

MCODER II is the ultimate integer compiler for the Spectrum 48K. It will instantly translate your basic programs into super fast machine code. Superbly easy to use. Simply write your basic program as normal and then watch MCODER II compile it. For a list of functions see the full instruction booklet inside.

PERSONAL SOFTWARE SERVICES
TRANSLATES BASIC PROGRAMS
INTO MACHINE CODE
MCODER II
NEW IMPROVED VERSION
005 Programming aid for SPECTRUM 48K

MCODER II

SPECTRUM

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MCODER (SPECTRUM)

MCODER is the first true compiler for use with the 48K SPECTRUM. It runs integer BASIC using numbers in the range -32768 to 32767 to allow considerable increase in the running speed of compiled programs.

Although MCODER is a sophisticated and versatile tool; do not expect miracles. You will have to become familiar with its method of operation if you are to use it to its best advantage.

How do I load MCODER?

MCODER must always be present in the computer before you enter any code. It is loaded using LOAD "".

How do I use MCODER?

Using MCODER is really a very simple operation. After loading MCODER, type in your BASIC program. It is essential to run and check the program before compiling it, however we strongly suggest that you first read through the list of commands which MCODER will compile ensuring that your BASIC program consists only of these commands.

Once you are satisfied with the BASIC program you can compile it using the command RAND USR 60000 and pressing ENTER. The BASIC will then scroll up the screen. If MCODER comes across a statement it cannot compile then it will return to BASIC with an inverse S at or near the offending command.

Possible errors include:

- 1) Using illegal variable names.
- 2) Goto 'variable' or Gosub 'variable' which are not allowed.
- 3) Illegal statement type such as SAVE or DIM AS (10)

If an error is reported then you should correct it and recompile.

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At the end of a successful compilation you will be shown 3 pieces of information:

- 1) A report saying that your program has compiled OK.
- 2) The length of the compiled code.
- 3) The run address.

Can I compile basic programs I already have on tape?

YES - first load MCODER and then load the program you wish to compile. You should be aware that you will probably have to make considerable alterations to your program before it will successfully compile as it is likely that the BASIC was not written to suit MCODER.

Can I compile more than one program?

YES - it is possible to 'stack' several programs on top of each other. This is done by first moving RAMTOP using CLEAR n where n is a number between 24000 and 59000. If RAMTOP is initially set high then a routine may be entered, compiled and stored above RAMTOP. If RAMTOP is then lowered using CLEAR n then another routine can be inserted between the new RAMTOP and the bottom of the first routine. Care must be taken to lower RAMTOP sufficiently otherwise the first routine will be partly overwritten. These routines can then be called individually as required.

HOW DO I RUN COMPILED PROGRAMS

The compiled code is always stored immediately above RAMTOP with the exact call address being display after compilation.

TRACE FACILITIES

Three levels of trace and protection are available.

- a) BREAK is disabled except at 'scroll?' and INPUT. This results in the fastest and smallest code.
- 1) BREAK enabled. This results in longer code than

does o) and at work execution may only be half as fast.

- 2) BREAK enabled puts the line presently being executed displayed in the top right hand corner. This is clearly a powerful feature in debugging a program, its disadvantage is that if the code runs at about the same speed as BASIC.
- By default option 1 is chosen but you may change this as many times as you like during a program by a REM statement which starts REM#0, REM#1 or REM#2 corresponding to the three modes above.

Access to MCODER variables

The address of the variables used by MCODER can be listed with a routine starting at location 65240.

To use this routine enter:-

```
PRINT USR 65240; "variable name".
```

For arrays and strings the name can be shortened to the first two characters ie. A\$ or B!

Two values are returned for arrays and strings, the first is the address of the pointer to the array or string, the second is the address of the first item in the string or array.

NOTE Arrays in MCODER contain an element zero and the array pointer will point to the address of this element. This address printed has been adjusted and points to element one of the array.

Arrays and strings are allocated at run time and if this routine is called before the program has run then only the address of the pointer will be correct.

WHICH COMMANDS WILL MCODER COMPILE

Variable names may consist of upper and lower case letters and numbers. Arbitrary expressions may be used anywhere except in LET statement where they must be enclosed in bracket.

AND Boolean AND. Allowed only in an IF statement.

ABS
ATTR
BEEP x,y

Do not use brackets if a BEEP of less than 1 sec is required, e.g. use BEEP 1/3.5. NOT BEEP (1/3),5

BIN
BORDER
BRIGHT
CIRCLE x,y,z
CHR\$
CLS
CLEAR
CODE
COPY
DATA list

Clear compiled code variables only.

DIM A(V)

List must be a list of integers or strings in quotes and may not contain expressions.

Only one dimensional arrays are available in MCODER and there must be at least 2^V bytes spare space at run-time. No runtime array bound checking is done so make sure it works under normal BASIC. If you redefine an array a new version of it is made but the old one is not deleted. This means that repeated allocation can eventually fill the machine and give an error (out of memory) either when allocating an array or a string. Array and string space stretches from 100 bytes above STKEND to 256 bytes below RAMTOP. All arrays, strings and variables are erased when you re-enter an MCODER program and all the space is available again. There are no string arrays.

DRAW x,y
DRAW x,y,z
FLASH

FOR W = U TO V - W Increments in steps of 1 from U to V. NEXT W ends the loop. Note that (V-U) must be less than 32767. The loop is always traversed at least once.

GOSUB N Calls line N as a subroutine. If line N does not exist then it goes to the next line after N. Note that N must be a positive integer constant.

GOTO N Jumps unconditionally to line N. Otherwise as for GOSUB.

IF V op U THEN - where op is any of AND, OR, <, >, =, <=>, <or>. Note that V and U must not differ by more than 32767. For string comparisons AND and OR are not applicable.

IN
INK
INKEY\$
INPUT A, A(m) or A\$ As BASIC. For numbers a leading sign is allowed. For strings the default length is 32 characters. Characters with a code value less than 32 and greater than 164 are not allowed.

INT Included to facilitate testing under BASIC.

INVERSE
LEN A\$ As BASIC except that A\$ cannot be sliced.

