing' program for the Archimedes. It allows you to define scenes, including specifying textures or surfaces and directions and sources of lighting, and then animate them. The animated scene accurately reproduces reflections, shadows, and opacity and translucency of materials.

Development of animated graphics is in stages, and it can take a long time. The package contains two programs, the first of which you use to

define the ray-traced image, and the second of which provides the animation. First you need to describe a scene using commands in a line editor. This allows you to choose objects – spheres, pyramids, boxes, polygons, tubes, cones and discs – and their colours, opacity and so on. Opacity, specularity and refractive index are set as global parameters. You can set a ground colour and pattern (floorboards, for example), and a 'sky' colour and dark/light graduation from the horizon. Lights can be point light sources, parallel beams or spotlights, and you can have several. Finally, you can set the observer's position by altering the focal length of the 'lens' through which the scene is used.

Once you have set up the scene you need to define the animation, using a command file which generates the screens that will be used. There are lots of variables to set, but once you have done this you can go away and let the command file compose each screen – this can take many hours.

Finally, the second program, called Delta Animator, brings the screens together into the animated sequence, and you can watch the fruits of your labour in a very smooth and perfectly executed animation. You can add background sound, too, if you want.

Render Bender can produce some extremely impressive results – but you need to be prepared to devote time to it.

Armadeus

Armadeus is a sound-sampling system. This means that you can feed in sound – from a CD player, microphone, musical instrument, or whatever – and then play it back, edit it, mix it and so on.

Armadeus was written especially for RISC OS and has full multi-tasking operation. The Armadeus window shows a real-time wave image as you replay sound samples.

Once you have sampled your sound, you can mark blocks and move, copy, delete or overlay them. You can fade in and out, add echo, reverse a section and create loops. Zooming in on an area of the waveform enables you to edit in close detail.

There is a range of frequencies for sampling, between 8KHz and 90KHz, and the frequency, together with the computer's capacity,

limits the length of the sample. On an A310, a sample can be 52 seconds long if sampled at 10KHz; on an A440, it can be 457 seconds at 8KHz.

You need special hardware to sample sound with Armadeus: a sound sampling board, which fits into the backplane (see Chapter 19). This puts the price up rather. Clares, the producers of Armadeus, recommend their own sampler.

Ancestry

Ancestry is a database which enables you to build up a family tree and information base. You add a card to the database for each individual as you need them. This stores details in a standard format. You can also add free-form text on individuals, but to do this you need to create a skeleton 'user file'. This is a little more tricky, as you need to say how many entries you want to make before you start – and if you haven't finished collecting your information, the discovery that your great-great grandfather had ten children who each had a further ten will exhaust the cards you have created.

Each individual you add to the records is given a unique identification number, and relationships between individuals are stored as partner or child links. Anyone can have up to seven partners. On a 1Mb machine, you can include up to 3000 records if you are not using a user file, or 1000 if you are. On a 4Mb machine, with a 20Mb hard disc, you can store 10,000 records – more than enough for most families!

You can print out your family tree, over several pages if necessary, and can also produce reports on individuals or lines of descent. The English Royal Family from Henry VII is given as a full example.

Utilities

Several companies have released useful utilities to help you make the most of RISC OS. These include disc formatting routines that enable you to format discs at the same time as running other tasks, disc copying routines, and others just as useful to non-programmers. If you buy a package of several utilities, there are likely to be some utilities you will use and some you won't. Some utilities are fairly useless – you can do the same thing from the command line very quickly. However, if you

don't like using the command line, or want to do everything from the desktop, it's worth looking at what's available.

Instigator

Insigator is a powerful utility program which adds over 80 new commands to your Archimedes and can be used from the Desktop or the command line. See Appendix C for full details.

ArcDFS

ADFS is the standard Archimedes Filing System but previous BBC micros used Acorn's original filing system – the Disc Filing System, DFS for short. ArcDFS installs as a Relocatable Module and allows you to read and write from and to DFS discs using the standard Desktop techniques. See Appendix C for full details.

RISC OS Companion Volume 1

RISC OS Companion contains fourteen applications, including file conversion for View and WordWise into First Word Plus files, a simple way of setting copy options, a rubbish bin icon, an icon for changing file types, and a terminal emulator to give access to Telecom Gold.

Disc Sharer (Econet)

This utility application allows users of BBC micros and Archimedes to access transparently the hard disc of another Archimedes across the Econet. As the Disc Sharer is a Desktop task, the user of the Archimedes can also be running other applications at the same time.

Print Spooler (Econet)

Normally Econet printer servers can only accept files to print from one station at a time. This utility solves this and allows files from up to 24 stations to be queued until the printer is ready to deal with them.

Languages

If you want to write your own programs, there are several languages available from Acorn. BASIC V comes with the computer, but you can also buy FORTRAN 77, ISO-Pascal, ANSI C, Lisp, and Prolog X.

Of these C and Pascal are probably the most popular languages and, if you are so inclined, both are well worth learning. The Cambridge Pascal Compiler is also available from Dabs Press.

Archimedes Basic Compiler

If you don't want to learn a new language, but want the advantages of machine code then a BASIC Compiler is useful. ABC takes BASIC programs and converts them into machine code program which can be run straight away. The advantages of a compiler such as ABC are threefold:

- Speed increases of up to 4000% are possible.
- You can be sure that the program is effectively bug-free otherwise it wouldn't compile.
- Your program is 'tamper-proof'.

Appendix C contains more details about ABC.

Cambridge Pascal

Pascal is one of the most popular programming languages in use today. Its structured format encourages the use of good programming practises and teaches a careful, disciplined approach to writing programs which can be applied to other languages. Thus it is highly suitable for educational use and a must for any serious programmer.

One of the aims when Pascal was developed was to produce a language which could be compiled quickly and which produced efficient code. Both of these requirements have been met by this implementation. The Cambridge Pascal Compiler requires just a single pass over the source code during compilation and produces code which is both compact and extremely fast in execution.

A further aim was to supply a language which was simple, compact and not burdened by numerous irrelevant features. The result of this is that Pascal is easy to learn and use. One potential disadvantage, however, is that certain areas are rather poorly catered for. The extensions which the Cambridge Pascal Compiler provides fill these gaps in a manner which is compatible with the rest of the language. In addition, since it has been written specifically for the Archimedes, this

compiler provides mechanisms for taking full advantage of the machine's capabilities. Appendix C contains full details about Cambridge Pascal.

Books

Books are a tried and tested way of learning more about your Archimedes and there is an ever-increasing range available. Appendix C contains details on the various Dabhand Guides currently available.

Summary

This chapter has only outlined a few of the software products available for the Archimedes. New products are being released all the time, and to keep up to date with what there is you need to check all the sources given in Chapter 20 and talk to your Acorn Dealer.

19 : Hardware Additions

There is a variety of additional hardware you can buy to improve your computer and expand it to suit your needs. This chapter outlines the type of equipment you can buy and what it does. Many of these items are supplied by a large number of dealers; contact your local dealer who will be please to help, or Acorn Customer Services, or look in the computer magazines for adverts. Details of equipment here are divided into these categories:

- Printers
- Monitors
- Additional disc drives
- Modems
- MIDI
- Scanners
- Expansion boards
- Memory expansion
- Connecting the computer to a network

Printers

Fitting a printer to your computer enables you to print out your text and graphics, print listings of your programs, and so on. The use of printers is described in Chapter 17. If you have the original RISC OS printer drivers, rather than any supplied with another package you have bought, you will only be able to drive an Epson-compatible dot-matrix printer or a PostScript laser printer compatible with an Apple LaserWriter.

