

ORIC~CALC

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SOFTWARE

01		02	03	04
AA	ITEM	TANSOFT QUANT.	SPREADSHEET PRICE	TOTAL
AC
AD	FROGS	80	13.00	1040.00
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AI				
AJ				
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Introduction

Oric-calc is a program that enables you to maintain a spreadsheet. Oric-calc can be used for simple filing, ledgers, and many number-crunching applications. It is designed for use with a 48K Oric computer with cassette recorder.

Loading Oric-Calc

To load it, type CLOAD " " for fast or CLOAD" "S for the slow version. If problems arise when using the tape try adjusting the volume. It may be worth saving Oric-calc on your own cassette as a backup.

What is a spreadsheet?

Imagine a large sheet of paper, ruled into rows and columns so that the page contains a number of boxes. Then imagine that you can put numbers, or characters into any of the boxes. Oric-calc simulates this paper, allowing you to easily write in long columns of numbers, and just as easily overwrite them later.

The interesting part comes when you want to perform calculations on the numbers on you spreadsheet. By entering simple instructions — called FORMULAE — you can get Oric-calc to work out many complicated problems.

Oric-calc lets you experiment by letting you change — and change again — the numbers and formulae.

Your spreadsheet would be lost if you switched off the Oric, so a facility is available to save (and later reload) all the information.

The best way to get familiar with Oric-calc is by using it! As this manual discusses the various options it would be worthwhile for you to try them out.

Oric-calc is saved as a fast recording on one side of the cassette and slow on the other.

Setting up Oric-calc

When Oric-calc has successfully loaded, you will be asked to select one of two options: L to load from tape a previous spreadsheet or N to begin with a fresh new sheet. The whole beauty of a spreadsheet is the ability to keep changing the figures and formulae, and Oric-calc lets you keep your spreadsheet on tape for safe keeping. So that if you accidentally destroy part of your spreadsheet, you can simply reload it from cassette again.

If you select L, the computer will ask if the tape recording was made at Fast or Slow speed, and S or F must be entered.

If you select N for a blank sheet, (as you must for the first time you use Oric-calc) you will then be asked a series of questions.

Firstly, Oric-calc will ask for the size of your spreadsheet in terms of the number of rows, and the number of columns. It is worth mentioning that the smaller you make your spreadsheet, the faster Oric-calc performs. At the same time, once your dimensions have been selected, you cannot ever change them on that particular spreadsheet. For most cases, about 26 rows of 12 columns is sufficient.

Oric-calc then asks for the number of decimal places with which to hold numbers. Numbers are shown in a 'fixed' right justified position, so that they line up correctly. Numbers are always rounded to the last available digit, and a minus sign put to the far right when present. If 'V' is entered, the number is stored in the normal 'lazy' way — with a sign first, followed by only the necessary parts of the number. The variable format for numbers does not look very neat, but will be explained in the section which shows how the number of decimal points can be altered.

When you have entered all three pieces of information, Oric-calc will display your spreadsheet.

If you have loaded in an old spreadsheet, this should now be shown — if the display does not look correct, or the screen starts to jitter, press the space bar. If still incorrect, you have had a tape error, so run the program again and reload your spreadsheet.

Entering information

You will notice that your spreadsheet has letters which go through the alphabet down the left of the screen. These identify a certain ROW. A row will always be specified by using row letters, from AA to ZZ – within the limits of your spreadsheet.

Looking across the spreadsheet, you will see numbers going across – there will always be four on the screen at one time.

These numbers are centred above each column on your spreadsheet, so that the first column is identified by '1' the next by '2' etc up to a theoretical maximum of 99.

Therefore any BOX can be identified by combining the row and the columns, as in AM7, meaning row AM column 7.

You will notice that one BOX is coloured differently to the rest of the sheet. This is your CURRENT BOX into which the next number, formula or text will be placed.

