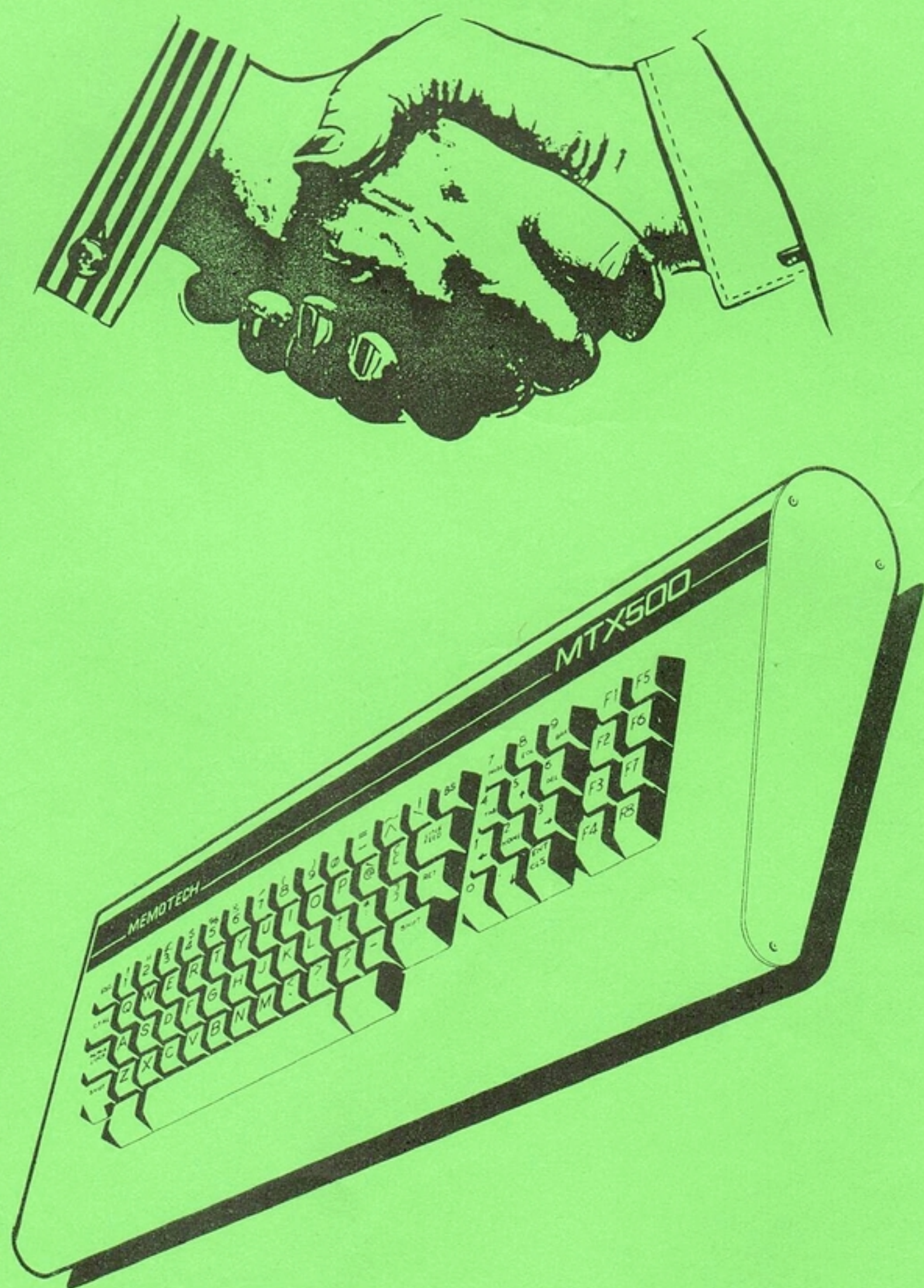


memorad

Memotech Computer User Club Magazine



MEMOTECH
MTX
SERIES



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EDITORIAL

Well, our move is over ! We are now settled in our new office and after two weeks of hectic activity we are frantically trying to catch up on the back-log of orders, and work. Later on in the magazine you will find a map of where we are situated. If you would like to give us a call please ring first - because we have contracts with other companies, I would hate you to turn up and not be allowed to see us due to the fact that we are holding a training session, or a meeting. However, if you give us a ring we will do our best to be available. NOTE THAT OUR NEW TELEPHONE NUMBER IS:- 0282 698849.

Because our offices are now some way from where we all live we will have to have a different situation for "phone-ins". We will now operate on a system of if we are there we will answer the phone. Our normal office hours will still apply but evening and weekend calls will be on the above understanding.

Now, to bring you up-to-date. It now seems apparent that Memotech have lost the Russian order. From press reports it has been established that the Japanese, with MSX, have captured the first order. As expected, with the oriental countries, they have managed to offer a far lower price for their systems. We have not yet managed to confirm if it is MSX 2 or the version now available in this country. The area is still a bit grey, Memotech have been asked, by the Russians, to stand by for another quote in a few months time What this means is not clear at the time of writing. All I can promise is that we will keep you informed.

There is still no news on the User Manual. Memotech still appear to be dragging their feet. The 'hearing' has been ajourned twice, and until the matter is brought before arbitration there is nothing the publishers can do. If you have ordered a manual and would like a refund, or would like to order something else please write in stating your INVOICE NUMBER and we will deal with your request. We are really sorry about this situation but we cannot get Memotech to budge from their present attitude.

We have managed to aquire the final stocks of Peter Goode's book, and once these are exhausted it means that there isn't a book ready available for the Memotech. Our own position, with regard to the planned "Advance Programming Book", is one of reluctance to take the plunge. We paid for the Crib Card to be published, and although it is on sale in the shops we still haven't broken even. In fact, we need to sell another 150 before we have covered our costs. Still, we are considering the matter carefully, and now that the book is finished, we will let you know in the next edition if we have gone ahead with the project.

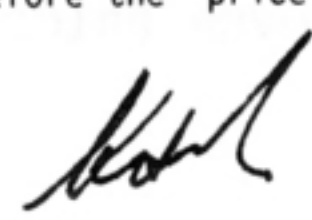
Because the holiday period is now upon us this edition is a bit smaller than was planned but we shall be back next month with a bumper Birthday Edition.

I, personally, would like to thank all members who have taken the trouble to write in with suggestions regarding software sales. You have really turned up trumps and have given me some very useful food for thought. I often wish I could have you working here, at Syntaxsoft, and we just may be able to get the Memotech to its rightful position in the U.K.

As most of you know, we started a raffle for a SDX system in the last edition and this continues through into this month. Unfortunately, to date, we have only received 90 contributors. It appears that nothing has changed since the last time we ran a raffle. Never the less, you have still time to enter. Surely the chance of owning a disc drive for £1 is worth the effort ? If you can't find a £1.00 note write your number on the back of a cheque ! We don't want to make anything out of it: If we get enough to cover two drives we will draw two members, otherwise we will offer prizes to the value of the remainder in software. No matter what happens, if we have to stand the loss, the winner will receive a disc drive ! So come on. The SDX does not need any other hardware. Just plug it in and away you go !

On the subject of the SDX, any member who ordered one, and did not receive it before the price was dropped WILL GET A REFUND. We have negotiated with Memotech and as soon as all is settled we will send you a refund from here. Any member who paid full price and received the drive before the price drop will be able to purchase the new CP/m & 80 column card less £50.00.

We would like to welcome all our friends, who have just joined, from Australia, New Zealand, Finland & the Middle East.





 HIGH SCORES : HIGH SCORES...Can you do better ??

GOLDMINE	8,995	Daljinder Singh
ASTRO-PAC	185,990	Richard Nash
BOUNCING BILL	128,142	Alan Dobson
SNAPPO	111,670	Richard Franks
KNUCKLES	999,999+	Sally Street
NEMO	17,610	Richard Nash
COBRA	8,924	Richard Nash
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TAPEWORM	168,515	Alan Dobson
TOADO	137,720	Andrew Lilley
POT HOLE PETE	75,080	Alan Hill
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CONTINENTAL RAIDERS	106,240	Sean Haverty
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MINEFIELD	1,500	David Nash
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FIREHOUSE FREDDIE	29,620	T.Eriksson
QOGO	21,360	T.Eriksson
ARCADIANS	15,100	Richard Nash
MISSILE COMMAND	12,110	Richard Nash
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HUNCHY	7,908	R.Harmer
SON OF PETE	2,200	R.Harmer
HAWKWARS	8,800	R.Harmer
CHAMBEROIDS	Completed 11 mins	N.Bowles
ESCAPE FROM ZARCOS	15 Items	R.Harmer
MISSION OMEGA	9,350	R.Harmer
ICEBURG	17,431	Alan Dobson

GENPAT Opening Times

MONDAY	9.15am	till	12.30pm	1.30pm	till	6.00pm
TUESDAY	9.15am	till	12.30pm	1.30pm	till	6.00pm
WEDNESDAY	9.15am	till	1.00pm	CLOSED		
THURSDAY	9.15am	till	12.30pm	1.30pm	till	6.00pm
FRIDAY	9.15am	till	12.30pm	1.30pm	till	6.00pm
SATURDAY	11.00am	till	1.30pm	If we are here we will answer.		

Evening sessions: If we are here we will answer your call

GENPAT HIT LIST

This chart is compiled purely on the sales of software within the Club and will be updated every month.

