

EASYCALC 64

 **commodore**
COMPUTER

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PREFACE

EASYCALC is a business software package that will speed up all your financial calculations; with EASYCALC and your Commodore 64, complex jobs will be easy! EASYCALC uses a work sheet that can be changed to suit your requirements and presents results in a clear bar chart for you.

You can divide the work sheet into rows and columns; the intersections between the rows and columns create thousands of positions or coordinates. You can enter numbers, words, or formulas in every one of these coordinates to calculate the information you need. You can give each coordinate an individual format using format commands.

EASYCALC lets you change, insert, and erase text, formulas, and values. The program's original appearance is very easy to change to allow for new rows and columns.

EASYCALC will sum, calculate the mean value, and manipulate the rows, columns, or coordinates you choose. Formulas are interpreted according to normal mathematical rules. EASYCALC records the formulas you use and protects them when working through a problem. If you change any given value, all other related values will be automatically recalculated, letting you correct errors or vary values to study different solutions.

USER CONVENTIONS

The Commodore 64 keyboard looks like a regular typewriter with a few extra keys; it is very simple to use. Here is a brief description of some of the conventions you should know to run EASYCALC 64.

RETURN Pressing this key transmits information to the computer's memory.

SHIFT This key is like the **SHIFT** key on a typewriter; pressing it lets you enter the top characters on double-character keys.

F7 This is the EASYCALC command key. Pressing this key gives you access to EASYCALC commands and functions. You can stop a function you have chosen by pressing this key during a program's run. The program will return to where it was before the function keys were used; if your printer is printing, it will stop.

CLR After you press the **F7** key, pressing this key will clear the current work sheet.

F3 After you press the **F7** key, pressing this key will move the cursor to a particular position. **F3** is **GO TO**; for example:

1. Press **F3**.
2. Enter "**BK150**".
3. Press **RETURN**.
4. The cursor will go to position **BK150**.

F6 After you press the **F7** key, pressing this key will cause the printer to print what is currently on the screen. The printer will print out all but the top three lines of the screen.

INST/DEL You can change information you have keyed in before you press **RETURN** by using the **INST/DEL** key.

INST stands for **INSERT**. You can add characters on a line by following these steps:

1. Position the cursor over the space where you want to begin adding characters.
2. Press the **SHIFT** key.
3. While holding down the **SHIFT** key, press the **INST/DEL** key.
4. You will see a new space provided on the screen for you to insert a character; if you wish to insert more than one character, simply hold the **SHIFT** and **INST/DEL** keys down. Spaces will continue to appear on your screen. Release the keys when there is enough room on the screen to insert the characters you need.
5. Insert the characters and continue with the program.

DEL stands for **DELETE**. You can delete characters on a line by following these steps:

1. Look at the cursor. The character immediately preceding its position will be the first character deleted when you press the **INST/DEL** key.
2. Press the **INST/DEL** key.
3. You will see the cursor move back one space and the character there will be erased.

4. If you wish to erase more than one character on a line, hold the **INST/DEL** key down and you will see characters deleted one at a time on your screen.

5. Continue on with the program.

HOME

When you press this key, the cursor moves to the upper left corner of the screen. If you press the key twice, the cursor will be in position A1.

SPACE BAR

Press the space bar before you enter a label; everything you enter will be treated as a value or formula if you do not precede the entry with a space. If you hold the **SHIFT** key while you press the space bar, you can change an earlier entry from a label to a value or a value to a label.

↑ (up arrow) Pressing this key will tell EASYCALC you would like a recalculation.

F8 When you press this key, you can edit the input line.

'n' In this manual, any character surrounded by single quotes (') denotes a single key to be pressed.

"n" Double quotes (") indicate that you must enter more than one character.

The following symbols are used in calculations:

- + addition
- subtraction
- / division
- * multiplication
- ↑ exponentiation

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Section I Tutorial

1.1. Getting Started

1. Insert the EASYCALC cartridge in your Commodore 64.

NOTE:

The Commodore 64 must be turned off before you insert or remove the cartridge or the cartridge may be destroyed.

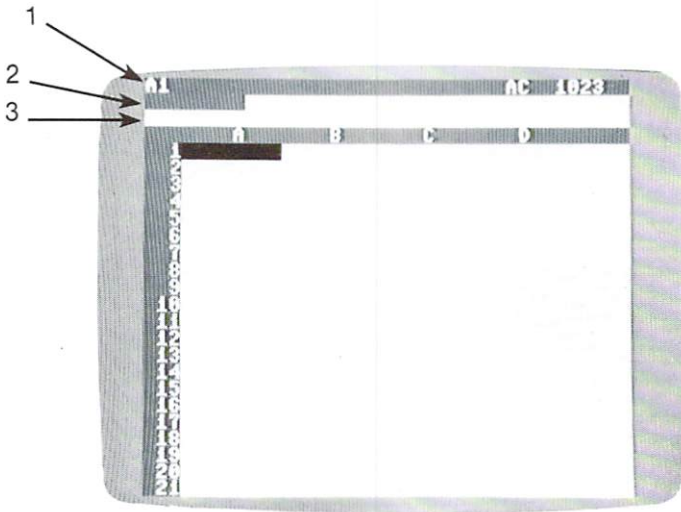
2. Turn on your Commodore 64.
3. Turn on your printer and align the paper.

NOTE:

If you are using a 1515/1525 printer, the device number must be set to 5. See the appropriate printer manual for instructions.

4. Turn on your disk drive.

After the Commodore 64 has loaded EASYCALC, you will see the EASYCALC screen displayed. Press the '**F7**' key on the right side of your keyboard and then press '**CLR**' by pressing the **SHIFT** and **CLR/HOME** keys. Next, press '**Y**'. This function clears the complete work sheet of data. Then, you will see this screen:



Now, press the 'F7' key again. Look at the previous screen; it is divided into numbered rows and lettered columns. At every intersection between a column and a row, there is a coordinate. For example, A1, C5, and J11 are all input positions. You can enter a word, number, or formula at every coordinate.

There are three lines which make up the control panel:

Line 1:

This is the command line; it shows the EASYCALC commands and the cursor coordinates.

Line 2:

This line shows the three functions which always follow the command choices on Line 1. The functions are:

- F3
GOTO. This moves the cursor to a specified coordinate.
- F6
HARDCOPY. The printer copies all but the command lines.
- CLR
CLEAR. This clears the current work sheet.

Line 2 is also used for:

- answering EASYCALC's questions, except for printer functions answered by one single character
- together with the input line will display any instructions connected with editing printouts
- to the left it shows what type of information is in the cursor position
- either VALUE (values or formulas) or LABEL (texts).

Line 3:

This is the input line. On this line the characters that you have written for a particular coordinate will be shown while the cursor is in that coordinate. It is also used for accepting input.

See Section 3.1 for a detailed description of the format of the EASYCALC screen.

1.2. Cursor Movement

At the coordinate A1, which is at the upper left hand corner of the work sheet, you will see a bar called the cursor. The writing on the screen is done along with the cursor coordinate.

The cursor can be moved using the CRSR keys and the shift key.

Press the '→' key once. The cursor has now moved to the position immediately to the right, column B, row 1. The coordinate reference in the control line has changed to B1.

Now press the '←' key; the cursor moves back to column A, row 1. Pressing the '↓' key moves the cursor down to column A, row 2. Pressing the '↑' key the cursor moves back to its original position A1.

The cursor can move across the current work sheet to column BK (63 columns), and down as far as line 254.

1.3. Screen Scrolling

When EASYCALC is loaded you will see two axes, one horizontal and one vertical. There are four columns and twenty-one rows on the screen.

By pressing the '→' key several times you will come to the last column (D). Now press the '→' key again and you will notice that column A disappears through the left edge out off the screen, while the last column on the screen is now column E. If you continue to press the '→' key, more columns will disappear out through the left edge of the screen while an equal number of columns will appear on the right hand side of the screen.

This effect is called scrolling since it gives the effect of rolling up or out a sheet of paper. If you press the '↓' key, the same effect will be seen with the movement of the rows. To get back to A1 you use the same keys but SHIFTED.

1.4. Automatic Cursor Movement

To speed up scrolling you use the same CRSR keys but, by keeping the key depressed, the cursor continues to move automatically in that direction. If you continue to press the '↓' key you will get to position A254 which is the bottom line of the electronic work sheet. Now press the '→' key until you come to position BK254. This is the bottom corner of the work sheet. This gives a total of 63 columns and 254 rows on each work sheet.

As you can see the EASYCALC electronic work sheet is much larger than it appears at first.

1.5. Faster Cursor Movement

Even with the automatic repeat function it takes some time to get to the last position on the work sheet. There is a much quicker way to move the cursor to the desired position. Press the control key, 'F7', to get the system command.

The key 'F3' is the command for GO TO. Press this. The text GO TO appears on the INPUT LINE.

Type 'A' once.

The letter "A" appears on the input line.

Now press the number '1' key followed by 'RETURN' to go to coordinate A1.

The whole screen changes to the upper left hand corner of the work sheet and the cursor is at position A1. Try some other coordinates and check that the cursor moves to the chosen positions.

The fast cursor movement works in all directions, but to move quickly to the top left of your screen you can use the HOME function.

Start by moving the cursor to coordinate M125 by using the method just described. Now if you press the 'HOME' key (not SHIFTed) the cursor moves to the upper left corner of the current screen. By pressing 'HOME' once more the cursor is returned to coordinate A1. Irrespective of where the cursor is on the screen you need only to press the HOME key twice to move it to A1.

1.6. Correcting Errors

EASYCALC has a number of features which let you correct errors; one of these is the DEL key. Suppose you type the coordinates for the movement of the cursor to A12 and you write A122 by mistake. This is one '2' too many. Just press the DEL key once and the extra 2 will disappear. Every time you press the DEL key, you will move the cursor back one position erasing any character in that position.

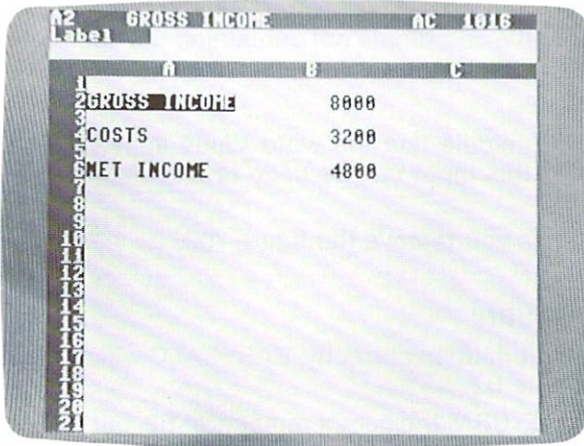
To negate a chosen command you can use the F7 key, which aborts the command and you return to the previous cursor position.