Dot-matrix printers come in a range of prices, from less than a couple of hundred pounds to over a thousand. You will find them listed as 9-

pin, 24-pin and so on. This refers to the number of pins on the print head. A character is made up by striking the page through a ribbon with a pattern of pins. The more pins available for each strike, the more definition can be given to the characters. A 48-pin dot-matrix printer thus gives a much better image than a 9-pin printer, but it is also much more expensive.

A laser printer gives better printout than a dot-matrix printer, but it is also more expensive. Output from a good PostScript printer is little different from typeset text. However, you can expect to pay about £2000 for a laser printer you can use with the PostScript printer driver.

If you have an applications package which uses different printer drivers (First Word Plus, Impression, Acorn Desktop Publisher, for example), you will be able to use some different printers, too.

Monitors

If you use your computer a lot, and particularly for work with text and layout or detailed graphics, you might want to buy a high-quality monitor.

The change you are most likely to make is to a high-resolution multiple frequency or 'multisync' monitor. These give a much clearer picture than the standard colour monitor. Blocks of colour are solid, rather than slightly stripy. This is because the pixels in a multisync's picture are square, whereas on a regular monitor in mode 12 a pixel is twice as tall as it is wide. You can use the regular modes 12, 15 and so on with a multisync monitor, but to get a really good picture use one of the higher modes: 20 or 21, or 27 or 28 for a VGA-type monitor.

A multisync monitor costs upwards of £400.

A monitor for the specialist is the 19" monochrome. This gives a very good quality display for text layout and precision drawing, displaying a whole A4 page at a view. It can't, of course, display colours. And it costs around £2000. You can only use it in mode 23, and only with a 400 series machine. Still interested?

You will need to use *CONFIGURE to set the monitor type after installing a new monitor (see Chapter 10).

Additional Disc Drives

You can fit additional floppy or hard disc drives to your computer, including an external 5.25" drive.

You can fit an internal or external hard disc; you can have up to three hard discs. A hard disc enables you to keep the files and programs you use a lot in the computer – you don't have to mess about with floppies, changing discs frequently. However, you will still need to use floppies to load any new programs, and to make back-up copies of your hard disc (hard discs do crash very occasionally, so you really *must* keep back-ups).

You can buy hard discs of different capacities. A 20Mb or 40Mb hard disc costs between about £350 for a 20Mb hard disc for an A310 to £400-£500 for a 40Mb hard disc for an A410. You also need a hard disc controller card if you have a 300 series machine; this is often included in the price. The 400 series have a hard disc controller card fitted as standard, whether or not the machine has a hard disc. An A300 series machine also needs a backplane and fan, costing about £50 extra.

You can fit additional internal or external floppy disc drives depending on the present state of your machine. You can have up to four floppy drives. An extra drive is quite a useful upgrade if you have a single floppy machine, because it cuts the need to switch discs while copying and while running programs that use more than one disc. An extra floppy drive will cost around £100-£120. You can fit an external 5.25" drive, too, for around the same price.

If you want to fit an external disc drive you will also need to buy a socket kit to fit a socket to the back of the machine.

Modems

A modem is a device to link your computer to the telephone network so that you can send and receive data electronically through the phone line. This means that you can, for example, ring up Prestel (providing you have opened an account!) and use its information services, buy things on your credit cards, dial bulletin boards, join electronic mail services, including Telecom Gold, and send data to other linked computers.

To run a modem, you need to buy:

- A modem or a modem expansion board for your computer (and a backplane and fan if you have a 300 series machine).
- Suitable communications software.

Modems come in different standards, and transmit data at different rates. For about £500, you can get a modem which will transmit around 240 characters per second (2400 baud); if you spend only £200, it might transmit fewer than 100 characters a second. You can plug the modem directly into your normal British Telecom telephone socket; make sure it is approved for connection to the British Telecom network before you buy it.

You also need software to drive your modem; this will usually be called a 'comms' package or terminal emulation program. The type of software you buy should reflect your needs. You will need to decide what you want to do – receive viewdata, such as Prestel? use a Telecom Gold account? – and ask your dealer to recommend suitable software. The software will consist of facilities to control your modem, facilities to interpret the incoming data and display it correctly on your screen, and may be capable of file transfer, allowing you to transmit files from your computer to another.

The software will control your modem; the industry standard for doing this is called the 'Hayes AT protocol' and you should probably buy a modem which will understand this set of commands. There is then a good chance that you will be able to use it with a different computer if you ever want to.

There are three levels of compatibility to consider when you buy a modem:

- Can the modem and your computer communicate?
- Can the modem and software communicate with the modem you want to connect with? – both modems must use the same frequencies if they are to communicate.
- Do the linked computers use the same data format? – if your computer expects viewdata from Prestel, but the other computer sends a file it is trying to transfer, there will be problems!

Your dealer should be able to help you choose something suitable as long as you know what you want to be able to do.

MIDI

MIDI is the Musical Instrument Digital Interface; it lets you use your computer to play a musical instrument, typically a synthesizer with or without a 'proper' keyboard. The instrument is linked to the computer's serial port, and requires a MIDI expansion card (around £70) to run it. A keyboard or synthesizer costs from about £200 for a fairly basic model; around £500 is a more usual price. Different types offer different facilities, and you really need to decide exactly what you need and then go and look at (and preferably try) several models.

Scanners

A scanner is useful if you want to incorporate photographs or other forms of finished artwork in your computer-generated pictures or text. A scanner copies a picture into your computer by detecting the light and dark areas that make it up and turning these into a series of shaded dots that make up a picture on the computer screen.

Scanners are either large enough to lay the picture face down on a glass plate, through which light shines onto them from beneath, or are hand-held, and rolled over the picture, light being emitted from the bottom to reflect off the picture as the scanner moves over it.

A scanner will cost a few hundred pounds, depending on the quality. You will also need an expansion card.

Expansion Boards (Podules)

Many types of expansion require you to buy and fit an expansion board of some type (once called 'podules'). If you have a 300 series machine, you need to buy an expansion backplane, a vertical board which fits into the back of the machine. If you have a 400 series machine, it will already have an expansion backplane. You plug any podules you buy into the backplane. If you have an A3000, you will need to buy an external box to hold the expansion cards.

Amongst the expansion boards you can get are:

- Additional memory boards.
- Hard disc controller board.
- MIDI podule.
- I/O (input/output) podule with digital and analogue i/o ports.
- Scanner podule.
- Music sampling board.
- ROM chips: either RISC OS specific software on ROM, or BBC ROMs to run under 6502 emulation.

Most of these you will only need if you are buying another add-on, but memory expansion boards are an exception.

Memory Expansion

You can increase the memory of your computer by adding a memory expansion board and memory chips.

Fitting a memory expansion board gives your computer more memory for data processing, running applications, and so on. You will be able to allocate more memory to different tasks, and so they will be able to run more quickly. You will also be able to have more icons on the Icon Bar at any one time. Memory expansion differs from adding an extra disc drive or a hard disc in that the memory you add with an expansion board is extra resident memory for processing, not storage space for your files and programs.

A memory expansion board has memory chips plugged into it. It may come fitted with the chips you need, or there may be a choice of memory sizes, in which case your dealer can fit the chips you want to the board.

To fit an expansion card to a 300 or 400 series machine, you need to remove the cover of the machine, and one of the two 'backplane' panels at the rear of the computer to reveal the expansion card area. The expansion board, with its fitted chips, plugs into this area. If you have a 300 series machine, you need to fit a backplane board assembly and a fan (these are already fitted on a 400 series machine).