LET
LPRINT
NEW
NEXT W See for - NEXT
OR Boolean only allowed in IF statement.
OUT
OVER
PAPER
PAUSE
PEEK
PLOT
POKE
POINT

PRINT
RAND
READ Reads a list of integers or strings from a data statement. Only minimal checking is done to ensure correct data types.

REM
RESTORE N Restores the DATA pointer to line N. N must exist.

RETURN Returns from a subroutine started by a GOSUB. Make sure that your GOSUBS and RETURNS match as no check is made.

RND Returns a random integer between 0 and 32767. (NOT the same as BASIC). To obtain the same effect under BASIC use USR 59997.

SGN As BASIC
SQR Integer square root.
STOP If MCODER finds a STOP statement compilation ceases there. If you wish there to be a STOP in the middle of your program then the command LET L=USR 7406 will give an error 9 and stop.

STRINGS By default strings have a maximum length of 32 characters. If you exceed the maximum string length then you will gwrite into whatever follows (either another string or an array). To change the default length you should POKE location 60200 with a value between 1 and 255. This should be done from within your program before the first use of the variable which is to have a different length. There are no string arrays. A\$(TO n) and A\$(nTO) not permitted. The general form A\$(m TO n) or A\$(m) must be used.

TO

USR m Calls a user defined machine code routine.

USR "string"

EXAMPLE PROGRAM

Entering this simple program will give you an indication of the speed improvement possible with MCODER.

```
10 LET P = 0: INK P
12 FOR F = 1 to 20
13 BEEP 1/ (2^F), F
14 NEXT F
20 LET A=0: LET B = 255: LET C = 175: LET
D = 0: CL$
30 FOR I = 0 TO 255: PLOT OVER 1; I.A:
NEXT I
40 FOR I = 0 TO 175: PLOT OVER 1; B, I:
NEXT I
50 FOR I = 0 TO 255: PLOT OVER 1; (255-I),
C: NEXT I
60 FOR I = 0 TO 175: PLOT OVER 1.D,
(175-I): NEXT I
70 LET A = A+1: LET B = B-1: LET C = C-1:
LET D = D+1
80 LET P = P+1: IF P = 7 THEN LET P=0
81 PRINT AT 10,12; "SPECTRUM"
82 PRINT AT 11,13; "MCODER"
85 INK P
90 IF A>176 THEN GO TO 10
100 GOTO 30
9000 STOP
```

How do I save the compiled Code?

This is done by using the normal save routine of the SPECTRUM ie. SAVE "name" CODE n where n is the start address of the compiled code. Notice, however, that MCODER must also be saved as it contains several runtime routines which the compiled code needs to run properly. The compiler stretches from 59990 to 65368 thus the full save command should be SAVE "name" CODE 40000, 25368.

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VU-3D is a design and modelling program in three dimensions. From an image in the mind, create an object on the screen, rotate and view it in three dimensions, zoom in and zoom out and display the object in high resolution colour in different perspectives.

Sinclair ZX Spectrum
VU-3D
from PSION

Load and Run by typing LOAD "vu3d"

VU-3D is a sophisticated three-dimensional design and display program. Using simple commands, the user may create a solid object or set of objects in three-dimensional space, observe, modify, print and store such displays. Of course on a television screen, just like the retina of the eye, only a two-dimensional representation or image of the three-dimensional world can be portrayed. As people we get a sense of the three-dimensionality of the world by moving around and looking at objects from different directions. VU-3D portrays the three-dimensional world of its data structure, like a software camera, in exactly the same way as the eye observes the three-dimensional world. And, just like an individual can walk round an object and look at it from far and near and from different directions, so VU-3D includes commands to allow you, the user, to move round the object and look at it from different distances and directions. In this way, we can design a solid object and obtain a sense of its reality in the three-dimensional world. After loading VU-3D from cassette, the user is asked if he wishes to create a new design or set of objects, or whether he wishes to load a data file from cassette. If this is the first time you have used VU-3D, press the option "1".

CREATE

The CREATE function in VU-3D allows the user, through a simple set of commands, to construct a completely new object in 3 dimensions. After entering CREATE a command banner of 3 lines can be seen at the top of the screen with the data line at the bottom of the screen. This format is standard and is used throughout VU-3D. The commands are invoked by pressing the first letter or symbol of each command. CREATE functions by taking, in sequence, sections or slices through the object. Each section, or slice, is called a Z plane and the different sections have different Z values. One may think of these Z planes as if one had sliced through the object with a knife and then examined the surface, so opened. The points on such a surface now lie in two dimensions which are called X and Y. The X axis and Y axis are shown along the bottom and the left-hand margin respectively. Before invoking CREATE, the user should have some image in his mind of the object or set of objects he wishes to construct. You should choose the Z direction to be the axis with the greatest symmetry of the object. For example, a rugby football has an axis symmetry, (the Z direction), along the line through the two pointed ends of the ball. This line should be chosen as the Z direction and slices or cuts taken perpendicular to this line. Another example might be a glass or a cup: the greatest symmetry in these cases is along the line looking downwards into the cup (Z), and the slices or section (X-Y), should be taken in the horizontal plane across the cup. It is important for the user to choose Z and the corresponding X-Y planes before he proceeds. The commands available to the user in CREATE are: Open, Close, Figure, Magnify, Reduce, Next Z, Quit and the arrowed cursor keys to shift.

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Open

After entering CREATE the user may start an object by using the O for Open command. This command allows the user to define the shape of the object on the first plane or section. For example, if a rugby ball was being constructed the first section, or salami slice, would define a small, regular polygon approximating a circle. This polygon is defined in Open. After typing O or Open, the command banner will change and the user will see a cursor on the screen. The position of the cursor is given in the data line at the bottom of the screen. Press the arrow keys to move the cursor around the screen. The first face of an object is defined by a set of closed lines, (closed in the sense that the line joins up on itself). Position the cursor at the point where you wish to start the line. Press S for Start. Now move the cursor to the next position to which you wish to draw a line. Press L for Line and a line will be drawn between the start position and the present position. Move the cursor to the next point and press L again. Continue in this way until you have formed the particular figure you wish to draw. To close the figure, press E for End. The user will then be returned to the CREATE function. If, while drawing the lines making up the figure in Open, an error is made, you may delete the last line by pressing D for Delete. More than one figure may be included on a section or in the general display. To start another object, or indeed a hole inside another object, press O for Open again and draw the second, or more, closed curves under the Open command. **The lines of a figure may never cross and two figures are never allowed to intersect.** Open will detect any attempt by the user to draw a line which intersects another line and will not allow such a line to be drawn. If this occurs, move the cursor until no such intersection occurs. This will also be the case if the line to complete a figure when the End instruction is invoked would intersect an existing line.

