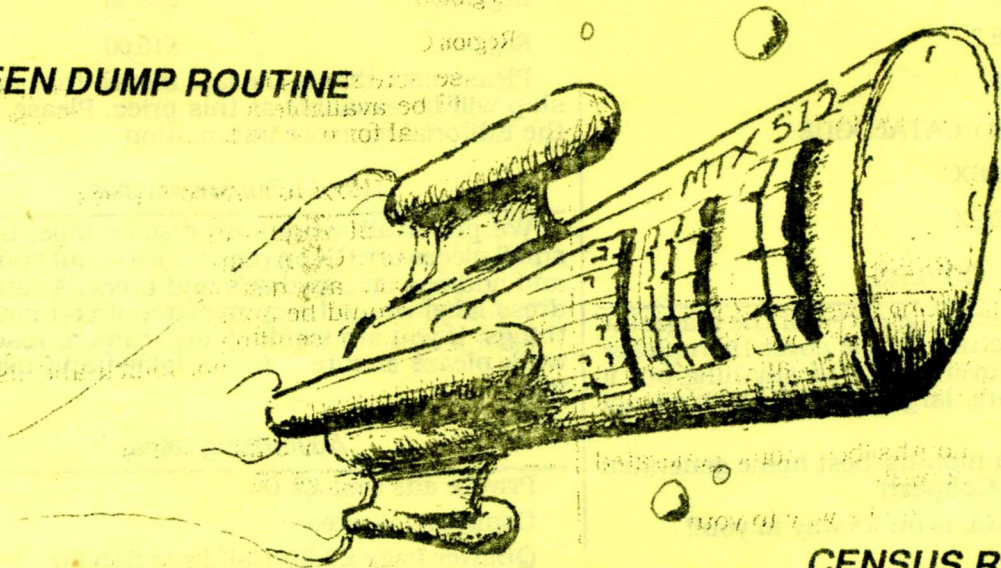


MEMOTECHNIQUES

The
MEMOTECH
Owners'
Club
Magazine

HAPPY NEW YEAR

SCREEN DUMP ROUTINE



CENSUS RESULTS

GRAYSOFT

**13, Copse Road,
Townhill Park
Southampton,
SO2 2GY.**

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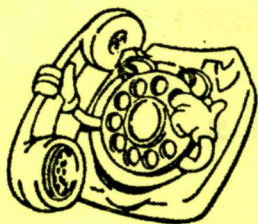
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COVERS

If you have an interesting cover for the magazine or an interesting picture for the cover then please send it to us. The cover can be of anything but it must be mostly white, large areas of black do not duplicate very well.

The winner of last months 'best home generated front cover' is **Nigel Cooper!!**

A copy of **The WALL** is on its way to you!!



Software Top Ten

By SALES

1. Assembly Language Course 2. T.Snooker
3. Highway Encounter
4. Turbo
5. Karate King
6. Target Zone
7. Jet Set Willy
8. Lords of Time
9. Maxima
10. 3D Tachyon Fighter

Subscriptions

THE MOC Magazine is available only by subscription:-

U.K.	£8.00
European	£12.00
BFPO NO.s	£10.00
Outside Europe	
Region A	£13.00
Region B	£14.50
Region C	£16.00

Please note this is the last month that membership will be available at this price. Please refer to the Editorial for more information.

How To Submit Articles

We prefer all articles on disc or tape, but very small pieces are OK on paper. Please put your name and address on any disc's and tapes. A return address label would be appreciated if you have such things. If you are sending any "camera ready" artwork please ensure it is not folded and use black ink.

Advertising rates

Private ads cost £2.00
Commercial rates
Quarter Page £7.50 Half Page £15.00

Telephone contacts

Please only ring at sensible times!
Phil Eyres 0703 585106
(Ansa Machine when not available)
Alan Hamilton 05055 2491
Paul Woods 0905 24260

EDITORIAL (January 1989)

Phil & Hazel Eyres
13 Copse Road
Townhill Park
Southampton

Accounts

Below are the year-end accounts. Well, 15 month-end accounts. They show that we are still in the black, although general running costs have risen sharply. This is mainly because of the photocopier, but also include increased stationary requirements. Money tied up in stock has risen due to recent hardware purchasing and higher levels of commercial software stock. Monthly income has stayed basically the same as last year.

In the next month or so we will endeavour to make the magazine a little thicker, as suggested in the census report, trying to fill it with what you want more of. This will rely on more members sending in articles to print. If this works ok, we will increase membership costs to £10-£12 depending on how many extra sheets we can fill.

1987 Balance	1102.76
Total Money In	6656.95
	7759.71

Magazine costs	2872.50
Running Costs	2624.63
Stock	1146.00
Holding Acc.	400.00
Current Acc.	825.58
Loan Alan	300.00
Club Equipment	591.00
	7759.71

Robotics

In last month's magazine we were asking for volunteers for a robot project. Paul Wood has tentatively agreed, so what we now need to find is a good little robot like device to attach to the MTX. I think to be fair to everyone it should connect to a basic MTX, via either:-

1. The Centronics port. (Paul will build an interface).
2. The internal port 7. (May be a little restrictive?).
3. Paul will build a special interface.

Personally I think the robot cost should be in the £20-£45 price range, with as many features as possible. If anybody has any details of such a device could they send copies to me, I'll then talk over the 'possibles' with Paul.

Programming Competition

This is a new section of the magazine which will become a regular feature and will replace the older competition which was usually well received.

What I'm going to do here is to set a problem which hopefully will inspire you to write a program in any language you like (the more the better) which solves the problem.

Entries will be judged on compactness, elegance and visual appeal and prizes will be awarded for the three best programs.

And what about the prizes? Well, this will vary between an item of commercial software and up to £10 of free software from the MOCPSL. All entries should be sent to: Competition, Memotech Owners Club, 12 Roebank Road, Beith, Ayrshire, KA15 2DX.

Competition 1

For the first competition we'll run, I'd like a program which can display the time in a digital fashion like a digital clock with large characters on the screen showing the time. Prize: £10 free selection (of your choice) from the PDSL.

Alan Hamilton

Graysoft

Lastly, we have bought John Graysons stock of software. He has not had good sales for some time and has decided to call it a day. This is a shame as it means another author will no longer be writing for the MTX range. All his titles will be incorporated into our software lists. I hope you will see fit to buy some of this software, especially the BASIC Tutorial which is very good value.

Phil Eyres



The Club Hotline is between 7 and 8 pm any evening. During the day and after 8.00pm a club answer phone takes over. I hope this is ok for everyone. The number to phone now is (0703) 585106, ask for Phil.

