USER GUIDE

C A L C
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1. Intro to the Calc User's Guide

   This text program and CALC V1.4 LS are made available as shareware. Please distribute and share these files with anyone interested. Note however that shareware is not Public Domain; Calc's copyright is still retained, and modifications to Calc are prohibited, as well as selling of Calc.
   The principal behind shareware is that it be distributed freely for use during an initial tryout period. Calc follows this trend. In this way, Users can 'test out' the program without cost. If it then fulfills your needs, please send in the registration fee of $25 (American or Canadian currency) to the address below:

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   Registered users will be sent the Calc package, which includes the 80 page "Calc User's Reference Guide", and a disk containing the latest version of Calc, several utility programs, and an assortment of spreadsheet templates.
   Although a great deal of effort has gone into making the manual accurate, and Calc bug-free, the Author cannot assume liability for any problems, difficulties, errors, omissions, or damage that may be caused through use of the Calc program, or anything else in this package.

2. Calc Fundamentals

   In order to get you started with Calc, some 'Beginners Basics' have to be covered. Reading the rest of the manual will be easier if you know some of the keywords and concepts used.
   First, you'll have to get Calc up and running. Turn on all peripherals, and then the computer. Insert the Calc disk, and type: **LOAD"CALC*",8** and press the RETURN key. After a few

moments, the program will load. Then type 'RUN', and press
'RETURN' to start. (NOTE: to exit Calc at any time, hold down
the RUN/STOP key, and hit the RESTORE key)

Now some concepts. The Calc spreadsheet is made up of data
locations called CELLS. Each cell is a location in the
spreadsheet having its own row name and column name. For
example, when Calc starts up, the top left-hand corner
contains the cell "a1" - this cell is labeled that because
it is in both column "1" and row "a". This is the same for
all the cells in Calc. (The total sheet, by the way, is 240
columns by 240 rows)

Another important concept is related to the type of
information each cell can contain. Calc can store any of three
types of data: NUMERIC, TEXT, or FORMULA. Numeric data is
simply a number. Likewise, text data is just text. Generally,
if entered data is not a number, it is considered text data.

The third group of information is the most useful. It is
the formula type of data. A formula calculates a value, and
places the result in that cell. Numeric data from other cells
can be used, allowing you to change results without changing
the formula. As an example, let's say the content of cell 'e5'
is: **=a1*2,** and that the content of cell a1 is 4. When calculated,
the formula at e5 would take the value of cell a1 (4) and
multiply it by 2, to get 8. This value would then be displayed
in the spreadsheet at location e5. Notice how Calc formulas
are written. They resemble Commodore BASIC Math statements;
and, in fact, they are very similar. The two major differences
are: a variable is not placed on the left side of the equals
sign, as the result is assumed to go into that cell, and, the
variables in Calc math are the cells themselves. An important
thing to remember about formulas is that, unlike text or
numeric data, formulas aren't displayed. Instead, the RESULT
of the calculation is displayed. The formula can, however,
be changed or erased by cursoring up to it (cursoring will
be discussed later).

3. Using The Data Entry Line

The Data Entry Line, as has already been mentioned, allows
you to work on each cell in Calc. In fact, all work with Calc
is done from here. When the cursor is positioned on a cell,
that cell's content is displayed on the Data Entry Line. To
change the information, you normally type new data, and it
overwrites the old. Transfer this text from the entry line

to the cell by pressing RETURN or executing a command, such as moving the cursor. Occasionally, however, it's necessary to edit the data, perhaps to correct a spelling mistake. For small corrections like this, press the **f7** key. This will place you into Edit Mode. In Edit Mode, you can use the following keys to correct: left and right cursor keys,to move along the edit line, the INST/DEL key, to insert or delete characters, the **f1** key, which moves the cursor to the beginning of the line (similar to the HOME key in BASIC), and the **f2** key (hold the SHIFT key down, and press f1), which clears the entry line. The only way to escape from edit mode is by pressing the RETURN key, which then copies the entry line's contents to the current cell.