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Figure

In CREATE, either through Open or by repeating a figure from the previous Z plane, several figures may be included at once. In the commands Magnify, Reduce and shift with the arrow keys, (below), each of these figures may be magnified, reduced or moved separately. This is done by choosing one of the figures in turn. Press F for Figure to choose the next figure displayed. The currently chosen figure is shown with a dotted line as opposed to the solid lines of the other figures. **Magnify** A figure which has been drawn from Open or repeated by moving to the next Z plane may be magnified by pressing the key M. Continue to press M until the figure is magnified to the size you desire. **Reduce** Reduce is the opposite of magnify. Press R to make an existing figure smaller.

Arrows

The cursor arrow keys in the Spectrum may be used to move or shift the figure left, right, up or down.

Next Z

When the figures on the first plane have been constructed satisfactorily, the user may move to the next Z plane by pressing the key N until the Z value required is displayed in the data line at the bottom of the screen. After pressing N the figures from the previous plane will be repeated on the new plane. These figures may now be modified using the Magnify, the Reduce and arrow shift commands. For example, to construct a rugby football, one starts on the first plane at one pointed end of the football which may be represented by, say, a regular 10-sided polygon (or with greater accuracy, more sides). This first polygon is made very small using the Reduce command. N is then pressed for the next plane and the polygon simply magnified. The next plane is taken again and the polygon magnified once more until a plane through the centre of the

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football is reached. Further planes are then taken while reducing the figure back to a small polygon at the other end of the rugby football. The object is then complete. An object which is part of the whole scene may be terminated on any Z plane (apart from the first) using the Close command or another object may be started on any Z plane by invoking the Open command again. Holes or hollow objects may also be devised by using the Open command and drawing one figure entirely inside another. For example, a mug may be constructed by drawing a polygon similar to a circle on the first Z plane, using N to proceed to the next Z plane, invoking Open again and drawing a smaller polygon inside the first on the second Z plane. The rim of the mug is then extended by proceeding to a further Z plane where the object is closed.

Two or more objects may be placed very close to each other to form a composite object, for example, a cup with a handle may be devised out of two objects.

Close

To complete a particular object press F until you obtain the figure in question. Press C for Close to close or complete that object. You may continue to develop other objects in the scene so long as they are not closed as you move through further Z planes.

Quit

Press Q to close any existing objects and to return to the main menu.

DISPLAY

Having created an object or set of objects through the CREATE function or having returned a data file from a cassette, the user may display the object in three-dimensional perspective through a variety of displays. There are 3 main types of three-dimensional representation. These are: 1) a full wire line diagram; 2)

hidden line diagram; 3) shaded solid diagram. Each of these displays are in full, three-dimensional perspective. The user may observe the object from any position in space, both inside and outside the objects, from any angle and any distance. To understand the geometry of observing such an object or set of objects, the user may think of himself as sitting on the surface of a sphere with the object or objects near the centre of the sphere. The commands of Display allow the user to move around the surface of this observing sphere and to move out to larger spheres or move in to smaller spheres.

On entering Display, a three-dimensional wire line perspective of the object is displayed. The orientation and distance of observation of the object should be chosen by the user through the Near, Far and Arrow commands before asking for a hidden line or shaded picture, since the latter may take a significant time in computation.

Far

Press F for zoom away or backwards from the display and observe the object at a greater distance. Pressing Caps. Shift at the same time as F will move the observation point back slowly for precision.

Near

Press N to zoom in or observe the object or objects at a closer distance. If you continue to press N, the observation point may actually move inside the object.

Arrow Keys

Use the ← to move left, (or change the longitude of observation to the west). Press → to move to the right, (or change the longitude of observation to the east). Press ↑ to move upwards or increase the latitude to the north of the observation point. Press ↓ to move down or increase the latitude of the observation point to the south. If you press the Caps. Shift key at the same time as arrow keys, the rotation of the observed object will

be slowed down to position the observation point with greater precision.

Magnify

Press M to Magnify the scene. Note that this is different from pressing N for Near, since the picture in the former case will be magnified but without increasing the perspective effect.

Reduce

Press R to Reduce the scene. Note that this is different from pressing F for Far, since the picture in the former case will be reduced but without decreasing the perspective effect.

Quit

Press Q to exit from DISPLAY back to the main menu.

PICTURE

Once you have defined, in DISPLAY, the vantage point or observation point of the object and its magnification, press P for PICTURE to produce in colours of your choice a hidden line diagram or solid diagram with shading. The commands under PICTURE are Shade, Hidden line, Print, Colour, Keep and Quit.

Hidden line

This command produces a hidden line diagram of the existing picture shown on the screen. The edges which divide the faces making up the object are shown as lines but only those edges, which the observer from the present vantage point can see, are drawn. The edges on the back side of the object are not drawn. The execution of this command may take a significant time if the display is a complicated one with many faces.

Shade

Another way of viewing the three-dimensional object or objects is to shade in those faces of the object which the observer can see.

Those faces which are on the other side of the object away from the observer are eliminated in this algorithm.

The lightness of the shading of each face is determined by a combination of a diffuse background light and by "diffuse reflection" from a single light source.

After pressing S for Shade the command panel at the top will change and ask the user where he wishes to place the light source. In answer to the first question enter a, c or b for the light to be above, from the centre or below. In answer to the second question enter l, c or r to position the light source at the left, centre or right respectively.

