INTERFACE

Introduction

ROM-LINK

Computer Concepts

PLEASE NOTE

IT IS VITAL THAT THE REGISTRATION CARD SUPPLIED WITH INTER-SHEET IS RETURNED TO US, WITH YOUR NAME AND ADDRESS FILLED IN. THE CARD IS POSTAGE PAID FOR THE U.K. IF FOR ANY REASON A REGISTRATION CARD IS NOT SUPPLIED, YOU MUST CONTACT THE DEALER FROM WHOM THE PACKAGE WAS PURCHASED. THE SERIAL NUMBER ON THE REGISTRATION CARD SHOULD BE PRINTED INSIDE THE MANUAL. YOU MUST QUOTE YOUR SERIAL NUMBER IN ANY CORRESPONDENCE WITH REGARD TO INTER-SHEET.

INTER-SHEET is designed and distributed by Computer Concepts

INTER-SHEET is supplied with two manuals, this Introduction and a Reference Manual.

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The abbreviation BBC Micro for British Broadcasting Corporation Microcomputer has been used throughout this book.

1st Edition

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Computer Concepts cannot be held responsible for any loss of data due to the use of INTER-SHEET.

Contents

Introduction 1
  Spreadsheet Terminology 3
Main Menu 8
Entering Data 10
Further Useful Facilities 13
FUNCTION Keys and !Boot Files 16
Care of Files 18
Glossary 22

INTRODUCTION

This introduction has been written for those who, like me, could not get over-excited about the idea of columns and rows of figures on a computer screen, and yet may have the need to manipulate figures very quickly and easily. With the inexorable growth in the complexity of the business world, with tax at varying percentages, VAT always threatening to change its rate, and inflation eating into work profits, or more probably worsening the deficits, a spreadsheet will, if used properly, at least keep track of where the money is going.

Database + Wordprocessor

Let us consider what features would be useful in an ideal spreadsheet. It would be nice if it could be linked with a database so that e.g. names and addresses, lists of stock items, details of all the standing orders etc., could be accessed without having to leave the spreadsheet program... i.e. the computer keeping track of all the information at the same time!! Following on from this it soon becomes necessary to have access to a wordprocessor so that e.g. standard letters, business forms, or pleading letters to the bank manager can be written and edited, with the ability to incorporate the latest worksheet totals, and the current stock levels. This can become a real chore if one program has to be terminated, and another started, whilst trying to remember the various figures. This is the case with other programs currently on the market.

Graphs and Charts

Many businessmen need to produce *'visual displays'* of their company's progress; so the next requirement of the perfect spreadsheet would be the ability to transfer all the relevant figures to generate graphs, barcharts and pie-graphs. This is best done by transferring information direct to a chart-drawing program, without having to *remember* the results and re-type them.

Mail-merging
Mail-merging is an important requirement in business, and with a linked suite of programs as envisaged above this task becomes very simple, because the latest Ex VAT, Inc VAT, discount figures, and the ability to supply from stock, can all be incorporated without having to rewrite the letters to customers. A recent survey of office staff found that over 70% of their time is taken up with writing almost exactly the same letter to several different people concerning very similar requests. As a result, calculators and numerous price sheets are referred to time and again for the same information.

ROM-LINK Packages
INTER-SHEET is designed as one of a series of inter-linked ROM packages that will aim to cover all of the above requirements and more. This spreadsheet may be used alone but, when the full suite is installed in the computer, the user will be able to have up to 16 packages operating, accessing for instance several databases and worksheets whilst referring to several letters on a particular subject all at the same time. Data from one package will be transferable to another enabling, for instance, invoice details to be incorporated into letters, using information produced by one of the worksheets, and sent to customers whose files are stored on the database. This is an exciting concept, meaning that fully integrated work can be carried out on the computer, without the chore of having to swap from one program to another whilst trying to remember important data.

Other Uses of spreadsheets.
Not everybody is a business man, and for us 'normal' householders the spreadsheet can still be a boon. The different tariffs, standing charges, thermal units and kilowatt-hours make just the gas and electric bills nightmares to work out. Bank charges have always been a mystery to me, and it is a continual source of amazement that the bank statement NEVER tallies with my own figures... and always in their favour!! With the disciplined use of a spreadsheet, standing orders, direct debits etc can be recorded, and the draining of the financial resources

can at least be monitored, though not plugged, unfortunately! Planning major transactions such as buying a house becomes much simplified. It is relatively easy to calculate the total outgoings over a period of time and see what, if anything, is left to invest.