If anyone would like back issues they are available for the small remittance of 80p each. At present there are 39 back issues, 10 for volume 1, 10 for volume 2, 10 for volume 3 and 10 for volume 4.

It should be noted that all articles are the copyright of the sender and M.O.C., anyone wishing to have articles published elsewhere should inform us first.

Phil Eyres

The Use of Files With The Disc Systems

By Alan Hamilton

Having a disc drive on a Memotech machine does not only represent the expansion of a highly expandable system, nor does it merely represent the fact that you're able to load programs at about three times the speed of a tape system. The Memotech disc systems all provide the facility to save variables onto the disc and hence provide a way of writing useful and flexible programs much more easily and with more speed than with the tape based counterparts.

Routines have, and probably will be, written for dumping variables onto tape but these have proved, and probably will prove, at times to be both slow and hazardous in the sense that you could be loading any variables from any program rather than the variables required for your particular program.

The disc systems however, are very different in their approach to variables. For instance, with tape based programs, all data is loaded sequentially. In other words, whatever is recorded first on the tape is loaded first. Discs however, despite allowing for sequential files, also cater for random files in which a pointer is moved to point at the particular item of data you wish to load. Take the following example:

```
10 20 30 40 50 60 70 80 90 100
```

With tapes, the number 10 would be loaded first, then 20, then 30 and so on. We have no way of isolating one particular number, say 40 and it is partly that for this reason tapes tend to be a rather unsatisfactory way of storing variables on the Memotech.

As I have said, discs allow for random files. The pointer, called REC is moved to the number of the item in the particular file we wish to get. So, if we wanted to load the number 40 from the above, we would make REC equal 4 (for the fourth RECORD in the file).

This would be done from BASIC by the following program (non-CP/M users would change the command DISC to USER):

```
10 DISC OPEN#1,"FILENAME.EXT","R",2
20 DISC REC#1,4
30 DISC INPUT#1,AGE
40 DISC CLOSE#1
50 PRINT AGE
```

If we wanted to expand this to read in, say the fifth and sixth RECORD of the file, we could do this:

```
10 DISC OPEN#1,"FILENAME.EXT","R",2
20 FOR ITEM=5 TO 6
30 DISC REC#1,ITEM
40 DISC INPUT#1,AGE
50 PRINT AGE 60 NEXT ITEM
70 DISC CLOSE#1
```

The difference in the INPUT command from the normal usage is the addition of the hash just after the command. This tells the computer to take a piece of information from channel one of a disc file

and put it in to the variable called AGE. This is similar to the normal use of INPUT which tells the computer to take a piece of information which is typed at the keyboard and put it into a variable.

The use of channels in disc files ought to be discussed before going any further. The facility to use channels in both sequential (which we will deal with in a moment) and random access files makes life a great deal easier for the programmer than otherwise would have been the case. It allows up to four different sub-files to be opened at once from one single filename and data to be read from and written to in any order. For example:

```
10 DISC OPEN#1,"FILENAME.EXT","R",1001
20 DISC OPEN#2,"FILENAME.EXT","O"
30 DISC OPEN#3,"FILENAME.EXT","I"
40 DISC OPEN#4,"FILENAME.EXT","R",23
50 DISC REC#1,3
60 DISC INPUT#1,NAME
70 DISC PRINT#2,ADDRESS
80 DISC INPUT#3,AGE
90 DISC REC#4,1
100 DISC PRINT#4,AGE
110 DISC CLOSE#1:DISC CLOSE#2:DISC
CLOSE#3:DISC CLOSE#4
```

This means that any particular program which you might write doesn't need to have a whole host of slave data files doing one particular thing which is good since it's not a particularly elegant or neat way of going about things.

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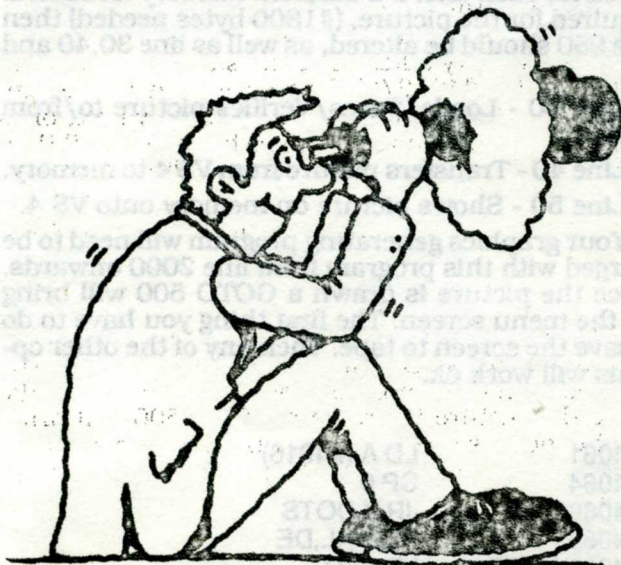
In the above and other examples with random access files, you will have noticed that after the "R" parameter which tells the Disc Operating System (DOS) that we have opened a random channel, there is a number. This number corresponds to the maximum length of characters which we are going to be reading out of any particular record in the file. In practice, it is better to make the maximum length specified one greater than the very maximum. Here is an example of this:

```

10 DISC OPEN#1,"FILENAME.EXT","R",51:
   REM Max record length of 51 characters.
20 DIM A$(50):INPUT "Enter some letters ";A$
30 DISC REC#1,1 40 DISC PRINT#1,A$
50 DISC CLOSE#1

```

The DIM command sets the length of the variable A\$ to 50 but even though we don't type in 50 characters at the keyboard, the length of A\$ will remain 50 with the computer padding out the extra spaces. If the length of your string exceeds what you have opened your channel for, you'll get an error message and the program will stop.



You may have noticed that in the above example, there were commands which involved the use of the "O" and "I" parameters in the DISC OPEN command. These parameters tell the MTX that the channel being opened is a sequential file. The "O" indicates that the file will be used for Output (using the PRINT# command) and the other, "I", for Input (using the INPUT# command).