Colour

The background colour and the colour of the objects in the display may be chosen with the colour command. Press keys 0 to 7 to choose the appropriate colour in each case according to the questions in the command panel.

Print

Press key P, if a printer is attached to the Spectrum, for a hard copy record of the display.

Keep

Allows you to keep a record of the display only on cassette. Note that Keep differs from Save in the main menu since Save stores on tape the complete data-file of the object on cassette. Keep, on the other hand, simply saves the screen image and can be loaded later from cassette using SCREEN \$ without the VU-3D software. On pressing K for Keep you will be asked for a file name and thereafter told to connect the tape recorder to the Spectrum and to start the recorder on record.

Quit

Q returns the user to the display function.

MODIFY

After an object or set of objects have been defined through the CREATE function, the user may later wish to change or alter the objects. This may be done

through the MODIFY function providing the changes to be made are not of a major kind. If the new figures are to be substantially different from the existing figures, the user should rather ABANDON the file and CREATE a new set of objects.

The MODIFY function works in a very similar way to the CREATE function and will take the user through the sequence of sections or Z planes previously defined through CREATE. On entering MODIFY the display will change to show the existing two-dimensional figure drawn on the Z = 0 plane. The commands then available to the user are Magnify, Reduce, ←, →, ↑, ↓, Next Z and Quit. These commands are precisely the same as those in CREATE.

ABANDON

This function deletes or abandons an existing data-file to leave memory for a new data-file formed from CREATE or LOAD.

SAVE

The Save function is called from the main menu of VU-3D. It allows a user to save permanently on cassette a data-file which has been created. Connect the microphone socket on the Spectrum to the microphone socket on your tape recorder, define a file name and press the record button on your recorder.

LOAD

This function allows the user to retrieve from cassette a previously defined VU-3D data-file. To load such a data-file there must be no existing data-file in the memory of the Spectrum. If there is such a data-file use the ABANDON function first before entering LOAD.

SIDE B: EXAMPLE

Load and run by entering LOAD "example":

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Made in U.K.



Sinclair
ZX Spectrum with 16K or
48K RAM
VU-CALC
from PSION

Load and Run by typing LOAD "VU-CALC"

Pocket calculators have become a powerful and indispensable tool to many though they only work out and display one number at a time. They are useful because there are many things in life that are well described by a single number. There are many more things, however, which can be described more fully and completely with a table or an array of numbers organised in an ordered way. VU-CALC is a program for calculating and displaying tables of numbers and names. You start with an empty table or grid composed of boxes and arranged in rows and columns. With a simple set of commands you can invoke calculator-like formulae which link one box to another or one row to another or one column to another so that the computer can calculate a whole table in a few seconds. You can also enter data or names into particular boxes and by simply changing one or more parameters, tables for different situations can be re-evaluated and displayed almost immediately.

This provides an immensely powerful tool for financial analysis, budgets, the calculation of engineering or scientific tables, statistical analysis etc.

LAYOUT — Table, Cursor and Window

On entering VU-CALC, a two line command panel can be seen at the top of the screen, a blank labelled area is

in the middle of the screen and an input line can be seen at the bottom of the screen. The blank area in the middle of the screen is a window on to the table.

The table can be thought of as a large number of boxes ordered into rows or columns. The rows are labelled alphabetically and the current rows shown in the window can be seen down the left-hand margin.

The columns are labelled numerically from 01 upwards and the current columns shown in the window are numbered along the line immediately above the window. Each box or rectangle is uniquely identified by the row letter followed by the column number.

Thus, A01 or A1 refers to the box lying in the top left-hand corner of the table.

At any stage during the use of VU-CALC, the user's attention relates to a particular box which is illustrated as a large red rectangle on the table. This is the cursor. The cursor can be moved freely and rapidly to read or enter data, text or formulae. The cursor is moved on the table by pressing the four arrow cursor keys on the keyboard, (caps shift held down while keys 5, 6, 7 or 8 are pressed). The cursor may be moved rapidly by holding down one of the arrow keys firmly.

When the cursor reaches a box at the edge of the window and the cursor keys are pressed further the window will automatically move over the table. This can be observed by noticing the column numbers or row numbers along the sides of the window changing. By this means, the user can move rapidly round a very large table (in the case of the 48K Spectrum).

Entering Data and Text

The user may think of VU-CALC as a thinking spreadsheet in which he may layout at will text and numerical data. At the main command point of VU-CALC, 4 types of entries may be made: text, data, formulae or a command.

To enter text, position the cursor at the box where you

wish to start the text. Press " " and now simply type in the text which you wish to enter at that position. As you type you will see the text being written on the input line at the bottom of the screen with the small red cursor on that line moving along. You may fill the whole line and use the delete key to make alterations. When complete, press "ENTER" to insert the text on to the spread sheet.

To enter a number in any box, simply position the cursor where you wish to enter the number and type in the number followed by the "ENTER" key. The number will immediately be shown in the current box.

To calculate a number at a particular box using a formula, position the cursor at the appropriate box and simply type in the formula. When the formula as shown on the bottom input line is correct press "ENTER" which will apply the formula to the current box and which will calculate the data immediately at the appropriate boxes. A formula may be applied to many boxes with the # Repeat command, VU-CALC will automatically distinguish between text, data and formulae.

When the bottom input line is empty typing a " #" will set VU-CALC into the command mode and a list of commands will appear on the top two lines. By pressing the first character of the required command, the command will be executed subject to its appropriate parameters.

Formulae

The real power of VU-CALC comes from the use of formulae for boxes, rows or columns which can generate the data you require for your table. The syntax of a formula includes the use of constants, (numbers), references to the numbers in other boxes and the simple arithmetical operators: +, -, /, *. The numbers in another box are always referred to by the box reference of row letter followed by column number. In constructing formulae you may think of the box

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4 references as variables and the formulae as simple algebraic expressions using these variables, constants and the arithmetical operators. Some examples of such formulae are:—

```
B1*1.03
D12*(B2+1.5)/C1
D7-C7
```

A formula can refer to one particular box or it may be repeated along a row, down a column, or across a block. To achieve this, the # Repeat command is used (see below under commands).