4. Calc Math

In Calc, as in all other spreadsheets, an understanding of spreadsheet mathematics is important to create the necessary formulas. Calc uses a modified form of Commodore BASIC, so if you've programmed in BASIC before, formula entry shouldn't be too difficult. A simple formula can look like this: **=a2+1**. If, for example, this formula was in cell d2, then every time recalculating was done, cell d2 would display the value of cell a2, plus one. More complex formulas can be made, using ordinary math, as well as the functions in Commodore BASIC, and several Calc spreadsheet functions. Most of these functions are available, and will give a result identical to that obtained if run from BASIC.

To enter a formula, type it as you would in a BASIC program. Don't place anything to the left of the equals sign, as the result of the calculation automatically goes into the current cell. The variables in a formula can be any valid Calc cell ID. If the cell name is invalid (such as kk999 or zz0) the function will be entered as text data, and the type flag will show 'T' instead of 'F'. However, an error can also occur during calculation, such as dividing by zero, or referring to an empty cell. Then the error indicator (**"***E***"**) will be displayed in that cell.

There is also another error flag in Calc. If a number is too large to be displayed in a cell, (either because the number is too big, or there are too many decimal places to display) then the cell location will display the Overflow indicator (**"<<<O>>>"**). This error can be eliminated by increasing the cell width, or, sometimes, by decreasing the number of decimal

places.

Results of calculations are placed automatically in each cell when a formula is entered. Of course, values change, and so formula recalculation can be done on Calc by using the backspace key (top left corner of the keyboard). This recalculates all formulas in the spreadsheet, and displays the new values on the screen.

Recalculation is normally done only when you press the calculate key. Another option is to have Calc automatically calculate after each entry. Do this by pressing the **CTRL+↑** key combination. This sets auto-recalculation mode. Now, each entry causes all formulas to be recalculated. (to disable auto-calculate mode, press **CTRL+↑** again).

For more on the mathematics available in Calc, consult Appendix A.

5. Cursor Movement

Moving the cursor in Calc to access other cells is done by using the cursor keys. When the cursor goes to the edge of the sheet, it scrolls through to the next row or column. This way, you can move through the complete spreadsheet, and easily look at a sheet that is much larger than the display screen. However, this can become time-consuming if you have a large sheet to view. So, to move faster, there is the 'GOTO' command. Use it by pressing **CTRL G** (while holding down the CTRL key, press G) Calc will ask you for a destination cell. Enter any valid cell name, and press RETURN. The screen will then display another section of the sheet, with the cell you entered shown at the top left hand corner of the screen.

The cursor keys, and 'GOTO' allow you to move around the spreadsheet quickly. In two special cases, Calc provides 'shortcuts' to save time in moving around the sheet. These are via the HOME key. By pressing the HOME key once you will move the cursor to the top left-hand corner of the current display screen; by pressing it twice, the display will move to cell a1, at the beginning of the sheet.

6. Screen Display

   Calc's screen display can be altered in a number of ways,
for example to make the display more visually pleasing, or
to fit more data on the screen. In each cell, a data item has
3 display qualities, or attributes. These are the width of
the cell, its justification within the cell, and (for numbers)
the decimal places displayed. These attributes can be adjusted;
for each cell individually, for a column, or even for the entire
sheet.
   The first attribute, width, can be adjusted for the column
and globally only. To alter the width of one column, press
CTRL SHIFT W (while holding the CTRL and SHIFT keys down
together, press W), and then enter the new width for the current
column. A column can be anywhere from 3 to 38 characters wide.
The wider the column, the greater the amount of information
each cell can display, but the fewer the number of columns
displayed on the screen. The width for the whole sheet can
be changed (this is the GLOBAL, or default, width) by pressing
COMMODORE W (hold down the COMMODORE LOGO key, located at the
bottom left of the keyboard, and press W). This will affect
every cell created, and so should be done only when starting
a spreadsheet.
   The number of decimal places displayed is altered in much
the same way. However, individual cells can also have their
decimal attributes changed without affecting other cells. Use
CTRL D, and enter the number of decimal places. This can be
from 0 to 14 Again, for a whole column's display, press **CTRL
SHIFT D**, and, for the whole sheet, the **COMMODORE D**. Note that
this command affects only the display; the data as stored by
Calc isn't affected, only the displaying of it.
   As the third display editing command, justification
affects the positioning of the data in the cell. Data can be
left justified (such as labels, or names) right justified
(usually for numbers) or centered. To change justification
for an individual cell, press **CTRL J**. Calc will ask
'Justification(l/r/c)'. Pressing the 'L','R' or 'C' keys will
adjust the positioning of data in the cell accordingly.
Entering anything else will abort the routine. Again, like
the other two commands, pressing **CTRL SHIFT J** will alter the
current column, and **COMMODORE J**, the whole sheet.
   Besides altering the displayed data, the display itself
can be adjusted. The color of the characters can be changed
by pressing the **f5** key; this will cycle through the 16 colors