1.7. Writing on the Work Sheet

As we have seen, moving the cursor to different parts of the work sheet on the screen is very easy. Writing on the work sheet is equally straightforward.

EASYCALC must be able to differentiate between the different kinds of inputs since they can be values, labels and formulas. To do this all labels start with a depression of the SPACE key. All inputs which have not been initiated with SPACE are regarded by EASYCALC as either value or formula.

If you wish your labels to be all in capitals you can treat them as values by not pressing the space bar, then changing them to LABELS by pressing SHIFT SPACE. We are now going to construct the example shown in the following picture.



The screenshot shows a spreadsheet window titled "GROSS INCOME AC 1986". The spreadsheet has a grid with rows numbered 1 to 21 and columns labeled A, B, and C. The data is as follows:

Row	Label	Value
1		
2	GROSS INCOME	8000
3		
4	COSTS	3200
5		
6	NET INCOME	4800
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		

Now, you will write on the work sheet. Just to make sure that you have not left old data on the sheet, start by pressing

'F7' 'CLR' (this is the shifted home key) and **'Y'**

The screen will blank and the cursor will be placed at A1. Move the cursor to A2, then type:

'SPACE' (this is the space bar) **"GROSS INCOME"**

On the middle line the text Label appears. This means an alphanumeric input is required and this input will not be used in calculations. Remember, if you make a mistake while typing, use the DEL key to back up to the position you wish to correct.

When you are ready press **' → '**

On the input line the text GROSS INCOME disappears. The cursor has moved to the coordinate B2 and the words "GROSS IN" appear at A2.

Do not worry about the coordinate not containing the complete label — this will be explained further on.

Now type **"7000"**

Notice that on the middle line the word Value appears. The numeric input and this input can be used in calculations. By pressing the

'DEL' key four times you remove the figure 7000.

Now type:

"5000 + 2000" 'RETURN'

If you entered all information correctly, EASYCALC will display "7000" at coordinate B2.

When you press **'RETURN'** the cursor remains at B2, but if after making an input you press the **' → '** key the value will also be accepted, and the cursor moves directly to C2.

All the **'CRSR'** keys work in the same way and can help to make the input of data quicker.

1.8. Using Formulas and Recalculation

Move the cursor to A4 and then type:

'SPACE' "COSTS" ' → '

The words COSTS should now be at A4 and the cursor at B4. We will now write a different kind of formula.

We want expenses to be 40% of the value of income. We could write ".4*B2" — the sign * represents multiplication — but it is easier to use EASYCALC percent-function (%). It works like this: if you want to express 10 percent you just write %(10). In our example then it will be %(40).

Type the following at B4:

"%(40)*B2" 'RETURN'

In B4 the sum 2800 should be displayed and on the command line the formula %40*B2.

Move the cursor to coordinate B2 and try to type:

"8000" 'RETURN'

As you can see the screen flashes red and an ERROR message appears. EASYCALC will not let you write over an existing formula (5000 + 2000). You must first empty the position or alternately edit the formula. Blanking the position can be done with the function F7 B and editing on the input line with F8. This editing function will be explained later. We will blank the formula.

At position B2 type:

'F7' 'B'

Now type "8000" 'RETURN'

You have now inserted a new value at position B2 (8000) but B4 has also been changed (3200). The value in B4 is still 40% of the GROSS INCOME. This demonstrates EASYCALC's recalculation feature.

1.9. Labels and Values

Type the following to take you to A6.

'F7' 'F3' "A6" 'RETURN'

Now, write a formula to calculate the difference between income and expenditure. Type:

'SPACE'

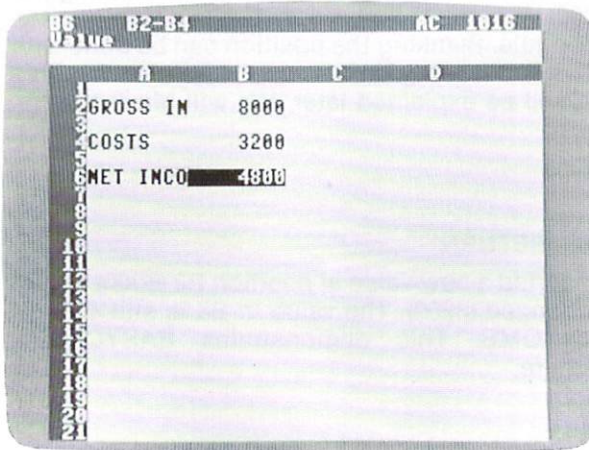
After pressing SPACE we see the text LABEL on the command line. EASYCALC looks at this first input to determine whether this is alphanumeric (LABEL) or numeric (VALUE) input. Type:

"NET INCOME" ' → '

We are now ready to calculate net income which equals gross income less costs. Type:

"B2 - B4" 'RETURN'

The answer 4800 is at B6. On the command line the formula B2 - B4 will be shown.



1.10. Formulas Through Cursor Movement

You already know how to move the cursor into different positions, write messages or titles, a number or numbers and formulas which refer to other positions. You will by now realize that hanging the values in B2, B4 or both will lead to new values in B6, thanks to the recalculation function. When you were writing the formula for Income minus Expenditure, you most probably checked to see that income was at B2 and Expenditure at B4. If you are writing a number of formulas you would have to keep careful track of positions. Due to the scrolling function, columns will disappear off the left edge of the screen.

EASYCALC has a solution to this problem. You write the formula and let EASYCALC fill in the coordinates for you. To try, first blank B6 by typing:

'F7' 'F3' "B6" 'RETURN' 'F7' 'B'

Now type:

'B2 - '

Move the cursor to B4 and press:

'RETURN'

You will see the formula completed. You can even get the first coordinate using the cursor.

With the cursor at B6, blank the position again and type:

' + '

Move the cursor to B2 press:

' _ '

Move the cursor to B4 and press:

'RETURN'

As you can see, you only have to type the arithmetic operation symbols +, -, /, * and ↑ after positioning the cursor.

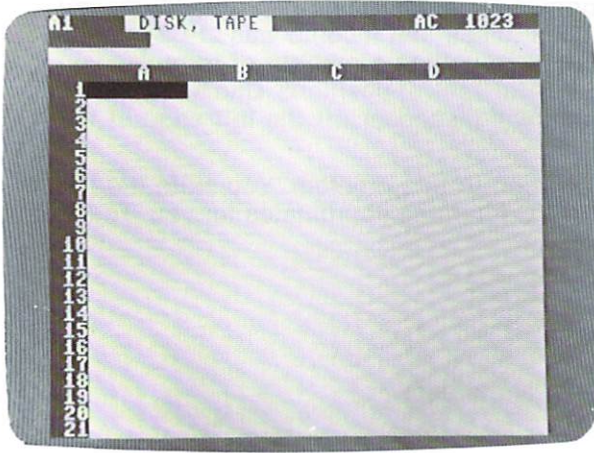
This technique of cursor movement between coordinates may seem a little strange at first but does let you omit typing the actual coordinate positions.

1.11. Saving Information on Disk or Tape

When you have your DISK/TAPE inserted press:

'F7' 'T' (T for transport).

On the command line DISK, TAPE will be displayed.



Choose unit by either pressing:

'D' or 'T'

NOTE:

A disk must be formatted before it can be used by EASYCALC.

The command line will display LOAD, SAVE.

Press 'S' for save.

We will call our example TESTEX. Enter

"TESTEX" and then press 'RETURN'

If you are using a tape recorder you will be instructed to press RECORD and PLAY.

NOTE:

When using a tape recorder the operating system in Commodore 64 will turn off the screen. It turns on again after the saving or loading is finished. The save/load procedure takes about 9 minutes.

NOTE:

The maximum number of files that can be stored on a disk is **nine**.

When your file is stored, the screen will return your work. If you want to erase the work sheet, use the **F7 CLR** function.

1.12. Editing the Input Line

The F8 key lets you correct information on the input line. When editing the following keys can be used ← , → , INST, DEL, CLR and HOME.

To demonstrate this, type the following: THIS IS A LONG STATEMENT at coordinate A1. Press:

'HOME' 'HOME' 'SPACE' and "THIS IS A LONG STATEMENT"
'RETURN'

We will now change this to: THIS IS A **VERY** LONG STATEMENT. You could use the DEL key and retype, but using F8 is quicker. Type:

'F8'

Move to the L in LONG using the → key and then use the **INST** key to create space for the word **VERY** (five spaces are needed). Type:

"**VERY**" and 'RETURN'

The text is now THIS IS A **VERY** LONG STATEMENT.

Now change the text to THIS IS A **VERY VERY** LONG STATEMENT, before you go on.

1.13. How EASYCALC Handles Data

EASYCALC uses two places for storing data:

- When working with EASYCALC your data is sent to the computer's internal memory, RAM. This memory is sufficient for storing about 1000 memory positions — that is room for a coordinate formula or a piece of text. This memory for storing data will normally be enough but if this is not enough you can easily store your work sheet on disk or on tape.
- When you have finished your work you can store the work sheet, or part of it, on the disk/tape. There you store the work sheet with reference to a file name. Of course you can call it back for further use.

Section II Using EASYCALC

2.1. Getting Data From Disk or Tape

Start by loading EASYCALC. If you already have the program loaded, press

'F7' 'CLR' and 'Y' to clear the screen.

First, take a quick look at the TRANSPORT COMMAND. Press:

'F7' 'T'

On the command line DISK, TAPE will be seen. Press either:

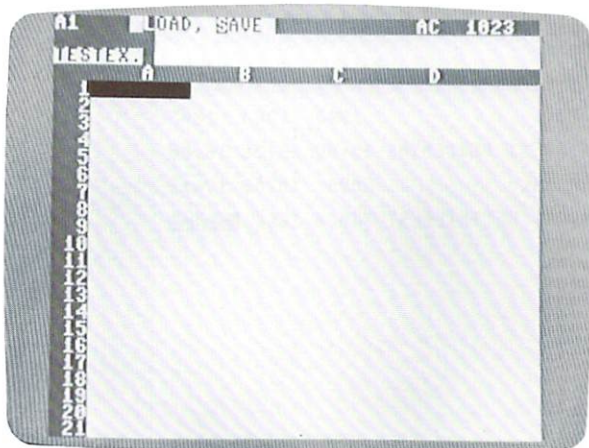
'D' or 'T'

On command line appears LOAD, SAVE.

Press 'L'

Name the file to be loaded by typing:

"TESTEX."



Press: 'RETURN'

Now, the TESTEX file will be fetched and the data placed in the computer memory.

You can now see that your data is once again on the screen.