Try pressing the Oric's arrow keys, and notice how the Current Box moves about the screen. You will see that the page is moved as your current box moves, so that you can see different parts of your spreadsheet. You may keep the arrow keys pressed for continuous movement.

As you move the box, a green box reference is shown at the top of the screen. This reference identifies your current position. A fast way to move around is to use the GOTO function. Type 'G' and you will be asked where you wish to go. Now type a box reference, such as 'AM4' meaning row AM column 4.

Entering numbers

Type N and you will be asked to enter a number. You must enter your number with the sign (only if negative) followed by the number. You need not use a particular format for the number — the computer will sort out the decimal places, and round up if necessary. Numbers cannot be entered in an exponent form eg: 3.2 E10. If you change your mind about entering a number, simply press RETURN on its own, and the current box will not be altered.

Since you will often be entering a whole row or column of numbers, an Automatic feature has been installed.

Press 'A' and you will be asked whether the current box should move left, right, up or down.

Then, enter numbers, pressing RETURN after each. When you have finished, enter any thing other than a number (you can just press RETURN on its own).

Important note on numbers

There are nine characters available for each number, including one character for the sign and possibly one for the decimal point. If a number cannot be fitted into the available space, normally you will lose some of the accuracy, and the significant digits will take precedence over the fractional part of the number. Numbers that get too large may also be slightly corrupted, and have the decimal point positioned to an incorrect place. It is important therefore to specify the right decimal-point position before doing calculations. Numbers using the 'E' — exponent form cannot be entered into Oric-calc.

Formulae

Supposing that you wanted Oric-calc to work out the VAT of any value, and that you had filled up box AA1 with your price. Assuming that you want the VAT to be displayed alongside, move the current-box to AA2 and press F for Formula.

You can now enter a series of box references and operators to represent the calculation.

We shall shortly see all the options, but in the case of VAT all you would need is : AA01*0.15 or if you prefer, : AA1*15/100.

If you enter this, the formula will be checked, and then the answer is calculated. Whenever you visit that box (AA2), the formula will appear showing you how that box got its value.

You will probably understand what the formula is doing, if you have ever written any calculations in BASIC. A formula can contain any of the following:

- 1) Numbers in any format eg: -123.2, 0.02 etc.
- 2) References to boxes on the sheet, eg: AA1 is the top-left box.
- 3) Operators — the characters that say which calculation is to be performed. eg: -, +, *, /, ^, — meaning minus, plus, times, divide and raise to power.

Examples:

- 1) To average a column of numbers:
(AA2+AB2+AC2+AD2) / 4
- 2) Some complex maths functions:
(AG1*AB2) ^ (AC4/3, 14159)
- 3) To add a row of numbers:
AG1+AG2+AG3+AG4+AG5

This last example could get a bit tiresome — and there is an easier way to add up a column or row of figures. Instead of using the type of formula above, use the left square bracket in the form: [AA1AT1 which adds up every box between AA1 and AT1, including the specified boxes. Example 3 could be replaced by: [AG1AG5.

The two box references are pointing to the top left and the bottom right respectively, so that [AB3AD5 adds up the contents of boxes AB3, AB4, AB5, AC3, AC4, AD3, AD4 and AD5. This method of identifying a number of boxes is used in many of the Oric-calc commands.

Conditional Formulae

This is an advanced feature, to be used once you are familiar with the operation of Oric-calc.

Just as a formula can contain arithmetic functions, like add and multiply, it can also contain comparison symbols, like in the BASIC IF/THEN statement.

To explain, a condition, such as (AA1=23.5) will either be true or false, according to the value of box AA1. When this, or any condition is true, then the arithmetic value of that condition becomes minus 1. When untrue, it will be zero.

So if the formula for AA2 is: 6=7, then the number 0 will be moved into box AA2. If the formula is AA1=AA1 then the number -1 is moved into AA2.

The use of this may not yet be apparent, but consider the case where you want a vat amount to be calculated depending on whether, say, box AA2 is 0,1, or 2 - meaning zero rate, 8% or 15%.