Adventure

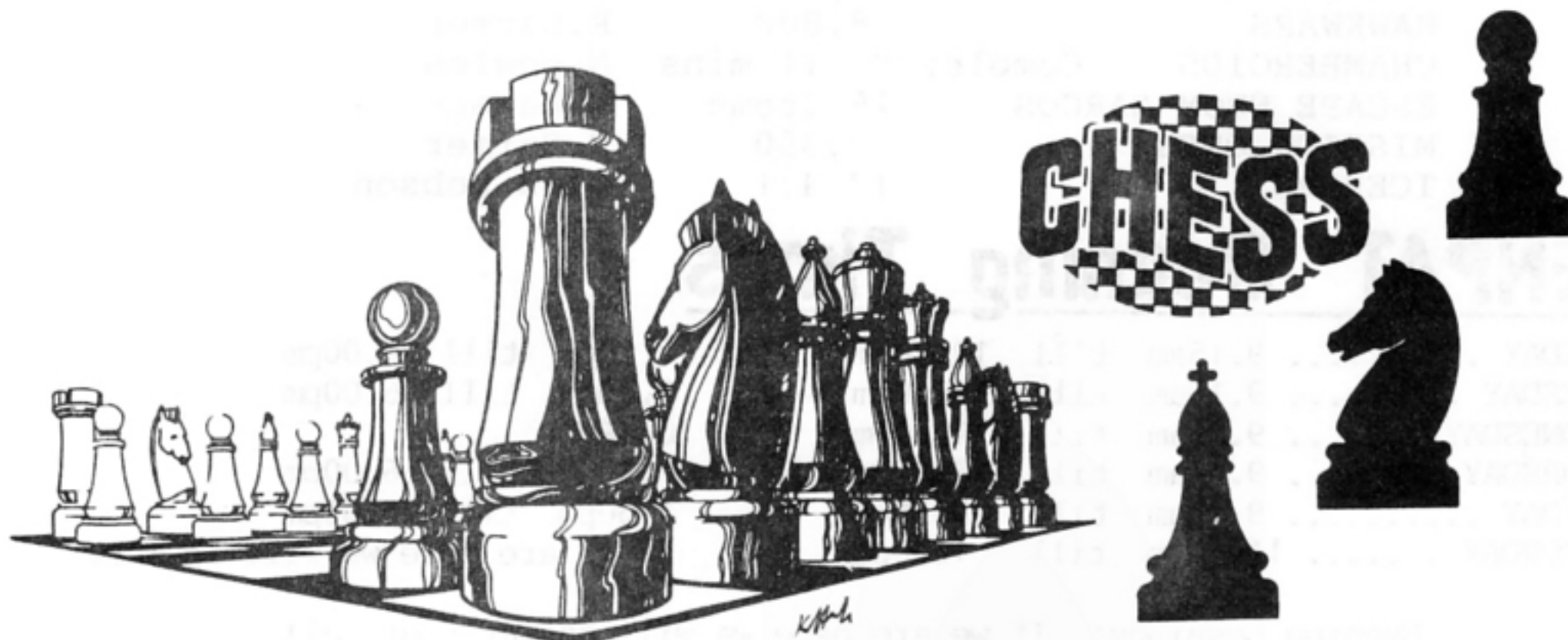
- | | | |
|----|---------------------|-------------|
| 1. | EMERALD ISLE | LEVEL 9 |
| 2. | ADVENTURE QUEST | LEVEL 9 |
| 3. | MURDER AT THE MANOR | SENTIENT |
| 4. | THE KEYS TO TIME | SENTIENT |
| 5. | SNOWBALL | LEVEL 9 |
| 5. | ALICE | CONTINENTAL |
| 7. | DUNGEON ADVENTURE | LEVEL 9 |

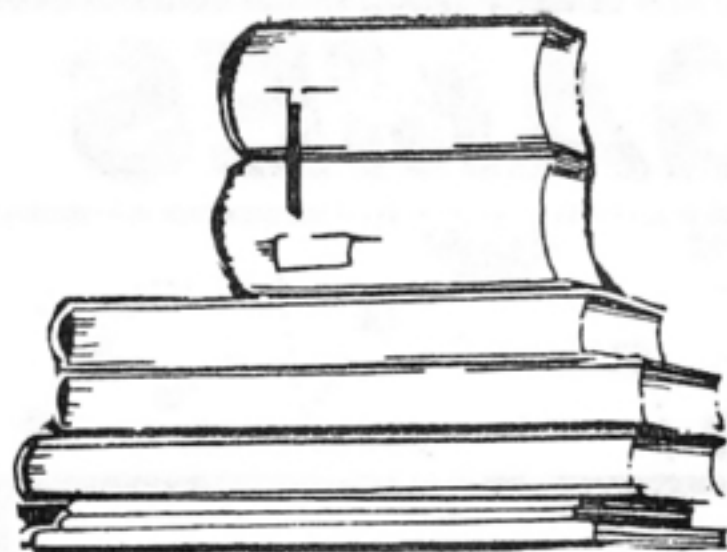
Arcade etc.

- | | | |
|----|--------------------|-------------|
| 1. | ESCAPE FROM ZARKOS | MEGASTAR |
| 2. | MEMOSKETCH | SYNTAXsoft |
| 3. | FIG FORTH | SYNTAXsoft |
| 4. | QOGO 2 | MEGASTAR |
| 5. | AGROVATOR | SYNTAXsoft |
| 6. | SON OF PETE | MEGASTAR |
| 7. | EDASM | SYNTAXsoft |
| 8. | EXTENDED BASIC | SENTIENT |
| 9. | GRAPHICS | CONTINENTAL |
| 10 | FATHOMS DEEP | MEGASTAR |

Educational

- | | | |
|----|--------------|-------------|
| 1. | SPELLICOPTER | SENTIENT |
| 2. | FIRST WORDS | CONTINENTAL |
| 3 | PHYSICS | CONTINENTAL |





FORTH BOOKS

Dr. B. Houghton

DISCOVER FORTH by Thom Hogan. Published Osbourne/Mcgraw Hill £10.95

This is the most elementary of the books I found. If, like myself, you already know FORTH but don't know very well, then it is still worth reading, but probably not worth buying. It gives a very good introduction to the language especially as regards the theory of stack operations, and the general structure of the language.

FORTH PROGRAMMING by Leo J. Scanlon. Published Blacksburg £12.00

This is definitely an important book. The book is readable, gives clear explanations, and gives a large number of example words, most of which are practically useful and some - S, ARRAY, CARRY, DEPTH - are very important. Most are explained in detail, and most are given in both FORTH 79 & FIG-FORTH. It should be noted that the disc access routines of MTX FORTH appear a little idiosyncratic and chapters on disc access, in all these books, should be read somewhat cautiously: some of the routines work and some do not!

FUNDAMENTAL FORTH & FORTH TECHNIQUES by Richard Olney & Michael Benson Published Pan £6.95 each.

These two books are meant to be read in sequence. They are tremendously detailed and describe very advanced techniques: their final tour-de-force is a LOGO compiler! However, there are mistakes in them, and some of the programs appear not to have been practically tested [a set of fixed-point routines involves assumptions about the word NUMBER which are certainly untrue in both FIG-FORTH & FORTH-79] They are, however, valuable reference books for anyone who already knows FORTH, and their examples of **How to write programs which can afterwards be read** make them well worth borrowing, even if one might think twice about buying them.

Dr. Houghton managed to pick all the above books out of his local library.... why don't you try doing the same ?

Air Sea Rescue

The Missing Line

We have quite a few members ring in to say that their copy of the program AIR SEA RESCUE had been corrupted on page 31. To save any further annoyance here34 is the offending line

```
3150 IF R+(AN/2)<P*40 THEN LET R=R+(P/2) ELSE IF R+(AN/2)>P*40+2 THEN LET R=R-1.5
```


★ MEGASTAR GAMES

It has been many years now since manufacturers started to advertise. In that time they all said that their products were the best, which is fair enough. When you actually purchase a product, you sometimes find that it is are not as good a it is made out to be.

As soon as the customer realises that the goods are not as good as they were advertised to be, they stop buying the goods and the manufacturer begins to get a bad name. Eventually people will stop buying all together because they realize that the product is not as good as advertised.

It takes a brave company to say that their products actually are as good as they are claimed to be. The people who started MEGASTAR GAMES have watched and learned over the last two years-if you start with bad software then the customer will lose trust in your products. With this in mind we have spent a lot of time on our first games which we are sure you will see when you purchase them.

The following titles are now available.

SON-OF-PETE: (the sequel to P-PETE) Help Bert find Pete and rescue him from the meanies in Petes mansion.

ESCAPE FROM ZARKOS: Can you find all the parts of your space ship and escape from the planet ZARKOS.

QOGO-2: Help Qogo bounce around filling in the squares as he goes. This one has a prize for the first person to complete all fifty screens.

CHAMBEROIDS: Fly around the rooms looking for the passes, can you find the key and escape from the Chamberoids?

FATHOMS DEEP: Swim your way to riches in this highly entertaining game.

SURFACE SCANNER: Protect the humonoids from the pods in this very fast scrolling arcade game.

We have alot of new titles under development which will be launched soon and we are sure that you will be astounded by them....

For a free software catalogue please send an S.A.E to us at the address below.

***** ALL SOFTWARE IS AVAILABLE FROM GENPAT AT DISCOUNT PRICE*****

MEGASTAR GAMES ★ J. WILLS ★ 29 TAPHOUSE AVENUE ★ WITNEY ★ OXON

Need we say more?

STARTING FORTH K. JONES

This month we'll look at some more of the maths functions which FORTH has to offer. We've already seen the standard operators (*,/,+ and -) and now we'll examine some of the more esoteric things that FORTH offers.

The first one we'll examine is `"*/"` which is called "star-slash". Star-slash is a scalar, so called because it uses an intermediate double number. What this means is that values which would otherwise overflow the usual single length range can be used because a double number is used to hold the result of the multiplication. Let's look at an example to make this clearer. Suppose we wanted to find 75% of 1000. We can not use `(75/100)*1000` because FORTH is integer only, therefore the first part of the equation would leave 0 on the stack. What about `(1000*75)/100` ? This translates as

```
1000 75 * 100 /
```

Try it. Can you see why the result is wrong? The reason is that as we are working with single numbers the first part overflows. Now to try it with star-slash

```
1000 75 100 */
```

If you type this you'll see that we get the correct answer.

The other scalar which FORTH offers is `"*/MOD"`, pronounced "star-slash-mod". Star-slash-mod operates in the same way as star-slash but it leaves the remainder of the division on the stack, below the result.