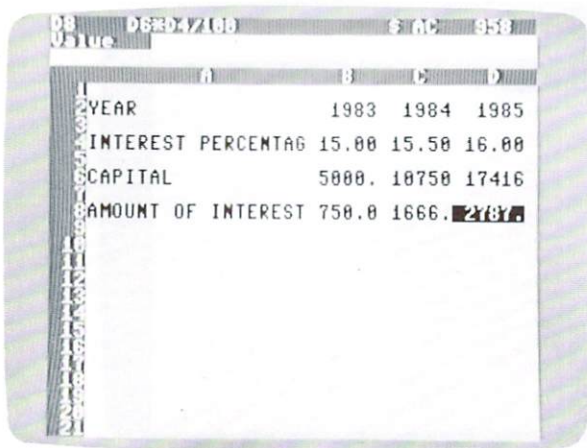
Before we continue, clear the screen using:

'F7' 'CLR' 'Y'

2.2. Interest Rate Calculation

Clear the screen.

Suppose you want to see how much money you will have accumulated after one year if you save 500 with an interest of 15 percent.

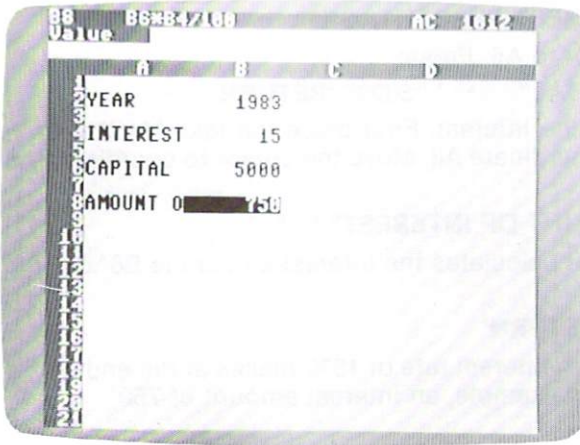


The screenshot shows a terminal window with a title bar containing 'DB 0620/200' and 'STAT 9:39'. Below the title bar, the word 'Value' is displayed. The main content is a table with four columns labeled 'A', 'B', 'C', and 'D'. The rows of the table are as follows:

	A	B	C	D
YEAR	1983	1984	1985	
INTEREST PERCENTAGE	15.00	15.50	16.00	
CAPITAL	5000.	10750	17416	
AMOUNT OF INTEREST	750.0	1666.	2787.	

2.3. Replicating a Formula

Your screen should look like this:



Now calculate total interest over a ten year period: Every year the capital will be increased by 5000 and the interest rate will increase by half a percent each year.

Start by placing the cursor at coordinate C2 and type:

"B2 + 1" 'RETURN' 'F7' 'F' 'I'

Repeat this formula to give values over ten years. The function doing this is in the Edit command. Take a look. Press:

'F7' and 'E'

On the command line you will see EDIT: C D G I M P R T. To explain this, take a look at section 5.4.

The function that you are looking for is REPLICATE. When you know which function to use, just press the character.

Choose REPLICATE by pressing:

'R'

On the screen REPLICATE will be seen on the command line and on the middle input line SOURCE RANGE C2 TO... TARGET RANGE...TO...

Press:

'RETURN' 'RETURN'

What you have done so far is to state that you want to repeat the formula in position C2. EASYCALC now wants to know where the formula is to be repeated (target range). You intend to expand our calculations for 10 years. The first year is B2, the second is C2 and the tenth will be K2. As we want to copy the formula in C2 to D2 continuing up to K2 type:

"D2" 'RETURN' and 'K2'

An alternate way to do this would be to move the cursor to D2 and press:

'RETURN'

and then move the cursor to K2 and press:

'RETURN'

When you are ready, the input line will look like this: SOURCE RANGE C2 TO C2 TARGET RANGE D2 TO K2. Press:

'RETURN'

On the middle line you will now see: ABS. OR REL.

EASYCALC is asking if we want the same formula — $B2 + 1$ — in all coordinates — ABSolute — or if the formula is to be made — RELative — to the other coordinates. In our example we want to increase by one each year, so the formula will be $B2 + 1$ then $C2 + 1$ etc. Press:

'R' for relative

Numbers will fill the coordinates D2, E2, F2 etc. If you move the cursor to the last coordinate K2 you will see 1992.

Go to C4. Now increase the interest by 0.5% per year.

Do this with the formula " **$B4 + 0.5$** " and then replicate this across to column K4.

When done correctly the interest at K4 should be 19.5.

To recap, to repeat a formula:

1. Place the cursor on the formula you want to repeat, then:
2. Press 'F7' 'E' 'R'
3. Give the SOURCE RANGE...TO...by moving the cursor to the coordinate that you want to repeat and then pressing RETURN twice (once for FROM and once for TO).

If you want to repeat an interval of coordinates, first move the cursor to the first coordinate, press RETURN, and then move the cursor to the last coordinate in the interval and press RETURN.

4. Give the TARGET RANGE...TO...that is, the range of coordinates over which you want the formula repeated.
5. State if the coordinates within the formula are unchanged (ABS.) or relative (REL.)

If you make a mistake just press the DEL key and start again.

2.4. Replicating a Chain of Formulas

To complete the calculation of interest over ten years you need two more formulas. The first formula will calculate the capital increase each year ($B6 + 5000$) plus the interest of the year before (B8). This formula is to go at C6. Press:

'F7' 'F3' "C6" 'RETURN' " $B6 + 5000 + B8$ " 'RETURN'

The answer in C6 should be 10750. The second formula will calculate the yearly interest which will be $C6 * C4 / 100$.

Cursor to C8, type:

"C6 * C4 / 100" 'RETURN'

The answer in C8 should be 1666.25. Now you have all the formulas to complete the calculations. Start by moving the cursor to C6 and then use the replicating function (REPLICATE). Press:

'F7' 'E' and 'R'

On the middle/input line REPLICATE: SOURCE RANGE C6 TO...TARGET RANGE...TO...will be seen. If you press RETURN, RETURN like last time only the formula in C6 will be replicated. This time C8 is to be included. Press:

'RETURN' (for C6)

then move to C8 and press:

'RETURN'

On the middle/input line SOURCE RANGE C6 TO C8 TARGET RANGE C8 TO...will be seen. Our replicating interval is between D6 and K6.

Move the cursor to D6 and press:

'RETURN'

Now give the end coordinate for the TARGET RANGE by typing:

"K6" 'RETURN'

State if the formula is unchanged or relative. In our case it is relative. You will have to press R for every coordinate. Press:

'R' 'R' 'R' and 'R'

You will now see all the formulas and values in all these coordinates. Check that in K6 you have 114700. and in K8 22366.5.

By now EASYCALC has done quite a lot of work for you, but some of the figures are a little difficult to read. We can improve this by reformatting the screen.

2.5. Screen Formatting

Type:

'F7' 'G' 'F' '\$'

The letters mean GLOBAL FORMAT and \$ means two decimal places. This is explained in detail further on in the manual. Press:

'F7' 'F3' "B8" 'RETURN'

Now take a look at the following picture.

	A	B	C	D
YEAR	1983	1984	1985	
INTEREST	15.00	15.50	16.00	
CAPITAL	5000.00	10750.0	17416.3	
AMOUNT	0	1666.25	2786.60	

EASYCALC has rounded off the values, where there is place enough, to two decimals. This does not mean that the values used to calculate in the memory are rounded up; they are still computed with twelve digits. You will see that the figures in row 2 are unchanged. This is because the individual formats always keep a higher priority than the global one.

Before going any further, reset the format to global to show the values as they were to begin with. Press:

'F7' 'G' 'F' 'G'

Then change the screen back to a two decimal format.

2.6. Fixing Titles

Move the cursor to B1.

The values for each year are easily seen but not the titles. To improve this, press:

'F7' and **'G'**

On the command line GLOBAL: C F will be seen. Press:

'C' to change the column width.

Now COLUMN WIDTH will be seen on the command line and EASYCALC is waiting for a WIDTH on the input line. Choose 18 for width. Type:

"18" and **'RETURN'**

The texts, except for interest percentage, are now visible in full.

Use **'HOME'** **'HOME'** to go to A1, then press:

'F7' and **'E'**

on the command line EDIT: C D G I M P R T will be seen. Choose T for TITLES. Press:

'T'

This function fixes a column on the left hand edge of the screen. To remove the additional A column use the → to move E onto the screen. For this title function to work, the column to be fixed must be at the left hand edge of the screen.

As you can see EASYCALC readjusts the rest of the columns irrespective of the title width making sure there will always be three columns shown on the screen. Now readjust the column widths (B and so on). Go to B1 and type:

'F7' **'G'** **'C'** **'6'** and **'RETURN'**

Try moving the cursor on the screen. As you see you cannot move the cursor to the fixed A column.

You can write on the second A column, however, and values or texts inserted there will be reproduced in the fixed A column also. You can quickly move the cursor to the unfixed A column by using the HOME function.

Before proceeding remove the TITLES function and set normal column width. Type:

'F7' **'L'** **'F7'** **'G'** **'C'** **'8'** **'RETURN'**

2.7. Fast Recalculation

With the help of the replicating function, you have written a number of formulas and values. How are these related to each other?

First go to B2, B4 or B6. There is only a value in each of these coordinates. If you go to B8 or any other coordinate you will see that these are dependent on one or several other positions. This means that if you go to B4 and change the interest rate all the values that are related to B4 will also change. Try changing B4 to 20 and see what happens.

Move the cursor to B4 and type:

“20” ‘RETURN’

EASYCALC will recalculate all the other values.

Change B4 back to 15 before you go on.

2.8. Adjusting the Column Width

This is a function that can help avoiding the need to scroll the screen when you are using only a few columns. Move the cursor to A1 (use the HOME function). When you are ready press:

‘F7’ ‘G’ ‘C’ ‘6’ and ‘RETURN’

As you can see, you now have more columns on the screen since every column is smaller.

You can use this Global command whenever you want to, and choose a working size between 5 and 18 characters per column.

When you have only 6 characters per column you will see that the text entries lose some characters. If you move the cursor to positions A4 or A8 you will see on the command line that all the words are still there, even though they are not shown on the screen. All the texts are available as written, and if you wish you can format the screen to get to see it all.

Section III EASYCALC Features

3.1. Formula Repetition

Start by loading EASYCALC. Press:

'F7' 'CLR' 'Y' to clear the screen, then change the column width to 7.

In this example we will create a table which contains ten columns and ten rows like this picture.

COLUMN	1	2	3	4	5
ROW 2	200	200	200	3000	3000
ROW 4	400	400	400	400	400
ROW 6	600	600	600	600	600
ROW 8	800	800	800	800	800
ROW 10	1000	1000	1000	1000	1000
SUM:	3000	3000	3000	5000	5000
PERCENT	6	6	6	12	12
TOTAL	49600	49600			

First mark out the ten columns which start at column B1. One way is starting in column B with 1, inserting 2 for column C etc., but this is unnecessary. You can do it using the replicate function.