SPREADSHEET TERMINOLOGY

Manuals are sprinkled liberally with enough technical terms to drive anybody back to the paper, pencil and rubber of the old days. Indeed to understand all the terms it is probably easier to compare it with a large sheet of paper on which you are going to do all of your calculations.

Imagine the sheet is divided into hundreds of boxes by dividing it vertically into *columns* and horizontally into *rows*. You want to design a simple sheet dealing with some items of stock to be sold, involving discounts, VAT and sub/grand totals. Into some of the boxes, those on the left hand side in this example, you want to put the names of the individual items. You now find that the boxes aren't wide enough so you have to redraw the page. On the computer you would instruct the column width to be increased to n characters (n = the required number). Along the top of the sheet you will want the following headings:

```
Item          Quant. Price   Net    VAT    Total
```

The first box has been made slightly wider than the others to allow for the width of a brief description. We will want to be able to put items into the first 3 boxes, and *formulae* into the other 3. Using letters it would be thus:

```
Brown sugar a      b       c=a*b  d=c*15/100  e=c+d
```

Putting actual figures into the line, if we want 4 packets at 50p per packet,

```
Item          Quant. Price   Net    VAT    Total
Brown sugar     4     .50    2.00   .30     2.30
```

What now happens if we want to change the quantity sold from 4 to 7 packets. With the sheet of paper the above figures would have to be rubbed out and new calculations would be made. With the computer, the number 7 would be installed in the 'quantity' box, and all the necessary maths would be done, the new results being displayed instantly and automatically.

What is displayed?

It is important to realise however that the boxes will not actually display the formulae as entered, but instead show the result. This often confuses people who decide to put a formula into a box, type it in, and see something different displayed... has it been lost? No, the computer has marked that box with the formula, and as soon as it detects a new value being entered within a box to which the formula refers, it will calculate the new result and display it. Since it is necessary to be able to examine the formula in a box, and because the formula itself is not shown in the box, it is instead diplayed in a certain position at the top of the screen. In fact, the *actual* content of any box can be seen at the top of the screen whenever you move to that particular box.

Following on from this, it is also easy to get quite confused by what you see on the screen as a whole. The screen only displays a small part of the whole sheet at any time, because the whole sheet is many times too large to be shown on the screen all at once. Imagine looking at a newspaper with a magnifying glass. It is only possible to see one relatively small area, that which is in focus, at any one time, though you can easily move to look at any part of the whole sheet you wish. In the same way, the computer screen is just a small 'window' into the large worksheet but, by moving the window around the sheet, you can examine any part of it. When calculations are performed they act on the whole sheet, so you can change a value on one part of a sheet and move to another part to see the result. Any box may refer to any other box, anywhere on the sheet.

Developing the example.

The brown sugar example above can now be expanded to include other items to be sold, and the calculations would be

ALMOST the same, the difference being that the formulae would refer to a new row of figures, concerning e.g. coffee in row 3. To explain this further we now need to label each box as shown below. You will notice a) that a new column has been added, 'discount', which will be explained later, and b) that row 1 has been filled with the column titles.

Item	Quant.	Price	Disc.	Net	VAT	Total
A2	B2	C2	D2	E2	F2	G2
A3	B3	C3	D3	E3	F3	G3
A4	B4	C4	D4	E4	F4	G4
A5	B5	C5	D5	E5	F5	G5

Rather than using a,b,c,d etc. as we did in the brown sugar example, we will now refer to each box by its column and row, and so the box in the top left (Item) is A1. Consequently E2 (net price) = B2 (quantity) multiplied by C2 (price)... i.e. E2=B2*C2 (ignoring the effect of discount). This would be represented in the E2 box simply by the formula `B2*C2`. If we now insert the amount 15% into D2, then the formula in E2 would be changed to `B2*C2*(1-D2/100)`, i.e. 4 * .50 * 85% = 1.70.

More terminology.
The use of (1-D2/100) allows the discount amount to be changed without having to alter the E2 formula. The discount box itself can contain a *logical expression* allowing for e.g.:

IF more than 20 items THEN 5% else 10%

It can be further expanded by using what is called a *look-up table*... i.e. a small remote part of the worksheet is set up with its own set of values and formulae to cater for different numbers of items, different discount rates, and different customers. This will be described in more detail in the reference manual.

The formula within a box can contain all the normal mathematical operations and functions (i.e. `SIN`, `RAD` etc.) supported by the computer, meaning that extremely complex

calculations can be chained together with ease to e.g. test out a mathematical model... "what if...". This is useful in a small business because it can show what would happen if for example stock in one item was increased, whilst another was reduced or phased out.