If the formula was 'AA1*.15' for 15% vat, then the new conditional formula would be: 'AA1*(-.08*(AA2=1)-.15*(AA2=2))'

When AA2 is 1, then the result of (AA2=1) is -1, and (AA2=2) is 0. Therefore -.08 times -1 gives +.08 - which is the vat rate used.

As well as the '=' sign, you may use the other signs: < <= > >= and <> which mean, less-than, less-than-or-equal, greater-than, greater-than-or-equal, and not equal.

Here is another example, where we want to give a 10% discount to BA4 whenever BA4 exceeds £200, to give a revised total in BA5.

BA4*(-.9*(BA4>200)-1*(BA4<=200)) Take care of the use of minus signs when conditions are being used. Remember that anything times a false condition will be zero and anything times a true condition will be negative.

Does it matter if a box is empty?

If a formula uses a box that does not contain a number, then there is no problem as that box will be taken as zero. The only difficulty could arise as a result of trying to divide by a blank box – division by nought is impossible!

Formula Disasters!

Because of the nature of this program, it is possible for a formula to upset Oric-calc. The program does some validation of your formulae – for instance checking that box references are correct – but try typing in a formula such as `AA3*(AB4+1)` and see what it does!

What happens is that a SYNTAX error occurs (other errors such as DIVISION BY ZERO can happen) and the calculations stop. Oric-calc reports on which box causes the error, and when you return to the spreadsheet (after pressing a key) the current box will have been moved to the appropriate place ready for correction.

Entering Text

A spreadsheet with only numbers does not make for very interesting reading! Oric-calc lets you put text into any box, nine characters at a time. That is not to say that you are limited to entering 9 characters, but that the minimum change to your spreadsheet is one whole box.

To see how this works, move your box to some free position on the screen and press the quote key (without shift). You can then enter up to 70 bytes of data which will be written into the current row, from where your current box stands. It is worthwhile experimenting with quote on your own. Try putting in headings — such as ‘JOHN SMITHS MONTHLY STATEMENT’ — and sub-heading lines like ‘TOTAL’ and ‘VAT’.

Note that if a formula uses a box containing letters, it will normally be taken as zero — but if the box contains some sort of number, such as 15%, then that number may be used.

Obviously if you put a formula against a box which has text in, you are going to overwrite that box with the result.

Building a Spreadsheet

Using the Automatic entry facility, you will soon have a spreadsheet full of numbers. Then you can enter the formulae and the results of the calculations will be done. (We will later see further commands to help you enter a large amount of formulae)

Supposing then that we need to change some of the numbers in one column — this will possibly make the other numbers ‘out of date’ — since entering a number in one place does not force a re-calculation of the whole spreadsheet. So after doing amendments to your spreadsheet, you may well want to get the Oric to WORK OUT (command ‘W’) the new values.

After pressing W, you are asked if you would like to restrict the re-calculation to a certain part of the sheet. As before, you would then enter the top left box and the bottom right box, and only the formulae in this area is dealt with.

Calculation is fairly fast, but allow time if you are calculating a whole sheet — the computer may have to scan many empty boxes.

Also note that the calculations are done twice — since a formula may use the result from a calculation that has not yet been done.

For example, if the formula at AA1 is 'AF1+1' and the formula at AF1 is '43*2', then the first time through, the calculations will move 1 into AA1 (since box AF1 is initially 0). After this, the formula at AF1 is calculated, and it is this new result which is used during the second scan in order to calculate AA1.

Free memory

When you specify the number of columns and rows, the machine assumes a certain memory requirement for each box.

This assumption is that, on average, each formula will have 10 characters.

Normally, you will be working with less than the maximum range of columns and rows, and it is unlikely that the whole spreadsheet will be full of large formulae — but if it is, then you may need to keep careful eye on your remaining memory. Type '?' in order to find out how much room is left — but allow several minutes for the answer.