Write COLUMN in A1 and 1 in B1 by moving the cursor to coordinate A1 and then press:

'SPACE' "COLUMN" ' → ' '1'

Move cursor to C1. Now write a formula which can be replicated. Enter the formula $1 + B1$ in C1. Type:

"1 + B1" 'RETURN'

In C1 the figure should be 2, but on the command line you see 1 + B1. Now we have created a formula to use. Next, press:

'F7' 'E' 'R' (for Replicate)

Since just C1 is to be replicated you press:

'RETURN' 'RETURN' ' → '

Now you give the TARGET RANGE by pressing:

'RETURN' 'K1' and **'RETURN'**

Here you are asked if the formula is ABSolute or RELative. It is relative. Press:

'R'

To draw a line under the column numbers, move the cursor to A2 and press:

'F7' '-' '-'

You have now underlined the A column. By replicating this it can go over the entire table. Press:

'F7' 'E' 'R' 'RETURN' 'RETURN' ' → '

'RETURN' "K2" and **'RETURN'**

If you have it right your sheet should look like this.



3.2. Replicating Values and Texts

Move the cursor to A4 and then type:

'SPACE' "ROW 2" ' ' ' "150" and 'RETURN'

Fill all the columns in ROW 2 with 150 by using the replicate function. Press:

'F7' 'E' 'R' 'RETURN' 'RETURN'

"C4" 'RETURN' "K4" and 'RETURN'

Is this the best way if you later want to change the figure in every column? No, because if you want to change all the columns you will have to use the replicate function each time. It is much easier to let the values relate to each other from the beginning. This is done as follows:

'F7' 'F3' "C4" 'RETURN' "B4" 'RETURN'

'F7' 'E' 'R' 'RETURN' 'RETURN'

"D4" 'RETURN' "K4" and 'RETURN' 'R'

It still shows 150 but if you move to D4 you will see C4 on the command line. If you continue to the right, you will notice that the coordinate is related to the coordinate before. This means that you can change one value and all the dependent coordinates will have that new value as well.

'F7' 'F3' "B4" 'RETURN' "1000" 'RETURN'

Now, change coordinate E4 to K4 to the value 3000. This is done the same way as before. Enter 3000 in coordinate E4 and the rest is done by EASYCALC. Remember that the coordinate is protected and you have to use the Blank function. Look at the command line where 3000 is seen and then go to F4. Do you see E4 written here? As you can see, E4 is a start value for the coordinates to K4.

What happens if a new value is placed in coordinate B4? Try with 200:

'F7' 'F3' "B4" 'RETURN' "200" and 'RETURN'

Only coordinates B4 to D4 are changed. This is because E4 is not related to D4. If you wanted all the values to be changed, you would have to first of all place D4 in coordinate E4, but do not do this in this example.

Now place more values in the table.

Move the cursor to A6 and press:

'SPACE' "ROW 4" ' → ' "400"

Move the cursor to A8 and press:

'SPACE' "ROW 6" ' → ' "600"

Move the cursor to A10 and press:

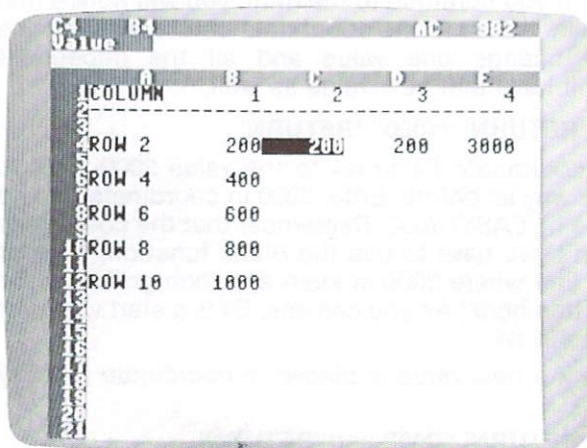
'SPACE' "ROW 8" ' → ' "800"

Move the cursor to A12 and press:

'SPACE' "ROW 10" ' → ' and "1000" 'RETURN'

Move the cursor to C4.

At this stage your screen should look like this:



C0	B	C	D	E
COLUMN	1	2	3	4
ROW 2	200	200	200	3000
ROW 4	400			
ROW 6	600			
ROW 8	800			
ROW 10	1000			

Now replicate the rest of the values in the remaining nine columns with the value in column B.

3.3. Replicating a Column

Staying at coordinate C4, you will see B4 on the command line. Relatively C4 is connected to B4 as C6 is to B6 etc. Write the following at C4:

'F7' 'E' 'R' 'RETURN' 'RETURN'

"C6" 'RETURN' "C12" 'RETURN' and 'R'

If you have followed the instructions correctly you will have the same values in COLUMN 2 as in COLUMN 1.

The NA message stands for Not Available. Erase those positions which contain NA.

3.4. Replicating a Column Several Times

Now you have formulas for every ROW. The next step is to replicate these formulas over the rest of the table. This time, give the whole interval which will be copied as the Source Range.

Move the cursor to C6 and then type the following:

'F7' 'E' 'R' 'RETURN' "C12" 'RETURN'

"D6" 'RETURN' "K6" 'RETURN'

'R' 'R' 'R' and 'R'

3.5. Sum Function

This function will total all the values in every COLUMN. First, separate the total line from the values by underlining ROW 10 in the table.

Move the cursor to A13 and press:

'F7' '-' '-'

'F7' 'E' 'R' 'RETURN' 'RETURN' ' → ' 'RETURN'

"K13" and 'RETURN'

Enter the text SUM: in coordinate A15 by writing:

'F7' 'F3' "A15" 'RETURN' 'SPACE' "SUM:" and ' → '

First total COLUMN 1. As you have seen, you can easily replicate the formula later to the other columns. The cursor should be in coordinate B15. Type:

"SUM(B4:B12)" 'RETURN'

Within the parentheses, the coordinates are to be totalled. Now the sum for COLUMN 1 — 3000 — is shown. The rest of the totals are obtained by replicating. Stay in coordinate B15 and type:

'F7' 'E' 'R' 'RETURN' 'RETURN' ' → ' 'RETURN'

"K15" 'RETURN' 'R' 'R'

All the COLUMNS have individual totals and your screen should look like this:

COLUMN	A	B	C	D	E
ROW 2		200	200	200	3000
ROW 4		400	400	400	400
ROW 6		600	600	600	600
ROW 8		800	800	800	800
ROW 10		1000	1000	1000	1000
SUM:		3000	3000	3000	5000

Now, create a sum total. Type:

'F7' 'F3' "A19" 'RETURN' 'SPACE' "TOTAL"

' ↓ ' "SUM(B15:K15)" and 'RETURN'

In coordinate A20 you will now see 49600. It is as easy to get the sum total of these numbers without first producing a row of totals which are themselves added together. EASYCALC can sum an area — in this example the matrix with the top left corner B4 and the bottom right hand corner K12. Try this method.

Move the cursor to A21 and type:

"SUM(B4:K12)" 'RETURN'

You should now have the same answer as in A20. Now, show every SUM as a percentage of this TOTAL.

Move the cursor to coordinate A17 and type:

'SPACE' "PERCENT" ' → ' "B15/A21" and 'RETURN'

In COLUMN 1 the answer is 0.0605, ie approximately 6%.

3.6. Formatting a Single Coordinate

The value at B17 — 0.0605 — is difficult to read; so many decimal places are unnecessary. The usual format for EASYCALC is maximum precision (M), but integer format is best here. First, multiply the formulas at B17 by 100 and then format it to an integer value. Move the cursor to B17 and type:

'F8'

Then, edit the formula to read "B15/A21*100"

When ready, type:

'RETURN' 'F7' 'F' 'I'

There should now be a 6 in B17. The title TOTAL is not directly over its values because EASYCALC normally positions text on the left and numeric values to the right. You can adjust TOTAL to its values by formatting it.

Move the cursor to A19 and type:

'F7' 'F' 'R'

Label R	A	B	C	D	E
COLUMN	1	2	3	4	
2					
3					
4	ROW 2	200	200	200	3000
5	ROW 4	400	400	400	400
6	ROW 6	600	600	600	600
7					
8	ROW 8	800	800	800	800
9					
10	ROW 10	1000	1000	1000	1000
11					
12					
13					
14					
15	SUM:	3000	3000	3000	5000
16					
17	PERCENT	6			
18					
19	TOTAL				
20					
21					

A19 49600

3.7. Replicating a Format

Move the cursor to B17. We will now replicate the formula for SUM as a percent of TOTAL. Write:

'F7' 'E' 'R' 'RETURN' 'RETURN' ' → '

'RETURN' "K17" and 'RETURN'

To answer the question ABSolute OR RELative, think of how you want to treat the formula $B15/A21*100$. The first value at B15 must change as you require different sums each time, but A21 (total) remains the same. Press:

'R' (for relative at B15) and 'A' (for absolute at A21)

You should now have percentage values in the rest of the columns. As you can see, the formatting to integer value has also been replicated.

3.8. Replicate Function for Copying a Row or Column

Move the cursor to A13.

Now, draw a line under the percentage values. This time you will use a different method. Press:

'F7' 'E' 'R' 'RETURN' "K13" 'RETURN'

"A18" 'RETURN' "A18" 'RETURN'

This uses the replicate function when a row needs to be copied. It works the same way when copying a column.

3.9. NA (Not Available) Function

Suppose coordinate B4 is for the time being, unknown. You can make use of the NA function — Not Available.

Move the cursor to B4 and type:

'F7' 'B'

You will see a red NA in all the coordinates which are related to B4.

Now erase B4 with the BLANK function.

Place the following formula at B4:

"1/0" and 'RETURN'

Now you get a red ERROR instead of NA. ERROR means exactly that — in this case a division by zero error has been done.

When a formula contains references to one or more coordinates which have a value of zero, an ERROR answer is given. If the formula contains references to another coordinate which is a LABEL, then NA will be shown. NOTE that these messages are red.

Now, blank B4 and place a value there.

3.10. Inserting and Erasing Rows and Columns.

If you want to insert an extra row in your table, eg ROW 12, first move to A13. Type:

'F7' 'E' 'I' 'R'

I is for insert and R is for row. This creates an empty row at row 13. All the rows under 13 are moved one row down.

Do this insertion once again.

Now you have a place for ROW 12. Move the cursor to A14 and type:

'SPACE' "ROW 12" 'RETURN'

To remove the line you have inserted and to restore the table to its original appearance, move the cursor to A13 and press:

'F7' 'E' 'D' 'R'

After WORKING message is erased, press:

'F7' 'E' 'D' 'R'

D stands for DELETE. Using these functions you can either insert or delete both columns and rows. If you insert a column all the other columns are moved one step to the right.