If we now increase the stock to include coffee (row 3), and biscuits (row 4), it can be seen that each line of calculation is almost the same, and these can, if desired, be written into each box. However this is laborious, and a useful spreadsheet facility is the ability to *copy* columns, rows or areas from one part of the worksheet to another. We want each line to use the same formula, but referring to its own particular row, so we want a *'relative'* copy of the formulae in row 2. An *'exact'* copy would mean all the sugar figures being transferred to the other rows, which would be quite wrong and quite useless. Instead, the copy command actually changes each formula, where necessary, to suit its new position. In the example above, when the sugar row is copied complete onto the rows below, the formulae are changed automatically to refer to the particular row on which they are now situated. This action will become clearer in use.

The end result will be a complete set of figures, and all that is now required is to add up the 3 sets of totals, Net, VAT, and Total using row 5. Consequently `D5=D2+D3+D4`, but this can be shortened to `SUM(D2:D4)` using the `SUM` command. The same would be true for columns E and F but of course the latter two can be copied from column D.

Horizontal/Vertical.

As the worksheet becomes more complicated, values and formulae results will often be transferred from row to row, and column to column. In such instances it is important to be fully aware of the order of calculation. There are several different orders in which a spreadsheet program can calculate the results for the whole sheet, but it all boils down to choosing a convention, and sticking to it.

INTER-SHEET calculates from left-to-right in rows, starting at row-1 and working down. A formula in any particular box should not refer forward to a box which has not yet been calculated. Such is called a "Forward Reference". A forward reference will return the last value calculated, which is unlikely to be correct. Always use values which occur to the left of and above the current box. A reference to a box below and to the right of the current position is a "Forward Reference".

MAIN MENU

When you have inserted the ROM software in the computer (following the fitting instructions), check everything, and then turn on the power. Insert the function key strip underneath the perspex sheet above the red keys, and type:

*ISHEET RETURN

and the screen should display the opening menu accompanied by a welcoming bleep (indicating that INTER-SHEET is completely re-set). The command can usually be shortened to

*IS. RETURN

Users of Wordwise and Wordwise Plus will immediately recognise the layout of the menu page, and indeed there are many similarities in menu operation too.

Note that to the right of the INTER-SHEET title there is a figure 0. One of the main features of this ROM is that it can be used as part of an integrated package of ROMS that will include a word-processor, a database and a graph-drawing ROM. Up to 16 different packages can be held in memory at the same time, and the 0 refers to the worksheet (or package) currently selected. To illustrate this, type

*IS.5 RETURN and you will see the screen change to show a figure 5 at the top. You could now enter data into this sheet, then select *IS.0 RETURN to go back to your original sheet, and its contents would still be secure.

Each of the menu options is fully covered in the manual, but you can see that worksheets can be saved, loaded and printed in a variety of ways.

: and * commands

Though not shown on the menu page there are in fact other commands that can be issued. These include particular commands preceded by a colon '**:**' to access the other ROM-linked packages, and '*****' commands. These are passed to the operating system, and must be used with care, as some may corrupt worksheet data. In general it is better to be safe than sorry, and always save your file before using***** commands if you are not sure what the effect might be. (See the section later on 'care of files').

From the main menu, the **ESCAPE** key will take you to the worksheet proper, and pressing it again will return to this menu, so it swaps between the two, as in Wordwise.

ENTERING DATA

From the main menu, press **ESCAPE** to enter the worksheet. At any time, you are positioned at one particular box on the sheet. The current box is indicated by a 'cursor'; in 40-column mode this is a '>' symbol, and in 80 or 105-column mode the cursor is a white rectangle covering the entire box (any contents are still displayed, but in black). The keys →, ←, ↑ and ↓ are described as *cursor keys*; when pressed, they move the cursor to the next box in the corresponding direction. Try using the cursor keys to travel round in the 4 different directions. Pressing **CTRL** with one of the keys will move the cursor to the next 'screenful' of boxes, a quicker means of jumping to a new area, and **SHIFT** with a cursor key will move the cursor to the extremes:

SHIFT ← moves to column A on the current row
SHIFT → moves to the rightmost column containing data
SHIFT ↑ moves to row-1 in the current column
SHIFT ↓ moves to the last row containing data

Now try entering some numbers. Place the cursor in box A1, the top left-hand corner, type

`25` **RETURN**

and you will see it displayed in the current box (indicated by the cursor). The numbers are right-justified, i.e. set against the right hand edge of the box. Move the cursor to box C1, by pressing → twice, type:

`A1*5` **RETURN**

and `125` should be displayed, (25 multiplied by 5). Now move down to box B4 and type:

`"Total` **RETURN**

Note that this has only one set of quotation marks, at the beginning, which indicate to INTER-SHEET that text is being entered. The quote marks will not be displayed in the box. Finally move to box C4 and type:

`A1+C1` **RETURN**

at which point the result, `150`, should be displayed in box C4 as the total.