available on the Commodore 64. The same can be done for the background color, by pressing **f6**. These features can be used to create a more readable display, or to avoid problems that can be caused by displaying certain color combinations on a monitor.

7. **Spreadsheet Editing**

Calc provides you with full editing of the spreadsheet. You can move information around, erase it, or duplicate it quickly and simply. To use the editing commands, however, another concept will need to be discussed; the concept of blocs. A bloc in Calc is a rectangular array of data items. For example, when you start up Calc, you're looking at a bloc of cells displayed on the screen, even though there's no information entered yet. The displayed bloc runs from columns 1 to 5, and rows a to v. If you needed to refer to this bloc, you could describe it as all the cells from a1-a5, down to v1-v5. For editing, however, there's a simpler way to describe this area; we refer to the top left hand corner cell, and the bottom right-hand corner cell, in this case, a1-v5. All editing in Calc works this way. First, you enter the top leftmost cell ID of the bloc, and then enter the bottom right hand corner cell ID. The cell IDs MUST be entered in this order, top left, then bottom right. Otherwise, the edit routines will abort. (Incidentally, this provides a convenient way to exit an editing command without executing it).

To illustrate the way blocs are used, let's look at the first edit command, ERASE. This is executed by pressing **CTRL E**. Calc asks you to outline the bloc you want to erase, by positioning the cursor on the bloc's top left-most cell, and then pressing RETURN. After, you move the cursor (via the cursor keys) to the bottom right-most cell of the bloc. Press RETURN, and the bloc of data is then erased.

Not just a block, but the entire spreadsheet can also be erased. This is done by pressing **SHIFT CLR** (hold down SHIFT, and press the CLR/HOME key). You are asked if you want to erase the sheet. If you wish to go ahead, press 'Y'
(any other key aborts the command). This erases the whole sheet. However, if you should decide you want it back, it is possible to 'unerase' the file. This is done by pressing **CTRL U**, which recreates the erased spreadsheet. This is as long as no data has been entered since erasing the sheet, otherwise the old spreadsheet is irrecoverable.

Finally, the current cell can be erased with the command **CTRL B** (for BLANKING the cell).

Besides erasing data, you can also duplicate information. Several commands are available, to provide flexibility in moving data. These are the COPY, RELOCATE (GLOBAL) and RELOCATE (BLOC) commands. The first command, COPY, is executed with **CTRL C**. Calc will ask for the outline of the bloc that you want to copy, just as with the ERASE command. After you press RETURN the second time, Calc then asks you for a destination. Position your cursor where you want the TOP LEFT-MOST CELL OF YOUR BLOC TO BE COPIED, and press RETURN. The data is moved, exactly as if it was cut out of the sheet, and pasted in the new location. For example, if you wanted to move a small bloc of data from bloc a1/c4 to cell a5, afterwards the data in a1 would be duplicated
In a5, the data in a2 in a6, and so on.

COPY is useful and fast. The other copy commands work similarly, with one exception. This is in how they handle the formulas they copy. The COPY command moves formulas without any changes. Sometimes this is fine, but more often than not, the cells' formulas refer to other cells, which are in turn moved. To overcome this limit in the COPY command, you can use the RELOCATE (GLOBAL) and RELOCATE (BLOC) commands. The relocate commands change formula references to other cells. The RELOCATE (BLOC) command will adjust the locations in the formulas if the cells referenced are part of the bloc; cells outside the bloc are left unchanged. RELOCATE (GLOBAL) changes all cell references.