Formulae are always applied relatively. For example, in the Repeat command, if the current formula is being applied to a sequence of boxes along a row then the column references in the formula are always incremented as the formula is applied sequentially along the row. For example, if the formula "1.03*A1" in the box A2 was repeated along the row A then the formula in box A3 would be "1.03*A2" and the formula in box A4 would be "1.03*A3", etc. The same relative concept is applied down a column or over a block where the row letters in the formula are incremented sequentially.

If, in a formula, you wish to refer to an absolute box reference which does not alter when repeated, the box reference in the formula should be prefixed with the character "\$". Thus, for the above example, the formula "1.03*\$A1" when applied to the row A would always refer to the contents of box A1 only.

COMMANDS

A variety of commands exist in VU-CALC for loading, saving and printing files, for editing etc. These commands are entered by typing "#" in the empty input line followed by the first character of the particular command.

B Blank Blanks the current box.

5 # C Calculate Forces a recalculation of the whole table and is sometimes required when a formula is changed.

E Edit Allows the formula referred to by the current box to be replaced by a new formula.

F, c, f, j Format Format specifies the representation of a number in a column, as defined by the three parameters c, f, j. The first parameter c must be a one or two digit number or the letter "A". If c is a number, the formatting will apply to that column only, while "A" will apply the format to All the table.

The parameter f specifies the type of formatting required. If an I is entered, integer format will be used. If \$ is entered, a real number with two decimal points will be used. G specifies a general format. The third parameter, j, must be L or R for left or right justified.

G, rc Go Move the cursor immediately to the box rc.

L Load Will clear the screen, ask for a file name and load that file.

P Print Will cause a copy of the screen to be output to the printer.

Q Quit Will allow the user to clear the worksheet or exit from the program.

R, rc, f:l Repeat This will cause the contents of the box rc to be reproduced across the range specified. Most importantly, it will repeat the formula in the box rc over the other boxes within the range specified.

6 The first parameter, rc, is a box reference, for example B3, which specifies the box whose contents or formula is to be repeated.

The box can be repeated along a row, down a column or over a rectangular block of boxes. This is defined by the parameter range which has the form f:l where f and l are box references, for example A3:B5. f is the top left-hand box of the block and l is the bottom right-hand box of the block. In the example, the box at rc would be repeated over the boxes A3, A4, A5, B3, B4 and B5, in the range, the box f must always be to the left, and, or above the box l.

S Save Clears the screen and asks the user for a file name. The data on the table will be saved to cassette.

T, r or c, r' or c' Transfer This command transfers a row or column defined by the first parameter to another row or column defined by the second parameter. A row cannot be copied to a column and vice-versa.

SUM FACILITY

Part of a row, a column, or a rectangular block of boxes may be added automatically through the sum facility. Summing is performed as a formula. Position the cursor at the cell where you wish to place the result of the summation. Enter a formula of the form & f:l

and press the enter key. The sign "&" means sum and the formula means "sum the boxes from the first box f to the last box l".

f:l is the rectangular "range" of boxes over which the summation is to be performed where f is the top left-hand box of the rectangle. For example: & A2:B4 will sum the boxes A2 + A3 + A4 + B2 + B3 + B4.

7 To sum the row C from C3 to C10 enter, & C3:C10

To sum the column 5 from B5 to D5 enter, & B5:D5

The box reference f must always be above and, or to the left of box reference l.

Errors

An error will occur and the program will fail with a Spectrum error code at the bottom of the screen if a formula is entered which refers to a blank box or one with characters rather than numerical data.

If this occurs, return to the program by entering GOTO 9000. The program will then display the identity of the box which it was trying to calculate when the error occurred. Press the key ENTER. The display will return to the table and you may then move the cursor to the problem square. Look at the formula for this box and see which box the formula is referencing which contains characters or is blank.

SUMMARY OF VU-CALC COMMANDS

- # B — Blanks the current box and its formula.
- # C — Forces recalculation of whole grid — required when data or a formula is changed.
- # E — To change the formula in the current box.
- # F, c, f, j — Formats column c (A = All). f = i (integer), = \$ (decimal), = G (general), j = L (left), = R (right) justified.
- # G, rc — Go to box rc.
- # L — Load a Vu-Calc data file.
- # P — Prints a copy of the screen.
- # Q — Quits Vu-Calc.
- # R, rc, f:l — Repeat contents of box rc over range of boxes f to l.
- # S — Saves the current Vu-Calc file.
- # T, r or c, r' or c' — Transfer row r to row r' or column c to c'.

BIBL. 1/6

Sinclair
ZX Spectrum

VU-FILE
also GAZETTEER

Sinclair
ZX Spectrum

VU-FILE
also GAZETTEER

B2/S

SOFTWARE BY **PSION**  **16K or 48K RAM**

Sinclair
ZX Spectrum
with 16K or 48K RAM

VU-FILE
from **PSION** 

Load and Run by typing LOAD "VU-FILE"

At both home and work we continually use lists, card indices, filing cabinets etc. to store in an ordered manner repetitive data for all kinds of information. In the home this includes address books, lists of members of clubs or societies that we may belong to, dictionaries, encyclopedias, etc. At work, schools, colleges, businesses and particularly government departments have numerous filing cabinets and card indices for all manner of information.

VU-FILE is a computer program for the electronic storage of lists or files based on the Spectrum. The advantage of a computer for doing this is not only that the information can be stored easily and compactly, but particularly that the computer is very powerful in ordering, sequencing, searching, finding and listing such files.

The file consists of a collection or lists of "records" where each record may contain various items of information. Each item of information on a record is called a "data-field". VU-FILE allows you to lay out or format the standard record of a particular file in a manner of your own choosing. Each record will appear as one page on the screen and you may have as many data-fields in each record as is consistent with your layout on the screen. After laying out or formatting the record a whole series of commands allows you to

develop the file and interrogate it. In addition you can save the file permanently on your own cassettes and retrieve it from the cassette for subsequent use.

Throughout VU-FILE you will find the command or information heading in the top four lines of the screen. This heading continually prompts you as to what to do next and in addition tells you the present command under which you are acting. The rest of the screen always shows the general or current record.