This obviously isn't putting the mathematical capabilities of the computer into overdrive, but it shows how easy the system is. If you now move back to A1 and enter a new value, you will see how quickly INTER-SHEET re-calculates and automatically displays the new results.

Aids to entering data.
When actually entering data, it is possible to refer to many boxes in the formula. There are extra commands available, e.g. **MAX**, **MIN**, **SUM**, **AV** (average) etc., and below are a couple of examples to show how these work.

The formula:

SUM(B5:B20) RETURN

will add up the contents of boxes **B5** to **B20**, and enter the result into the current box (i.e. where the cursor is). This could be expanded to eg:

SUM(B5:B20,C1:H1,J6,57) RETURN

and this will add together the column B5 to B20, the row C1 to H1, the box J6 and the number 57. In other words, the formula can cope with adding together columns, rows, individual boxes and constants.

The command **MAX** will look for a maximum value, and so the formula:

MAX(A1:A10) RETURN

will look through all the boxes specified to find the largest number and place it into the current box.

The same principle applies for **MIN** (minimum), which will find the smallest number.

The average function **AVERAGE** or **AV** calculates the average of the boxes specified. The calculation performed adds all the

values and divides by the number of USED boxes. Empty boxes are not taken into consideration, since they would cause an inaccurate result.

COPY key.
Rather than having to type in box references, you may find it quicker to use the **COPY** key. Simply place the cursor in the appropriate box, press the **COPY** key, and its co-ordinates will be entered on the command line. This is easier than trying to work out exactly where a particular box is in the middle of the screen. The **COPY** key is also used during editing after pressing **f0**, during which it will not enter the current box number.

Function Keys
At the top of the keyboard are the 10 red function keys, and these are detected by INTER-SHEET to invoke commands such as inserting and deleting columns or rows. These functions are shown on the keystrip supplied and described fully in the reference manual. In addition to this use, you may program your own strings into them, as described later in this manual.

The BREAK key.
To the right of **f9** is the **BREAK** key. Try not to press this, but if by accident it is used, INTER-SHEET will try to recover all of your data, so the result should not be a disaster. You will be returned to the main menu and pressing **ESCAPE** should restore you to your sheet intact.

FURTHER USEFUL FACILITIES

Within INTER-SHEET there are several commands to make life easier for the operator, including special mathematical functions to reduce what would otherwise be extremely complicated calculations. Those likely to be used most often are described below, but you may refer to the manual for more information.

'Slash' commands.

Whilst within the worksheet itself, there is a series of commands known as 'slash' commands, and these all consist of a letter key, preceded by the '**/**' key (situated on the same key as the question mark '**?**'). As the letter key is pressed, the computer will display the complete command word corresponding to that key at the top of the screen and, as appropriate, questions will be displayed. Sometimes the questions require simple **Y / N** (yes/no) responses, sometimes **A / B / R / C** (all/box/row/column) to specify on which boxes the command is to act, and sometimes you will be asked for a range of boxes, etc. The layout of the commands at the top of the screen stays consistent as follows:

The very top line always shows the contents of the box at the cursor.

The second line shows what you are actually doing, and displays error messages.

The third line is the command line where anything is typed in. This will be the line that poses questions when **/** commands have been issued.

The COPY command
Probably one of the most useful **/** commands is **/ C** meaning *Copy*. This enables you to copy boxes, rows, columns, or whole

areas from one part of the sheet to another, and as they are transferred, so the formulae are automatically adjusted to take account of their new position. So if for example box C1 had the formula A1*B1 in it, and it was copied to A2, the formula would be changed to A2*B2. Look in the reference manual to ensure the correct format is followed, using colons to separate the two co-ordinates defining a given area, and a comma to separate different areas. When used properly, this facility is probably more powerful than the replication commands of other spreadsheets, but it does require thought and patience to be exploited fully. (See section 5.3 in the Reference manual)

The GOTO command

/G is a simple *'goto'* command and allows you to go directly to a particular box, without having to use the cursor keys. On a large worksheet it is amazing how much time this will save. (See section 5.6 in the Reference manual)

The HOLD command

/H is thought to be a unique function. It enables you to hold on the screen a particular row or column for display, whilst moving the sheet around underneath it. Entries can still be made, and the calculations will be performed even when the row/column is still on *'hold'*. Underneath the row/column on hold there will be another one hidden, but don't worry, because its contents are still secure, and will be updated automatically as necessary.