A variety of memory upgrades are available and the type you go for will depend on your current machine. The price of memory is also very volatile so consult your dealer for advice.

Networks

If you have more than one Archimedes, or you want to continue using your Master, Master Compact or BBC, you can set up an Econet network to link them together. This makes the transfer of data between computers easy, and means that you can share resources between computers – you can have one printer linked up to several computers, for example. Econet is not really intended for the home user but for businesses, which is why it hasn't featured much in this book so far. However, new products are coming onto the market soon which make it more attractive for someone with two or three computers, who wants to carry on using a BBC perhaps. If you have a network to link your BBC to your Archimedes, for example, you can transfer data from 5.25" ADFS discs directly to your Archimedes. You will need to buy an Econet expansion board, special Econet cable, and a clock-box or filestore (a central controlling device). But this is not cheap; if you just want to use an old machine and a new machine, you can buy the appropriate cables to link them for about £15-£20.

Summary

There is a wide range of additional hardware you can buy to go with your computer. When you want to buy hardware, look through computer magazines to find the best price for what you want (see Chapter 20). You can always go to a shop to look at products and make your choice, but you will often get a much better price if you buy your equipment by post. The drawback is that you won't get much in the way of support, so if you think you might need after-sales service, go to a shop and pay the higher price. But a salutary example: I recently bought for £419 by post a monitor that cost £589 in the local computer shop – it's worth shopping around!

20 : A Finger On The Pulse

The last two chapters reveal the range of software and hardware you can buy for your computer. The variety increases month by month, and the selection mentioned in the last chapters will be missing some new products by the time this book goes to press. So how do you keep abreast of developments? Magazines are a good source of information on new products for RISC OS computers, and Acorn's own annual list of third-party products is also useful.

Magazines

While the general computer magazines often feature software and hardware that will work with RISC OS computers, the specialist Acorn magazines are the best source of information on new developments.

The biggest and glossiest is *BBC Acorn User*, published monthly by Redwood Publishing (20-26 Brunswick Place, London N1 6DJ).

It carries a large volume of advertising, mostly for goods targeted specifically at Archimedes and BBC users. It also runs comprehensive and thorough reviews, gives good news coverage of developments, shows and general gossip, and frequently prints hints and tips, program listings and other miscellaneous goodies.

A&B Computing is published monthly by Argus Publications and although less glossy than BAU it has extensive coverage of the Archimedes. Articles are biased towards the more serious and experienced user and the reviews are extremely thorough.

Micro User is published monthly by Database Publications. Its coverage of the Archimedes varies, but is well suited to beginners.

There are two smaller, A5 format magazines: *Risc User* is published by BEEBUG, 117 Hatfield Road, St Albans, Herts AL1 4JS, and *Archive* is published by Norwich Computer Services, 18 Mile End Road,

Norwich, NR4 7QY. These are both subscription *only* magazines packed with information, ranging from the simplest of hints and tips to quite complex specialist articles. There is much less in the way of useful advertising material, though – but what there is is entirely devoted to RISC OS computers. Both these are effectively user group magazines

Acorn's Third-party Product List

Acorn produces a catalogue of hardware and software products suitable for their machines. The catalogue is published in the late autumn, and is available from Acorn Computers (Cambridge Technopark, 645 Newmarket Road, Cambridge CB5 8PB) for about £2. It lists hardware and software packages of various kinds, with brief product descriptions and details of how to obtain products and/or further details. Most items are priced in the catalogue.

PC Software

Information about PC software that might run under the PC Emulator can be found in PC magazines (such as *PC User*, *Personal Computer World*, and so on) and more general computing magazines. Try to check with distributors, dealers or Acorn that software will run under the PC Emulator before you buy it. In theory, any legally written PC software should run, but it's best to get an assurance that it will first – then you have some comeback if it doesn't!

Shows

New software and hardware are displayed and announced regularly at shows. The most important show for a RISC OS computer user is the BBC Acorn User show held annually in July or October. Shows are a good opportunity for you to see new products, some of them still in the later stages of development, and to try out or see new things before you buy them.

The people on the stands will answer your questions and try to sell you things – and you will often get a discount or good credit deal which makes it worth buying at a show. But even if you don't want to

buy, you can get a good idea of what's available and what's coming soon. Details of shows are published in advance in computer magazines.

SID

SID is the Support Information Database set up by Acorn to provide support and technical information on-line to Acorn computer users. It costs (at the time of writing and subject to change) £46.00 a year (inc VAT) to join SID, on top of which you have to pay 8p a minute (exc VAT) for on-line time. For your money you get access to videotext pages which include news of new products, a library of software you can download onto your computer, an electronic mail box, access to bulletin boards and user groups. You can also address queries to Acorn's support group. You need a modem to use SID. For more details, contact The SID Editor, Customer Support and Services, Acorn Computers Ltd, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN.

Summary

You should now be well on the way to getting the most out of your computer. Keep an eye on what's going on, and you will find the Archimedes to be the most powerful and versatile personal computer you can buy.

Glossary

anti-aliased font

A font in which the characters have shaded pixels around their outline to give them less abrupt edges. An anti-aliased font gives a better quality image on screen than system font.

applications program

A software package which you can use to perform a function, such as drawing pictures, or preparing text. Edit is an example of an application.

ASCII text

ASCII stands for the 'American Standard Code for Information Interchange'. It is text in a standard form, where each character corresponds to a known number. It is useful for transferring text between otherwise incompatible systems.

back-up

A copy of data held on a hard or floppy disc. The back-up copy is held as security in case the working copy of the disc is damaged or corrupted. To back up a disc is to make an exact copy of it.

backplane

Board assembly for fitting expansion cards to an Archimedes.

baud rate

The rate at which data is transferred using a serial interface (to a printer, by a modem, or whatever). It is measured in bits transmitted per second.

boot file

A file which is run when the computer is turned on or reset, and which sets up parameters and configurations. A boot file might set the command line prompt, and start the Desktop running a Desktop boot file, for example.

bounding box

The area which encloses a graphic object in Draw.

dialogue box

A box which appears on screen with a message. It has space for you to type a reply – such as a file name – and/or boxes for you to click on. It will usually have 'OK' and 'Cancel' boxes for you to confirm or cancel an action, sometimes after giving other information.

directory

A structure of files stored together. A directory may contain other directories. These are called sub-directories.

directory viewer

A window showing the files and directories stored in a directory or disc.

expansion board

An addition to the computer which is fitted to the backplane to expand the machine's capabilities. An expansion board has a special function, such as adding extra memory, running a scanner, or plugging in ROMs holding software.

file

A computer record, such as a wordprocessed document, a drawing you have prepared in Draw or Paint, or a program.

filing system

A structure for storing files in directories on a disc (or network).

fixed-pitch font

A font in which each character and punctuation point is allowed the same amount of space on the page or screen. Wide letters – like 'm' – look quite squashed, and thin letters – like 'i' – have spare space around them.

font

A set of characters of the same design.

font cache

The amount of the computer's memory which is allocated to storing fonts.

format (disc)

Prepare a disc for holding data. Discs can have different formats, suitable for use with different computers or filing systems.

icon

A small picture representing a file, directory, or piece of hardware or software on the computer.

Icon Bar

An area across the base of the screen which displays icons representing the software loaded, the hardware attached, and the data storage facilities (hard disc, floppy disc, RAM Disc).

inverse video

Display with foreground and background colours reversed – white text on a black background, for instance.

menu

List of commands or operations displayed when you press the menu button on the mouse. Some menu items have sub-menus offering further options, or with space for you to type something.