Sequential files can be thought of as also having a pointer associated with them. However, we are unable to alter this pointer as we were able to do with random files. This may sound like a bad idea but sequential files provide much faster access to data than random files and it is for this reason (and also for simplicity) that sequentials are used at all. Here is an example of the use of sequential files:

```

10 CLS:PRINT "Enter 10 numbers"
20 DIM ITEM$(10,3)
30 FOR LOOP=1 TO 10:INPUT
   ITEM$(LOOP):NEXT
40 PRINT "Writing to disc file."
50 DISC OPEN#1,"FILENAME.EXT","O"
60 FOR LOOP=1 TO 10:DISC
   PRINT#1,ITEM$(LOOP):NEXT
70 DISC CLOSE#1: REM THIS IS NOT
   STRICTLY NECESSARY
80 CLS:PRINT "Reading disc file."
90 DISC OPEN#1,"FILENAME.EXT","I"
100 FOR LOOP=1 TO 10:DISC
   INPUT#1,ITEM$(LOOP)

```

```

110 PRINT ITEM$(LOOP):REM TO THE SCREEN
120 NEXT LOOP:DISC CLOSE#1:REM THIS
   CLOSE COMMAND IS NECESSARY

```

Notice how the parameter in the DISC OPEN was changed to allow reading or writing. If you have set a file to read ("I") you are not allowed to write anything to it. The reverse is also true that if a file is set to write, you are not at liberty to read anything from it.

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£25.00 + £2.00 P&P

FDX Twin 500k System

including CP/M etc £180.00 + £5.00 P&P

Please make cheques payable to Memotek Owners Club. Address all correspondence to Phil Eyres.

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Contact Steve Atty on 0942 35112

MTX 512 - VS 4 SCREEN DUMP

By G.Carter

The following routine is a comprehensive listing designed to print to a Centronics compatible printer, all or part of the graphic screen VS 4. It is possible to print either a single sized copy (that is 1 dot on paper to 1 pixel on the screen), or a double sized version which gives 2 dots along and 2 dots down per screen pixel (actually a quadruple size!). Part of the screen from the top left hand corner both along and down can be output by setting the number of lines down and the number of pixels across as requested in lines 920-937. These settings may be incorporated into a draw programme using a cursor to edge the limits.

The program is designed to work on a 512. You will need to edit the assembler lines and any basic lines that contain a POKE command in order to get it to work on a 500.

HOW IT WORKS

The whole screen is transferred from Video Memory into user memory (at #A000-#B800) by the routine at line 40. Then each line across the screen (of 8 pixels down) is adjusted for the printer by the rou-

tine at line 20, checking for single or double size by the flag at #4016. This routine is called up to 24 times according to the number of lines down required for output. (Line 980) The number of pixels across to be output is placed in (#4014/5) (line 937), and the memory address of the start of the picture is placed in (#4012/3) (line 950), and this is updated for each line. If a different memory location is required for the picture, (#1800 bytes needed) then line 950 should be altered, as well as line 30,40 and 50.

Line 30 - Loads/Saves/Verifies picture to/from tape.

Line 40 - Transfers picture from VS 4 to memory.

Line 50 - Shows picture on memory onto VS 4.

Your graphics generating program will need to be merged with this program from line 2000 onwards. Once the picture is drawn a GOTO 500 will bring up the menu screen. The first thing you have to do is save the screen to tape. Then any of the other options will work ok.

```
10 GOTO 500
20 CODE
4010      JR START
4012      DS 5
4017 START: CALL DTS
401A      CALL LINE
401D      CALL CRT
4020      LD A,(#4016)
4023      CP 0
4025      JR NZ,DB
4027      LD HL,(#4012)
402A      INC H
402B      LD (#4012),HL
402E      RET
402F DB:   LD HL,(#4012)
4032      LD DE,#0004
4035      ADC HL,DE
4037      LD (#4012),HL
403Q      CALL DTS
403D      CALL LINE
4040      CALL CRT
4043      LD HL,(#4012)
4046      LD DE,#00FC
4049      ADC HL,DE
404B      LD (#4012),HL
404E      RET
404F CRT:  LD B,13
4051      CALL #0CE0
4054      LD B,10
4056      CALL #0CE0
4059      RET
405A DTS:  PUSH HL
405B      LD DE,(#4014)
405F      PUSH DE
4060      POP HL
```

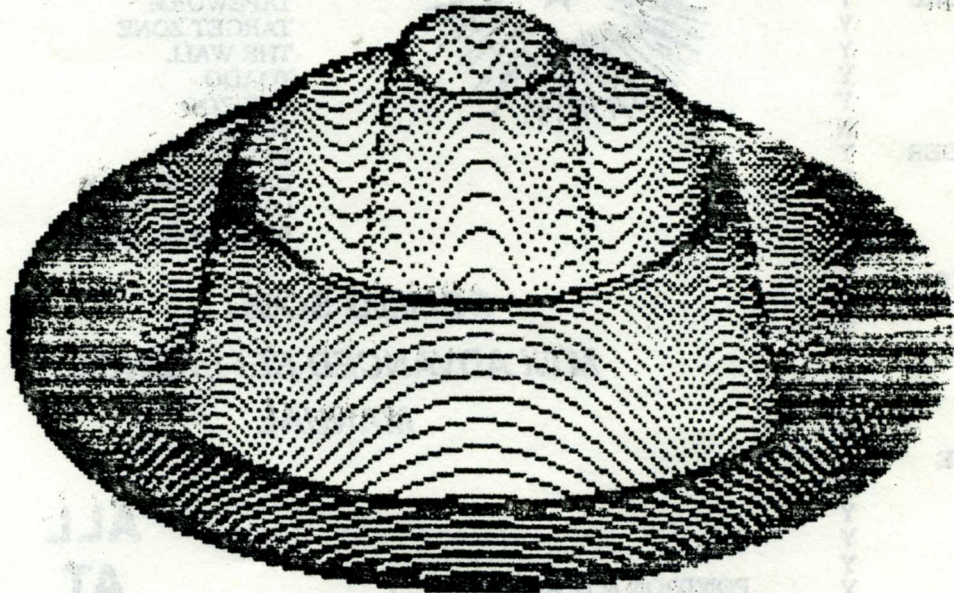
```
4061      LD A,(#4016)
4064      CP 0
4066      JR Z,DOTS
4068      ADD HL,DE
4069 DOTS: LD B,27
506B      CALL #0CE0
406E      LD B,#4B
4070      CALL #0CE0
4073      LD B,L
4074      CALL #0CE0
4077      LD B,H
4078      CALL #0CE0
407B      POP HL
407C      RET
407D LINE: LD HL,(#4012)
4080      LD A,(#4014)
4083      LD C,A
4084 L3:   LD B,8
4086 L2:   PUSH BC
4087      PUSH HL
4088      CALL ADJ
408B      POP HL
408C      POP BC
408D      DEC C
408E      RET Z
408F      DJNZ L2
4091      LD DE,#0008
4094      ADC HL,DE
4096      JR L3
4098 ADJ:  LD A,(#4016)
409B      CP 0
409D      JR NZ,DADJ
409F      LD BC,#0800
41A2 LP:  BIT 7,(HL)
40A4      JR Z,NX
```