Thus if for example your totals columns are a distance from your entry boxes, you can tell the sheet to *'hold'* your totals row on display, move the sheet up to the entry boxes, and type in any new data. The totals will then be updated, and you can instantly see the effects on the various totals. If you find you want to enter data in a box hidden underneath the row/column on hold, simply use a cursor key to move the hidden box into view, and then enter as normal. The command to cancel the 'hold' is **/R**, meaning *'release'*. (See sections 5.7 and 5.12 of the Reference manual)

The LOCK command
It is sometimes essential that certain boxes be protected, so that data cannot be inadvertently entered. The **/L** command will 'lock' and box, row, column or even the whole sheet to protect against accidental change. If you have set up a series of columns and totals ready to have datya entered into them by someone else or by yourself at a later date, locking the part that will not change is a good safeguard against accidental change. In the same way as any area can be locked with the **/L** command, any area can be 'unlocked' with the **/U** command. (See sections 5.9 and 5.13 of the Reference manual)

The WIDTH command
/W will allow the width of any particular column, or all columns, to be set. A column may be any width from 3 to 31 characters. If a box suddenly fills with asterisks, it means that the result has more decimal places than can be displayed in the current width of that column. Increase the width, and the value should then be revealed. (See section 5.14 of the refernece manual)

There are many more '**/**' commands (see section-5 of the reference manual), and you are advised to become familiar with them to speed up the task of entering data, but the one to be careful of is **/Z**, which after checking with a **Y/N** response, will 'zap', destroy, kill, the entire worksheet, so beware! (See section 5.15 in the Reference manual)

FUNCTION KEYS AND !BOOT FILES

In addition to the functions already described, the red keys at the top of the BBC keyboard can be programmed so that you don't have to keep typing the same words. You may well have used this facility before, but within INTER-SHEET there is a slight change, because you have to hold down both SHIFT and CTRL at the same time as pressing one of the function keys.

Function key program.
If you have a set of standard function key definitions you may avoid having to enter them manually each time. Simply write the definitions into a BASIC program which will set the function keys as you want, and then call up the spreadsheet as its final command. To give a very simple example of this the following will program three keys with text.

```
10 REM Function Key program.
20 *KEY0 ||"Sub-total
30 *KEY1 ||"Grand-total
40 *KEY2 ||"Number of days
50 *IS.
```

You will note that in this example each key is entering some text and, for INTER-SHEET, must therefore begin with a quote mark. Because of the way that *KEY is understood, the double-bar character must precede the quote mark. When the function key is pressed, with SHIFT and CTRL, only the set of quotes at the beginning, and the rest of the string itself, will be displayed and not the double bar (||) character.

This program would then be saved using e.g. the name "SPREAD" on file and, if discs are in use, can be set up as a !BOOT file, (to automatically run with SHIFT BREAK). To do this, type:

*opt 4,3 RETURN
(the disc drive will whir) Then type:
*BUILD !BOOT RETURN (the disc drive will whir again and the number 1 or 0001 will appear on the screen) then type:

CHAIN"SPREAD" RETURN
Then press ESCAPE (the disc drive will whir for a few seconds).

Altogether this will automatically load and run the program called "SPREAD" when you press SHIFT BREAK with this disc in the drive.

Finally, to test whether it has worked, hold down SHIFT and press BREAK (let go of BREAK first) and the program should run and almost immediately you will be presented with the spreadsheet opening screen. Enter the worksheet, then try pressing SHIFT CTRL and f0 when you should see '"*Sub-total*' appear on the screen in the command line.

Adding "|M" to the end of a key definition is like saying 'press RETURN after it. The string will be typed and automatically entered. For instance, if you regularly want to move to box A100 on the sheet, you can use the command:
/G A100 RETURN
and this can be put onto a function key with the command from the menu:
*KEY 0 /GA100|M RETURN
Then, worksheet edit mode, holding down SHIFT and CTRL and pressing f0 would enter the command and move to box A100 in one operation.

CARE OF FILES

Disc filing system

It is assumed that the filing system in use is an Acorn DFS or DNFS. If you have some other filing system then it will probably still work, but the use of some commands and their effects may be different from those described below. When using filing system commands, extreme caution should be exercised, since the effects of some commands can be quite drastic.

Only insert and remove the discs when the disc-drive light is off, otherwise the disc and read/write head could be damaged.

Try to keep discs away from strong magnetic fields: don't put them on top of the monitor or near a loudspeaker. Any such damage may be gradual, but drastic in the end nevertheless.

Always store the discs away from direct sunlight and heat. Keep them in their paper wallet and never touch the actual disc surface, visible through the holes and the two slots. Always write on the disc label very gently, with a soft marker-pen, not a ball-point pen or pencil, as these may cause indentations on the disc surface, corrupting the data.