To show the difference between the two commands, enter the following:

    in cell a1: 5
    in cell b1: 7
    in cell b2: =a1+b1

Now, use the RELOCATE (GLOBAL) command (**CTRL SHIFT R**) to move the bloc at b1/b2 to c1. After that, use the RELOCATE (BLOC) command (**CTRL R**) to move the bloc at b1/b2 to d1.

If you now cursor down to c2, the formula there will display =b1+c1. All the formula references in b2 were changed when it was copied to c2. Cursor down to d2, which should have the formula =a1+d1. The second cell reference was adjusted from b1 to d1, because it was referring to a cell being moved. However, a1 was outside the bloc moved, so it was left unchanged.

The final group of commands for editing are the add and

delete commands for a column or a row. With these, it is possible to add or delete a row or column at a time, useful if a spreadsheet needs more room. To add a column or row, press **CTRL and the +** key together. Calc asks the question 'Column or row?'. Answer with 'C' or 'R' (or press any other key to abort). The new column or row is inserted and displayed. Calc automatically adjusts formula references so that all formulas continue to work properly.

　　Deleting a column or row is in much the same manner, with the **CTRL −** command. All references in formulas are again adjusted, but if there are any formula references to the row or column just deleted, these will be left untouched.

8. Input and Output

　　A spreadsheet is of little use if you can't reuse it, or have a permanent copy. So Calc provides all the commands you need to save and load sheets, and also to print them out. As well, it supports a full range of disk commands.

　　Saving files is done by pressing **CTRL S,** and indicating the device to save to (tape or disk), and the file name. After the save, Calc displays the usual screen. Load is similar (**CTRL L**); you indicate your choice of device (tape or disk), and enter the filename. (Tape users can enter the asterick '*' by itself to load the next file on tape). If there are any load errors, Calc halts, and displays the error message. One warning about saving and loading, however; filenames cannot have embedded spaces in them.

　　For permanent records, Calc can print out copies of a spreadsheet. To allow for both the wide variety of devices available, and yet provide ease of use, two print commands are provided; PRINT (SIMPLE), and PRINT (COMPLEX). PRINT (SIMPLE) (**CTRL P**) asks you to outline a bloc, as in the editing commands. However, the bloc's top leftmost corner is already assumed to be cell a1, so all you have to do is locate your cursor at the bottom right corner of the bloc, and press RETURN. Calc then prints that section of the spreadsheet on the printer (Assuming it is powered up and on-line; if not, the print command is ignored).

　　PRINT (SIMPLE) provides an easy way to print most spreadsheets out. However, sometimes you may need more flexibility (for example, a different device number, or to print out a small section of the spreadsheet). PRINT (SIMPLE) prints a bloc beginning at cell a1, and it prints to device

4, with a secondary address of 7. If these parameters aren't appropriate for your printer, you can adjust them, by selecting PRINT (COMPLEX) (**CTRL SHIFT P**). This requires you to outline the bloc entirely (both top left and bottom right corners) and also specify the device number and secondary addresses. Consult your user's manual for the number of the device you want to use. If no secondary address is needed, you can usually just enter 0 or 255.

    Besides file storage and printing, you can also communicate with the disk
drive. Three commands are provided. The first, **CTRL $** (press CNTL and the 4
key) displays the current disk directory on the screen. Press any key to pause the listing; press again to continue. The second, **CTRL SHIFT $**, allows you to send a command to the disk drive. When sending commands, don't use surrounding quotes; for example, typing S0:PAY would scratch the file 'PAY' on disk. And lastly, the third disk command is **CTRL @**, which checks the error channel of the disk drive, and displays the status.