The formulas that are affected by insertion or deletion are adjusted. When deleting a row or column all formulas that contain references to the deleted row or column become LABELS. Those coordinates that then refer to these LABELS will show NA. You can then edit these coordinates using the edit function, F8.

3.11. Moving Matrices With the Move Function

You are now going to move the matrix which contains the 2nd, 3rd and 4th values in ROW 6 and ROW 8. Move the cursor to coordinate C8 and press:

'F7' 'E' 'M' 'RETURN'

You will see MOVE on the command line and FROM C8 to C8 on the input line.

The matrix to be moved is defined by the coordinates C8 and E10, the upper left hand edge and bottom right hand corner, respectively. Continue by giving the bottom corner coordinate. Type:

"E10" 'RETURN'

Now give the coordinate to which the whole matrix is to be moved. With the cursor at C19 press **'RETURN'**

1	A	B	C	D	E	
2	1	1	1	1	1	
3	2	200	200	200	3000	
4	3	400	400	400	400	
5	4	600				
6	5	800				
7	6	1000	1000	1000	1000	
8	7					
9	8					
10	9					
11	10					
12	11					
13	12					
14	13					
15	14	SUM:	3000	1600	1600	4400
16	15	PERCENT	7	4	4	10
17	16					
18	17	TOTAL		600	600	600
19	18	49600				
20	19	45400		800	800	800
21	20					

Change the value in B8 or B10. As you can see, EASYCALC calculates the matrix just as if it is in the TABLE.

Before continuing, try moving some other matrices. This method works just as well as moving single rows and columns.

3.12. Recalculation Order

On many occasions now you have seen EASYCALC recalculate values after every new input, for instance when you change the values in the TABLE. Recalculation in EASYCALC works by starting with the upper left corner and then calculating down toward the lower right corner.

Each formula is calculated once only, unless you order a second recalculation by pressing the up arrow key. This means that coordinate A1 cannot be a formula that refers to other coordinates. Formulas must be stored from the upper left hand corner right down across the screen till you reach the bottom right corner.

EASYCALC can look at the formulas either column by column or row by row. In the right corner on the command line a C is displayed. This is the RECALCULATION INDICATOR and indicates the order of calculation — C for column or R for row. Normally EASYCALC's recalculation is by column and calculates A1, A2, A3...B1, B2, B3...etc.

In most circumstances this has no effect on the results of recalculations, but there are instances when the correct result is dependent on the direction of the recalculation and it is important to know when this arises.

At this time, save your TABLE on a disk or tape before clearing the screen. Refer to sections 1.11. and 5.7.

When the example has been saved type the following:

'F7' 'CLR' 'Y' "10" ' → ' "10 + A1" 'RETURN'

'F7' 'E' 'R' 'RETURN' 'RETURN'

"C1" 'RETURN' "D1" 'RETURN' 'R'

'F7' 'F3' "A3" 'RETURN' "2*D1"

When you write formulas think of how the coordinates are dependent of each other. You will most probably see that this must be calculated row by row.

Test this by entering in A1 a value of 2. Press:

'HOME' '2' and 'RETURN'

Try pressing the ' ↑ ' key once and study the screen.

This key depression will order recalculation and now A3 is correct.

If you change the recalculation order by pressing:

'F7' 'O' 'R'

and place the value "10" in A1 you can see that it will calculate properly this time.

The conclusion from this experience is that you should construct models so that they either lie in rows or columns but, if possible, not in both directions. If you are uncertain type \uparrow several times just to be sure your model has no "forward" or "circular" references.

3.13. Reference Order for Formulas

The formula in A3 is an example of "Forward Reference" because it refers to the coordinate which "normally" is calculated before B1.

In some case the "Forward Reference" is built on others; to get the result press the \uparrow key several times.

"Circular references" are impossible to calculate no matter how many recalculations done.

Before continuing, reset recalculation order to columns.

Clear the screen.

Now we will place the formula, $10 + D2$, in coordinates B2 and D2. With the cursor at B2 type:

"10 + D2" 'RETURN'

As a reference to an empty coordinate the answer is NA. This is to help you to avoid and discover eventual mistakes. Type:

' \rightarrow ' ' \rightarrow ' "O" 'RETURN' " $10 + D2$ " and 'RETURN'

This kind of formula is called a self-reference. You should always insert a value — even if it is zero — at a coordinate before creating a self-reference formula, otherwise the answer will always be shown as NA.

Each time you undertake a further calculation — each time the \uparrow key is pressed — a new value will be shown.

Section IV Worksheet Capabilities

4.1. More About Formats and Values

Load EASYCALC. If you have not already done so, clear the screen.

Write the following:

'F7' 'F3' "B10" 'RETURN'

"54.456" 'RETURN'

'F7' 'E' 'R' 'RETURN' 'RETURN'

" → " 'RETURN' " → " and 'RETURN'

You now have the same values in the three coordinates B10, C10 and D10 and as you have not given any format command all three coordinates have the normal global format. Move the cursor to B10 and press:

'F7' 'F' 'I'

'F7' 'F' 'L' ' → '

'F7' 'F' '\$'

'F7' 'F' 'L'

You have now formatted B10 to integers, positioned on the left, and C10 to 2 decimal places, also positioned to the left.

Alongside VALUE on the middle line you will see "\$L" for the format of the coordinate in the current cursor position. The dollar sign \$ represents two decimal places and L the left hand positioning. EASYCALC always leaves an empty position at the beginning of each column to leave a vertical space between them.

Now press:

'F7' 'G' 'F' and 'I'

to change the global format to whole numbers — integer. The only coordinate which was affected was D1 because the others were individually formatted. Local formats always take priority over global ones. At the right hand edge of the Command line you will see "I" indicating the Global Format for the current work sheet.

With the cursor in B10 press:

'F7' 'F' and 'M'

This has deleted the integer value and returns it to its original form — you have the value 54.456 again. The Maximum Precision format does not affect the left adjustment — M format is only concerned with the way a number is rounded, not its position. Now do the same for C10. Move the cursor to C10 press:

'F7' 'F' and 'M'

Change the global format back to normal format by pressing:

'F7' 'G' 'F' and 'G'

How the numbers are presented depends on the current column width. Type:

'F7' 'G' 'C' '6' 'RETURN'

You have the value 54.46 in all the coordinates. EASYCALC always leaves a blank position to the left while showing as many numbers as possible within the column width.

4.2. Large and Small Values

Clear the screen. Note that earlier global commands are erased, giving normal column width (8).

Enter 9999999 (seven 9's) in A1. Press:

"9999999" 'RETURN'

This is the largest value to be shown in an 8 character wide column.

Place the formula $1 + A1$ in coordinate B1. Go to B1 and press:

"1 + A1" 'RETURN'

The value 10000000 is written as 1E7 instead, which is 1 times 10 to the power of 7.

Place .0000001 in C1. Move the cursor to C1 and press:

".0000001" 'RETURN'

Here the value $1E-7$ means 1 times 10 to the power of -7 .

When a value is given, the column width is taken into consideration. If it is too small or too large the value is shown. Try to increase the column width. Type:

'F7' 'G' 'C' "11" and 'RETURN'

As you see the values are now shown in full.

4.3. Mathematical Priority

So far we have had relatively simple formulas in our examples. If a formula contains more than one function you must understand in which order the formula will be calculated.

EASYCALC always calculates according to normal mathematical laws. In the following list, 1 has the highest priority, 11 the lowest.

- 1 Higher mathematical function references such as MIN, MAX, ABS and INT
- 2 Functions and characters within parentheses
- 3 Exponent
- 4 Multiplication and division * and /
- 5 Addition and subtraction + and -
- 6 Less than and greater than < and >
Not equal to and equal to < > and =
Equal to or greater than = >
Equal to or less than = <
Greater than or equal to > =
Less than or equal to < =
- 7 NOT
- 8 AND
- 9 OR
- 10 THEN and ELSE
- 11 IF

In general, the higher mathematical functions are followed by parentheses containing the range of the expression. The colon character is used to describe the areas and each expression within the parentheses is differentiated with a comma.

4.4. A Small Matrix

Start by clearing the screen. Now put in a series of different values which you can use in the tests which follow of the higher mathematical functions and priorities.

Move the cursor to B5; type:

"20" ' → ' "2.25 + B5" 'RETURN'

'F7' 'E' 'R' 'RETURN' 'RETURN' ' → ' 'RETURN'

"F5" 'RETURN' 'R'

Move the cursor to B5; type:

'F7' 'E' 'C' 'RETURN' "F5" 'RETURN' "B10" 'RETURN'

Move the cursor to D5; type:

'F7' 'E' 'C' 'RETURN' "F5" 'RETURN' "B6" 'RETURN'

Move the cursor to B7; type:

"500" ' ↓ ' "50" 'RETURN'

Move the cursor to B5; type:

'F7' 'E' 'R' 'RETURN' "B8" 'RETURN' "E6" 'RETURN'

"F6" 'RETURN' 'A'

Move the cursor to E8; type:

'F7' 'E' 'C' 'RETURN' "F10" 'RETURN' "C7" 'RETURN'

Move the cursor to B9; type:

'1' 'RETURN' 'F7' 'G' 'C' '6' 'RETURN'

Your screen should look like this:

	B	C	D	E	F	G
1	20	22.25	24.5	26.75	29	
2	24.5	26.75	29	20	20	
3	500	500	500	24.5	24.5	
4	50	50	50	500	500	
5	1	26.75	29	50	50	
6	20	22.25	24.5	26.75	29	
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						

4.5. Formatted Printouts

Format a printout for this work sheet. Press:

'F7' 'E' 'P'

P is for PRINTING. Here you will choose between formatted and direct printing.

- Direct printing lets you choose a part of the work sheet or the entire work sheet to be printed in the same format as shown on the screen.
- Formatted printing lets you decide the number of rows and the width of each of the columns varying between 1 to 255 characters wide.

Choose formatted printout; press:

'F'

All the lines of a work sheet — 254 lines — can be printed, but as this example contains only 10 write this:

'1' 'RETURN' "10" 'RETURN'

Now, decide which columns to print. Press:

'C' 'RETURN' "10" 'RETURN'

For the other four columns you can have varying widths. Remember the smallest width allowed is 1 character wide. After entering all the column widths (do not forget the B column) press RETURN once again, this tells EASYCALC it can start the printout.

When ready, the work sheet will be printed according to your format. Make sure your printer is connected, switched on, and has paper!

Note that the columns are in the exact order as they were entered in the FORMAT command.

4.6. Minimum and Maximum Values

Start by searching for the smallest value in column E. Move the cursor with the 'HOME' key to A1 and then type:

'MIN(E1:E10)' and 'RETURN'

In A1 '20' is seen, and it is easy to check that this is the column's smallest value. The colon is used to split the start and end values for the area which is to be searched. The blank coordinates within E1 and E4 created no problems.