40A6	SET 7,C	40C4	RLC C
40A8 NX:	RLC (HL)	40C6	DJNZ LPD
40AA	RLC C	40C8	LD B,C
40AC	INC HL	40C9	CALL #0CE0
40AD	DJNZ LP	40CC	CALL #0CE0
40AF	LD B,C	40CF	RET
40B0	CALL #0CE0		
40B3	RET	25 RETURN	
40B4 DADJ:	LD BC,#0400		
40B7 LPD:	BIT 7,(HL)	30 CODE	
40B9	JR Z,DNX	423C	LD HL,#A000
40BB	SET 7,C	423F	LD DE,#1800
40BD	SET 6,C	4242	CALL #AAE
40BF DNX:	RLC (HL)	4245	RET
40C1	INC HL		
40C21	RLC C	35 RETURN	

MEMOTECH

MTX

SERIES

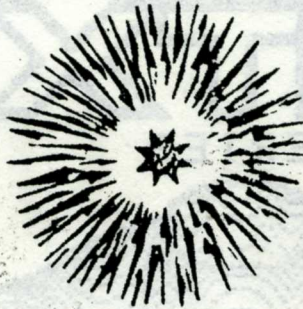


40 CODE		428A	OR C
4274	DI	428B	JR NZ,LP
4275	XOR A	428D	EI
4276	OUT (2),A	428E	RET
5278	LD A,0		
427A	OUT (2),A	45 RETURN	
427C	NOP		
427D	NOP	50 CODE	
427E	LD HL,#A000	42D4	DI
4281	LD BC,#1900	43D5	XOR A
4284 LP:	IN A,(1)	42D6	OUT (2),A
4286	LD (HL),A	42D8	LD A,#40
4287	INC HL	42DA	OUT (2),A
4288	DEC BC	42DC	NOP
4289	LD A,B	42DD	NOP
		42DE	LD HL,#A000

SOFTWARE PRICE LIST January 1989

MOC Phil Eyres 13 COPSE ROAD, TOWNHILL PARK, SOUTHAMPTON.
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ASTROMILLON	Y	OBLITERATION ZONE	Y	SALES LEDGER	N
ASTROPAC	N	OBLOIDS	Y	SALTY SAM	N
ATTACK OF KER TOMS	Y	PAINTBOX	Y	SEPULCRI SCELERATI	Y
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FIG FORTH	Y				
FIG-FORTH MOC	Y				
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Software

We desperately need copies of:-

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to replace master tapes that we have that no longer work. We only need to borrow these titles for a day or two, but we will buy them from anyone wishing to sell.

The 1988 Census

Full report by Alan Hamilton

After the last magazine's trailer to the results, we now have the full and up-to-date picture of your views (those of you who aired them) and I thought you might like to know exactly how many people want what, and what general impression we get from you, the member.

Total census forms returned: 108. Not all members answered all questions.

Computers

Members with MTX500	= 6 (5.6%)
Members with MTX512 64K	= 88 (81.5%)
Members with MTX512 256K	= 11 (10.2%)
Members with RS128	= 2 (1.9%)

Editorial Content

Those wanting more	= 37 (34.3%)
Those wanting the same	= 64 (59.3%)
Those wanting less	= 2 (1.9%)

Competitions

Those wanting more	= 28 (25.9%)
Those wanting the same	= 54 (50.0%)
Those wanting less	= 19 (17.6%)

BASIC Coverage

Those wanting more	= 51 (47.2%)
Those wanting the same	= 48 (44.4%)
Those wanting less	= 4 (3.7%)

Assembler Coverage

Those wanting more	= 65 (60.2%)
Those wanting the same	= 34 (31.5%)
Those wanting less	= 5 (4.6%)

Pascal Coverage

Those wanting more	= 21 (19.4%)
Those wanting the same	= 49 (44.4%)
Those wanting less	= 27 (25.0%)

Forth Coverage

Those wanting more	= 26 (24.1%)
Those wanting the same	= 46 (42.6%)
Those wanting less	= 25 (23.1%)

CP/M Coverage

Those wanting more	= 45 (41.7%)
Those wanting the same	= 37 (34.3%)
Those wanting less	= 20 (18.5%)

Hardware Reviews

Those wanting more	= 56 (51.9%)
Those wanting the same	= 42 (38.9%)
Those wanting less	= 4 (3.7%)

Software Reviews

Those wanting more	= 34 (31.5%)
Those wanting the same	= 59 (54.6%)
Those wanting less	= 9 (8.3%)

Listings

Those wanting more	= 40 (37.0%)
Those wanting the same	= 50 (46.3%)
Those wanting less	= 11 (10.2%)

Interfacing & DIY

Those wanting more	= 53 (49.1%)
Those wanting the same	= 39 (36.1%)
Those wanting less	= 9 (8.3%)

SALE

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Letters

Those wanting more	= 47 (43.5%)
Those wanting the same	= 55 (50.9%)
Those wanting less	= 0 (0.0%)

Software Library

Those wanting more	= 39 (36.1%)
Those wanting the same	= 60 (55.6%)
Those wanting less	= 3 (2.8%)

Expanded Magazine

Those wanting more	= 98 (90.7%)
Those wanting the same	= 0 (0.0%)
Those not sure	= 7 (6.5%)

More Issues Per Year

Those in favour	= 84 (77.8%)
Those not in favour	= 6 (5.6%)
Those not sure	= 14 (13.0%)

New Membership Fee to Cover Expansions

Those willing to pay more	= 103 (95.4%)
Those not willing	= 0 (0.0%)
Those not sure	= 2 (1.9%)

New Membership Fee Amount

£ 10	= 11 (10.2%)
£12	= 37 (34.3%)
£14	= 18 (16.7%)
£16	= 35 (32.4%)

National Meeting

Those willing to attend	= 38 (35.2%)
National Meeting Venue (Includes those not sure if attending)	
Scotland	= 4 (3.7%)

Midlands	= 42 (38.9%)
Southern England	= 23 (21.3%)

These figures haven't really come as much of a surprise to me. When it comes to general features of the magazine, you seem to pretty well happy with what's there already. The programming side shows an interesting trend with, I expect, most of the newer users wanting more BASIC, whilst the "old hands" are probably happy with what there already is. I think however, the most interesting thing to be drawn from the programming section of the results is with the CP/M coverage. The majority of you want more which indicates that there are a lot of CP/M users out there. The fact that a lot (34.3%) of you want it to stay the same shows that perhaps many of you are contemplating going CP/M in the future.