Two non-scalar functions are `"/MOD"` and `"MOD"`. `/MOD` will leave the result of a division and its remainder, and `MOD` just leaves the remainder. So

```
22 5 /MOD
```

will leave 4 on top of the stack and 2 below it. Just using `MOD` will leave 2 on the stack. One use for these two is to test whether a number is odd or even. In the June edition of "FORTHWRITE FIGUK" is a problem which is as follows. You are asked to write a word which starts with any number. If the number is even then it will be divided by two. If it is odd then multiply by three and add one. Can you see how we can use `/MOD` and `/` or `MOD` to help us solve this problem ? We'll be coming back to this at a later date.

To date I've received two letters (thank you Mark Adams and Julian Barkway), both critical of my not providing a way of saving a memory copy of FORTH. So in order to quell this tide of abuse I now present routines to enable you to do this. They are listed below and once loaded will bring down the COLD start parameters so that they are within the protected dictionary. How to use them follows the listings.

SCR #1

```
0 FORTH DEFINITIONS HEX
1 CREATE (TAPE) SMUDGE
2 C5 C, ( PUSH BC. ALWAYS PRESERVE BC ACROSS WORDS )
3 21 C, 4100 , ( LD HL,#4100. #4100 IS START OF BLOCK )
4 11 C, 0000 , ( LD DE,LENGTH. SEE BELOW )
5 01 C, 0000 , ( LD BC,DATA. SEE BELOW )
6 ED C, 43 C, FD67 , ( LD [#FD67],BC )
7 CD C, 0AAE , ( CALL #0AAE )
```



```

3 C1 C,      ( POP BC.  ALWAYS RESTORE BC AT END OF WORD )
4 C3 C, 412C , ( JP NEXT.  RETURN POINT FOR ALL MACHINE CODE WORDS )
10
11 : SAVE-MEM
12 (TAPE) 5 + !
13 0 (TAPE) 8 + !
14 (TAPE) ;
15

```

SCR #2

```

0 : VERIFY-MEM
  (TAPE) 5 + !
2 101 (TAPE) 8 + !
3 (TAPE) ;
4
5 FORTH DEFINITIONS DECIMAL
6 LATEST 12 +ORIGIN !
  HERE 28 +ORIGIN !
8 HERE 30 +ORIGIN !
9 EDITOR 6 + 32 +ORIGIN !
10 HERE FENCE ! ;S

```

12

4

FORTH: LOAD

Before I explain the routines I'll explain the symbols ' ', " and ";S".
 pronounced "arrow" means continue loading with the next screen. ;S means stop
 loading at this point, but it has another use which I'll cover at (need I
 continue this sentence ?) a later date.

The routines are as follows:-

TAPE is the tape primitive for the other two routines. It requires nothing
 on the stack, but it must NEVER be called on its own, it must always be called
 from one of the other two -MEM routines.

SAVE/VERIFY -MEM are the tape routines which set up system variables for the
 SAVE/VERIFY ing of the FORTH kernal. They all require a number on the stack.

To save a memory copy of FORTH after the routines have safely compiled (this
 need only be done once for the reason given above) then type

```

HEX
HERE 4100
4094 !
2 EMIT

```

With this you will exit to BASIC. Type <CTRL> L to clear VS 0 and save the
 loader program by typing RUN. Then when it has saved stop the tape. DO NOT
 REWIND THE TAPE and note the number on the tape counter. Reset the computer
 and type VS 5:RAND USR (16640). You will then re-enter FORTH via a COLD start
 (RAND USR (16645) for a warm start, but don't re-enter this way if you've reset
 the MTX). Then start the tape and type

HEX
HERE 4100 - SAVE-MEM

This will then save the kernal. To verify rewind the tape to the number which you noted from above and type

HEX
HERE 4100 - VERIFY-MEM

And restart the tape. If FORTH replies with ok then all's well. If not then you'll exit to BASIC and I'm afraid that you'll have to start all over again by reloading the original FORTH and recompiling the above screens unless you've saved them to tape.

You now have a memory copy, with loader of your own personalised FORTH system.

Lines 5 to 10 on screen 2 are worth noting. They are the words which reset the COLD start parameters, and I would recommend that you type them in each time you use SAVE-MEM.

Yet another tape program. Julian quite rightly pointed out that RAM-DISC has no way of VERIFYing, so here it is

SCR #1

```
0 FORTH DEFINITIONS HEX
1 CREATE VERIFY SMUDGE
2 C5 C,
3 21 C, D800 ,
4 11 C, 1800 ,
5 3E C, 1 C,
6 32 C, FD67 ,
7 32 C, FD68 ,
8 CD C, 0AAE ,
9 C1 C,
10 C3 C, 412C ,
11
12
13
14
15 ;S
```



This will then verify screens, saved using the SAVET command, in the usual way.

That's your lot for this month. The EDITOR commands which I should have done in this article will be in next months as well as the final section on maths.

As a final word can I ask that if you want a personal reply then please enclose a stamped, self addressed envelope (thank you Mark for doing just that), otherwise all our communications will be through these articles. Bye for now. ★

VAEUE

ONE MCP-40 PRINTER

SEND £60.00 TO MR. G. PASSMORE, 14. DAVY CLOSE, TORPOINT,
CORNWALL. PL11 2NQ.

BASIC GRAPHICS*Part 3***Michael Gaut**

This month, it may be a good idea to backtrack over some of the ground previously covered. The only reason for this being that we have covered many things in two issues, and, not surprisingly, many people are being left behind. To overcome this, I'm going to work through a few more examples in the hope that it will make everything perfectly clear.

The first question I was asked is why we need turtle graphics at all? I think this is best answered with an example. In this case, to draw a square of a certain size, and position on the screen.

```
10 VS 4:CLS
20 LET X=100:LET Y=100
30 LET LENGTH=50
40 LINE X,Y,X,Y+LENGTH
50 LINE X,Y+LENGTH,X+LENGTH,Y+LENGTH
60 LINE X+LENGTH,Y+LENGTH,X+LENGTH,Y
70 LINE X+LENGTH,Y,X,Y
80 PAUSE 5000
```

If you try that example, then by altering the values in lines 20 and 30, you should be able to draw the square anywhere on the screen. Although this works perfectly, try altering it to draw a square with slanting sides, instead of vertical and horizontal sides. If you manage it, then you certainly shouldn't have to read this beginners' guide !!

Going back to the question, this is where turtle graphics come into their own. For instance, let's rewrite the square drawing program using turtle graphics.

```
10 VS 4:CLS
20 ANGLE PI/2
30 LET X=100:LET Y=100
40 LET LENGTH=50
50 PLOT X,Y
60 FOR F=1 TO 4
70 DRAW LENGTH
80 PHI -PI/2
90 NEXT F
100 PAUSE 5000
```

Now alter the program to make it draw slanted squares. Easy isn't it! As you can see, the ANGLE command in line 20 specifies the starting direction. If we change the value to $\text{PI}/4$, then you can see that the square produced is at 45 degrees. If you cast your mind back to the last issue, you will remember that turtle graphics always draw their lines relative to the current position. This means that to the routine which draws the square (lines 60 to 90), the starting direction and position are irrelevant. Obviously, this is a great advantage over normal graphics and is probably the reason why turtle graphics were invented. Anyway, try adding these lines to the last example.

```
15 FOR G=PI*2 TO 0 STEP -.1
20 ANGLE G
100 NEXT G
200 GOTO 200
```

Try changing the values in line 15, but be sure that the value after STEP is negative. As you can see,

following routine.

```
10 VS 4:CLS
20 FOR F=0 TO PI*2 STEP PI/16
30 CIRCLE 128+COS(F)*30,96+SIN(F)*30,40
40 NEXT F
100 GOTO 100
```

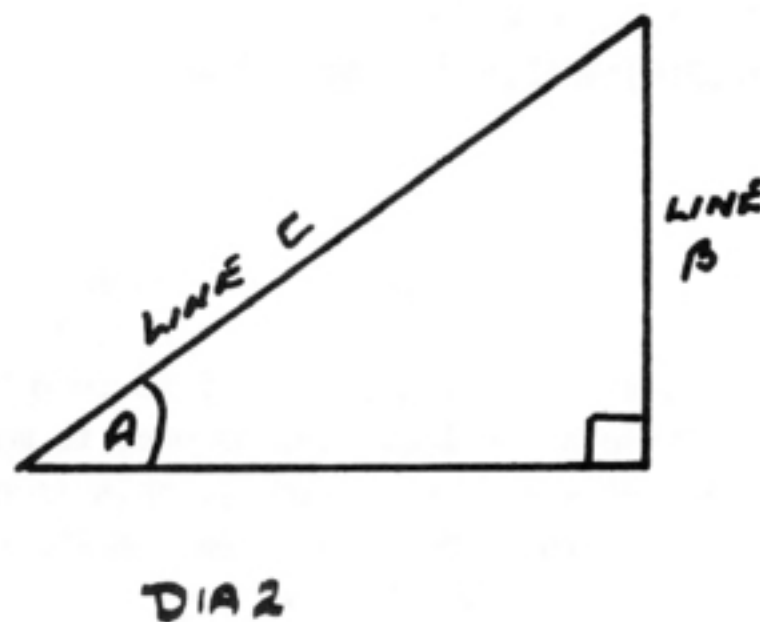
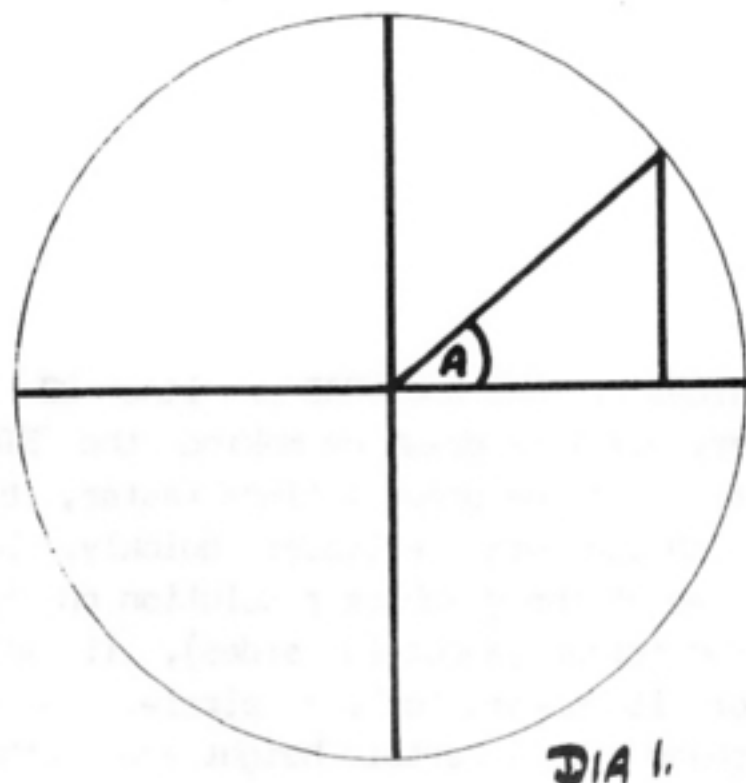
When it has finished drawing, press <BRK> to stop the program. In future, all programs will finish in this way. A few words of explanation are needed on this example. As the function of lines 10,40 and 100 should be clear by now, I will just explain lines 20 and 30.