If the file is important, make a backup copy and store it well away from the original. Always write-protect your backup copy, by sticking a small label (usually supplied with discs) over the small notch in the side of the disc, so that it can't be accidentally overwritten.

It must be stressed that these operations to make backup files will completely destroy any work currently in memory. Always finish your worksheet, and any other work in memory, save it. To make a backup copy, assuming you have 2 drives, 0 and 1, type:

```
*ENABLE RETURN.
*BACKUP 0 1 RETURN
```

Note (a) that the ***ENABLE** command is not strictly necessary with the Acorn DNFS ROM, and (b) that the **BACKUP** command will destroy any files already on the 'destination' disc (i.e. the disc you are copying TO). Any information lost by overwriting in this way cannot be retrieved – BEWARE!

It is sometimes necessary to transfer all your files to a disc that already has something on it. In order to avoid total destruction of any existing files on the destination disc, do NOT use the ***BACKUP** command. Instead type:

***COPY 0 1 *.*RETURN**

and this will transfer all the files or as many as will fit.

If you only have one drive you would instead type ***BACKUP 0 0** or ***COPY 0 0 *.*** as appropriate, and follow the screen instructions for changing the discs as necessary. It is quite easy to get the discs mixed up, so place a write-protect tab on the original 'master' disc as en extra safety measure.

Lock your wanted files by typing:

***ACCESS** <*filename*> **LRETURN**.

If you want to lock all of the files in one go, type:

***ACCESS *.* LRETURN**

Similarly to unlock any or all of the files, use the above commands but miss out the '**L**'.

Compact your data disc at regular intervals to squash all the files together and put all the blank disc areas together at the end. Again, beware of the ***COMPACT** command which will delete anything currently in memory. Assuming the disc is in drive 0, tidy the disc by first deleting any unwanted files using ***CATRETURN**, to see what is actually on the disc and then use ***DELETE**<*filename*>**RETURN**
to delete the unwanted files, until only the wanted files are left. The unwanted spaces left by the deleted files are then removed by typing:

*COMPACT 0 RETURN

saving onto to cassette
If you want to save your file onto cassette, when disc is the normal filing system, you must turn on the cassette filing system by typing:

*TAPE RETURN

then save the worksheet file. To transfer worksheet files from disc to tape is only slightly more awkward. Simply load the file from disc in the usual way, type *TAPE RETURN from the menu and save the file onto cassette. Type *DISC RETURN to return to using the disc filing system.

Cassette filing system

Users of the cassette filing system should save important files from INTER-SHEET onto 2 separate cassettes for security. It is not possible to copy all of the files direct from one cassette to another, though it is possible to load a file from one tape and save it to another. (Don't forget to press RETURN on the computer once you have pressed the 'record' button on the cassette deck!)

Cassettes can have their data corrupted by storing them too close to strong electro-magnetic fields, so keep them away from the monitor/TV, telephone, computer etc. Mark the cassette (as well as the box) clearly, and if the data is vital, break off the small record-protect tab at the back. (If ever you need to use the cassette again for recording this can be taped over.)

It is sometimes necessary to adjust the volume control on the cassette player in order to read data from the tape reliably. This is especially true when reading tapes which were not recorded on the machine being used to replay them.

PRINTER PROBLEMS

Assuming your printer usually behaves itself, proving that the interconnecting lead is not faulty, there is little that can go wrong.

If you get just a few characters displayed on the screen, then it freezes, your printer is probably not turned on. There is usually an *'enable'* or *'on-line'* switch as well, so make sure that this is activated.

Serial or Parallel printer?
Check that *FX5 (printer select) has been set correctly. If your printer is connected via a flat 'ribbon' cable to underneath the computer, it is known as 'centronics parallel', and the computer defaults to this setting. This means you don't have to do anything. If however you have a 'serial' printer, connected by a thin round lead to the din-type socket on the back of the computer, you will need to type:

*FX5,2 RETURN

to get any printout. This should be done from the main menu of INTER-SHEET.

Linefeed problems
If your printer goes into action, but everything is printed on the same line, then you have got to either change one of the internal DIP switches inside the printer (Auto-linefeed ON), or type:

*FX6,0 RETURN

from the INTER-SHEET menu. This is because the printer needs a *'line-feed'* character to turn up one line, and though the computer tries to send one, it is intercepted and stopped by the printer-driver routines in the BBC Micro Operating system (independant of INTER-SHEET). *FX6,0 tells the O.S. not to intercept any characters, so the printer receives the line-feeds sent and behaves properly. However this can be a nuisance as you have to remember to type it each time you use the computer, so normally it is possible to set one of the switches located in the printer so that, in effect, it sends itself a *'line-feed'* character at the end of each line. Incidentally if you now send *FX6,0 as well you will find that your output will be double-spaced!