Moving information

Often you will need to repeat a column or row at some other place. To do this move the current box to the column or row that you want to copy, and select option M for move. Then enter either a column number, or a row reference. That row or column will then be filled with the row or column at your current position. Note that you may need to adapt any moved formulae to fit in with the new column or row identity.

Inserting extra information

'I' is the facility that inserts space into a column or row. Simply move the current-box to the place after which you want to insert a new row or column and select option I. This facility does not remove the actual line — which leads onto the next facility — BLANK.

Also note that this facility may make most of your formulae wrong, since the rows or columns will alter.

Wiping out information

Type 'B' to blank out part of the sheet.

You are asked whether you want to blank out the formulae, the data in the boxes, or both — reply with Y or N to each question.

You must then enter the top left and the bottom right box reference. The contents of the boxes are erased, along with any associated formulae.

Copying formulae around

In many cases on a spreadsheet, you are doing the same type of calculation to a column or row of figures. Suppose that you had every other row reserved for numbers that you enter, and the column to its right used for the vat payable on that value.

Taking the topmost formula, you would want something like: AA1*.15 in box AA2. Then underneath, you would want AB1*.15. Somewhere else you might have AF3*.15 and so on.

To help you enter all those formulae, but changing the box references intelligently you have the 'Copy' function.

With the current box pointing to the formula that you wish to copy, you enter 'C' to select option C and then enter the top left and bottom right box numbers.

So, the formula in box AB2 can be copied to AC2, AD2 etc by entering AC2 to AZ2, for example.

Be warned that the COPY function is very slow, it takes about 3 seconds for each converted formula, longer if the formula is more complex.

Coming back to the vat formula, supposing that we wanted to use a vat rate that was contained in, say, BOX AZ10, then the formula might be: $AA1 * AZ10 / 100$

The problem is that if you copy the formula, Oric-calc will attempt to alter the AZ10 when you copy the formula around. To stop COPY from changing a box reference, put an equal sign before it, as in $=AZ10$.

So the vat example would come out like: $AA1 * AZ10 / 100$ and when copied remains correct.

Saving Spreadsheets

A spreadsheet may take several hours to build up, something that you do not want to do for nothing. So type S to save the spreadsheet to tape, press RECORD and select slow or fast speed.

It will take several minutes, at fast, to save the spreadsheet, even if empty! But the smaller the spreadsheet the better.

To subsequently load the sheet back, use option L when you start up.

Note that slow speed will take about five times longer than fast, but will be more reliable.

Loading a Spreadsheet

If you get fed up with your spreadsheet, and want to load up another one, you have to first quit the program. To do this type Q. As a safeguard, the program then asks again if you want to quit, or continue. Press Q again, and the program will restart, presenting you with the choice to load a new sheet or to start with a blank sheet.

You are asked whether the file was recorded at fast or slow, and must type F or S respectively.

On certain Oric computers, you will be asked to stop the tape during the load, and restart after a short while (usually no longer than three minutes). If this happens, full instructions will be given to you.

PINGS will sound during a load to remind that something is happening or 'LOADING' may show at the top of the screen, according to your Oric.

If you have trouble loading, try different volumes, speeds etc. — it may be necessary to reload the program after a failed load.

Changing the Decimal Places

If you get fed up with working with your current number of decimal places, type D and select a new value. Your whole sheet is altered accordingly.

The choice is the same as that presented when you start a new spreadsheet — 0—9 and V.

It is worth pointing out that this facility will alter anything that looks numeric including words like '15%' and '14th FEB', so use with care!

Also, you may find that zero values are not always converted correctly.

Printing the spreadsheet

If you have a printer attached to the Oric, it is possible to print off your spreadsheet, by using option P.

You are asked to enter the top left box reference and the bottom right. You are also asked whether you want columns and rows to be shown, and whether any formula in the area are to be printed. On a standard 80—column printer, you can fit in seven columns at a time, so you could do your printing in several parts, and join them up with sticky tape!