MIDI

This stands for Musical Instrument Digital Interface. It is a device enabling your computer to play a musical instrument, usually a synthesizer of some type.

modem

An acronym for MOdulator-DEModulator. It is a device for connecting your computer to the telephone network so that you can send and receive data electronically.

module

Area of code stored in the computer's resident memory. Relocatable Modules can be loaded as necessary when they are needed. The modules in the Modules directory of Applications Disc 1 are the same type of thing, but are kept on disc to save space in the computer.

operating system

Program resident in the computer which controls its operation, coordinating the use of input and output sources, the processing of data and so on.

palette

Set of colours used for the screen display, or associated with a Paint file.

path

Line between two points in Draw. A path object is one which is made up of linked lines.

pathname

The full name of a file. This begins with the filing system, followed by a colon; then the disc drive number, preceded by another colon and followed by a fullstop. The names of the directories which need to be opened to find the file follow, each separated from the next with a fullstop, and the file name comes at the end. For example, a file called 'ch1' in a directory called 'NewBook' on a hard

disc would have the full pathname:

```
adfs::4.$.NewBook.ch1
```

pixel

Smallest element of the screen display; a single coloured dot (really a rectangle or square).

podule

Another name for an expansion card.

printer driver

Program which controls the operation of the printer and how data is sent to the printer.

proportionally spaced font

A font in which characters are given different amounts of space, according to their needs. A wide character like 'm' is given much more space than a thin character like 'i'.

RAM

This stands for Random Access Memory. RAM is the resident computer memory which can be used to load and run applications, to process data and perform tasks.

reset

Return the computer to the state it is in when you turn it on, or return many of its settings to that state. The most severe reset is the hard reset: hold down CTRL and press the RESET button at the back of the keyboard (near the mouse connection).

resident memory

Data storage space held in the computer's own hardware. A 1Mb machine has 1Mb of resident memory. This is totally separate from the memory capacity of storage devices fitted to the computer, and is used to run programs (including the Operating System and Desktop), to

process data and to control input and output devices such as the monitor and printer.

root directory

The first level of files and directories in the filing structure of a disc. The contents of the root directory are shown when you click on the disc icon on the Icon Bar. In pathnames, the root directory is shown by the symbol $.

ROM

This stands for Read Only Memory. It is the memory which you cannot access to store your own files and data, but which you can read data from. A program on a ROM chip is an example: the computer can read the program into its Random Access Memory, and you can use it and process data in RAM, but nothing is added to the record of the program itself, which remains unaltered in ROM.

screen mode

The resolution and colour display of the screen. Some modes are appropriate only for certain types of monitor.

sprite

Graphic image made up from coloured pixels.

WIMP interface

User interface which uses Windows, Icons, Menus and a Pointer as a means of controlling the computer and its operation.

window

Area of the screen dedicated to a particular task, such as displaying the contents of a directory, or showing a document which you are working on with a wordprocessing program.

A : Shareware

It is a fact of life that PC software is generally much more expensive than Archimedes software. There is, however, a wide source of software for IBM-compatibles, including the Archimedes, which you can 'try before you buy' for the cost of the media it is supplied on and postage. If the software doesn't work, you haven't lost anything. This is public domain software and shareware. The main differences between this type of software and normal commercial software are:

- Distribution is not through dealers, but through other sources.
- You only have to pay for the software if you like and use it.
- It's much cheaper than commercial software.
- It's often the only source of those obscure little useful items.

About Shareware

Shareware is a software distribution system which originates from the USA, which works on a principle of honour. The software is distributed by the author to the computer-using community at large, through specialised shareware distributers and bulletin boards. Shareware distributers make charges to cover the cost of discs, postage and packaging and so on, but these are small compared with the true value of the software. If you like what you have tried, you can then register, and again the costs are small in comparison with a similar commercial product. For example, a small disc management utility might have a registration cost of $5 (£3), against say, a cost of £20 as a commercial product. A full-blown wordprocessor may cost $75 (£50) to register, whereas the commercial equivalent would be several hundred pounds.

When initially distributed, the idea is that the software is 'on approval', effectively a free trial. Each program will contain

information about registration and text file on disc providing enough documentation to allow you to use it effectively. Registration means that you pay a more realistic price for the software, by sending payment to the author. In return, you will receive the benefits of a normal, commercially available package, such as updates, printed manuals, extra facilities and so on.

Because you, the customer, are dealing directly with the author, the registration fee is usually much lower than the cost of similar commercial packages. Even major packages cost only about £30–£40, and small ones may be as little as £3. It is even reported that (some) shareware authors are often better at providing customer service than (some) commercial firms. Naturally, registration is a matter of trust, and no-one is going to know if you don't register. However, if you are serious about a particular shareware program, you are likely to want the full documentation and extras that are available, so there is a natural incentive to register.

Payment is not the problem it might have been a few years ago. Most of the authors will accept Access and Visa card payments, or have European agents. It is fairly straightforward to obtain dollar cheques for a small charge at your local bank.

Public Domain

Another category of software is 'Public Domain' – often referred to as PD. This is similar to shareware and is distributed in a similar fashion, but unlike shareware, it is completely free of charge! Once you have it, there is never anything more to pay. This is because the author is genuinely giving you something for nothing, or more usually, the software originates from a source, such as education or industry, where the actual author doesn't own the software, perhaps because it was written in 'work' time, and the 'owner' is not set up to receive registrations.

Shareware and PD Sources

There are five ways of getting hold of shareware and public domain software:

- By copying friends' discs
- By downloading it from a bulletin board
- By sending off to a shareware distributor
- From Dabs Press
- From magazine discs

Copying from friends is the quickest and cheapest way of obtaining material. Unlike normal commercial software, for which passing between friends is illegal, you are positively encouraged to copy shareware. The authors desire the widest possible distribution, as this increases the number of people who may possibly register.

Downloading From a Bulletin Board

To download software from a bulletin board, you will need some communications software, and a modem. If you are unfamiliar with communications ('comms'), don't worry, it is all fairly straightforward. A bulletin board is simply a computer and modem connected, normally permanently, to a telephone line, which is capable of answering the phone when it rings. Because the noises generated by a modem make no sense to the human ear, the telephone line is normally separately installed, and dedicated to the bulletin board. To save download time files have often been compressed into one large file that must be un-compressed before it can be used.

Shareware Distributors

Naturally, using a bulletin board runs up your telephone bill, so another method of obtaining shareware is to order it from a shareware distributor. You send your money and get discs in return, just like commercial software, but with one big difference – the money you pay to a shareware distributor covers only the cost of the discs themselves, plus carriage, and the distributor's overheads. The software on the

discs is not being paid for, and you are still expected to pay the author if you register.

Shareware distributors come in all shapes and sizes, from hobbyists doing it for fun, to highly professional firms with large and detailed catalogues. Naturally, a professional firm employing staff and printing catalogues will have more overheads, so you might expect to pay a little more per disc for the material. Costs range from about £1.50 to £10 per disc, although virtually all the distributors at the higher price bracket reduce the unit price if you order several discs at once. In practice, the cost of blank media plus duplication is usually the smaller part of the distributors' overheads, the larger part being staff to fulfil orders and answer telephone calls, and advertising and printing. There is, incidentally, no law preventing anyone actually making a profit from shareware distribution, but natural competition has brought the charges to a very fair level. Some distributors have a 'club' system, whereby as a member, you obtain better prices. For example PC-Serve currently charges £5 per disc, but only £2.50 to members.