GLOSSARY

* The asterisk is used in 2 different ways by the computer. It either signals the start of an *'Operating System command'* from the menu, or in a formula it tells the computer to multiply one number by another. Don't worry, because the computer knows which is which by its context.

***BACKUP** This is the command used to make a spare copy of all your files, from the 'source' disc, and writing them on the 'destination' disc as a security measure. (Disc only).

***CAT** This command is used to list the contents of the disc on the screen. This can be abbreviated to `*.` RETURN. (Disc only).

***COPY** This is another means to make security backups of your files. Unlike `*BACKUP`, this command only copies one file at a time and leaves any files already on the destination disc intact. (Disc only).

***DELETE** A Disc filing system command used to delete a file. Unlike tape recorders you can't simply record over old files; instead they have to be deleted from the disc catalogue.

***ENABLE** Because there are some disc filing system commands, e.g. `*BACKUP` and `DESTROY`, that could potentially be disastrous, they have to be *'activated'* first by typing this command. (The new DNFS ROM has a slightly different way of warning you). (Disc only).

***FX5** The computer can send the output to various types of printers, as decided by this command. `*FX5,1` (default) is for a parallel printer, and `*FX5,2` is for a serial printer.

***FX6** Some printers don't generate their own line-feed characters. If this is the case, the computer must send one, otherwise the printed output will all be on the same line. The command `*FX6,0` RETURN will effectively cause line-feeds to be sent to the printer.

***ISHEET** The command used to start INTER-SHEET.

***TV** A command used to adjust the displayed height of the picture on the video display. Refer the the User Guide for more information.

/ commands Whilst working on the worksheet several commands are available by first pressing the *'slash'* **/** key (unshifted **?** key).

40/80 track Disc drives can be obtained with either 40 or 80 track capability. 80 track discs can hold twice as much information. Discs produced by one type of drive cannot be read by the other. Some drives are available with a 'select switch' to swap between the two formats.

ASCII This is a standard used in the computing industry, whereby every character is defined by a unique number in the range 0-255. Files stored like this, can often be read by different computers. The term "ASCII file" is sometimes used in a slightly different context to mean one which has no 'special' characters within it and can therefore be read and understood even by programs which did not originally create the file.

Auto-stepping An INTER-SHEET option. By switching on this option, the cursor will automatically move in a chosen direction each time data is entered.

Bar-chart This is a type of graph in which each value is shown as bar of a height relative to the value.

Centronics parallel This term describes one type of printer interface. Printers with a Centronics 'parallel' interface are connected to the underneath of the BBC Micro by a flat *'ribbon'* cable. Data is transmitted in parallel along the wires.

Character set Different countries use different shaped characters in their alphabet, and so many printers can be configured to produce these variations.

Column refers to the vertical axis of the spreadsheet. The spreadsheet has many columns labelled e.g. A, B, C, etc.

Condensed Printers are often able to print in a variety of styles, condensed being one of them. A condensed character is narrower and usually shorter than the normal printed characters. This enables more characters per line, and the line-spacing can usually be reduced as well to get more information on a page.

Copy An INTER-SHEET command. This is the INTER-SHEET method of duplicating formulae, labels, etc. from one area to another., often called replication in other spreadsheets.

Cursor With reference to INTER-SHEET: This indicates the current box being edited. The cursor is shown in 40-column mode as the '>' character and in other modes as a white rectangle filling the current box size, with any box contents shown in reverse (black on white). When editing on the command and prompt lines (after using **f0**) an underline character acts as a prompt showing the current position on the line.

Database This refers to a type of information retrieval system very common on computers. Information can be stored and recalled in various ways, usually very quickly.

Default value The value that will be assumed unless some other value is specified. e.g. The default width of all columns in INTER-SHEET is 7 characters, unless you specify something different.

DIN This is the name for a type of standard-shaped socket and matching plug. The cassette output on the back of the computer is a 7 pin DIN socket. "DIN" simply refers to the 'standard'.

Filename The name given to a file on tape or disc.

Floppy disc The name given to the circular very thin disc of magnetic material, housed in a thin plastic rectangular case.

Format In the INTER-SHEET context: This word has two meanings, (a) the name given to the process of preparing a disc ready to receive information, and (b) when printing, the word

format is used to describe how the output will look, e.g. a number in INTER-SHEET can be displayed in different ways – see section 5.5 of the Reference manual.