Appendix A — Calc Mathematics

    Mathematical formulas in Calc follow the pattern of formulas in Commodore
BASIC, with the exceptions that; 1) there is no variable to the left of the equals sign, as the result goes into the cell containing the formula, and 2) all variables used are cell IDs. Otherwise, evaluation is as in Commodore BASIC.
    Formulas can be constructed with the standard operators: plus, minus, multiply, divide, and exponentiation (the up arrow), as well as Boolean, or logical, operators (and, or, not, <, >, =). Parenthesis are available, and terms can be nested. Logical statements evaluate to a value of -1 if true, and 0 if false. As an example, the formula; =a1<>a3 will assign a -1 to this cell if true, and a zero if not.
    Additionally, Calc provides various functions for use in formulas. The functions are: ABS, ATN, COS, EXP, INT, LOG, PEEK, RND, SGN, SIN, SQR, and TAN. (NOTE: the functions are printed in upper-case for legibility in this manual; in Calc, enter them in lower-case) These are explained in various Commodore 64 manuals, and so won't be discussed again here. Syntax is the same as in BASIC statements, with the exceptions

noted above.

Calc also provides some specialized functions for spreadsheet work. These are: MAX, MIN, AVG, NUM, SUM, and IF. Their syntax differs somewhat from the Commodore BASIC functions in that, whereas the other functions can be nested, and have terms within the parenthesis, these functions (with the exception of IF) are limited to the form FUNCTION(tl:br), where 'tl' is the top left and 'br' is the bottom right of the spreadsheet bloc described (to review blocs, see the chapter on editing). The data in the bloc described is then acted upon by the function. The use of each function is as follows:

 MAX: this function returns the maximum value in the bloc described.
 MIN: this function returns the minimum value in the bloc.
 AVG: finds the average of the values in the bloc described.
 NUM: returns the number of cells in the bloc that contain a numeric value or formula.
 SUM: finds the total of all the numeric cells in the bloc described.

These five functions all work on a bloc of data. However, there does not need to be data in the bloc – in which case, the value returned will be zero. Also, text data is ignored by these functions (unlike the Commodore BASIC functions, which will return the error flag if trying to use a text cell for data).

The last special-purpose function is the conditional function IF. Its syntax is IF(exp,n,z,p), where 'exp' is an evaluating expression or condition, and 'n', 'z', and 'p' are the expressions to be executed if the result is negative, zero or positive, respectively. For example, =if(a3-2,a5*2,5.4,x7) would evaluate a3-2; if negative, the function would return the value of a5*2. If zero, the value of 5.4 would be returned, and if a3-2 was positive, the value of cell x7 would be the result. The positive and zero expressions are optional; if not included, their value is assumed to be zero. For example, =if(a7*a1,-2) would return -2 if the expression is negative, and zero otherwise.

Another format for if is with logical expressions. This format is if(exp,t,f), where 'exp' is the logical expression, 't' is the expression evaluated if true, and 'f', the expression to evaluate if false. For example, =if(a1<>a2,2,14)

would return 2 if a1<>a2, and 14 if a1=a2. Again, the false
expression is optional; if left out, and the result of the
logical expression is false, IF returns zero.

Appendix B — Command Summary

Command	Keycodes
Auto-Recalculate Mode	CTRL ↑
Blank Cell	CTRL B
Calculate	↑
Change Screen Color	F6
Change Text Color	F5
Copy Bloc	CTRL C
Decimals (Column)	CTRL SHIFT D
Decimals (Global)	(Cmd Logo) D
Decimals (Individual)	CTRL D
Disk Command	CTRL SHIFT $
Disk Directory	CTRL $
Disk Error Channel	CTRL @
Erase Bloc	CTRL E
Erase Row/Column	CTRL −
Erase File	SHIFT CLR
Go to Cell	CTRL G
Home Cursor	HOME
Home Cursor to Cell a1	HOME (Twice)
Insert Row/Column	CTRL +
Justification (Column)	CTRL SHIFT J
Just. (Global)	(Cmd Logo) J
Just. (Individual)	CTRL J
Load File	CTRL L
Move Cursor	(Cursor Keys)
Print (Complex)	CTRL SHIFT P
Print (Simple)	CTRL P
Relocate Bloc (Bloc)	CTRL R
Relocate Bloc (Global)	CTRL SHIFT R
Save File	CTRL S
Un-Erase File	CTRL U
Width (Column)	CTRL SHIFT W
Width (Global)	(Cmd Logo) W