LINE 20

The function of this line, as seen in most examples, is to set up a loop, which counts from 0 to $PI*2$ in steps of $PI/16$. The value $PI*2$ is the radian form of 360 degrees. ie a full circle. The reason for this value is that the pattern is created by going round a central point on the screen, drawing circles as we go. The value $PI/16$ is the amount by which we go round the outer circle each time. If you alter it to $PI/8$ or $PI/32$ then the results should explain it better than I can !

LINE 30

This line actually draws the circles at the correct place on the screen. The COS and SIN functions in this case are used to move the circle around the screen in a circular pattern. Have a look at diagram one.



Imagine that the radius of the circle equals 1 cm. The angle A could be any value between 0 and 359, but for now, just look at the top right quadrant where the angle must be between 0 and 90 degrees. If we now draw a line at an angle of A degrees from the horizontal to the edge of the circle, and then drop a line down from that point perpendicular to the horizontal line, we will have made a right angled triangle (one with an angle of 90 degrees in it). The triangle is shown in diagram two

The value generated by $SIN(A)$ would be equal to the length of line B divided by the length of line C. Lines B and C are known as the opposite and the hypotenuse sides respectively. Although this may not mean too much, the actual use of SIN when generating circles is to return a value between -1 and 1 for any angle. If we multiply this by the vertical radius of the circle required, then we obtain an offset to add to the vertical position of the centre of the circle. As the value of SIN could be negative, the value we obtain could also be negative, meaning that the position of that part of the circle is below the centre of it.

All we require now to enable us to draw a circle is a routine to work out the offset to add to the horizontal position of the circle. As you may expect, this is done using the COSine function. Look at the diagram to see how COSine works.



DIA 3.

In the diagram, the right angled triangle is constructed exactly the same as with SINE. The difference is that the value of COSine for any angle is equal to the length of line D over the length of line C. Lines D and C are called the adjacent and hypotonuse sides respectively. The value returned by COS is also in the range -1 to +1. The offset to be added to the horizontal position of the centre of the circle for any point on the circle can be found by multiplying the value returned by COS for that angle, by the horizontal radius of the circle.

As you may have noticed, it is possible to define the height and width of the circle independently.

This allows us to create ellipses. Try changing the values in line 30 of the last example to see the effect on the overall shape produced.

Anyway, now that you know how a circle is produced, let's make a routine to draw ellipses instead of circles. The most accurate way of doing it is like this:-

```
10 VS 4:CLS
20 LET XRAD=50:LET YRAD=50:LET XPOS=100:LET YPOS=100
30 FOR F=0 TO PI*2 STEP PI/256
40 PLOT XPOS+COS(F)*XRAD,YPOS+SIN(F)*YRAD
50 NEXT F
100 GOTO 100
```

Although this routine is slow, it is possible to change the values of XRAD and YRAD in line 20 to produce any sort of ellipse or circle. Line 30 ensures that every pixel is drawn by making the STEP value extremely small. If you change it to read PI/64, the circle should be drawn 4 times faster, but it will have pixels missing. So, we need to make a routine which can draw ellipses quickly, but doesn't miss any pixels. Surprisingly, this is quite easy, because of the graphics resolution on the MTX. Although it is high, if we draw a multi-sided shape on the screen (about 20 sides), it will appear more like a circle. The more sides the shape has, the more it appears to be a circle. Going off this information, we can write a routine to draw a 64 sided shape with a certain height and width.

```
10 VS 4:CLS
20 LET XPOS=100:LET YPOS=100:LET XRAD=40:LET YRAD=40
30 FOR F=0 TO PI*2 STEP PI/32
40 LINE XPOS+COS(F)*XRAD,YPOS+SIN(F)*YRAD,XPOS+COS(F+PI/32)*XRAD,YPOS+SIN(F+PI/32)*YRAD
50 NEXT F
100 GOTO 100
```

The routine works by effectively splitting an ellipse with radii of XRAD, YRAD into 64 pieces. The effect of this would be similar to a cartwheel with 64 spokes. The command in LINE 40 joins the ends of two spokes together. The loop in lines 30 and 50 ensure that line 40 knows which 'spokes' to join together. Line 40 needs a little explaining because it seems very complicated. In fact, it is relatively simple.

The first two coordinates, are taken from the circle routine and should be obvious. The last two coordinates refer to the next 'spoke' in the circle, because if the current spoke has an angle of F radians to the horizontal, then the next spoke will have an angle of F+PI/32 because each spoke is PI/32 degrees further round the circle than the previous one.

The values in Line 20 govern the centre of the ellipse and the X and Y radii. If you alter all three occurrences of $\pi/32$ to $\pi/8$ or $\pi/16$ then you will be able to see how the ellipse is drawn. Changing the values to $\pi/64$ or $\pi/128$ will produce more accurate ellipses, but will be slower.

Anyway, that is all for this month. In the next issue we shall be looking at user definable graphics and how to use them. Until then, keep experimenting and have fun !! ★

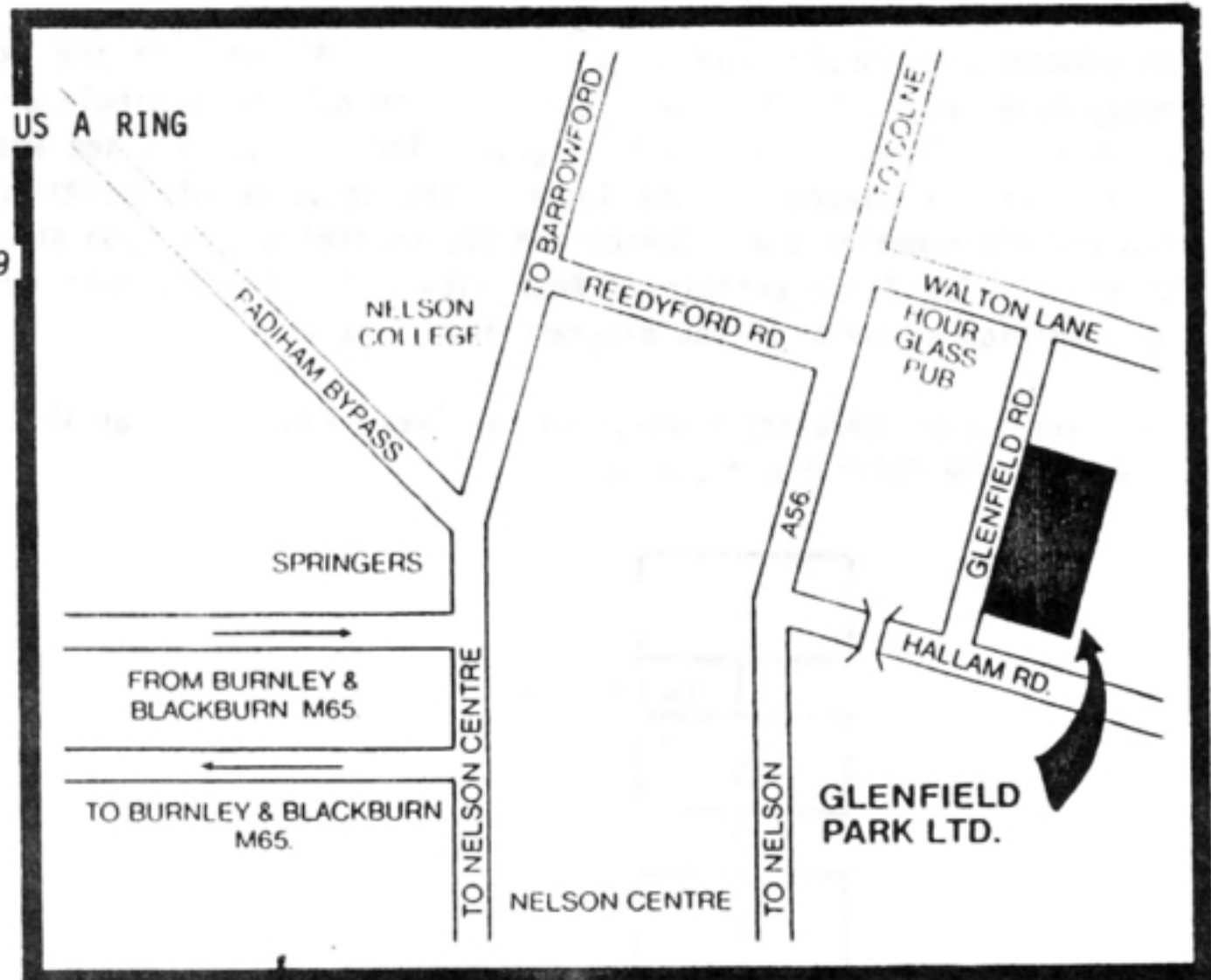
THIS IS WHERE WE ARE !

IF YOU WANT TO CALL ON US PLEASE GIVE US A RING FIRST.