Now we look for the largest value within the matrix. Type:

**' → ' "MAX(B5:B10,C5:C10,D5:D10,E5:E10,F5:F10)"
'RETURN'**

Here you see how the comma is used to separate the different expressions.

4.7. Count and Mean Functions

The COUNT function counts the number of coordinates containing values or valid formulas within the row/column or area.

Move the cursor to A5 and press:

"COUNT(B1:B10)" and 'RETURN'

The answer is 7.

The MEAN function calculates the average value of the given row/column or given area.

Move the cursor to A7 and press:

"MEAN(F5:F9)" 'RETURN'

The mean of 29, 20, 24.5, 500 and 50 should be 124.7. You can check this by moving to A8 and typing:

"SUM(F5:F9)/5" 'RETURN'

This answer is also 124.7.

4.8. Absolute and Integer Functions

The ABSOLUTE function, ABS, works with an expression, and gives the value's absolute value. To get the absolute value of - 150 write:

"ABS(- 150)"

The answer is 150.

The INTEGER function works like the ABS with expression. INT function gives the integer part of a value. If we have 26.75 in C6 and 500 in C7 we could have the integer sum in A20 as follows:

Move the cursor to A20 and type:

"INT(C6 + C7)" 'RETURN'

The answer will be 526. The INT function does not round off the numbers compared to the formatting function F7 F1 which does.

4.9. IF-THEN-ELSE Function

IF is always followed by ELSE. With this function the following tests can be accomplished.

IF the value in coordinate B5 is larger than the value in coordinate F10 THEN 1 is placed in coordinate A3 or ELSE the value at B5 will be placed in A3.

Move the cursor to A3 and type:

"IF (B5 > F10) THEN (1) ELSE (B5)" 'RETURN'

Since the value in B5 is less than the value in F10, the answer is 20 as this is the value in B5.

NOTE:

When using this function and some of the conditions are not available, NA, the answer will be NA even if the true condition in itself is correct.

4.10. True and False Statements

These are expressions which impose certain conditions that must be passed and cleared before further calculation can be undertaken. This can be useful, for example, in a calculation of interest which is dependent on the amount saved when 1000 will attract 11% while 2000 will get 13% and so on. By using the IF...THEN...ELSE... structure, you can place conditions on coordinate values.

(IF A1 = 1 THEN C1 ELSE 2)*D1

In the example above we see that if A1 is equal to 1 then D1 will be multiplied by C1. If A1 is not equal to 1 then D1 will be multiplied by 2. When the statement is true then the value or expression after THEN will be taken as this represents truth, while a false statement will be given the section after ELSE. You could also have a condition within the condition e.g.:

F1*(IF A1 = 1 THEN 1 ELSE (IF A1 = 2 THEN 2 ELSE 3))

This shows that if A1 is equal to 1 then F1 will be multiplied by 1 otherwise it will be tested by the next condition. You must always have the ELSE at the end otherwise EASYCALC will show that an error has been made. Write the following:

IF A1 THEN 2*3/A2 (true) ELSE 3 + B2 (false)

Now if A1 is blank or is a text, it will have the value NA so as to indicate that there is not value in it. But, if A1 had the value 0 then it will do 3 + B2 as the statement is false. All other values will lead to a true statement.

If you should get FORMULA TOO COMPLEX as a reply, then you will have to break up your expression as EASYCALC cannot calculate it. Within the IF...THEN...ELSE structure you can use AND, OR, and NOT to change the conditions. NOT will change the true/false statement so that it will be false/true instead.

When using AND both expressions must be true to make the statement true:

IF A1 = 1 AND B1 = 10 THEN 100 ELSE 5

A1 = 1	T	T	F	F	(T = TRUE F = FALSE)
B1 = 10	T	F	T	F	
Result	100	5	5	5	

When using OR both or one of the expressions must be true to make the statement true:

IF A1 = 1 OR B1 = 10 THEN 100 ELSE 5

A1 = 1	T	T	F	F
B1 = 10	T	F	T	F
Result	100	100	100	5

NOT, AND, OR are the lowest in the mathematical priority. NOT is higher than AND while AND is higher than OR.

4.11. Random Function

The RND random number function is used to produce random numbers. If you want a random number which lies between zero and 100 in coordinate G20, type:

'F7' 'F3' "G20" 'RETURN' "RND(100)" 'RETURN'

The random value will stay in the coordinate until you place another value there.

If you need a random number between 1 and 100 that changes each time a recalculation is done then use the function referring to a coordinate like this: in G19 type

"99" 'RETURN'

Cursor to G20, blank the old formula and insert the new one by typing:

'F7' 'B' "1 + RND(G19)" ' → '

Each time a recalculation is undertaken a new value for the random number between 1 and 100 will be given at G20. Try this several times using the \uparrow key for the recalculation.

4.12. Percent Function

This function is useful to easily express percentage values, eg to express 15% you could write 0.15 but, with the percent function you just write "%(15)".

To get the percentage of a formula eg F5 + F6, type:

"%(F5 + F6)" 'RETURN'

In the first example you do not need the parentheses — you could just write %15. In the other you have to have them; otherwise, the function will only operate on the first value.

4.13. Manual and Automatic Recalculation

As you most probably noticed in a number of your earlier examples, EASYCALC takes time when recalculating a value. Every value is calculated to up to twelve positions and it can take a number of seconds to recalculate many values over a large sheet. Often, you do not need a recalculation for every new value when you make an entry, but only when all the values have been entered.

EASYCALC lets you choose between automatic and manual recalculation. Automatic recalculation is set when you start up EASYCALC.

If you want to avoid recalculation during every new input, press:

'F7' 'R' 'M'

You can enter as many new inputs as you want without being interrupted by recalculations. After you have changed a number of values in the matrix you can do a recalculation by pressing the up arrow key. When you have finished all your inputs, go back to Automatic Recalculation by pressing:

'F7' 'R' 'A'

As you see a recalculation is done.

4.14. Graphics on the Screen and Printer

EASYCALC's graphic function gives you a bar chart which you specify.

The graphic function works in such a way that the row or column which is to be represented is determined by the current cursor coordinate.

Start by moving the cursor to A17 and then type:

"90" ' → ' "100" ' → ' "115" ' → ' "SUM(A17:C17)"

Now give each of these four coordinates a color:

Move the cursor to A17 and type:

'F7' 'E' 'G' 'R'

EASYCALC now clears the screen and asks for LOWER and UPPER LIMIT. This is the scale interval within which the bars will lie. Since your values are 90, 100, 115 and 305 a range 0 to 500 will be fine. Type:

'0' 'RETURN' "500" 'RETURN'

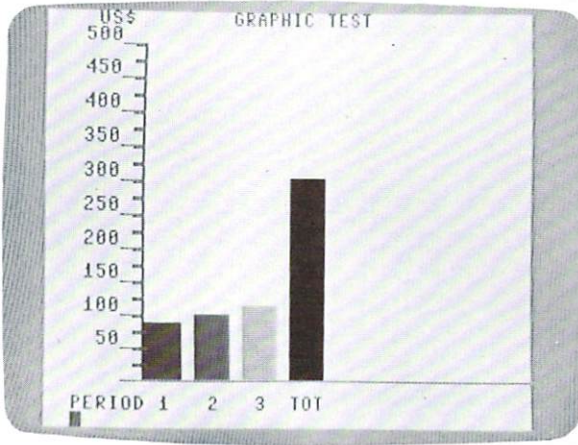
You will now be asked to title your bar chart with a maximum of 39 characters. Then press:

'RETURN'

To print press:

'F6'

Now you will be given the option of adding two more rows of text to the printed version of the chart. When you have input the data for the first you can move to the second line with the **'RETURN'** key.



When you have completed titling your chart press:

'RETURN'

and the printout will start.

- 4 Error codes. One character is used for User errors and three for Formula input errors (See Appendix).
- 5 AC, AR, MC and MR gives type of recalculation. For example, AC indicates automatic column-wise recalculation, MR manual row-wise.
- 6 Shows available memory space by indicating the number of memory positions remaining to use. A value uses a maximum of one position, but the number of memory positions used for formulas and labels depends on their length.
- 7 Shows the current cursor coordinate.
- 8 Here is shown the type of coordinate at the current cursor position: either LABEL (letters) or VALUE.
- 9 These characters tell you the format of the current coordinate position: M for maximum precision, I for integer, \$ for two decimal places, R for right adjusted and L for left adjusted. The current format remains with the coordinate until changed or erased.
- 10 The same characters as above indicate the global format for the current work sheet. Like the local format it remains with the current work sheet until it is changed or erased.
- 11 X-axis shows the columns labeled alphabetically from A to BK (63 columns).
- 12 Y-axis shows the rows numbered from 1 to 254.

5.2. SYSTEM Command: B E F G L O T R -

B:Blank Cancel contents of cell under cursor
E:Edit command For screen and printer
F:Format command Individual cell
G:Global command Global format and column width
L:Leave Title
O:Order Of recalculation
T:Transport command .. For Disk/Tape communication
R:Recalculate Automatic or manual
-: Automatic repetition of characters
at cell under cursor

5.3. TRANSPORT Command: L S

L:DISK/TAPE Load File to computer
S:DISK/TAPE Save File on disk/tape

5.4. EDIT Command: C D G I M P R T

C:Copy Data area to another area
D>Delete Row or column
G:Graphic Bar chart
I:Insert Row or column
M:Move Data area to another area
P:Print Worksheet or user-defined format
R:Replicate Data area to other areas
T:Title Protects a title in the left column

5.5. FORMAT Command: C G M I \$ L R

C:Color Select color
G:Global... Cell Sets global format
Global Sets normal format
M:Maximum Sets maximum precision display
mode
I:Integer Sets integer display mode
\$: Sets 2 decimal display mode
L:Left Left-justifies field
R:Right Right-justifies field

5.6. GLOBAL Command: C F

C:Column width Sets global width in all columns
except in protected title-column
F:Format Sets given format in all cells

5.7. Save a File on Disk/Tape

This function is used to store work on the disk/tape. The total contents of the work sheet are stored, under its specific name, on the disk/tape.

The contents of the RAM are still left intact after the file has been saved so that you can continue working with it.

To save your file, start by typing:

'F7' 'T' 'D' (or 'T') 'S'

Enter the file name with a maximum 12 characters not including ' ' : ; , # \$ * ?

Then press **'RETURN'**

If, when you have successfully saved your file and you are going to start a new project, you might need to clear the work sheet, then use the Clear function — **F7 CLR** —.

NOTE:

The maximum number of files that can be stored on a disk is limited to **nine**.