The fact that 81% of you have Series 1 MTX512s is what was expected. However, I was expecting a little more than two users with an RS128 (because one of them is me!!!). You appear to be quite happy with Assembler and BASIC and although want the same amount of Pascal and Forth, it's good to see that you don't want to ignore them altogether.

The listings remaining the same is fair enough, indicating that you want more "meat" in the expanded magazine which you (nearly) all want. Talking of which, it is with great relief that I see that you are willing to pay for the expansions. The sum of #12 was what I thought you'd want and I believe Phil has worked out that an extra 5 or 6 pages can be added. As regards more issues per year, we'll have to wait and see if you're willing to help fill the pages.

Finally, the national meeting may go ahead in the Midlands, probably in Birmingham and there are rumours that we won't be on our own...watch this space in the coming months!!

PRINTLINER

PRINTLINER

PRINTLINER

PRINTLINER IDEAL FOR SHORT RUNS OF POSTERS AND HEADED NOTEPAPER

From Nigel Cooper
93, Francis Road,
Leston, London,
E10 6PL.

IT'S MORE THAN A BIT VERSATILE!

FIRST WE TOOK EVERY PRINTER/GRAPHICS PROGRAMME WRITTEN FOR THE MTX AND PULLED IT APART.....
....THEN WE MADE THIS ONE

*8 PRINTER DUMPS *10 FUNCTION USER-FRIENDLY DRAWING PROGRAMME *SCREEN SAVE/LOAD *FACILITIES FOR PRODUCING HEADLINE SIZE CHARACTERS (TALL & BROAD) *SOME PRINTER DUMPS WITH "MARGIN" FACILITY *TAPE BASED

IF YOU OWN AN EPSON CONFIGURATION PRINTER (DMX, PANASONIC ETC) YOU'D BE DAFT NOT TO BUY IT -

PRINTLINER 00-57

```

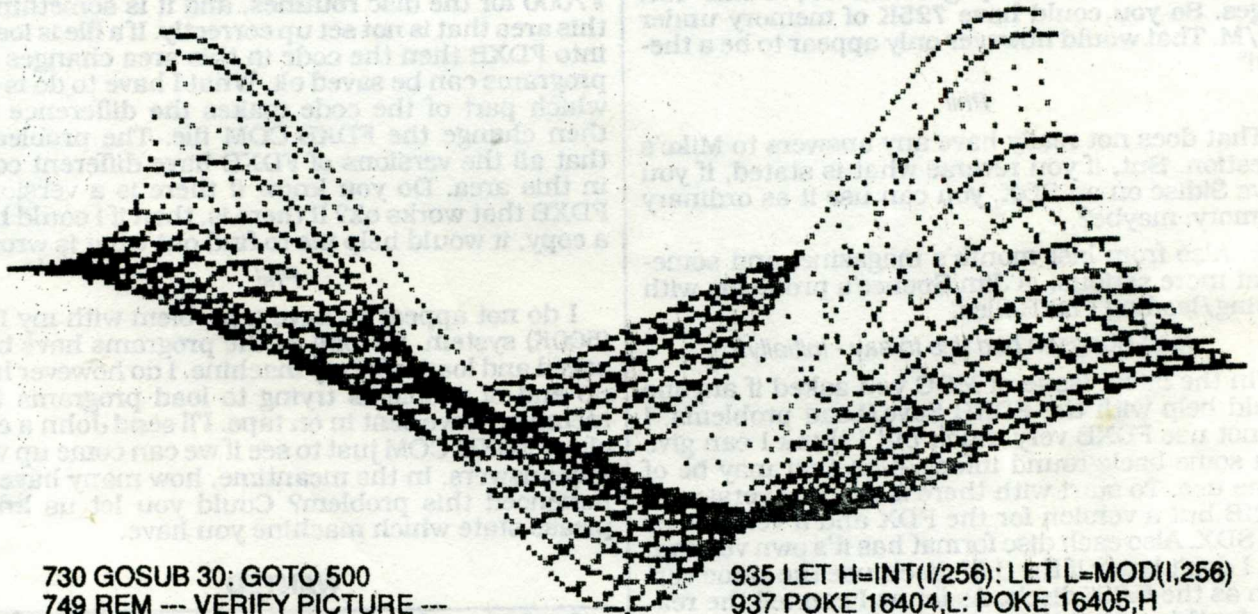
42E1      LD BC,#1800
42E4 LP:  LD A,(HL)
42E5      INC HL 42E6      OUT (1),A
42E8      DEC BC
42E9      LD A,B
42EA      OR C
42EB      JR NZ,LP
42ED      EI
42EE      RET
55 RETURN
200 REM DTS IN CODE 20 SET DOT
GRAPHICS TO 640 DOTS PER LINE WITH A
MAX OF 256 DOTS AS DETERMINED BY
(#4014/5)
220 REM OR IF FLAGED DOUBLE PRINT A
MAX OF 512 DOTS
300 LET I$=INKEY$: IF I$="" THEN GOTO 300
310 RETURN
340 PRINT : PRINT "IS THE CASSETTE READY
?"
350 GOSUB 300: IF I$="Y" OR I$="y" THEN
RETURN ELSE GOTO 350

```

```

400 GOSUB 40: REM SAVE VS 4 TO MEMORY
AT #A000 HEX
450 CLEAR
460 SAVE "SCNDUMP.BAS"
500 VS 5: CLS
510 PRINT "1. PRINT SINGLE"
520 PRINT "2. PRINT DOUBLE"
530 PRINT "3. LOAD PICTURE FROM TAPE"
540 PRINT "4. SAVE PICTURE TO TAPE"
550 PRINT "5. VERIFY SAVED PICTURE"
560 PRINT "6. SHOW PICTURE"
570 GOSUB 300: LET I=VAL(I$): IF I>6 OR I<1
THEN GOTO 570
590 ON I GOTO 500,900,800,600,700,750,1000
599 REM --- LOAD A PICTURE FROM TAPE ---
600 POKE 64872,1: POKE 64871,0
610 GOSUB 340
630 GOSUB 30: GOTO 500
699 REM --- SAVE A PICTURE TO TAPE ---
701 GOSUB 40
710 POKE 64872,0: POKE 64871,0 720 GOSUB
340