After loading the program from a virgin or original cassette, the program will automatically enter record formatting. Otherwise the main menu will appear.

Formatting a Record

VU-FILE is a general purpose computer file. In the initial option of RECORD LAY OUT, the user may lay out or format standard headings, titles, colour etc. to format the general record as he wishes.

On entering, a red cursor square will be situated in the top left-hand corner of the record. The keyboard may be used as a simple typewriter to enter standard titles and headings. In addition the cursor may be moved more rapidly around the screen with the aid of the arrow keys. Only information which is fixed or repeated on every record should be entered at this stage. The colour for paper and ink can be varied throughout the record layout by pressing "EDIT" (caps shift with key "I"). The current attributes will be displayed and may be altered. When the standard information has been entered the user may exit from this mode with the "STOP" command (shift A).

After exiting from the RECORD LAY OUT mode the program will immediately enter a new mode called DATA-FIELDS. A new command heading will appear at the top of the screen. The mode allows the user to define the position on the record where he wishes to place variable information items. For example, if a file was being created for names and addresses each record

BIBL. 1/4

might show the word "NAME:" followed by the particular name say "BROWN JOHN" of a particular record. The letters "NAME:" would have been entered in the record lay out mode and are fixed on every record. The letters "BROWN JOHN" are a "data-field" and vary from one record to another. The user must specify the position on the record where the data-field (e.g. "BROWN JOHN") is to appear, namely after "NAME:." Move the cursor square with the arrow keys to a position immediately after "NAME:" and press ENTER at the correct position. You will be asked to define the paper and ink colours for that field. The position of the data field will now be marked with a ? Continue to define the position of each data-field you require on the record. Press the command "STOP" to exit.

VU-FILE Commands

After exiting from this mode the programme will automatically enter the main VU-FILE command point (option 2 from the main menu). The main commands available to the user are ENTER, ALTER, INFORM, FORWARD, BACK, RESET, ORDER, SELECT, QUIT, LIST, PRINT, COPY, DELETE. If the file is empty, the ENTER command will automatically be effected. Most of these commands are self-explanatory and can be implemented from any point of VU-FILE (under option 2) by typing the first letter of each command.

Entering, Deleting and Altering Records

From the command point press key "E" to enter a new record to the file. The screen will show a blank record with the standard titles and headings which have been entered previously. The red cursor box will be situated at the position for the first data-field. You may now simply enter the information for the field and for the record that you require. In the example included on side B of the cassette "Gazetteer" the first item of fixed

information on every record is the word "COUNTRY" and the first data-field following this is the particular country which varies of course, from record to record, for example Afghanistan, Albania etc. If you were entering this as a record you would now type in Afghanistan followed by "ENTER". The cursor will then automatically move to the start of the next data-field for you to type in the next item of information. When you have entered the information for every item on a record, the display will automatically bring up a new blank record. You may continue to enter by this means as many records as you wish. If however you have completed the new records you require, press the key "STOP" to exit to the main command point.

A record may be deleted by finding and displaying the particular record followed by the command "D" for DELETE. The information on a record may be changed with the aid of the ALTER command. First find the record which you wish to change and press "A" for ALTER. The record will be shown with the red cursor box situated at the beginning of the first data-field. If you wish to change this item of information simply type in the new information followed by "ENTER". The new information will be recorded and the cursor will automatically move to the next data-field. If you do not wish to change the information of a particular item press the key "↓" (SHIFT - 6). After all items on the record have been dealt with the user is returned to the main command heading.

Ordering, Listing and Printing the Records

The whole file may be listed or printed in a number of different sequences which the user may define. The particular sequencing required is defined through the command ORDER. The order of the whole file can be defined by the leading alphanumeric characters of any particular data-field. Ordering or sorting is according to the first character of a data-field which, if the same for two or more records, will be followed by the second

character etc. Precedence is given to numbers over alphabetic letters (strictly speaking precedence is given by the character code, see page 183 of the Spectrum manual).

After pressing the key "O" for ORDER the command heading will change asking the user to define the data-field for the particular ordering required. This is achieved by moving the cursor red square by pressing any key to the data-field required. When the correct data-field is identified press the key ENTER and the program will return to the main command heading. If the user has not defined a particular data-field through the ORDER command, ordering will automatically be carried out according to the first data-field.

The commands, RESET, FORWARD, BACK, LIST AND PRINT are all affected by the order. The command "R" for RESET will bring up the first record of the file. "F" for FORWARD will step forward from the present record to the next record. "B" for BACK will step backwards one record. The command "L" for LIST will list all the records of the file from the current record and according to order with each record displayed for a short time for the user to observe. The listing can be frozen at any record by pressing any key. To continue listing thereafter simply press "L". To list the whole file it is of course necessary to RESET the file to the first record.

The "PRINT" command operates similarly to LIST except that the records are printed out on the printer as opposed to being displayed on the screen. Press "P" for PRINT. To stop the printing at any stage simply press any key. As opposed to printing out the whole file or part of the file a particular record may be printed with the COPY command. Press "C" to COPY the current record display.

Selection and Data Processing

One of the most powerful features of VU-FILE is the ability to pick out, find or select a particular record or a

particular set of records as opposed to the complete file. This is achieved by the "SELECT" command. From the main command heading press "S" for SELECT and the command heading will change to ask the user to pick out a particular data-field to which the SELECT is to apply. If the SELECT is to apply to any field press "ENTER", otherwise press any key to move the cursor automatically to the data-field required and then press "ENTER".

The picking out or finding of a particular set of records is then carried out by comparing the data-fields with a "string" of characters which the user defines.

Having defined the appropriate data-field the command box will change to allow the user to return to the main commands and leave the character string selected for all subsequent operations of LIST, PRINT, FORWARD, BACK or RESET. This enables the user to carry out simple data-processing. For example, in GAZETTEER (example side B) if the user were interested in all Spanish-speaking countries of the world he could use the select option to define the "languages" data-field followed by the string select "SPANISH". If he then returns to the main command heading and enters "L" for LIST a list will immediately be shown of all Spanish-speaking countries.