OUR NEW TELEPHONE NUMBER IS (0282) 698849

OUR ADDRESS IS:

SYNTAXsoft
UNIT 109
GLENFIELD PARK,
GLENFIELD ROAD,
NELSON
BB9 8AR



Competition

The competition involves using MEMOSKETCH

We want to produce a calender for Christmas and would like all the pictures to be from the Memotech. What we want you to do is design a suitable picture using MEMOSKETCH and submit it to us for judging.

We are giving you plenty of time to prepare for this competition because the final date for submitting your entries is OCTOBER 20TH.

There will be prizes awarded to each entry that is used in the calender that means 12 prizes.

Once you have designed your screens DON'T THROW YOUR COPY AWAY. IF YOU WIN WE WILL REQUIRE YOUR DESIGN ON TAPE TO ENTER INTO THE CALENDER.

If you haven't got a printer then send your entry on tape and enclose a SAE for return when we have down loaded it. The same applies to disc entries.

So all you budding Rembrandts GET CRACKING !!

STRUCTURED PROGRAMMING

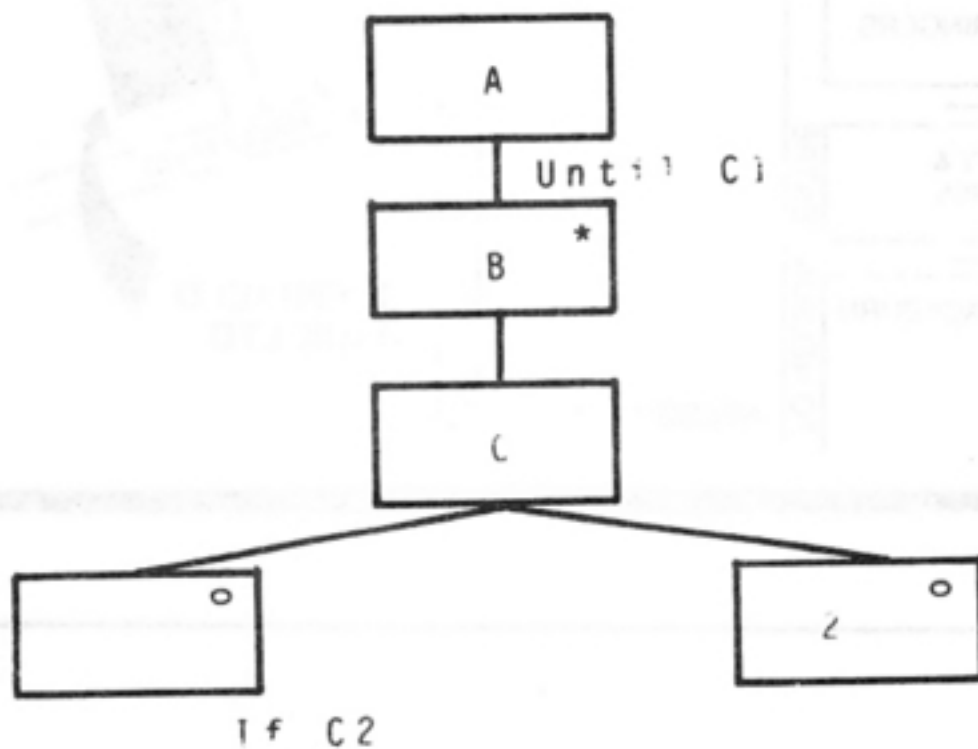
by PETER KNAQGS

Schematic Logic is a method of showing the logic format of a program. It does not contain any actual program instructions but is the steps needed to be placed in a program to perform the desired operation.

A schematic logic is simply the layout of the program. As it contains no actual program statements, it can be used to program in any language.

Each element box should have a name or label. Alright, in the examples we have used so far they already have one, but this time they should be only be a single or double letter label, starting A through to Z. Take a look at the diagram below and you will see what I mean. These names are used to reference the diagram to the logic - the sequence of events starting with BOX A is known as A-SEQ the SEQ denoting the SEQUENCE and SEL denotes a SELECTION and ITER, as you have guessed, is an ITERATION. (See first article). Both ITER & SEL are followed by a condition. This must be the same condition as shown on the diagram. For example:

Box A leads to an iteration B which in turn was selection on an IF, then the diagram logic would be shown in the following diagram.



```

A-SEQ
  B-ITER UNTIL C1
    C-SEL IF C2
      do 1.
    C-SEL OR
      do 2.
    C-END
  B-END
A-END
  
```

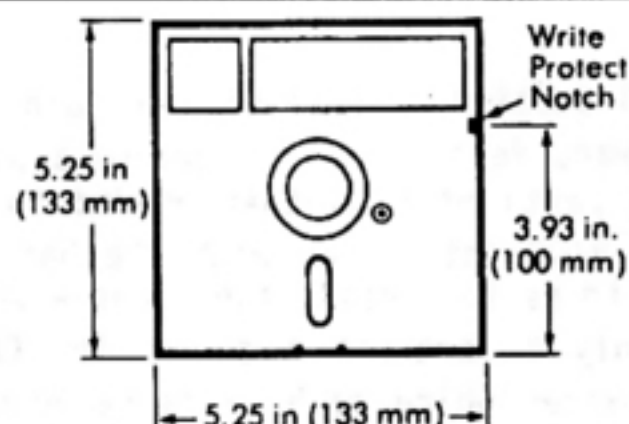
Please note that 1, 2, C1, & C2 are taken from the FUNCTIONS & CONDITIONS discussed in an earlier article. You should also have noticed that each inherent level goes one step in and comes back out by the use of the -END function. This helps you distinguish between the start of a selection and the end of the previous one.

* there had been another function on the same level as the box B this would have been written with the same indent as B-ITER. Each level down the diagram has an indent level in the logic.

The fourth part of schematic logic is the DO. DO tells the programmer that you actually want to do something. DO should always be written in 'lower case', this, of course, makes it stand out. You can have more than one function to a DO, and if so, they are separated by a comma. A DO must be always terminated with a semi-colon. ★

Disc Mania

All about it!



Because low-cost CP/m is just around the corner, this month we are going to make a little deviation from the previous two articles and discuss how CP/m operates within your computer so that those of you who have never used a disc drive can gain an insight into how it operates.

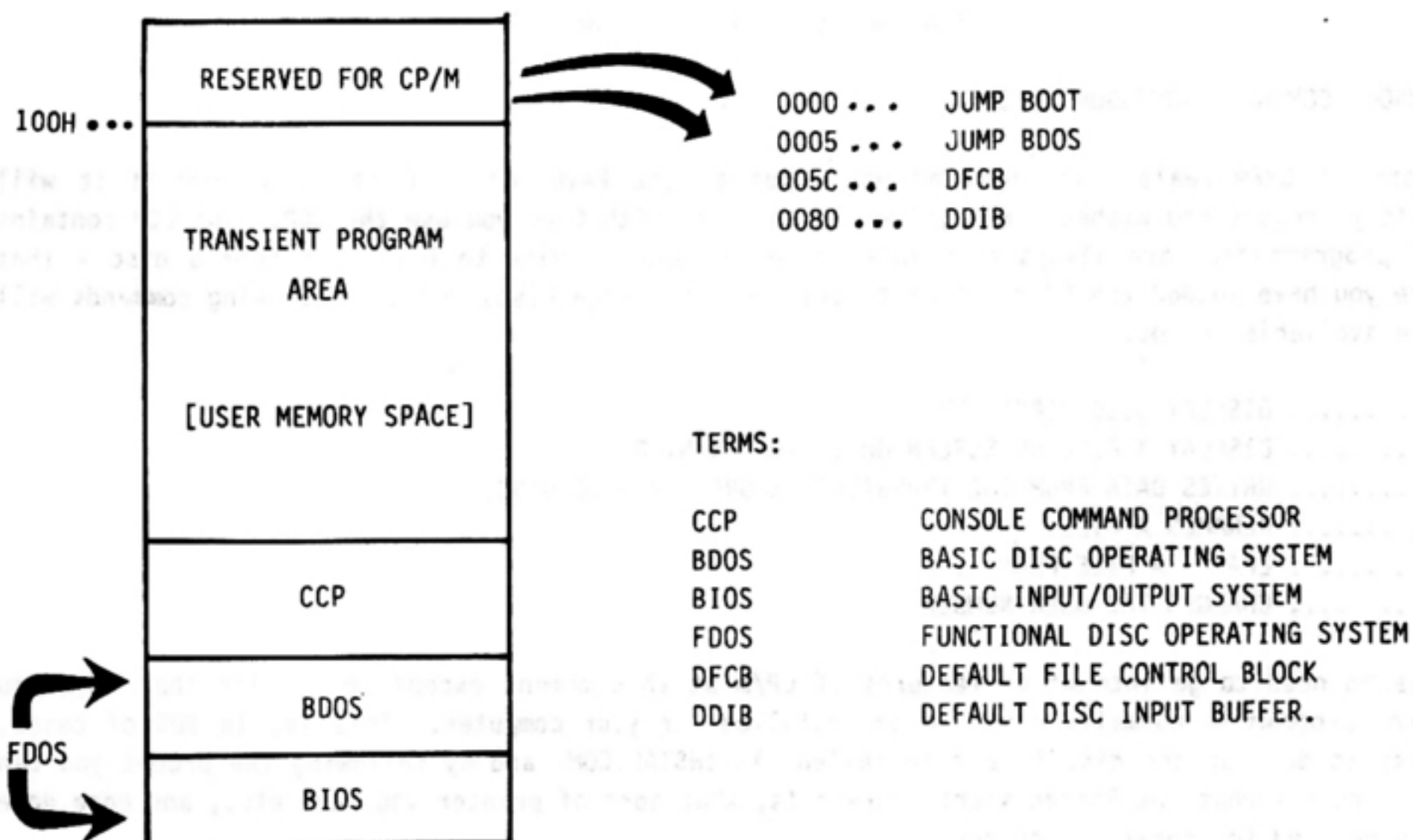
CP/m stands for CONTROL PROGRAM MICROPROCESSORS. Most of you have heard of MSX and its compatibility between manufacturers. Well, MSX works in a very similar way to the methods we are about to discuss.