```



```

730 GOSUB 30: GOTO 500
749 REM --- VERIFY PICTURE ---
750 POKE 64872,1: POKE 63871,1
760 GOSUB 340
770 GOSUB 30: GOTO 500
800 REM --- SET FLAG TO DOUBLE PRINT (@
#4016) ---
820 POKE 16406,1
850 GOTO 910
891 REM --- SET FLAG FOR SINGLE PRINT
SIZE (@#4016) ---
900 POKE 16406,0
910 PRINT "IS THE PRINTER READY?[Y]":
GOSUB 350
920 PRINT : PRINT "HOW MANY LINE DOWN
THE SCREEN (1-24)"
925 INPUT C
927 IF C>24 OR C<1 THEN GOTO 925
930 INPUT "HOW MANY SCREEN PIXELS TO
PRINT (1-256)":I
933 IF I<1 OR I>256 THEN GOTO 930

```

```

935 LET H=INT(I/256): LET L=MOD(I,256)
937 POKE 16404,L: POKE 16405,H
950 REM --- POKE START OF PICTURE
(#A000) INTO BUFFER (@ #4012) ---
950 POKE 16402,0: POKE 16403,160
955 REM --- SET LINE SPACE ON
PRINTER TO 8/72 INCH ---
960 LPRINT CHR$(27);"A";CHR$(8);
965 REM --- SET PRINTER
TO UNIDIRECTION PRINTING ---
970 LPRINT CHR$(27);"U";CHR$(1);
975 REM --- CALL MACHINE CODE
FOR EACH LINE OF
SCREEN (24 TIMES) ---
980 FOR N=1 TO C: GOSUB 20: NEXT
990 GOTO 500
1000 VS 4: COLOUR 2,15: COLOUR 3,4: CLS
1010 GOSUB 50
1050 GOSUB 300: GOTO 500
1999 REM --- PUT YOUR GRAPHICS
DRAWING PROGRAM HERE ---

```

YOUR LETTERS

Possible Solutions

1. Last month Mike Rudkin asked if it is possible to do anything with the silicon disc's. Well, Mr C. Collins from M.C.L had this to say (It may be a bit 'garbled', but should provide some food for thought!):-

"In an FDX you can have SIDISC sized between 256K & 4Meg. This is all achieved using registers. Now, with SDX (old SDX?) systems you can implement SIDISC, but as far as the machine is concerned it is all considered as RAM!! Thus, if you have a series II or an older system with more RAM & 80 column card you can configure the extra RAM as a Sidisc. All you have to do is set the Sidisc up as a Type 50 then you will have a 196K Sidisc. Only the first 16K is formatted as directory space the rest is left free. Now, if you try and copy (PIP) something larger than 100K using Verify it will 'fall over'."

Now, MTX has 32K pages and CP/M has 48K pages. So you could have 725K of memory under CP/M. That would however only appear to be a theory!"

Phil

That does not really have any answers to Mike's question. But, if you reverse what is stated, if you have Sidisc on an SDX, you can use it as ordinary memory, maybe?.

2. Also from last month's magazine, and somewhat more serious, is Jim Spence's problems with saving/loading FDXB files.

John Hodgson had this to say - initially!

"In the latest issue of MOC you asked if anyone could help with the FDXB Save/Load problems. I do not use FDXB very much but I think I can give you some background information that may be of some use. To start with there is not one version of FDXB but a version for the FDX and a version for the SDX. Also each disc format has it's own version, but I don't know if the 3.5" disc's use the same version as the 5.25" disc's. As far as I can tell the reason for this is that the machine address of the FDX discs is different from the address of the SDX discs. Also the size of the disc that it will read from, or write to, is fixed in the FDXB code. So you can see there are at least four versions of FDXB. Alan Hamilton has a 1Mb FDX system and the 1Mb version of FDXB that came with the machine would not load programs that had been saved with it. What Alan had to do was to boot the FDX up as a 500k system and save his program with the 500k version of FDXB, reboot the system and then he could load the program with the 1Mb version of FDXB. Alan let me have a copy of the faulty FDXB and I changed the code and got it to work. Before you can take this problem any further you need to know the computer system it is running on and the disc size. I've just had a thought, I wonder if they are using a version that has been set up for a different disc size. Anyway, as far as I can tell I have working FDXB versions for the FDX (500k and 1Mb) and the SDX (1Mb). If the problem is with the SDX 500K version

then if you can send me a copy of the program I'll see if I can work out what is wrong. Otherwise I can send you a copy of one of my versions of FDXB and see if it makes any difference."

...Then, just over a week later, John had this to say!

"It would seem that I was a little premature when I last wrote about the FDXB Save/Load problems. I thought I had a good version of FDXB but to my horror I find that I have the same problems, I wonder how many of the files I have saved are any good!

I think I know where in FDXB the problem lies but I still have to find out what is wrong with the code. FDXB is a CP/M program and is loaded and run from memory address #100. The first instruction is a jump address #8103 and the program then sets up FDXB and the system variables. When this is done it will start running the FDXB code.

It appears that FDXB uses code from about #7000 for the disc routines, and it is something in this area that is not set up correctly. If a file is loaded into FDXB then the code in this area changes and programs can be saved ok. What I have to do is find which part of the code makes the difference and then change the FDXB.COM file. The problem is that all the versions of FDXB have different codes in this area. Do you know if there is a version of FDXB that works ok? If there is, then if I could have a copy, it would help me to find out what is wrong."

Phil

I do not appear to have a problem with my FDX (500K) system. So long as the programs have been saved and loaded by my machine. I do however have no end of problems trying to load programs that members have sent in on tape. I'll send John a copy of my FDXB.COM just to see if we can come up with any answers. In the meantime, how many have experienced this problem? Could you let us know, please state which machine you have.

WANTED

Books on the M80/L80 macro assembly programs.

SDX CP/M 80 Column board.

FDX unit (must be very cheap) to convert to hard disc. An "HOW TO CONVERT TO HARD DISC" will be included in a future magazine.

Some sort of ROBOT to connect to the MTX. This will be used as another project in the magazine.

Please send all correspondence to Phil Eyres.

Hardware & Software

We are on the look out for any secondhand hardware and/or software at reasonable prices. Especially Disc systems and printers. (15% Commission for selling hardware for members). Contact Phil Eyres on 0703 585106.