Many authors have actually specified a maximum charge (usually $10) to be made for the distribution of their disc, and shareware distributors generally have charges which are below these levels. Some authors even go as far as to specify that no charge whatsoever may be made – you will normally only find these programs on bulletin boards, or bundled on discs with other programs, as even blank floppies cost money!

Most shareware distributors have no involvement with the author registration process, and once you have purchased discs from them, that is the end of it – if you want to obtain updates, you have to contact the author direct. However, one leading distributor, Shareware Marketing, of Tonbridge, also acts as UK, and in some cases European, registration agent for many North American shareware titles. Therefore, if you wish to register, you would send your money, and obtain the full manual etc. from them, even if you obtain the 'free' copy from another distributor or a bulletin board.

Brown Bag Software, a leading shareware author, have actually set up their own office and bulletin board in the UK to receive registrations, and supply manuals etc. There are signs that more of the 'upper

echelons' of shareware authors will do this. Because of the disappointing level of registrations from Europe, some shareware authors have made their product shareware in North America only, and insisted that the programs be sold on a normal commercial basis in Europe. Shareware Marketing, through their registration connections, are UK distributors for many of these programs. Full details are given in their regular catalogue.

UK Shareware Distributors

The following companies are the leading shareware distributors in the UK and you can obtain a free catalogue on request.

Shareware Marketing,
87 High Street, Tonbridge, Kent.
Phone: 0732-771344

PC-Serve,
1147 Greenford Road, Greenford, Middx. UB6 0DP.
Phone: 01-864 2611

Seltec,
Northumberland House, Staines Business Centre,
Gresham Rd, Staines, Middx. TW18 2AP.
Phone: 0784 64257.

Dabs Press

Dabs Press have already released two volumes of Archimedes tested shareware software. Each volume of the Shareware Collection contains five discs of Archimedes tested software and full details of this can be found in Appendix C.

Magazine Discs

There is, increasingly, a fifth method of obtaining shareware, and that is through the monthly hobbyist magazines for PC owners, such as Personal Computing with the Amstrad, and PC Plus. These magazines often contain a free disc fixed to the front of the issue. Be careful though – not all these programs are shareware. Both the magazines

mentioned include a mixture of shareware, and reader-submitted, or staff-written programs (the equivalent of the printed listings in BBC magazines) and these latter programs are not shareware, and you cannot pass them around. A point to remeber is that magazine discs are normally 5.25" format which you will not be able to read. However, may magazines allow you to return the disc in exchange for a 3.5" version. Check inside the magazine first though to ensure that this is indeed the case.

Archimedes Shareware

Unlike PC shareware, which runs into tens of thousands of titles, there are only a hundred or two shareware programs for the Archimedes running in native mode. These fall into several categories.

- Programs from the public domain for other computers, ported to the Archimedes (usually in C or BASIC).
- Programs written for enjoyment by British and European users.
- 'Demos' containg large amounts of musical and graphical data, sometimes ported from other machines, and a bit of Archimedes code to hold it all together. Sometimes the demos are actual output from commercial packages, such as Render Bender, or Armadeus.
- Programs written by Acorn, which they wish to distribute without charge to end users.
- Demonstration versions of commercial software packages.

Because the user base of Archimedes is smaller and it hasn't been around as long, clearly material is thinner on the ground. However, as programs get better, and code gets longer, printed magazine listings are becoming less and less viable, and so much material which previously would have been 'magazine quality' will now be published as shareware.

At the time of writing, the main sources of native mode shareware for the Archimedes are the SID bulletin board (see page 205), where software can be downloaded and Archive magazine (see page 204), who sell shareware discs at a nominal charge to cover production.

B : Understanding Printer Control Codes

The printer uses its own special language. This language is a number language. When a printer receives a certain sequence of numbers, it will act upon them. The telephone exchange recognises numbers you dial on the telephone, and uses them to select one particular phone in the whole world. Use a different sequence of numbers, and a different phone is called. Send a different sequence of numbers to the printer, and a different effect is selected or selected effect cancelled. The numbers that are sent to the printer are called control codes, or 'Escape' codes. If you are going to use one of the standard printer drivers, you may never need to use printer control codes, but if you want to edit PrinterDM to suit your own printer you will need to use them.

To select the effect that you want from your printer, check your printer manual to extract the necessary codes – not as painful as it seems! Printer manuals will normally provide control code sequences in one of two ways – ESC or CHR$ codes. Most printer manuals have both, so concentrate on the CHR$ codes.

For example, in a typical Epson printer manual, the table to select **emphasised** (bold) text might look like this:

CODE	ESC E
PURPOSE	Select emphasised print
FORMAT	CHR$(27) CHR$(69)
REMARKS	This command causes the printer to print in emphasised (bold) type

All the information needed to produce emphasised text is here! The line we are really interested in is the line marked FORMAT:

FORMAT	CHR$(27) CHR$(69)

All we have to do is take the two numbers given in that line, 27 and 69,

and place a 1 in front of each, so that the control code sequence to be sent to the printer becomes:

1,27,1,69

Sending this will turn on bold print on an Epson-compatible printer. Non Epson-compatible printers may well use different codes. You can try this from BASIC with the following five-line program:

```
1 VDU 2 : REM turn printer on
2 PRINT "This is normal text"
3 VDU 1,27,1,69
4 PRINT "This is bold text"
5 VDU 3 : REM turn printer off
```

If you find that your printer manual does not contain these CHR$ values, it certainly will have the ESC character sequences, which you can convert into CHR$ values. The italic font is also specified as:

CODE ESC E

ESC means ESCAPE. The ASCII code for ESCAPE is 27, similarly the ASCII code for E is – 69. So, ESC E is 27,69.

Up to a Point

Once a printer effect has been selected with an output control sequence, the printer will continue to act on the sequence until it is switched off or cancelled by another command. The manual entry to turn **emphasised** (bold) print off might look like this:

CODE	ESC 5
PURPOSE	Turn emphasised print mode off
FORMAT	CHR$(27) CHR$(70)
REMARKS	This command causes the printer to cancel the emphasised print mode

To cancel emphasised print, the control code sequence would be:

1,27,1,70

We could add two more lines to the BASIC program as follows:

```
10 VDU 1,27,1,7
11 PRINT "Normal text once more"
```

Underlined Text

Text underlining is very useful and is generally the second most common effect on printer drivers. It useful for emphasis (as is bold), and for distinguishing section headings. From a programming point of view, selecting underlined text provides a new challenge:

CODE	ESC - 1
PURPOSE	Turn underlined print mode on
FORMAT	CHR$(27) CHR$(45) 1
REMARKS	This command causes the printer to underline text

Underlining is one of several printer effects that require three control codes to be sent before it works. To get underlined print, we must send each of the above codes (27,45 and 1) to the printer, remembering to precede each with a 1 thus:

1,27,1,45,1,1

The sequence to turn off underlined text is almost identical except that the final 1 becomes a 0 as follows:

1,27,1,45,1,0

More Codes

Your printer can produce more special effects other than the two mentioned, especially if you have a dot-matrix printer. You may wish to substitute another effect, so here are some more examples of Epson-compatible printer codes for you to try.