Searching for or Finding Particular Records.

In many applications the user may wish to use the file like a card index. For example, if the file consists of a set of names addresses, telephone numbers, accounts and other possible business information, the user can load the file from cassette in the morning and leave it stored on his machine throughout the working day. In response to a telephone call or enquiry the record for that person or company can immediately be obtained by simply typing in a few characters from the name. This provides an immediate and powerful indexing system.

The search mode is obtained from the main command point by typing "S" for SELECT to select the

required data-field as before. After pressing ENTER the search mode command box will appear at the top of the screen. Different records can now immediately be accessed by simply entering an appropriate character string followed by ENTER. By this means individual records can be found efficiently.

Inform and Quit

Information on the status of the file can always be obtained by pressing the key "I" for INFORM.

This information includes the number of data-fields in each record, the number of records in the file, the current ordering being used and the extent in which the file is full. To return to the main command point press any key.

To return to the main menu to save the file press the "Q" for "QUIT". In many cases it may be necessary to format the file for printer output in a different way from the record format on the screen. This is to avoid using an excessive amount of printer paper. To format records for the printer enter the option 3 from the main menu when you will be asked to lay out the record for the printer in a manner precisely the same as for the record lay out on the screen. You can achieve this more compactly through option 3.

SIDE B: GAZETTEER

Run by typing LOAD "GAZETTEER"

"GAZETTEER" is an example of the application of VU-FILE. The word GAZETTEER means a geographical dictionary and the file GAZETTEER is a file of records for every country in Europe. (16K Spectrum), or in the world, (48K Spectrum), giving the name of the country, the capital city in that country, the main language spoken, the currency used and other information. This file can be interrogated and manipulated with all the commands of VU-FILE.

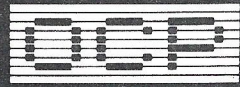
SUMMARY OF COMMANDS FOR VU-FILE

- A - Alter the current record
- B - Move backwards one record
- C - Copy the current record to the printer
- D - Delete the current record
- E - Enter a new record
- F - Move forward one record from the current record
- I - Information on all parameters of the file
- L - List all the records in the file from the current record to the last record
- O - Order the file
- P - Print the file on the printer
- Q - Quit VU-FILE to return to the main menu
- R - Re-set the current record to the 1st record in the file
- S - Select a data-field for searching for a record by a character string.

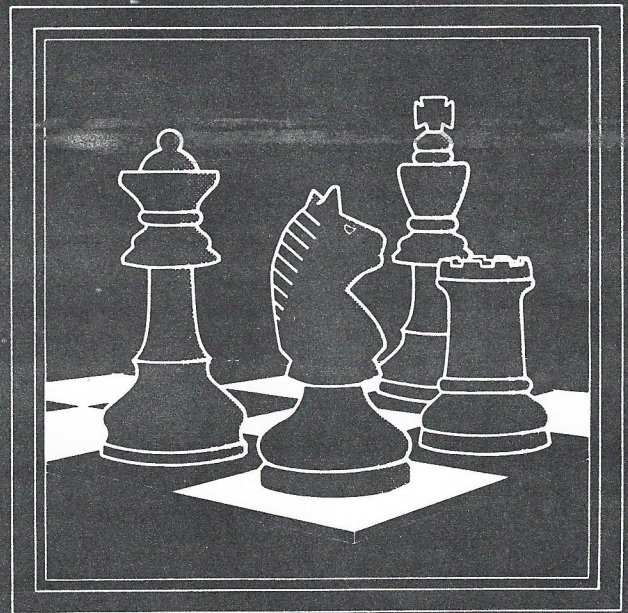
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BIBL: 1/4



CHESS THE TURK



ZX Spectrum 48K and
Timex TS 2000

THE TURK

A CHESS PROGRAM FOR THE 48K ZX SPECTRUM/TS2000

*And say besides that in Aleppo once
Where a malignant and a turbaned Turk
Beat a Venetian and traduced the stage*

Othello — W. Shakespeare

INTRODUCTION

The original Turk was an eighteenth century automaton, a life-size mechanical figure resplendent in Turkish costume and seated behind a wooden cabinet on which a chess board and pieces were placed. Built in 1769 for the amusement of the Vienna Imperial Court by an engineering genius, Wolfgang von Kempelen, the machine played chess with all-comers; moving the pieces with its left hand whilst the doors of the cabinet would be opened to reveal the workings of numerous wheels and cogs.

The moves it made were, no doubt, the product of a human player but the fascination lay in trying to guess where the human was hidden, how he followed the game, how he made the automaton move the pieces and how, given these handicaps, the player still managed to win most of his games. Perhaps a small boy was concealed within the body of the figure and was signalled moves by a real chess master amongst the audience. Or perhaps . . . but no matter — however it was done it was a wonderful trick.

You now hold in front of you the twentieth century equivalent of that Turk — a chess playing computer. No trickery is involved — just the amazing power of machine code and Sinclair hardware.

The Turk challenges you to a game of chess!
Do you dare to play the Turk?

LOADING INSTRUCTIONS

Insert cassette into Player, type **LOAD** " " **ENTER** . The program will take approximately 5½ minutes to load, respond to the prompt "are you using a colour or black and white television?" and the MENU will be displayed as below:***

— THE TURK: MENU —

Select one of the following:—

1. New game
2. Continue old game
3. Blitz chess
4. Demo:— the Turk plays itself
5. Input sequence of moves
6. Replay moves in the game
7. Edit board or setup new position
8. List moves to screen
9. List moves to printer
10. Line print the board
11. Save moves to tape
12. Save board to tape
13. Load moves from tape
14. Load board from tape

Keying in the number of your choice followed by **ENTER** selects the MENU option. The **DELETE** function will operate in case you change your mind.

***NOTE: In addition to our CHESS—THE TURK program we have included a routine that shows off to advantage the versatility of the ZX Spectrum. This demonstration program follows after The Turk on both sides of the cassette; to see for yourself type **LOAD** " " **ENTER** . We hope you enjoy it.