Competition

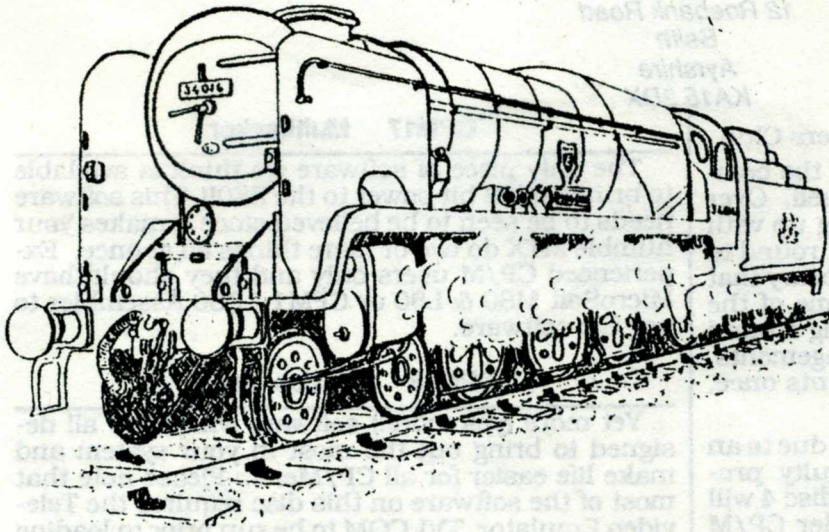
This month we have a special competition just for the kids. We have copy of the superb:-

MTX Fruit Machine

on offer as the prize. So come on kids, just spot the ten differences between the two pictures. Just circle the differences on the bottom picture, cut it out and send it to me with your name. All correct entries will be placed in a draw to decide the winner. If we get enough entries we'll put in an extra copy of Fruit Machine.

Please ensure all entries reach us before 15th February 1989.

GOOD LUCK!!



SMALL ADVERTS

FOR SALE

MTX 500 with 5 or 6 cassette games £25.00

Contact **Mr Sayer** 0795 412461 (Daytime)

MTX 512 with 10 cassette games £75.00

Contact **Phil Green** 0272 424000

FOR SALE

Memotech Items For Sale

1Mb Silicon Disc for FDX #60.00

V-ROM (SDX Emulator on FDX) £10.00

MTX 500/512 Service Manual and Technical Information, 72 pages £10.00

FDX with twin 1Mb 80 Trk Drives CP/M & Software. Also special cable for plugging in 3.5" & 3" disc drives £200.00

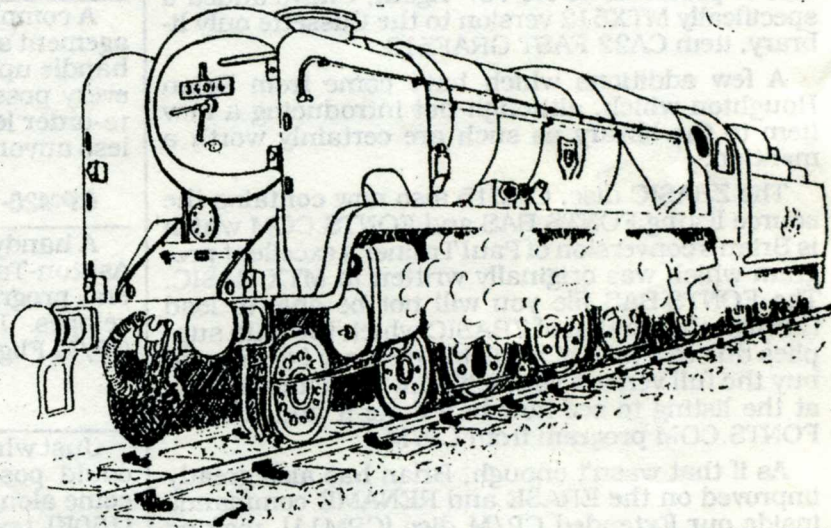
1*5.25" (CP/M) PRO-PASCAL (V2.184) £80.00

1*5.25" (CP/M) DEVPAC80 (V2) £28.00

Both 500K versions

Contact **AF Wilson** 0946 66770

To advertise your private items for sale, costs just £2.00!! Please send your advert by post to Phil Eyres 13 Copse Rd, Townhill Park, Southampton.



POWER AND FLEXIBILITY TO CP/M

Finding CP/M boring and unfriendly to use?

Newly developed is a suite of programs to assist you in your hour of need.

BUP - Backs up files with ease and uses discs to capacity.

UNERASE - Restores the file you erased

MENU - A menu system that makes 'A' look ancient.

CODE - A complex file encryption program

PERASE - Permanently wipes files

ECHO - Gets rid of the 'A' prompt whilst using the menu system.

All this on one disc plus two support programs for £15.00 + VAT (postage & packing inc.) Only from:- G.Mitchell, 169 Raeden Crescent, Aberdeen. AB2 4YB.

PUBLIC DOMAIN SOFTWARE LIBRARY

12 Roebank Road
Beith
Ayrshire
KA15 2DX

All cheques payable to Memotech Owners Club

Firstly, let me start by wishing you all the compliments of the season from Paul and myself. Over the Christmas break I have been catching up with all those things which I have meant to get round to and you'll notice from this update to the library that there have been some problems with some of the programs which have meant some ferreting around with discs and tapes and some re-arrangements. Anyway, I'll only publish these amendments once, so you have been warned!

The troublesome programs (which were due to an oversight on my behalf rather than faulty programming) are: Number 79 - 3D Maze on disc 4 will run only on CP/M systems running under CP/M BASIC or on MTX500s. For all MTX512 users, a new version, CA21 3D MAZE512 has been introduced to the library as a cassette only program. Fast Graf (No 80) was the other one, with the same sort of problems as No 79. Again, I have added a specifically MTX512 version to the Cassette only library, item CA22 FAST GRAF512.

A few additions which have come from Brian Houghton which, although not introducing a new item to the library as such are certainly worth a mention:

The ZBASIC disc, CPM15 also now contains the source listing FONTS.BAS and FONTS.COM which is Brian's conversion of Paul Trainer's excellent program which was originally written in MTX BASIC. The FONTS.BAS file you will not be able to load through the version of ZBASIC which the club supplies due to a lack of available memory (go out and buy the full version yourself!) but you can still look at the listing to see how he's done it and run the FONTS.COM program from CP/M.

As if that wasn't enough, Brian has also greatly improved on the ERASE and RENAME commands inside our Extended CP/M disc (CPM11), making them much friendlier and easier to use. Thanks Brian!

More additions to the CP/M software section:

CPM17 Multitasker

The only piece of software we think is available to bring 16/32 bit power to the Z80!! This software needs to be seen to be believed since it makes your humble MTX do two or more things all at once. Experienced CP/M users only and they should have MicroSoft M80 & L80 or CPM1 - Z80 Assembler to use the software.