Double-sized, or enlarged, characters are excellent to start a document. A single printer code will select double-sized text on Epson-compatible printers. The code is 14 – so the sequence is: 1,14. As you can see, an ESC character is not needed. Turning double-sized printing off is achieved using another single code – 1,20

If you want to squeeze more text on a line, there are several ways of going about it, depending on how many characters per line you want. Pica-sized mode prints text at the rate of 10 characters per inch, and is enabled using the codes 27,70,1 – so the complete sequence is:

1,27,1,70,1,1

Elite-sized mode prints 12 characters per inch, while condensed print squeezes in 17 characters per inch. The control codes for each are as follows:

1,27,1,66,1,2 1,27,1,66,1,3

If you are processing documents containing mathematical formulae and so on, the ability to print $^{\text{superscript}}$ and $_{\text{subscript}}$ numbers will be most invaluable. Superscript mode is enabled with the output control sequence:

1,27,1,83,1,0

This can be used with most other effects, with the exception of enlarged print. The code:

1,27,1,84

is used to cancel superscript and subscript printing. Of course, it is possible to print entirely in superscript mode – suitable for producing the small print that nobody ever reads! Subscript mode works by printing text on the bottom of the line, the output code for subscript printing is:

1,27,1,83,1,1

C : Dabhand Guides and Software

Quality Books for Every Archimedes User

Dabs Press publishes a wide range of books on computer topics. There follows a list of some of our recent and forthcoming titles. If you are interested in any of these books, details of how to obtain them are given at the end of the list.

Also by Anne Rooney

Acorn DTP – An Advanced User Guide
ISBN: 0-9514893 0 5. Price: £14.95 inc p&p. Examples Disc £3.95.

Get the most from Acorn DTP with the first advanced user guide for an Archimedes applications package. This book is essential for everyone who wants to use Acorn DTP seriously to produce documents with a professional appearance.

The advanced user guide shows you to to exploit the program's powerful features to the full, combining step-by-step instructions, guidelines, advice and hints and tips in a comprehensive exploration of the package. And if you're new to publishing and layout, it shows you how to achieve balanced and sophisticated document designs.

- Shows you how to generate a wide range of documents.
- Explains how to create special layout features.
- Gives invaluable guidelines on laying out and styling documents.
- Explains layout terms and techniques.
- Shows you how to use style sheets to the best advantage to save you time and effort.
- Useful hints and tips.
- Full operating instructions.

Acorn DTP: An Advanced User Guide is available from Emerald Publishing, PO Box 324, Cambridge CB1 3HB (tel. 0223 68409).

Archimedes Assembly Language: A Dabhand Guide by Mike Ginns

ISBN 1-870336-20-8. Price £14.95. Programs Disc £9.95. Available now.

Learn how to get the most from the remarkable Archimedes micro by programming directly in the machine's own language, ARM machine code. This is the only book that covers all aspects of machine code/assembler programming specifically for the entire Archimedes range.

For those new to assembler programming, this book contains sections which take you step-by-step through new and exciting areas of Archimedes programming, including many examples using the features of the RISC OS Operating System, including the co-operative multitasking environment.

- Practical tutorial approach with example programs
- Descriptions of all the processor instructions
- Using the Operating System, WIMPs and Vectors
- Co-operative multitasking explained
- Assembler equivalents of BASIC commands
- Sound and graphics in machine code

Mike Ginns holds a First Class Honours degree in Computer Science from Reading University, and has been programming the BBC and Archimedes computer for many years. He is a contributor to BBC Acorn User magazine, and is a full-time systems programmer.

"The contents make the book a welcome addition to the manual provided with the computer, and will, no doubt, be an invaluable source of information for many owners of an Archimedes" Everyday Electronics (December 1988)

Archimedes Operating System: A Dabhand Guide by Alex & Nic Van Someren

ISBN 1-870336-48-8. Price £14.95. Programs disc £9.95. Available now.

For Archimedes users who take their computing seriously, this guide to the Operating System gives you a real insight into the micro's inner workings. This book is applicable to any model of Archimedes.

The Relocatable Module system is one of the many areas covered. It's format is explained, and the information necessary for you to write your own modules and applications is provided. This tutorial approach is a common theme running throughout the book.

The sound system is explained and the text includes much information never before published. The discerning user will revel in the wealth of information covering many aspects of RISC OS such as:

- The ARM instruction set

- Writing Relocatable Modules
- Writing applications
- VIDC, MEMC and IOC
- Sound
- The voice generator
- SWIs
- Vectors and Events
- Command Line Interpreter
- The FileSwitch Module
- Floating Point Model

and much more.

Throughout the book, programs are used to provide practical examples to use side-by-side with the text, which go to make this publication the ideal table-side companion for all Archimedes users.

A programs disc is also available containing all the listings from the book, and some extra useful programs as well.

Alex and Nic van Someren have both worked for Acorn Computers. Alex is a former Technical Editor of BBC Acorn User magazine, and the author of numerous computer-related books. Nic is an undergraduate at Cambridge University, and an accomplished programmer.

"Here is an essential book for Archimedes programmers" Micronet 800 (April 1989). *"A jolly good read. Lots of really useful information presented in an accessible and readable manner...this is a clearly written, well presented book. It is up to the usual high standards we have come to expect from Dabs Press, and I wholeheartedly recommend it to all who want to know more about their machine's operating system."* Archive magazine March 1989.

BASIC V: A Dabhand Guide by Mike Williams

ISBN 1-870336-75-5. Price £9.95. Available now.

This is a practical guide to programming in BASIC V on the Acorn Archimedes. Assuming a familiarity with the BBC BASIC language in general, it describes the many new commands offered by BASIC V, already acclaimed as one of the best and most structured versions of the language on any micro. The book is illustrated with a wealth of easy-to-follow examples.

An essential aid for all Archimedes users, the book will also appeal to existing BBC BASIC users who wish to be conversant with the new features of BASIC V. Major topics covered include

- Using the colour palette
- WHILE, IF and CASE

- Use of mouse and pointer
- Local error handling
- Operators and string handling
- The Assembler
- Control structures
- Matrix operations
- Functions and procedures
- Extended graphics commands
- Sound
- Programming hints and tips

Mike Williams has been working with computers for over twenty years. For the past five, he has been editor of *Beebug* and *RISC User* magazines, the latter being the largest circulation magazine devoted to the Archimedes.

Archimedes Software

Archimedes Basic Compiler

ISBN: 1-870336-76-3. Price: £99.95 inc VAT. Two discs. 200 page manual.

FREE DEMO DISC ON WRITTEN REQUEST

"ABC is a vital part of any programmer's toolbox, it puts compilers on other systems to shame. Un-questionably one of the most impressive peices of software I have yet seen running on the Archimedes." A&B Computing.

The Archimedes Basic Compiler (Version 2) is the ultimate tool for converting Basic programs into fast, compact, stand-alone and position-independent ARM machine code. Just look at what ABC has to offer:

- Speed increases of over 4000% possible
- Small runtime library overhead (c.14k)
- Code size ratio approx. 1.2:1
- Program size limited only by disc space
- Conditional compilation supported
- Supports floating point arithmetic
- CALL and USR greatly enhanced
- New pseudo-variables included
- Runs with single floppy, twin, or hard disc
- Runs on any Archimedes
- Friendly window-based control system
- Optional standard '*' command line control
- Relocatable Module making option

- Makes application, utility and service modules
- Make your own '*' commands using BASIC
- User Parameter passing to programs
- Full in-line assembler support
- Auto-entry to Basic Editor at erroneous line
- Optional screen listing during compilation
- Compiles from/to disc or RAM
- Compiles object code to disc or RAM
- Large range of compiler directives
- Manifest constants for extra speed
- Comprehensive interesting examples disc
- Intelligent disassembler provided
- No intermediate code system
- 148pp Reference and 56pp User Guide
- Demonstration disc available (£2 refundable)
- All future upgrades are free
- Not copy-protected
- 100% RISCware – installs on icon bar
- Vast speed increases with ARM fp proc.
- Technical support to registered users
- Written by leader of Arc OS design team
- No royalties to pay on compiled code

Speed The compiler by and large produces code which runs several times faster than the interpreter. Programs which perform a lot of integer number crunching—business programs, search and sort routines, housekeeping utilities perform very well, whereas programs with a lot of floating point arithmetic will not be much faster.