General Notes — errors etc

Something known as Garbage collection occurs from time to time, unfortunately, and this is why you will suddenly get a lack of response!

Generally speaking, the smaller your spreadsheet, the less often this will happen. Garbage collection is common to most dialects of BASIC. Garbage collection will take something between two minutes and five minutes to complete, do not interrupt this process or your spreadsheet may be corrupted!

A word of warning: DO NOT PRESS CONTROL C! If you do, then you will not leave the program, but your spreadsheet will almost certainly get corrupted.

If you enter a formula that contains an incorrect box reference, then that formula will flash when shown and be reported in the formula list as invalid.

Here is a list of reasons why Oric-calc could crash while obeying a formula:

SYNTAX ERROR — some strange symbol is in the formula — you can only use +, -, *, / and ↑.

DIVISION BY ZERO ERROR — You cannot ever divide by zero!

OVERFLOW ERROR — the result is too high or too low for the Oric to cope with. eg: AA1 ^100 where AA1 is 20.

ILLEGAL QUANTITY ERROR — caused by bad arithmetic eg: (-1) ↑.5

TYPE MISMATCH ERROR — A really weird formula, with strings eg: AA1 * "!!!!!"

Loading Errors

1. OUT OF MEMORY ERROR means that the recording has been played from the wrong place. Could be caused by trying to load an ORICBASE file!
2. No response after loading — if nothing happens after the file is loaded, then you may need to restart the program, using the RESET key (under the Oric). Try to reload with a different volume setting.

Worked Example

To help clarify the instructions we will now go through an example spreadsheet. The whole spreadsheet has been printed below.

	1	2	3	4	5	6	7	8	9	10
AA	JD BLOGGS ACCOUNTS JUNE 83 TO DECEMBER 1983									
AB										
AC ITEM	RECEIPTS	ZERO	15%		PAYMENTS	ZERO	15%	BALANCE		
AD	*****>	VAT	VAT		*****>	VAT	VAT	TO DATE		
AE 12/6/83 JB001			115.00					115.00		
AF 20/6/83 PHONE BILL							57.50	57.50		
AG 25/6/83 JB002		65.00						122.50		
AH 20/6/83 STATIONERY			250.00					352.50		
AI 11/7/83 PHOTOCOPIES							27.00	325.47		
AJ								325.47		
AK								325.47		
AL								325.47		
AM								325.47		
AN								325.47		
AO								325.47		
AP								325.47		
AQ TOTALS:		65.00	345.00				11.00	84.50		
AR	-----									
AS RECEIPTS	765.00	RECEIPTS	45.00	PAYMENTS	75.50	PAYMENTS	11.00	VAT OWED	35.97	
AT NET VALUE		VAT	NET		VAT		PROFITS	291.50		
FORMULAE USED:										
AT AQ4	=AE4+AF4									
AT AQ5	=AG5+AH5									
AT AS2	=AS1*1.15/AQ4									
AT AS4	=AS3*1.15/1.15									
AT AS6	=AQ7*1.15/AQ8									
AT AE10	=AE10+AE4+AE5+AE8+AE9									
AT AF10	=AF10+AF4+AF5+AF8+AF9									
AT AG10	=AG10+AG4+AG5+AG8+AG9									
AT AH10	=AH10+AH4+AH5+AH8+AH9									
AT AI10	=AI10+AI4+AI5+AI8+AI9									
AT AJ10	=AJ10+AJ4+AJ5+AJ8+AJ9									
AT AK10	=AK10+AK4+AK5+AK8+AK9									
AT AL10	=AL10+AL4+AL5+AL8+AL9									
AT AM10	=AM10+AM4+AM5+AM8+AM9									
AT AN10	=AN10+AN4+AN5+AN8+AN9									
AT AO10	=AO10+AO4+AO5+AO8+AO9									
AT AP10	=AP10+AP4+AP5+AP8+AP9									
AT AQ0	=AEB0+AF0									
AT AQ9	=AEC0+AF9									
AT AS0	=AS0+AQ9*1.15/1.15									
AT AS10	=AS4+AS8									
AT AT10	=AS2+AS6									

The example here is aimed at Mr. Joe Bloggs, who wants to keep his accounts on the computer, and get it to work out how much vat he owes and a few other things. Mr. Bloggs uses the system in the following manner.