We have already stated that a disc drive needs some sort of software to allow it to function as the user types in various commands: USER SAVE, USER READ etc. All drives, no matter who is the manufacturer, require some form of software to control its various functions. Like most computers, normally, no two operating systems are the same which means that owners of disc drives encounter the same problems as cassette owners.

Clearly, it would be advantageous if a piece of software could easily be transported between different computers. However, before this can be accomplished a few problems have to be dispensed with. Here are a couple of major ones

- a] One computer might use port 6 for the printer while another will use port 2.
- b] Screen formatting varies from computer to computer.

To allow the same program to run on different machines with the minimum of alteration requires some method to interface between the program and the host computer. This is where CP/m comes in to its own. Below (Diagram 1) shows a normal memory map of a CP/m system.



TRANSIENT PROGRAM AREA: Any program that is not built into CP/m. Transient means that the program is only loaded into main memory when it is needed and the program is stored in a file on disc. A SYSTEM disc will contain many TRANSIENT PROGRAMS : PIP, DDT, ED ETC.

The BIOS is a special section of CP/m that contains all the "computer specific" functions. That is, all the special hardware features exclusive to a particular machine. This means that Memotech had only to re-write the parts of BIOS that needed to be installed for Memotech exclusive functions. Once customised, the BIOS interfaces with the hardware and any program written for CP/m will run successfully because to perform basic functions - sending data to the printer, writing to the screen - the program has only to execute a subroutine CALL to an address in reserved memory which is ALWAYS THE SAME no matter which machine is being used, and this is also the principle behind MSX. The BIOS deals with the following functions:

- LOCATES CORRECT DEVICE (Printer, screen, keyboard etc)
- CHECKS IF DEVICE IS BUSY. IF YES WAITS UNTIL NOT BUSY
- CHECKS FOR DEVICE MALFUNCTION.
- TRANSFERS DATA TO AND FROM DEVICE.
- CHECKS DATA TRANSFER FOR OBVIOUS ERRORS.

The BASIC DISC OPERATING SYSTEM (BDOS) is responsible for controlling and organising the way data is stored on the disc. BDOS can also be used to perform peripheral operations and tends to be more versatile than using the BIOS, but that is another story and we will come to that in a few weeks time.

Data is stored on disc in FILES. A FILE is a set of related data. A file can be a DATA FILE an actual program. Of course, one disc is capable of storing many files and it is not unusual to have over 50 files on one disc. To access a file it must have a name, and BDOS keeps track of each file by storing its name in a FILE DIRECTORY. This directory shows all the file names, their exact location on the disc and their size.

BDOS deals with the following each time a new file is added to a disc:

- CHECKS THE DIRECTORY TO MAKE SURE THERE ARE NO FILES WITH THE SAME NAME.
- MAKES SURE THERE IS ENOUGH ROOM FOR THE NEW FILE ON THE DISC
- UPDATES THE DIRECTORY.

BIOS & BDOS together form the FDOS

THE CONSOLE COMMAND PROCESSOR (CCP)

This part of CP/m deals with anything you input at the keyboard. If it is a command it will immediately process your wishes. Everytime you converse with CP/m you use the CCP. The CCP contains several programs that are always available to you without having to load them from a disc - that is, once you have loaded the CP/m system tracks you can change discs and the following commands will still be available to you.

- DIR DISPLAY DISC DIRECTORY.
- TYPE DISPLAY A FILE ON SCREEN OR TO THE PRINTER.
- SAVE WRITES DATA FROM THE TRANSIENT PROGRAM AREA TO DISC.
- REN RENAMES A FILE.
- ERA ERASES A FILE FROM DISC.
- USER CHANGES THE USER NUMBER

There is no need to go into other features of CP/m at this moment except to mention that when you buy a new program it normally needs to be installed for your computer. This is, in 90% of cases, very easy to do. On the disc is a file called XXXINSTAL.COM and by following the prompt you can tell the program what the Screen start address is, what sort of printer you have etc., and once done there is no need to repeat the process.

Later, we will be dealing with CP/m in detail: discussing how to use the BDOS & BIOS within your own programs etc, but we have a bit of ground to cover with the single disc first. But, I can assure

you, there are a lot of clever tricks that can be incorporated within CP/m programs. And as a footnote, anyone who is using CP/m and is not using MBASIC, GWBASIC or whatever, is missing out on a lot of easy methods of programming in CP/m via Basic - FDXBasic may be very good but Microsoft Basic, along with the Compiler, or CBasic & Compiler are brilliant !

The above has not been an attempt to explain the workings of CP/m but more an overview for those people who have never used it. For examples of what type of software is available to CP/m users take a look at the back of this magazine. ★



Lets begin this month with a useful routine from Mr. Collin of Reading.

I have been waiting ever since Issue 5 of Memopad for someone to write in and explain to Mr. Nichols how to overcome the problem of upper/lower case characters, and indeed numerals and punctuation marks in sorting routines. Alas, so far as I am aware no-one has done so - surely it cannot be that no-one in the club knows how to deal with this problem, can it?

Perhaps I could first point out that Mr Nichols has wasted an awful lot of memory in allowing 64 characters for each word in his array LST\$(400,64). It is extremely unlikely that he will want to enter words of more than 20 letters, and the space saved by making this array smaller can be used for additional arrays required to overcome this problem. So perhaps we may change his array to LST\$(400,20), and in addition we shall require two more arrays which we may set up as SORT\$(400,20) and SORT (400).

The program then works in the following way (I could give an example of an application program of my own but no doubt Mr. Nichols will find it more useful to work out the details for himself):

As each word is entered into the LST\$ array, a simple routine converts the word into a corresponding "sortcode" and stores it in the SORT\$ array, and enters the number of the LST\$ array line containing the word in the SORT array. After a few entries the contents of the arrays might look like this:-

	LST\$	SORT\$	SORT
(1)	O'Brien	obrien	1
(2)	Fortescue-Smythe	fortescuesmythe	2
(3)	Willoughby	willoughby	3
(4)	Brown	brown	4

How are the entries in LST\$ converted to those in SORT\$? Simply with a small subroutine like the one listed below:-

```
1000 LET TEMP$="":LET L=LEN(LST$(N)):REM N=array line number of word just entered
1010 FOR C=1 TO L
1020 LET XC=ASC(MID$(LST$(N),C,1))
```



```

1030 IF XC>64 AND XC<91 THEN LET XC=XC+32
1040 IF XC>96 AND XC<123 THEN LET X$=CHR$(XC):LET TEMP$=TEMP$+X$
1050 NEXT C
1060 LET SORT$(N)=TEMP$
1065 LET SORT(N)=N
1070 RETURN

```

When all the necessary words have been entered, then the arrays SORT\$ and SORT are run simultaneously through a sorting routine. E.g., a simple ripple sort:

```

2000 LET S=1
2010 FOR X=1 TO N:REM N=number of last record entered
2020 IF SORT$(X)>SORT$(X+1) THEN GOSUB 2500
2030 NEXT X
2040 IF S=0 THEN GOTO 2000
2050 RETURN

2500 LET TEMP$=SORT$(X):LET TEMP=TEMP(X)
2510 LET SORT$(X)=SORT$(X+1):LET SORT(X)=SORT(X+1)
2520 LET SORT$(X+1)=TEMP$:LET SORT(X+1)=TEMP
2530 LET S=0
2540 RETURN

```

After this subroutine has operated, the contents of the example arrays shown above would be:-

	LST\$	SORT\$	SORT
(1)	O'Brien	brown	4
(2)	Fortescue-Smythe	fortescuesmythe	2
(3)	Willoughby	obrien	1
(4)	Brown	willoughby	3

If the following subroutine is then run, an alpha-order list will be produced:-

```

3000 FOR X=1 TO N
3010 PRINT LST$(SORT(X)):REM print could be an lprint to produce output on printer
3020 NEXT X
3030 RETURN

```

It will no doubt have been noticed that the ASCII values chosen in lines 1030 and 1040 cause all characters but upper and lower case alphas to be eliminated. If it was desired to include names such as the 3M Company and the 600 Group, these two lines would have to be replaced with a different group of lines - which I will leave you to devise for yourself, and the numerical names would appear at the head of the list.

I hope the above will be useful to any member who wants to write an application program requiring the sorting of alpha strings, perhaps for stock control, or for computerising the records of his sports club, etc...

Another useful tip has been sent in by Mr. Vachell.

The following bit of info may be useful to members when debugging assembler routines;

It is fairly well known that the RST 38 command causes a trap to PANEL. RST 38 assembles to hex FF. We can use this little gem of information to provide for a conditional trap using the JR <condition>,<displacement> instruction where <condition> may be C, NC, Z, or NZ. If you enter:-

```
JR <condition>, #-1 ;# = current PC
```

then this will assemble as:-

XX, FF

where XX can be one of the following:-

38 = JR C,
30 = JR NC,
28 = JR Z,
20 = JR NZ,

The Z80 will interpret this into a jump into the middle of the instruction which is a hex FF...RST 38...PANEL !!

Unfortunately (there's always a but..) the MTX assembler does not provide the psuedo PC operator (the pound sign) as many assemblers (including EDASM) do, so users of the standard assembler will need to enter the following:-

```
CODE
enter code here
RST 38      ;enter panel unconditionally
more code
DB #38, #FF ;panel if carry set
still more code
DB #28, #FF ;panel if zero
yet another load of code
DB #30, #FF ;panel if no carry
and still more code
DB #20, #F  ;panel if non zero
RET        ;back to basic
```

I hope this is of use to someone.

Regards

Dave Vachell

Mr Hall has something to swap...

Mint condition Clarion 971 Radio Cassette. Digital Self Seek Radio with pre-sets. Auto Reverse Cassette. Dolby. Metal tape. Separate 23 watt per channel amp. Cost new 370.00. Will exchange for DMX 80 printer or Monitor with RGB/PAL/AUDIO. Tel: Barry Hall, Cambridge 354472 or evenings Stretham 463.