Code Size Very much dependent on the code in question, but a rough relationship of 1.2:1 can be assumed in most cases. This means that the compiled code is about 120% of the size as the tokenised BASIC program, not the size of the source as text.

Improvements over the interpreter:

1. CALL and USR read registers from variables without preassignment or decoding.
2. The compiler fixes the nested ELSE bug.
3. EQUF <fp number> in the assembler,.
4. INPUT/VAL/READ accept hex/binary.
5. Assembler OPTs controlled from directives.
6. Manifest constants for even further speed.
7. Compressed real no. file formats available.

9. Compiler allows conditional compilation.

Benchmarks (supplied on demo disc)

Program	BASIC V	ABC 2.29
REPEAT...UNTIL	8.10	0.25
WHILE...ENDWHILE	6.28	0.26
FOR...NEXT	15.00	0.00†
Ackerman(3,4)	3.30	0.07
Fibonacci(21)	4.83	0.26
Tak(18,12,6)	18.53	0.93
String swap	1.66	1.01
String Add	3.09	1.38
String Sort	3.95	0.19

BASIC V v1.04 running in RAM. †ABC can eliminate empty loops.

ABX – Archimedes Basic Extensions

ISBN: 1-870336-84-4. Price: £49.95 inc VAT. Format: Disc/24pp manual.

ABX is a collection of useful utilities for programmers using the Dabs Press Archimedes Basic compiler. The package consists of:

XRef: A BASIC source code cross-referencing program (which will incidentally work for users of interpreted as well as compiled programs). A cross-referenced report is then made of all variables used in the program neatly categorised into integer, real, and string simple variables and arrays. All procedures used in the program, their local variables and references and any uncalled or duplicate procedures are also reported. The program is particularly useful when analysing programs to be compiled with ABC, although for any long program, it will be invaluable.

Profile: Profile is a program which reports the amount of time spent in execution by various parts of your program. The profiling system works by recording time spent in specified procedures and function or parts of your program delimited by the relevant compiler directives.

LibMake: Many procedures that you write are used by more than one program. LibMake lets you separately compile procedures and functions, store them as a machine code module and then call them (with full parameter passing) from any ABC compiled program. The separate library procedures are notified to the main program by use of a simple INCLUDE directive and then invoked as normal in the program.

ABC65 – The Archimedes 6502 Cross-compiler

ISBN: 1-870336-84-4. Price: £69.95 inc VAT. Format: Disc and 150 page manual approx.

It sounds impossible, but we've done it! ABC65 is a 6502 cross-compiler. It takes BASIC V programs created on the Archimedes and compiles them into 6502 machine code that can be run on any BBC or Master computer with Sideways RAM. Ideal for home, schools or colleges to provide near compatibility across a wide range of BBC micros.

The system offers the superior development environment of the Archimedes and use of the enhanced BASIC language, and also a quality of optimised compilation that would not be possible on the BBC itself—ABC65 is vastly superior to any BBC-based compilers.

Programs are compiled from the RISC OS Desktop in a similar fashion to ABC. Once compiled they can be transferred to the BBC or Master using the serial transfer software included (drop the file on a 'BBC' icon) or via a 3.5" ADFS disc. Programs can also be tested *in situ* on the Arc using the BBC emulators.

As with ABC, a powerful sub-set of Compiler Directives are provided. Programs can be compiled for main memory or Sideways RAM images and long programs may be compiled into a series of RAM images.

NB: ABC65 requires the installation of a runtime ROM image into a Sideways RAM bank. Integer programs require a bank of Sideways RAM, floating point programs require two banks.

ABC65 gives you the three main compiler advantages, namely speed, syntax checking and security. Full Data Sheet available on request.

Instigator – The Archimedes System Manager

ISBN: 1-870336-77-1. Price: £49.95 inc VAT. Format: Disc/128pp manual.

Instigator is a powerful utility which adds over eighty new commands to the Archimedes operating system, yet occupies only 53k of workspace. Instigator provides you with additional commands for memory management, colour definition, screen display, cut-and-paste, command archiving, disc management, and other general utilities. Included in the package are:

- Full intelligent memory editor, memory find and fill
- Disassembler
- Disc sector editor (ADFS, MS-DOS and other formats)
- Get, put and find bytes on disc
- Loading and saving of CMOS RAM data, OS variables, and function key settings
- Fast screen loader/saver, with compressor/uncompressor
- Command archiving and history
- Window creation and management

- Line editor for use in all applications
- Text cut-and-paste in all applications
- Capture and replay all VDU output – for producing demos, tutorials etc.
- Screen dimmer and brightness control
- Smooth text scrolling
- Filename completion by matching from directory list
- Capture printer output to a file
- Define new screen modes
- Mouse-driven colour definer

and much more. Instigator commands can be used during program development or usage, or included in your own programs.

Instigator is fully RISC OS compatible, and will install on the icon bar. When the icon is clicked, a window appears with every Instigator command listed. Simply click the mouse on the desired command, and it is effected. A dialogue box allows you to enter any necessary parameters.

Instigator will run on any Archimedes with at least one megabyte of RAM. Included in the package is a detailed 128 page manual, quick reference card, and two discs, including demonstrations of all the various commands.

Instigator is written by Mike Ginns, author of 'Archimedes Assembly Language'.

Cambridge Pascal Compiler

ISBN: 1-870336-34-8. Price: £79.95. Format: Disc and manual.

Cambridge Pascal is a comprehensive version of the Pascal language and includes many extra enhancing features over the standard specification including:

- Full dynamic string handling
- Local error handling
- Random access files
- Direct access to '*' commands
- Access to RISC OS SWI calls
- 100% Desktop compatible
- Source files can be written in Edit, Twin or any other text editor.
- Compilation to absolute code or relocatable modules.
- Can also be run from the command line (within a task window if desired).

All programs compile into fast, efficient machine code. Pascal is a language much more suited to compilation than BASIC, and the code size and speed improve considerably even on our BASIC compiler. You can genuinely use this product to produce commercial software.

Cambridge Pascal requires any Archimedes running RISC OS with at least 1Mb of RAM. Hard discs and extra memory are useful, but the system is perfectly

workable with this configuration. If memory is tight, the compiler can be run as a '*' command (*PCOMPILE), with command line options.

Pascal is also a more portable language. Implementations on most computers are very similar, and in most cases, a text-based program written in Cambridge Pascal can be transferred to other compilers on other machines. The language is also an ideal implementation for students of Pascal, and can be used for any coursework in the language.

The superb error handling and run-time trace facility make the language particularly suitable for use in education. Tracing of a program's execution can be performed at source level, to file, printer or screen.

Cambridge Pascal also supports a wide range of compiler directives, allowing disc or RAM-based compilation, inclusion or exclusion of extensions (for production of portable source for inferior compilers), conditional compilation, inclusion of $include files, code tracing, and many other options.

Full run-time textual error messages are supported, and a comprehensive intelligible set of errors and warnings are used to flag any compile-time problems.

The $include file system allows you to build up libraries of additional procedures and functions, extending the language as much as you like. Already provided are a collection of routines concerning with desktop programming—the creation of multi-tasking programs which run from desktop windows.

Whether you're just learning or a Pascal expert, then Cambridge Pascal is for you.

Archimedes PC Emulator Shareware Collections Volumes 1 and 2

Volume 1 and 2 priced at £34.95 each inc. VAT.