5.8. Get a File from Disk/Tape

To get a file containing a work sheet type:

'F7' 'T' 'D' (or 'T') 'L'

Enter the file name; press **'RETURN'**.

5.9. Formatting (GLOBAL)

Also see **FORMATTING (LOCAL)**. All positions (coordinates) within the current work sheet, except those title protected, are set to the format which is given.

Note that **'F7' 'G' 'F' 'G'** resets all previous global formats. If, for example, left adjusted integer format has been chosen earlier, then both these formats will be deleted. The color format is not changed.

5.10. Column Width

The column width can vary between 5 and 18 characters. When EASYCALC starts, the column width is set to 8.

To change the column width, type:

'F7' 'G' 'C'

Give the column width and then press **'RETURN'**

All the positions (coordinates) within the current work sheet are set to the given width.

Note that title protected columns are not influenced by this aid.

5.11. Formatting Functions (LOCAL)

It is possible in both global and local functions to combine two formats, eg left adjustment and integer.

Note that all local formats except GLOBAL FORMAT have the same effect as the corresponding global format except that they only affect one coordinate instead of the whole work sheet. Used locally, however, the GLOBAL FORMAT does not have the same meaning as it does when used globally.

5.12. Color Format

Changes the color on the current coordinate.

Place the cursor at the coordinate which is to be colored. Type:

'F7' 'F' 'C' and choose color key with either the CTRL key or the Commodore key as follows:

The color keys are the following:

Together with the CTRL key

- 1 = Black
- 2 = White
- 3 = Red
- 4 = Cyan
- 5 = Purple
- 6 = Green
- 7 = Blue
- 8 = Yellow

Together with the Commodore key

- 1 = Orange
- 2 = Brown
- 3 = Light red
- 4 = Grey 1
- 5 = Grey 2
- 6 = Light green
- 7 = Light blue
- 8 = Grey 3

5.13. Global Format

Locally:

Changes the format of the current coordinate to the global format set up earlier — this will be the 'start-up' format if the Global Format has not been changed. The color format is NOT changed.

Place the cursor at the coordinate which is to be formatted.

Type:

'F7' 'F' 'G'

Globally:

Resets all coordinates at the current work sheet to EASYCALC's normal format, that is labels are left adjusted, values right adjusted and with maximum precision (decimals are shown if there is enough room). All earlier global formats are overridden. The color format is NOT changed.

5.14. Maximum Precision Format

Changes format at current coordinate to maximum precision, decimals are shown if there is enough space. This function only affects integer and two decimal place functions; other local formats are not changed.

Place the cursor at current coordinate. Type:

'F7' 'F' 'M'

5.15. Integer Format

Sets integer format at current coordinate. Any decimals are not rounded mathematically; they are just not shown in the display. This function only affects maximum precision and two decimal place formats, other local formats are not changed.

Place the cursor in the position which is to be changed. Type:

'F7' 'F' 'I'

5.16. Two Decimal Format

Presents the value at current coordinate to two decimal places. This function only affects maximum precision and integer formats. Other local formats are not changed.

Place the cursor in the coordinate which is to be changed.

Type:

'F7' 'F' '\$'

5.17. Left Adjusting

Changes from right adjusted to left adjusted at the current position (coordinate). This function only affects right adjusted formats. Other formats are not changed.

Place the cursor at the coordinate which is to be changed.
Type:

'F7' 'F' 'L'

5.18. Right Adjusting

Changes left adjustment to right adjustment at the current position (coordinate). This function only affects left adjusted formats. Other formats are not changed.

Place the cursor at the coordinate which is to be changed.
Type:

'F7' 'F' 'R'

5.19. Graphics on the Screen

Move the cursor to the current start coordinate and then type:

'F7' 'E' 'G'

If a row is to be represented, press 'R'. Otherwise press 'C' for column.

Give the lower and upper limits of the scale for the bars of the chart. Provide a title, maximum 39 characters.

The function ends by pressing 'F7'

5.20. Graphics Printed

All graphics can be printed by using the hardcopy function.
'F6'.

You are also able to include two further lines of titling for printed graphic output which can be used to label the bars of the chart. After each of these two lines press:

'RETURN'

When ready the printout will start.

5.21. Moving the Cursor

Movement of the cursor is controlled by the two CRSR keys together with SHIFT.

5.22. Moving the Cursor Toward A1

The HOME key is used for fast cursor movements towards coordinate A1.

One press of **HOME** results in the cursor being moved to the upper left corner of the current screen.

A second press of **HOME** makes the cursor, no matter where it is positioned on the work sheet, go to coordinate A1 of that work sheet.

5.23. GO TO

The cursor can be moved to any coordinate on the current work sheet by typing

'F7' 'F3'

Then enter the coordinate to which the cursor is to be moved and then press **'RETURN'**

5.24. Order of Priority

EASYCALC always calculates according to normal mathematical laws. In the following list 1 has the highest priority, 11 the lowest.

NOTE:

The EASYCALC corrects formulas before saving them — unnecessary brackets are removed, double minus signs are changed to positive and when a number of plus signs are written, only one remains.

- 1 Higher mathematical function references such as MIN, MAX, ABS and INT
- 2 Functions and characters within parentheses
- 3 Exponent
- 4 Multiplication and division * and /
- 5 Addition and subtraction + and -
- 6 Less than and greater than < and >
Not equal to and equal to <> and =
Equal to or greater than =>
Equal to or less than =<
Greater than or equal to < =
Less than or equal to > =
- 7 NOT
- 8 AND
- 9 OR
- 10 THEN and ELSE
- 11 IF

In general, the higher mathematical functions are followed by parentheses containing the range of the expression. The colon character is used to describe the areas and each expression within the parenthesis is differentiated with a comma.

NOTE:

That in the IF THEN ELSE function if any of the coordinates give NA then the result will be given as NA even if the condition is true.

5.25. All the Mathematical Functions

All the functions are presented here in groups within which they all have the same structure. An example is given for each group.

GROUP 1

COUNT Gives the number of coordinates containing a constant or valid formula (without NA or error)

MAX Chooses the largest value within a given area

MIN Chooses the smallest value within a given area

MEAN Gives average value for a certain area

STDDEV Calculates the standard deviation of a given area

SUM Calculates the sum of a given area

Structure: FUNCTION (argument, argument, argument...)

Example: MEAN (A1:A5,B1:B5)

GROUP 2

NPV To calculate the next present value

Structure: FUNCTION (precent, argument: argument)

Example: NPV(.10,C1:G15)

GROUP 3

NA Shows that the coordinate represents a value or a formula that refers to an invalid coordinate

Structure: FUNCTION

Example: SPACE NA

GROUP 4

ABS, EXP, FRAC, INT, LN LOG10 SQRT and RND

Structure: FUNCTION (expression)

Example: ABS(A1 + 1*2.5/B7)

GROUP 5

IF THEN ELSE

Structure: IF expression THEN expression ELSE expression

Example: IF A1 = 10 THEN B1 + 2 ELSE 5

GROUP 6

OR, AND and NOT

Structure: FUNCTION within IF THEN ELSE

Example: IF A1 = 10 OR C1 = 5 THEN B1 + 2 ELSE 5

5.26. Automatic Character Repeat

Used to repeat a character in a given coordinate.

If you want to fill a coordinate with, for example, equal signs, type:

'F7' '-' '='

The current coordinate will be filled, irrespective of the column width, with equal signs.

5.27. Blanking a Coordinate

Used to empty a coordinate.

Place the cursor at the current coordinate and type:

'F7' 'B'

5.28. Moving a Coordinate

Place the cursor at current coordinate and type:

'F7' 'E' 'M' 'RETURN' 'RETURN'

Give the coordinate to which coordinate contents are to be moved. Then type:

'RETURN'

5.29. Copying a Coordinate

Place the cursor at the required coordinate and type:

'F7' 'E' 'C' 'RETURN' 'RETURN'

Give the coordinate where the copy is to be placed. Then type:

'RETURN'

5.30. Repeating a Coordinate

Place the cursor at the coordinate and type:

'F7' 'E' 'R' 'RETURN' 'RETURN'

Provide the target range over which the selected coordinates are to be repeated, ending each entry with **'RETURN'**. The entries can be made by cursor movements or by direct input of the coordinate positions.

5.31. Self References in a Coordinate

This is used for creating new values at every calculation. To create, for example, a counter at A1 go to A1 and type:

'F7' 'R' 'M' " - 1" 'RETURN' "A1 + 1" 'RETURN'

There will now be a zero in A1 with the formula on the command line. Everytime the \uparrow key is pressed for a recalculation the value at A1 is increased by one. If you return to automatic recalculation the value will increase each time an input is made. You can also test this with the automatic recalculation feature and recalculate a number of times.

Note:

Because of the way EASYCALC works it will always calculate your self-reference as it is input — this is why we used minus one for the starting value. When the formula was accepted EASYCALC calculated the value to be zero.

5.32. Moving an Area (Matrix)

A specified area can be moved within the current work sheet. As an example move the area between A1 until C5 to J1.

Fill in the area A1 – C5 with some characters and values.

Place the cursor at the coordinate which is the start position (here A1). Type:

'F7' 'E' 'M' 'RETURN'

Give the last coordinate position of the area you want to move to either through cursor movement or direct entrance of the coordinate (here C5). Then press

'RETURN'

Now input the starting coordinate of the area to receive the moved area — press

"J1" 'RETURN'

The original positions A1 to C5 are now empty. Move the cursor to J1 (use GO TO) to check that the movement has been made.

5.33. Copying an Area (Matrix)

A specified area can be copied within the current work sheet. As an example move the area between A1 until C5 to J1.

Fill in the area A1 – C5 with some characters and values.

Place the cursor at the coordinate which is the start position (here A1). Type:

'F7' 'E' 'C' 'RETURN'

Give the last coordinate position of the area you want to copy either through cursor movement or direct entrance of the coordinate (here C5). Then press

'RETURN'

Now input the starting coordinate of the area to receive the copied area — press

"J1" 'RETURN'

Move the cursor to J1 (use GO TO) to check that the copy has been made.

5.34. Replicating an Area

This function is used to copy the content of several positions to various different places on the current screen. While it is possible to copy a single position, row or column, it is not possible to copy a row to a column or vice versa, or to replicate a matrix.

As an example of this function place rows of stars over the whole work sheet. Start by filling A1 and A2 with stars. Place the cursor at A1. Press

'F7' '-' '*' ' ' 'F7' '-' '*' ' ' ' '

These stars will now be replicated to row 10. Press

'F7' 'E' 'R'

Give the origin of the area of the asterisks you are going to replicate.