Here is a comment from Mr. Hunt.

May I say how much I and my youngsters look forward to the arrival of your magazine. I (we) feel our club membership to be excellent value for that above. I must apologise for not being a more active club member - unfortunately I spend much of my time away from home (I am a serviceman) and am thus separated from both the magazine and the MTX. My wife tries to keep in touch, but has little time to really get to grips with computing. I am hoping that my eldest child, Jenny will be able to become more active soon - she is nearly 12 and very keen.

Thank you, Genpat, for your services - but could we have more really good educational software at all levels - I have been only slightly impressed by the "Spelli-copter" style of program - and perhaps a few more "quickies" suitable for keying in by young children could be included in the magazine - nothing spectacular, just simple, confidence building BASIC programs. It's through my children, and I expect through those of many other families, that you will loosen the strings of Mummy's purse and get the cash flowing !

In answer to a few questions about FORTH, we decided to publish Keith Jones', the author of MTX-FORTH, letter to clear up these relevant queries.

Let me begin by giving you the history of MTX-FORTH. Originally the language was written for my own use, and was not supposed to have been sold commercially. Then I joined GENPAT and rang them up one day with a general enquiry, about EDASM actually. I happened to mention that I'd written FORTH, and were they interested. The rest, as they say, is history. At the time I offered the program it had no screen commands at all and was just the bare kernal. I explained to Keith Hook that I wanted to write a manual which explained every command with examples but, after receiving the program Mr. Hook wanted a manual quickly, as he was being pestered about FORTH. So I ripped apart my trusty fig handbook and he made that into the manual, with an agreement of articles. Before sending the fig manual off, I examined other FORTH packages. All the fig compatible programs, SPECTRUM "White Lightning" and "Abersoft", offered the same manual as the one you received although "White Lightning" now offers a "crib sheet" which is nothing more than a program on paper. In fact if you re-read all the reviews you will see that the manual is always the chief criticism !

In reply to your comment about "covering the basic essentials". Whilst composing the articles I realised that the only basic thing about FORTH is the Reverse Polish, nothing else is basic. That's not to say that FORTH is difficult, it's an experimenters' language. To quote Leo Brodie, "there is no correct way to write a FORTH program....Programming in FORTH is more of an "art...".

Here are Mr. Webb's suggestions:-

Your June editorial leaves one more than a little concerned for the future support for the Memotech.

You have asked for members thoughts and suggestions so here are mine. Any money I spend on software or peripherals must buy products that are going to be used fully. I find programs such as Toado - Pot Hole Pete - Johnny Reb soon lose their appeal and lay in their cases unused. I'm sure I am not the only one who has found games provide only a short lived interest. Level 9 games though are a family favourite for a rainy Saturday. We do however take months to complete a program and it will take years to buy and complete them all. The types of program I am interested in and would buy are programs that TEACH, SIMULATIONS such as flight, Running a business (Xaviersines' HOTEL), EXPERT SYSTEMS such as Stocks/Shares, Car fault diagnosis, Computer doctor (I dislike attending a surgery), EDUCATIONAL (I have them all apart from Physics). Apart from Heli-maths the rest are either too easy or not quite suitable for the job (O-level practice). Spelli-copter we do use but sadly my 7 year old son loves to watch the helicopter crash. Good educational programs will be on my shopping list.

Mr. Bernabe from Spain would like to contact other Spanish members. He can be contacted at:-

Alberto Bernabe,
Dr. Naveiras 46,
38001 Islas Canarias,
Spain.

To finish off with, here are two members, Mr. Nichols and Mr. McFarlane respectively who must surely have sore thumbs.

I feel I must respond to Mr. N.J. Woodger's criticism of my "Star Command" high score (Memopad 9). I assure you that it is genuine. I also realise that you have only my word for this, so in my defence I draw your attention to the following observation. The number of each type of ship varies from game to game, ie the maximum possible score for a game is not constant. Or, to put it another way, Mr. Woodger's score was lower than mine because he had fewer ships to destroy. I have managed to destroy every enemy ship in the universe on only 3 occasions, scoring 120900 (4/3/85), 128710 (19/7/84) and 140430 (26/11/84). I have kept a record on the inside of the cassette inlay card.

This observation can be checked by playing at "trainee level" (training my natural selection, methinks) and trying to destroy only the rebel ships (victory is yours when all of these are destroyed - the others don't attack starbases, they just get in the way and attack you).

I hope this clears up any doubts about my sincerity

Are there any members who want to swap one of there Level 9 adventures for any two of the following programs:-

TOADO, DRAUGHTS, REVERSI, TURBO and STAR COMMAND.

If you poke address #8FB7, in "Maxima", with values greater than five then you can slow the game down. My high score for "Maxima" is 511000 (I could have got more but I had to switch off my computer because it was overheating).

Are there any other Memotech users in the Moray area. I can be contacted at:-

2 Councillors Walk,
New Elgin,
Elgin,
Moray.
IV30 3JL ★

Purchase Ledger & Payroll

CONTINENTAL

These two packages form part of a proposed series of six, and are designed for tape based systems with at least 64K of memory.

In view of the limited cassette handling facilities on the MTX series, all data is held in arrays, and is saved with the program itself, which gives a save and load time of around 4 minutes, and there is no way to verify that the program has saved correctly, as any attempt to verify an auto-run program gives a mismatch error report.

The programs are both written in BASIC, with Noddy screens and three short Assembler routines to handle the cursor character and the saving of the date of the file. For all that, the programs run at an acceptable speed once loaded, and can handle a large enough area of data for most small business needs. A backup copy of the program is simple enough to make, due to the way the saving and loading of data is handled.

Once the programs have loaded, you are given a prompt to enter the Company name, followed by an entry code, which is user-definable up to six characters, but must always start with "LOGIN". There is no provision to convert lower case letters to upper case, so the entry code must be done with capitals.

Both programs come with fairly complete documentation, but written in such a manner that the first-time user may find himself in deep water until he has had a little practice.

A major shortcoming of the program is that when Data is changed, if the original string was longer than the new string, the end of the old data remains tagged on the end of the new until it is erased by re-editing the data and making up the length with the space bar. A simple way around this would have been to fill a string of say, 40 characters with CHR\$(0), and assigning part of this string to the string to be changed. ie LET EMPTY\$="":FOR I=1 TO 40:LET EMPTY\$=EMPTY\$+CHR\$(0):NEXT I:LET OLD\$=EMPTY\$(1,20).

Conclusion

Both programs perform the job they are supposed to do, and for the small business that cannot afford the more expensive "Professional" packages they should prove adequate, although a business with 170 employees, or credit arrangements with 32 suppliers (the maximum size of a file) will find them rather limited and slow.

D.ENGLAND

Advance Info..



Red Moon

The old storyteller shuffles to her place in the market, noting with satisfaction that a crowd has already gathered. She sits, takes a sip from the leather flask at her side, and starts. "Once upon a time, when the moon was still red, there lived a magician. He, or she, for you can never be quite sure when sorcery is involved, was not the best magician in the world, But it was already the age of failing powers when simple spells worked best. This is the tale of how the magician kept Magik alive"

RED MOON is the FIRST MAGICAL ADVENTURE from Level 9 Computing. It re-enacts a tale from the time when MAGIK still worked and when mythical monsters guarded fabulous treasure. There are over 200 locations, detailed scenery and, as in all Level 9 adventures, a fascinating storyline.

RED MOON will be available shortly.

40 COLUMN GRAPHICS

STEVE SCOTT

Once in a while we receive a really excellent program. The following listing is excellent.

The program is called "FORTY COLUMN GRAPHICS". As it name implies, it will allow those of you who program in Basic to print 40 COLUMN text on a GRAPHIC SCREEN VS 4.

The machine code program at LINE 10 performs the necessary rotation of characters and LINES 132 - 222 hold the eight byte values of the ASCII character set needed to perform the rotation.

If you want to modify the program LINE 40 must receive one character at a time held in I\$.

Steve has included a routine to illustrate both printing under direct control as well as a routine to operate under DSI mode. There is one limitation and that is horizontal movement is by tabulation in steps of four.

MAKE SURE THAT THE MACHINE CODE LINE NUMBERS MATCH EXACTLY THOSE OF THE LISTING OTHER WISE THE PEEKS AND POKES WILL NOT MATCH.

MTX 500 USERS CAN STILL AVAIL THEMSELVES OF THE PROGRAM, HOWEVER, THE MACHINE CODE WILL START AT £802A AND THE POKES IN THE BASIC PROGRAM (ALSO THE PEEKS) NEED TO HAVE 16384 ADDED TO THOSE IN THE LISTING. THIS WILL ENSURE THAT EVERYTHING IS ALIGNED.