By popular demand Dabs Press have collected together nearly eight megabytes of top quality PC shareware software tested to ensure it runs under the PC Emulator.

Supplied in two volumes each consisting of five discs, the Shareware Collection provides some startling software on a shareware basis. If you like any of the software, you can register with the authors and receive updates as they occur. Registration fees are generally quite small. If you don't like the software you need pay nothing! (The costs below represents discs, manual, testing, postage and VAT – the software itself is free).

Volume One

Volume One is the ideal starter pack containing a wide range of useful software. The five discs include:

- Mindreader : a full feature wordprocessor with an amazing 'word anticipate' feature.
- As Easy: a clone of the world-famous 1-2-3 spreadsheet.
- Games: including Chess, Backgammon, Mahjong, Checkers and more!
- Printer utilities, plus much, much more!

Volume 2

By demand Volume 2 includes:

- File Express – a full-function database
- Letterhead Designer – a program to produce your own letterheaded paper
- War on the Sea – a superb World War II strategy game, with colour graphics
- ZBASIC – a PC BASIC compiler
- Expert – a small expert system
- EZ Forms Lite – a full featured forms generator program
- Gomuku – the classic board game
- and 14 other programs.

Each pack comes with a manual giving full installation and documentation details.

Alien Images
The Dabs Press Archimedes Games Label

ALL-IN BOXING

ISBN: 1-870336-94-1. Price: £14.95 inc VAT.

Enjoy the thrills and spills of the exciting international boxing tournament on your screen. Marvel at the lifelike graphics as Ivor Hardpunch knocks Ed Strong to the floor while the ref. counts him out (with real digitised speech, as well as bells, grunts and groans). In this amazing boxing simulation, you are one of six boxers, who must prove themselves with the punchbag in the gym, in ring on fight night, and practising with skipping ropes between rounds. Features:

- One or two player game
- Digitised speech and sound
- Demo mode
- Runs on any Archimedes with 1Mb and RISC OS

ALIEN INVASION

ISBN: 1-870336-93-3. Price: £14.95 inc VAT.

Enjoy the excitement of a game of Space Invaders, the classic arcade game, now enhanced to take full account of the Archimedes' terrific graphics and sound capabilities. Also, you can customise the package to include your own invader sprites, and layout of each wave, to give the game that personal touch.

- Over 1000 different waves
- Passwords to higher levels

- Full wave and sprite editor included
- Different landscape backdrops plus design your own!
- Runs on any Archimedes with 1Mb and RISC OS

ALERION

ISBN: 1-870336-78-X. Price: £14.95 inc VAT.

"Alerion - an eagle without beak or feet – is the Arcturian term for impossible and the codename for your mission!"

"Your space-fighter is equipped with revolutionary new equipment, not least a new radar cloaking system which renders you invisible, a holographic targeting system and unlimited fire power."

"To succeed, your task is quite simple ... blow the living daylights out of anything that moves!"

Alerion is a welcome return to the most popular of computer games, but of course, using the power, speed and superb graphics only available on the world's fastest microcomputer–the Archimedes.

- 256 colours
- Digital sampled sound
- Sixteen levels of play
- Save high score table

ARCENDIUM

ISBN: 1-870336-79-8. Price: £14.95 inc VAT.

Arcendium provides four of the most popular board games on disc for you to run and play on your Archimedes.

Draughts, Reversi, Backgammon and Quadline are displayed in the Archimedes high-resolution Mode 12, using its colour capability to full effect. Combined with 3D-effects, the end result is an addictive environment for games playing for all the family.

All four games have varying levels of play. Two players in any combination can play either against the micro or another player.

When playing the Archimedes, the skill level is controlled by setting the computer's 'thinking' time from 0.1 to 60 seconds.

Other features include:

- sound and speech options
- game load and save
- playback
- list moves available

- on-screen hints
- smooth animation
- 3D rolling dice with sound!

BBC Micro Books

Dabs Press also produce a wide range of quality publications covering the BBC micro range of computers and software. Some of our titles are listed below. Contact us now for a comprehensive BBC catalogue – free of charge.

BBC Micro Assembler Bundle by Bruce Smith

ISBN 1-870336-08-9. Price £4.95 (inc.VAT). Available now.

Master 512: A Dabhand Guide by Chris Snee

ISBN 1-870336-14-3. Price £9.95. Programs Disc £7.95. Available now.

Master 512: A Dabhand Technical Guide by Robin Burton

ISBN 1-870336-80-1. Price £14.95. Available February 1990

Master Operating System: A Dabhand Guide by David Atherton

ISBN 1-870336-01-1. Price £12.95. Program Disc £7.95. Available now.

Mastering Interpreters and Compilers by Bruce Smith

ISBN 0-563-21283-7. Price £14.95 incl. programs disc. Available now.

Mini Office II: A Dabhand Guide by Bruce Smith and Robin Burton

ISBN 1-870336-55-0. Price £9.95. Program Disc £7.95. Available now.

View: A Dabhand Guide by Bruce Smith

ISBN 1-870336-00-3. Price £12.95. Program Disc £7.95. Available now.

ViewSheet and ViewStore: A Dabhand Guide by Graham Bell

ISBN 1-870336-04-6. Price £12.95. Program Disc £7.95. Available now.

Other Books from Dabs Press

Psion Organiser LZ: A Dabhand Guide by Ian Sinclair

ISBN 1-870336-92-5. Price £12.95. December 1989

Z88: A Dabhand Guide

ISBN 1-870336-60-7. Price £14.95. Available November 1989

Z88 PipeDream: A Dabhand Guide by John Allen

ISBN 1-870336-61-5. Price £14.95. Available December 1989

C: A Dabhand Guide by Mark Burgess

ISBN 1-870336-16-X. Price £14.95. Discs £7.95-£9.95 . Available now.

"I wish this book had been available when I was learning C" Personal Computer World.
"...will give even relatively inexperienced programmers a clear understanding of programming in C." Elektor Magazine (December 1988)

Obtaining Dabs Press Books and Software

You can obtain Dabs Press books from any good bookshop or computer dealer, or in case of difficulty direct from us, post free. Orders can be sent by post to Dabs Press, 5 Victoria Lane, Whitefield, Manchester M25 6AL. Payment can be made by sterling cheque or bank draft, postal order, or Access, Mastercard, Visa, Switch, or Style card. Credit card holders can also telephone their order to 061-766 8423 or fax it to 061-766 8425. A full catalogue is available free on request. Please state which model of computer you have.

Index

A Dabhand Guide

This book is the perfect introductory guide to the Archimedes. Its sole aim is to guide you through those first few months of ownership acting as an easy-to-read supplement to the Archimedes User Guide.

Its practical easy-going approach introduces the various software components of the Archimedes and describes in detail how to put the RISC OS Desktop to best use. The Welcome Discs contain a wide range of useful programs and these are fully documented.

But the book also goes beyond this and describes the sort of software and hardware additions available to the Archimedes owner, and how to choose and install them.

The many features of this book include:

- Applicable to *all* Archimedes with RISC OS
- Using the Desktop
- Using the RAM and Disc Filing Systems
- Edit, Paint and Draw
- The Welcome Disc programs
- The Task Manager
- The BBC and PC Emulators
- Hardware additions
- Software additions

Anne Rooney is a freelance writer and editor who has been writing about software for over five years and has written numerous computer manuals and courses. She has written for Acorn Computers over the last four years — including the *RISC OS Welcome Guide* — and has recently authored the *Acorn Desktop Publisher Advanced User Guide.*

£9.95

ISBN 1-870336-73-9

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