OPTION 1 — NEW GAME

Respond to the prompt and select a game level followed by **ENTER**. Level 1 is the easiest and level 6 is the hardest (and the slowest).

Approximate response times are:

Level 1	a few seconds
2	10 seconds
3	90 seconds
4	10 minutes
5	60 minutes
6	6 hours

BLACK OR WHITE

The Turk will ask you to choose a colour, respond (upper or lower case will do) and the game begins. The board will be laid out as normal and if the user has chosen white the Turk asks for a move.

HOW TO MOVE

Moves are entered using standard algebraic notation, a move being specified by two pairs of co-ordinates. Thus if white wishes to move his King's Pawn two squares forward he simply types:

e2e4 or E2E4 followed by **ENTER**
(the Turk recognises both)

If the move is legal the piece will flash and move across the board. Illegal moves are signalled and the Turk will ask for another move to be entered.

THE TURK REPLIES

The Turk will now compute its responding move. The move being considered is displayed just below the two clocks. The level of play is displayed above the clocks.

The game progresses with the user and the Turk moving alternately. If any move attacks the opponent's King the word CHECK appears on the screen.

HELP: Typing "HELP" causes a move to be suggested. If the user decides to make the suggested move he presses **ENTER**, if not he can remove it using **DELETE**.

BACK: Typing "BACK" causes the board to return to the state it was one move ago. This enables the user to easily correct moves made by mistake.

QUIT: Typing "QUIT" returns the user to the MENU.

The game continues until one side is mated or both Kings are stalemated. The losing King is toppled onto its side and the Turk returns to the MENU.

CASTLING, "EN PASSANT" and PROMOTION

CASTLING: This is accomplished by moving the King — the Rook will move automatically. A player may castle at any time provided that normal conditions are met i.e.

1. The King and the Rook have not been moved.
2. There are no men between King and Rook.
- and 3. The King is not in check, will not pass through check nor will end up in check.

"EN PASSANT": "En passant" captures are made according to the rules of chess, to re-cap for the less experienced these are as follows:

1. The move can only take place after the initial two-square move of a Pawn.
2. The move can only be made by an opposing Pawn that could legally have captured its adversary if it had moved one square.
3. The right to take "en passant" must be exercised at once or the privilege is lost.

PROMOTION: When a Pawn reaches the eighth rank the Turk asks what Piece it is to be promoted to — namely Knight, Bishop, Rook or Queen.

OPTION 2 — CONTINUE OLD GAME

Similar to Option 1 except that the pieces are not set up in their starting squares. This option is used in conjunction with options 5, 6 and 7.

OPTION 3 — BLITZ CHESS

In this mode both clocks count down from a starting time of 5 minutes. Whoever runs out of time first loses the game, so the player must mate or be mated before this happens. The Turk is rather good at this particular game!

OPTION 4 — DEMONSTRATION MODE

Here the Turk actually plays itself. Holding down any key returns the program to the MENU.

OPTION 5 — INPUT SEQUENCE OF MOVES

In this mode the Turk asks for both black and white's moves. Here two people could play each other at chess, the Turk simply displaying the board, keeping the times and recording the game.

OPTION 6 — REPLAY

In this mode the Turk replays the moves stored in its memory. Holding down the 'S' key freezes replay, while pressing the 'F' key speeds it up, any other key causes a return to MENU.

OPTION 7 — BOARD EDITOR

Fully prompted, this mode allows the user to set up the board as he wants it, either starting with a full army and amending their numbers and positions or locating the pieces on a clear board.

Ideal for tackling newspaper chess problems or replaying past games of the masters.

OPTION 8 — LIST MOVES TO SCREEN

The Turk lists all the moves in the game using standard chess notation, i.e.

X indicates a capture
0 - 0 indicates castling on the King's side
0 - 0 - 0 indicates castling on the Queen's side
ep indicates an "en passant" capture
= Q indicates promotion to Queen

OPTION 9 — LIST MOVES TO PRINTER

The Turk lists all moves to the printer (if fitted), using standard chess notation as in option 8 above.

OPTION 10 — LINE PRINT THE BOARD

This mode prints out the actual chess board showing the positions of the various pieces as well as the co-ordinates.

OPTION 11 — SAVE MOVES TO TAPE

All the moves in the game are saved onto cassette.

OPTION 12 — SAVE BOARD TO TAPE

The current board position is saved onto cassette. This is useful for users who have had to suspend a game and wish to continue it.

OPTION 13 — LOAD MOVES FROM TAPE

This complements option 11 and loads the saved moves into the computer. This enables the Turk to perform options 6, 8 and 9 for the loaded game moves i.e. replay and list moves to the screen or printer.

Old games can be continued via option 2 (continue old game) after option 6 (replay) has been completed.

OPTION 14 — LOAD BOARD FROM TAPE

This complements option 12 by re-loading board positions from tape back into the computer making it the current board position for option 2.

The last 4 options are used if one wishes to make a permanent record of an interesting game or to store "half-finished" games for completion at a later date.

HOW TO?

CHANGE SIDES DURING A GAME

Type "QUIT", return to MENU, select option 2 then choose the opposite colour.

REMOVE THE TURK'S QUEEN (shame on you!)

Type "QUIT", return to MENU, select option 7 and prompt 3 (Previous Position), move cursor to the offending Queen's square and press "C" followed by **ENTER**, respond to prompts and return to your game via option 2.

GO BACK TO SOME POINT IN THE GAME

Type "QUIT", return to the MENU and select option 6. Hold down any key at the point you wish to start playing from, select option 2.

NOTE: to go back one move only type "BACK".

CHANGE LEVEL DURING PLAY

Type "QUIT", return to MENU and restart the game via option 2 at the new level.

If you manage to break out of the program then type **GOTO** MENU, this will get you started again.

Well that's it — all you need to know. May I wish you many pleasant and challenging hours playing chess with the Turk.

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Whilst we try very hard to provide a totally bug-free program it is always conceivable that there is one bug that we have missed. Users who feel that they have identified such a bug or who would like to find out more about our expanding range of super-friendly programs please contact us at the address below.

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