0 REM *40 COLUMN GRAPHICS*	4033	LD HL,#407C;TEMP	
5 GOTO 20	4036	LD DE,#4074;LAST	
10 CODE	4039	LDIR	
	403B	LD C,1	
402A	PUSH AF	403D	LD HL,#406C;DATA
402B	PUSH BC	4040	LD IX,#4074;LAST
402C	PUSH DE	4044 LP1:	LD A,(#406B);COUNT
402D	PUSH HL	4047	CP 0
402E	PUSH IX	4049	JP Z,#4084;EXIT
4030	LD BC,08	404C	LD B,A

404D	LD D,0	4060	INC IX		
404F LP2:	LD E,(HL)	4062	LD A,C	4087	LD DE,#407C
4050	SLA E	4063	CP 9	408A	LD BC,08
4052	RL D	4065	JP Z,#4084;EXIT	408D	LDIR
4054	LD (HL),E	4068	JP #4044	408F	POP IX
4055	DJNZ #404F;LP2	406B COUNT:	DS 1	4091	POP HL
4057	LD A,(IX+0)	406C DATA:	DS 8	4092	POP DE
405A	ADD A,D	4074 LAST:	DS 8	4093	POP BC
405B	LD (IX+0),A	407C TEMP:	DS 8	4094	POP AF
405E	INC C	4084 EXIT:	LD HL,#406C	4095	RET
405F	INC HL				

```

15 GOTO 52
19 REM ***** INITIALISE *****
20 CSR 14,10: PRINT "PLEASE WAIT"
22 DIM D(122,8)
24 LET X=2: LET Y=0: LET PTR=0: LET C=1: LET P=2: POKE 16491,0
26 FOR A=32 TO 122
28 FOR B=1 TO 8
30 READ D(A,B)
32 NEXT B
34 NEXT A
36 CLS : VS 4: CLS : GOTO 240
40 REM ***** I$ HOLDS CHARACTER *****
42 FOR A=1 TO 8
44 POKE 16491+A,D(ASC(I$),A)
46 NEXT A
48 GOTO 10
50 REM ***** PRINT CHARACTER *****
52 GENPAT 0,127,PEEK(16492),PEEK(16493),PEEK(16494),PEEK(16495),PEEK(16496),PEEK(16497),PEEK(16498),PEEK(16499)
54 GENPAT 0,126,PEEK(16500),PEEK(16501),PEEK(16502),PEEK(16503),PEEK(16504),PEEK(16505),PEEK(16506),PEEK(16507)
56 IF C=1 THEN CSR X,Y: PRINT CHR$(127): GOTO 62
58 IF C<4 THEN CSR X,Y: PRINT CHR$(126);CHR$(127) ELSE CSR X,Y: PRINT CHR$(126)
60 LET X=X+1: IF X=32 THEN LET X=2: LET Y=Y+1: IF Y=22 THEN LET Y=0
62 LET PTR=PTR+2: LET C=C+1: POKE 16491,PTR

64 IF PTR=8 THEN LET PTR=0: LET C=1: LET P=X: POKE 16491,0
66 IF GO=1 THEN GOTO 430 ELSE GOTO 300
132 DATA 0,0,0,0,0,0,0,0
133 DATA 32,32,32,32,0,0,32,0
134 DATA 40,40,40,0,0,0,0,0
135 DATA 80,80,248,80,248,80,80,0
136 DATA 32,120,160,112,40,240,32,0
137 DATA 200,200,16,32,64,152,152,0
138 DATA 64,160,160,64,168,144,104,0
139 DATA 96,32,64,0,0,0,0,0
140 DATA 32,64,128,128,128,64,32,0
141 DATA 32,16,8,8,8,16,32,0
142 DATA 0,168,112,248,112,168,0,0
143 DATA 0,32,32,248,32,32,0,0
144 DATA 0,0,0,96,96,32,64,0
145 DATA 0,0,0,248,0,0,0,0
146 DATA 0,0,0,0,0,96,96,0
147 DATA 8,8,16,32,64,128,128,0
148 DATA 32,80,136,136,136,80,32,0
149 DATA 32,96,32,32,32,32,112,0
150 DATA 112,136,8,16,32,64,248,0
151 DATA 248,16,32,16,8,136,112,0
152 DATA 16,48,80,144,144,248,16,0

```



```

153 DATA 248,128,240,8,8,136,112,0
154 DATA 112,128,128,240,136,136,112,0
155 DATA 248,8,8,16,32,64,64,0
156 DATA 112,136,136,112,136,136,112,0
157 DATA 112,136,136,120,8,8,112,0
158 DATA 0,0,48,48,0,48,48,0
159 DATA 48,48,0,48,48,16,32,0
160 DATA 8,16,32,64,32,16,8,0
161 DATA 0,0,248,0,248,0,0,0
162 DATA 128,64,32,16,32,64,128,0
163 DATA 112,136,8,16,32,0,32,0
164 DATA 112,136,184,168,184,128,120,0
165 DATA 32,80,136,136,248,136,136,0
166 DATA 240,136,136,240,136,136,240,0
167 DATA 112,136,128,128,128,136,112,0
168 DATA 240,136,136,136,136,136,240,0
169 DATA 248,128,128,240,128,128,248,0
170 DATA 248,128,128,240,128,128,128,0
171 DATA 112,136,128,184,136,136,112,0
172 DATA 136,136,136,248,136,136,136,0
173 DATA 112,32,32,32,32,32,112,0
174 DATA 120,16,16,16,144,144,96,0
175 DATA 136,144,160,192,160,144,136,0
176 DATA 128,128,128,128,128,128,248,0
177 DATA 136,216,168,136,136,136,136,0
178 DATA 136,136,200,168,152,136,136,0
179 DATA 112,136,136,136,136,136,112,0
180 DATA 240,136,136,240,128,128,128,0
181 DATA 112,136,136,136,168,144,104,0
182 DATA 240,136,136,240,160,144,136,0
183 DATA 112,136,128,112,8,136,112,0
184 DATA 248,32,32,32,32,32,32,0
185 DATA 136,136,136,136,136,136,112,0
186 DATA 136,136,136,136,80,80,32,0
187 DATA 136,136,136,168,168,168,80,0
188 DATA 136,136,80,32,80,136,136,0
189 DATA 136,136,80,32,32,32,32,0
190 DATA 248,8,16,32,64,128,248,0
191 DATA 224,128,128,128,128,128,224,0
192 DATA 128,128,64,32,16,8,8,0
193 DATA 56,8,8,8,8,8,56,0
194 DATA 32,80,136,0,0,0,0,0
195 DATA 0,0,0,0,0,0,248,0

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196 DATA 48,32,16,0,0,0,0,0
197 DATA 0,0,96,16,112,144,120,0
198 DATA 128,128,224,144,144,144,224,0
199 DATA 0,0,112,128,128,128,112,0
200 DATA 16,16,112,144,144,144,120,0
201 DATA 0,0,112,136,248,128,120,0
202 DATA 48,64,64,224,64,64,64,0
203 DATA 0,0,120,136,120,8,136,112
204 DATA 128,128,224,144,144,144,144,0
205 DATA 32,0,96,32,32,32,112,0
206 DATA 32,0,96,32,32,32,32,192
207 DATA 128,128,144,160,192,160,144,0
208 DATA 96,32,32,32,32,32,112,0
209 DATA 0,0,80,168,168,168,168,0
210 DATA 0,0,224,144,144,144,144,0
211 DATA 0,0,112,136,136,136,112,0
212 DATA 0,0,224,144,144,224,128,128
213 DATA 0,0,56,72,72,56,8,8
214 DATA 0,0,176,192,128,128,128,0
215 DATA 0,0,112,128,112,8,240,0
216 DATA 64,64,240,64,64,64,48,0
217 DATA 0,0,144,144,144,144,104,0
218 DATA 0,0,136,136,80,32,32,0
219 DATA 0,0,136,136,168,168,80,0
220 DATA 0,0,136,80,32,80,136,0
221 DATA 0,0,72,72,72,56,8,112
222 DATA 0,0,248,16,32,64,248,0

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240 CLS : CSR 2,0: PRINT "1. DISPLAY MODE": CSR 2,2: PRINT "2. DIRECT SCREEN INPUT":
    CSR 5,4: INPUT "SELECT OPTION ";GO
242 CLS : ON GO-1 GOTO 405,250
250 GENPAT 3,0,248,248,248,248,248,248,0: CTLSPR 2,1: CTLSPR 6,0
252 LET U=20: LET V=187
254 SPRITE 1,0,U,V,0,0,15
299 REM ***** DIRECT SCREEN INPUT *****
300 LET I$=INKEY$: IF I$="" THEN GOTO 300
302 IF ASC(I$)=13 THEN GOTO 400
304 IF ASC(I$)=8 THEN GOTO 322
306 IF ASC(I$)=25 THEN GOTO 332
308 IF ASC(I$)=10 THEN GOTO 318
310 IF ASC(I$)=11 THEN GOTO 314

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312 IF ASC(I$)<32 OR ASC(I$)>122 THEN GOTO 300 ELSE GOTO 340
314 LET V=V+8: LET Y=Y-1: IF V>187 THEN LET V=19: LET Y=21
316 GOTO 320
318 LET V=V-8: LET Y=Y+1: IF V<19 THEN LET V=187: LET Y=0
320 LET X=P: LET U=X*8+4: GOTO 338
322 IF C<>1 THEN LET X=P: GOTO 326
324 LET X=P-3: LET P=X
326 LET U=X*8+4: IF U<20 THEN LET U=236: LET X=29: LET P=29: LET V=V+8: LET Y=Y-1:
    IF V>187 THEN LET V=19: LET Y=21
328 GOTO 338
332 IF C<>1 THEN LET X=P+3: GOTO 336
334 LET X=P+3: LET P=X
336 LET U=X*8+4: IF U>254 THEN LET U=20: LET X=2: LET P=2: LET V=V-8: LET Y=Y+1:
    IF V<19 THEN LET V=187: LET Y=0
338 LET C=1: LET PTR=0: POKE 16491,PTR: ADJSPR 2,1,U: ADJSPR 3,1,V: GOTO 300
340 LET U=U+6: IF U=260 THEN LET U=20: LET V=V-8: IF V<19 THEN LET V=187
342 ADJSPR 2,1,U: ADJSPR 3,1,V: GOTO 40
400 GOTO 240
405 LET DS$="*THIS IS A FORTY COLUMN GRAPHICS SCREEN*": LET X=2: LET Y=0: LET PTR=0:
    LET P=2: LET C=1: POKE 16491,0
406 REM X,Y ARE CSR CO-ORDINATES - SET X AT THREE SPACE INTERVALS STARTING AT 2 ie. 2,5,8 etc.
    :NB.ALWAYS RESET PTR,C,P & POKE 16491 AS SHOWN
407 FOR W=1 TO 40
410 LET I$=DS$(W)
420 GOTO 40
430 NEXT W
440 FOR W=1 TO 80 STEP 10
450 CIRCLE 125,90,W
460 NEXT
470 PAUSE 9999: CLS
475 LET X=2: LET Y=0: LET PTR=0: LET C=1: LET P=2: POKE 16491,0: GOTO 240
476 REM X,Y ARE CSR CO-ORDINATES:NB.ALWAYS RESET X,Y,PTR,C,P & POKE 16491 AS SHOWN
    WHEN ENTERING DIRECT SCREEN INPUT

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