- 1) He loads up his Oric-calc file from tape.
- 2) He enters any receipts on the left hand side, under either 'zero vat' or '15% vat'.
- 3) Payments are put on the right hand side under either of the two vat columns.
- 4) When Joe wants up-to-date totals, he presses W for the calculation to be done.

So let us look at the spreadsheet in more detail:

The format of the spreadsheet is entirely up to you, but in this example I have used 10 columns and 20 rows, with plenty of descriptive text.

If you wanted to use this example in real life, you would probably expand downwards to allow room for, say, fifty items.

The text is created simply by using the quote function.

The formula is the tricky part of this example, so let us look at how we arrived at them.

Firstly the balance must be calculated. Looking at a particular row it can be seen that the balance is the previous balance plus anything under the receipts headings, but minus anything under the payments side.

Here is the formula for the balance at AE10:—
AD10+AE4+AE5—AE8—AE9.

Since we do not want to have to enter this same formula countless other times, we use the COPY function to repeat the formula for all the Balance figures. You can do this by:

- 1) Enter the formula (above) into AE10.
- 2) Press 'C' and then enter a top left box reference of 'AF10' and a bottom right box reference of 'AP10'.

After a few minutes, the formula will have been copied to all the balance boxes.

If you are trying this out — use the arrow keys to see that the formulae has been entered into the balance column — and see how each formula has been altered to reflect the appropriate row and column.

And now to some easy formulae — the four totals.

Each total is just the sum of the figures above, so that the total of zero-rated vat is: [AE4AP4.

Similarly AQ5 must contain the sum of boxes AE5 to AP5, or [AE5AP5. And for the payments side, AQ8 is [AE8AP8 and AQ9 is [AE9AP9.

Finally the bottom lines of formulae need some explaining.

If the receipts or payments contain vat, then this must be separated out.

For instance, the receipts net value is the total of columns 4 and 5, with the 15% vat removed from the column 5 total.

This is: $AQ5/1.15+AQ4$.

It therefore follows that the vat on the receipts is: $AQ5^*.15/1.15$.

The same two formulae are used for the payments:

AS6: $AQ9/1.15+AQ8$

AS8: $AQ9^*.15/1.15$

Finally, we come to the two figures that Joe Bloggs really wants to look at, his profits and the vat he owes to Customs and Excise.

The vat owed in box AS10 is the difference between his receipts and payments — AS4—AS8.

Also, the profits in box AT10 are calculated from the formula:

AS2—AS6.

SUMMARY OF COMMANDS

- ← move current box left.
- move current box right.
- ↑ move current box up.
- ↓ move current box down.
- A Enter number, moving current box automatically.
- B Blank out part of spreadsheet.
- C Copy and adjust formula to other boxes.
- D Change decimal point.
- F Enter a formula.
- G Go to a certain box.
- I Insert room for a new column or row.
- M Move current row or column elsewhere.
- N Enter number into current box.
- P Print spreadsheet.
- Q Quit this spreadsheet (use to load new sheet).
- S Save spreadsheet, or part of spreadsheet.
- ' Enter text starting at current box.
- ? Print available memory (in bytes).

1. The first part of the report is a general introduction to the subject of the study. It discusses the importance of the research and the objectives of the study.

2. THEORETICAL BACKGROUND

2.1. Theoretical background of the study. This section discusses the theoretical framework of the study and the concepts that are used in the study.

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