Formula This is the name given to a mathematical equation stored within a box.

Function With reference to INTER-SHEET: A function is a command which calculates and produces a result, e.g. **SQR** will calculate and return the square root of a given number.

Graph A visual output of a set of numbers, enabling trends etc. to be understood more easily.

HEX We normally count in the base of 10, using the digits 0 to 9. Computers use Binary (base 2), counting with just 1 and 0. Hexadecimal is a counting syetem using 16 as a base. Because 16 is a multiple of 2, it is much easier to covert between base 2 and base 16 than between base 2 and base 10. Base 16 counts up in digits 0-9 then uses letters A-F. The Hexadecimal digit F represents 15; Hexadecimal 10 represents 1*16 and 100 represents 16*16, etc. A Hexadecimal number is often preceded by the '&' symbol.

Justification With reference to INTER-SHEET: something which is right-justified is placed as far to the right of the box as possible. Numbers may be left or right justified; text can be centred as well as left or right justified within a box.

Line-feed After printing a line of text, the printer has to move the text up one line to avoid over-writing. This is called a 'line-feed'.

Load The process of retrieving something from a file and placing it in the computer's memory.

Locked files Important disc files can be locked by use of the ***ACCESS** command. This protects them from being overwritten accidentally by certain commands. Any attempt to change the contents of a locked file will result in an error message, and to make any changes, the file must first be unlocked.

Logical Expression The statement 'IF I am thirsty THEN I will have a drink' is a logical expression. The computer similarly decides one or other course of action, depending on the input information.

Look-up table With reference to INTER-SHEET: A small section of the spreadsheet prepared with a special table of calculations to which the main spreadsheet refers for particular results.

Mail-merging A process whereby names and addresses can be taken out of one file, e.g. a database, and then added to a standard letter, to generate 'personalised' letters without having to retype it in its entirety each time.

Matrix The technical term given to a structure consisting of columns and rows.

Menu A list of options from which the user is invited to make a choice. More correctly called an "option menu". An option menu is much simpler to use than trying to remember what special commands may otherwise have to be pressed (such a system is termed as 'command-driven').

On-line The term given often to a printer that is ready to receive information and print it out. Conversely, if it is Off-line, it is not ready to accept information.

Pie-graph A type of graph in which the overall total is represented as a circle (a pie) and is divided into segments proportional in size to the various amounts. It represents the proportions of the various quantities that make up the whole.

ROM A memory chip from which information may be read, but not written. An EPROM is very similar except that information can be electrically written into it at manufacture and erased by exposure to strong ultra-violet light, and subsequently programmed with different information. An EPROM can be thought of as a re-usable ROM (though in practise they are rarely re-used. ROM chips are used to hold the INTER=SHEET program. This avoids having to load the program from tape or disc and saves memory.

Row INTER-SHEET has 255 'rows', or horizontal lines of information.

Save The process by which information (including worksheets) is copied from the computer's memory onto file.

Sectors Discs are divided up into tracks (concentric circles) of information recorded magnetically, normally 40 or 80 tracks in total cover one side of a disc. Each track is sub-divided into sectors (usually 10), each capable of holding the same amount of information.

Serial This term is normally used to describe a type of printer interface which transfers data along just one wire (in addition to power and other signals) in a serial fashion. The serial interface on the BBC Micro is called an RS423, but is similar to and compatible with the more usual RS232 found on printers and other computers. A printer with a serial interface plugs into the back of the BBC Micro in the socket labelled "RS423".

Spool This word unfortunately has several meanings, all completely different! In the context of the INTER-SHEET menu, it is used to describe an output in ASCII without special control characters. Such output can be used by other programs.

Spreadsheet The generic term for the INTER-SHEET type of package.

Superscript Printers can usually print numbers and text above or below the centre of the normal line, often used in mathematical and chemical formulae. Refer to your printer manual for more information.

Toggle When the same function alternately switches something on or off, each time it is used, it is said to 'toggle' between the two states.

Tracks When formatted, each disc is divided into concentric circles called tracks. See also "SECTORS".

Window It is impossible to see the entire spreadsheet on the screen at one time, so this term is used to refer to the way the computer screen acts as a 'window' showing only part of the worksheet at any time. The 'window' can be moved to show any screen-full of the whole worksheet, but not all of it at the same time.

Word processor A program used for easy manipulation of text. Wordwise Plus is an example of such.

Worksheet This is the name given to the information stored within INTER-SHEET. It is the total area of all the rows and columns.

Write-protect Each disc has a small notch in the side. If this is covered over, then nothing can be written onto the disc, and so any files on it are protected... except from physical damage.

Notes

Notes