'RETURN' ' ↓ ' 'RETURN'

Now input the area they are to fill by typing

"A10" 'RETURN' "I10" 'RETURN'

Having given both SOURCE RANGE and TARGET RANGE, when there is a reference to another position, the question ABSolute OR RELative will be asked. You have to decide if the positions are RELATIVE or not. Answer the question with **'A'** or **'R'**

5.35. Inserting a Row or Column

This function inserts an empty row or column at any place on the screen. To insert a row, type:

'F7' 'E' 'I' 'R'

Everything at and below the current row is moved downwards one step.

If a column is to be inserted, type:

'F7' 'E' 'I' 'C'

Everything at and to the right of the current column is moved one step to the right.

The formulas that are affected by the movement are adjusted to the new positions or changed to NA.

Note that it is not possible to insert a column if there is any data in the last column (BK), without first moving the contents of or blanking out the BK column. The same qualification is true when trying to insert rows if row 254 has been used.

5.36. Deleting a Row or Column

This function lets you remove a row/column from any position on the screen.

To create an example write the label **"A1"** at A1, **"B1"** at B1 and so on to fill the area as far as C5. We will now erase row 3.

Place the cursor at any position on row 3 and type:

'F7' 'E' 'D' 'R'

Everything below the cursor is moved up one step; this means that row 4 has replaced row 3. Thus row 3 has been deleted.

To delete a column, place the cursor at any position on column B and type:

'F7' 'E' 'D' 'C'

Everything to the right of the cursor is moved one column to the left and the original contents of column B are erased.

NOTE:

That formulas which contain references to a deleted row or column will be changed to LABELS and any references to them will become **NA**.

NOTE:

That the last used column/row can **NOT** be deleted. Here you can replicate or move a blank column/row instead.

5.37. Setting a Title

In the first column of the screen it is useful to be able to display text titles with a different column width to the rest of the screen. It is also helpful for this column to be fixed in position when scrolling the work sheet.

To create a title column, scroll the work sheet until the column is at the left edge of the screen and then type:

'F7' 'E' 'T'

The title is removed by typing **'F7' 'L'**

5.38. Automatic/Manual Recalculation

When EASYCALC is started, automatic recalculation begins as well as all positions that are relative to each other will be calculated. A recalculation will be undertaken each time a formula is entered or changed.

To change from automatic to manual recalculation type:

'F7' 'R' 'M'

When this function is chosen recalculation will take place only at the position of the cursor. This is useful when you are going to change several values on a work sheet and every change affects other positions. After all the changes have been made you can change BACK to automatic recalculation to see the new results. Type

'F7' 'R' 'A'

Note that the calculation order remains with the current work sheet until it is changed.

5.39. Recalculation by Row/Column

When EASYCALC is started it will calculate columnwise. If you want to change that type:

'F7' 'O' 'R'

and it will now calculate row by row (starting from A1).

When you want to change it back to columnwise again, type:

'F7' 'O' 'C'

Note that the calculation order remains with the work sheet until it is changed.

5.40. Undertaking Recalculation

You can undertake recalculation at any time by pressing the ' ↑ ' key.

5.41. Undertaking Multiple Recalculations

To undertake a number of recalculations type:

'F7' 'R' 'N'

Give the number of recalculations you require (1 — 999). If, for example, you want 25 type

"25" 'RETURN'

These recalculations can be stopped by pressing the 'F7' key.

Section VI Printout Functions

Depending on your needs you can choose between three different types of printout of EASYCALC data. Check that your printer is connected and has an adequate supply of paper. If you create a format wider than the selected paper width the rows will 'wrap around'.

NOTE:

When using VIC 1515/1525 you have to change their device number to 5; see their printer manuals.

6.1. Hardcopy

This function gives you a screen dump of everything except the first three lines of the screen. Position the data you want to print on the screen and press:

'F7' 'F6'

Note that when printing graphics you only need to press 'F6' without using the F7 key.

6.2. Direct Printout

Direct printout lets you choose a part of the current work sheet to print with the same format as the global format for that work sheet. Press:

'F7' 'E' 'P' 'D'

Now give the area to be printed by inputting the coordinate that is the upper left corner of the area (FROM), press **'RETURN'** and then, in the same way, the lower right (TO).

6.3. Formatted Printout

Formatted printout gives you extensive control over the output of the data from the work sheet. You can define the number of rows that the printout will include and the width of the columns to be included. The width of the columns can vary between 1 and 255 characters. Press:

'F7' 'E' 'P' 'F'

Input the letter of first column of the printout, for instance A, press **'RETURN'**, give its column width followed by **'RETURN'**.

Repeat this for each column that the printout is to include. End with **'RETURN'**.

Section VII Formula References

7.1. Moving Relative References

Clear the screen and then input some formulas containing references.

Move the cursor to A1 and type:

'1' ' → ' "A1 + 1" 'RETURN'

'F7' 'E' 'R' 'RETURN' 'RETURN' ' → ' 'RETURN' "D1"
'RETURN' 'R'

There is now a row where all the values are dependent on the value at A1, they are relative. What will happen to these references if the formulas are moved to other coordinates?

Try by moving B1 and C1 to B5 and C5 respectively. With the cursor at B1 type:

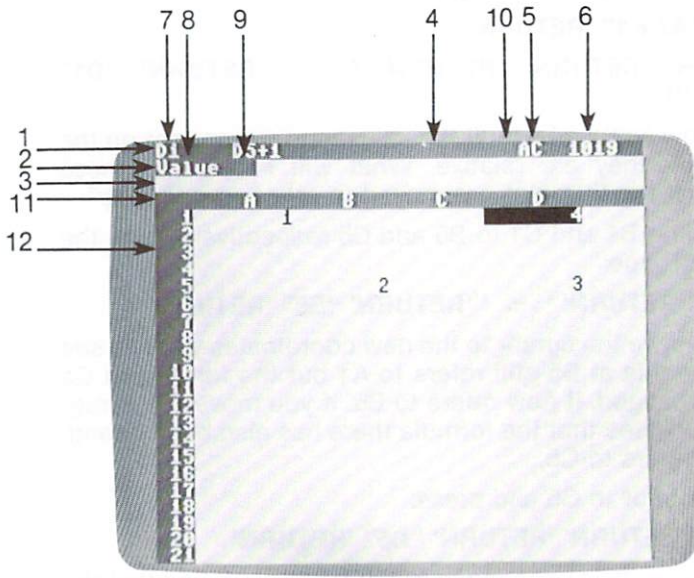
'F7' 'E' 'M' 'RETURN' ' → ' 'RETURN' "B5" 'RETURN'

When you move the cursor to the new coordinates you will see that the formula at B5 still refers to A1 but the formula at C5 has been changed, it now refers to B5. If you move the cursor to D1 you will see that the formula there has also been changed, it now refers to C5.

Move the cursor to C5 and press:

'F7' 'E' 'M' 'RETURN' 'RETURN' "D5" 'RETURN'

The formula at D5 is unchanged but at D1 you will find that the formula there now refers to D5.



This works in the same way when moving formulas which contains absolute references. It is not possible to move a row to a column or vice versa.

7.2. Copying Absolute References

Clear the screen, move the cursor to A1 and type:

"1000"

Now move the cursor to C1 and type:

"A1 - 100" 'RETURN'

Repeat this formula from C1 to C10 by typing:

'F7' 'E' 'R' 'RETURN' 'RETURN'

' ' 'RETURN' "C10" 'RETURN' 'A'

When you look at the formulas you will see that they all refer to A1, they are absolute.

See what happens if a part of the column is copied to another column.

Move the cursor to C4 and type:

'F7' 'E' 'C' 'RETURN' "C8" 'RETURN' "D15" 'RETURN'

When you examine the D column you will see that the formulas look the same, they all refer to A1.

	A	B	C	D
1	1000		=A1-100	
2			=A1-100	
3			=A1-100	
4			=A1-100	
5			=A1-100	
6			=A1-100	
7			=A1-100	
8			=A1-100	
9			=A1-100	
10			=A1-100	
15			=C8-100	
16			=C8-100	
17			=C8-100	
18			=C8-100	

Note that it works the same way when copying formulas which contain relative references. It is not possible to copy a row to a column or vice versa.

7.3. Replicating References

The two earlier reference examples showed how to use the REPLICATE function for replicating formulas with relative or absolute references. This example show how it works when both relative and absolute references are involved.

Clear the screen and type:

"10" ' → ' "20" ' ← ' ' ↓ ' "A1 + 10 + B1" 'RETURN'

'F7' 'E' 'R' 'RETURN' 'RETURN' ' ↓ ' 'RETURN'

"A10" 'RETURN' 'R' 'A'

When you have examined the formulas you will find that the A coordinate is relative and the B coordinate absolute. Now we shall replicate a part of this column.

Move the cursor to A6 and type:

'F7' 'E' 'R' 'RETURN' "A10" 'RETURN'

"A14" 'RETURN' "C14" 'RETURN'

As A5 is the start value for all columns being replicated it must be absolute. B1 on the other hand is absolute all the time. Type: 'A' 'A'

The following A references will be relative, type:

'R' 'A' 'R' 'A' 'R' 'A' 'R' 'A'

	A	B	C	D
1	10	20		
2	40			
3	70			
4	100			
5	130			
6	160			
7	190			
8	220			
9	250			
10	280			
11				
12				
13				
14	160	160	160	
15	190	190	190	
16	220	220	220	
17	250	250	250	
18	280	280	280	
19				
20				
21				

Move the cursor to A14. As you can see, the formula there is similar to the one at A6(A5+10+B1); it is absolute. If you move the cursor to B14 and C14 you will see the same formula. You will notice the difference when you examine the others. Here the A reference has been related to its surrounding coordinates.

APPENDIX

Error Messages

1 User Errors

Error Code	Cause	Remedy
1	Illegal position	Refer to REPLICATE
2	Illegal position range	See above
3	Input of an illegal position, eg A0 or B1D12, when using the GO TO function	Change to valid position, A1 – BK254
4-9	Unused error codes	

2 FORMULA ERRORS

Error Code	Cause	Remedy
100	Attempting to overwrite an earlier input formula (All formulas are protected)	Write the formula in another position or delete the current formula
101	Formula expressed in too complicated a manner	Put the formula in several positions if it uses IF THEN ELSE try to use OR, AND and NOT
102	Syntax error eg THEN argument IF argument ELSE argument	Correct the syntax in this example to: IF...THEN...ELSE
103	Too many arguments in a multiple (max 8)	Put the formula in several positions
104	Attempting to mix areas with arguments eg (A1:C5 + 12)	Here it should be: (A1:C5) + 12
105	Attempting to insert a multiple argument as an argument within another argument function eg SUM (A1:E3,MIN(B1:D2))	Erase the inner multiple argument function
106	NPV is short of arguments (must have at least two)	Input missing argument
107	First argument within NPV is wrong (Should be percent, like .13 for 13%)	Change the first argument to valid percentage value.

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