CPM18 Utilities disc 4

Yet more (yes more!) software which are all designed to bring out the most in your system and make life easier for all CP/Mer's. Please note that most of the software on this disc requires the Tele-video Emulator, TVI.COM to be run prior to loading software from it. Those without TVI on their system disc we will be happy to supply a copy.

CPM19- Stock System

A completely integrated stock analysis and management system for any small business to use. Can handle up to 200 different items with fields to cover every possible detail on each item. Even includes re-order levels. 80 column FDXB/SDXB only (unless anyone would like to convert it...hint,hint).

CPM20- dBase II programs & Flight Simulator

A handy collection of command files for use with Ashton-Tate's dBase II program. The include several programs to manage mail lists and print envelopes. The Flight Simulator is, I believe, the only CP/M Flight Simulator available.

CPM21- Utilities 5

Just when you thought that all the utilities which could possibly be written for CP/M, some more come along on this disc. It also includes a massive (150K) text file of postcodes for the UK. Check yours!

Some more additions to the main library:

INTERFACING PROJECTS

Why not get into the exciting world of micro electronics. Infact what better way to start than with an MOC D.I.Y. kit. Everything you need is supplied, except a soldering iron, wire cutters and of course a few hours of your time!! So why not order now.

Interface price list A full set of components and instructions for the LED kit £6.95

A full set of components and instructions for the Speech Synthesiser kit £19.00

Connecting cable for the internal port (needed for projects) £4.50

All prices are fully inclusive.

Please allow 14 days for delivery and make cheques payable to MOC.

94. Graphics Calc 2

The first update of the popular sprite editor, Graphics Calc. This version, updated by the author, has all of the bugs removed making it an even better bit of programming than ever.

95. Blaster

By the author of Graphics Calc 1 & 2, this is a variation on the age-old but still as much fun game which involves the bombing of a city whilst your plane gets lower and lower...can you flatten the city before you hit it?

96. Demolition

An excellent platform-type game in which you move your little man about the levels knocking out the rivets. Excellent graphics and lots of baddies make this one of the best all-round games in the library.

And an addition to the library documents:

LL13 - Hitch Hacker's Guide To CP/M

The article which appeared in the October issue of the magazine which explains how to set up a new system size in CP/M and change the BIOS date amongst others.

JANUARY SALES

Due to a lack of space in the magazine for the last issue, the special offer which I had intended to run over Christmas has been changed to a January Sale. It proved a great success last year with a very large number of you taking advantage of it. The offer this year is valid from today (the day this magazine hit your door mat) until the day the next magazine pops through the door, so there should be plenty of time for you to get your order in.

Special Offer Number 1

For cassette operating system users: Purchase two cassettes (four programs) at the regular price of £1.50 per cassette and receive an extra (free!!) cassette with an extra two programs of your choice. Save yourself £1.50

Special Offer Number 2

For disc system users: Purchase two discs at the regular price as advertised and get an extra disc's worth of software free of charge of your choice. Please note that this special offer only applies if you supply the discs. A saving of at least £2.75

Special Offer Number 3

Again for disc system users: If you wish the Library to supply the discs, then the price for each disc (including the disc itself) is £2.75 on 5.25" or £3.75 on 3.5". Saving yourself at least £1.

IMPORTANT NOTICE

Programs 82, 83, 84 and 85 despite being loadable to all users will only work on tape based MTX

512s. All CP/M users should copy the program(s) to tape and use MTX.COM to load the programs. Non-CP/M users with MTX512s will be able to use the program perfectly well - they will not work on MTX500s at all.

END ITEMS

When ordering from the MOCPSDL, please state the following things: Your MOC membership number, the names and item numbers of the software you'd like copied and the system you work on. Disc users please indicate clearly the disc size (5.25" or 3.5"), the memory capacity of your disc drives and the operating system (CP/M or non-CP/M) in addition to this.

3.5" disc copies of the library are available from: Mr Paul Wood, 12 Bishops Avenue, Worcester, Worcs. WR3 8XA. Phone him on (0905) 24260.

Paul has also set up a bulletin board for modem users. It accepts all baud rates so there should be no problem for anyone with a suitably equipped system. The Board's phone number is (0905) 52536. And, as if that wasn't enough, Prestel users can also leave messages for Paul (and the club!) on Mail Box Number 090524260.

Happy Memoteching
Alan Hamilton
FULL List Overleaf

MOC

MTX BASIC TUTORIAL

This book has been designed to teach the absolute novice the basic skills of programming in Basic, what the commands on the MTX do; and how to use them. This course is also meant for those programmers who would like to improve aspects of their programming. Useful routines are included in the book like FILL (for filling an area on the screen), bouncing ball, true circles; and a host of helpful programming tips.

The book is well and logically set out, easy to read and follow. Many examples are given. Very well presented - professionally bound and attractive.

All this for ONLY £5.95!

ADVANCED GRAPHIC DESIGNER

Create graphic screens otherwise almost impossible to produce by normal programming. It is well presented and can do everything useful - even draws proper circles.

APPLICATIONS: Loading screens, layouts (eg Garden), Scale drawings.

Available on cassette Former price was **£13.99**.

Price still stands at only £9.99 for cassette.

CHEQUES PAYABLE TO
MEMOTECH OWNERS CLUB
Orders usually dispatched next day.
Tel. 0703 585106

Disc 1

- 01. Hex/Dec/Bin
- 02. CGEN
- 03 D-Draw
- 04. Whist
- 05. Mem-Save
- 06. MTX-Draw
- 07. LOGO-Draw
- 08. Simplex Tableau
- 09. Breakeven
- 10. Statistics
- 11. Unsolved Problem
- 12. Radio Routines
- 13. Light Cycles
- 14. Hex/Dec/Bin
- 15. Character Ed.
- 16. Quasimodo
- 17. Planner
- 18. Hanoi
- 19. Noble
- 20. Hi-Lo

Disc 2

- 21. Composer
- 22. Anova
- 23. Cashflow
- 24. Reversi
- 25. Full Time
- 26. Panel 3
- 27. Word Pro
- 28. SwMice
- 29. TNT TIM
- 30. Sw3D Funct1
- 31. Sw3D Funct2
- 32. SwSpEd
- 33. SwMathe
- 34. OXO
- 35. Solitaire
- 36. Cross Numbers
- 37. Avoid Seven
- 38. Numerology
- 39. Chemin
- 40. Dice

Disc 3

- 41. Reversi Vers 2
- 42. ISOT
- 43. DBase
- 44. Diary
- 45. Terminal
- 46. Skittles
- 47. Card-Ind
- 48. 2 * H & W
- 49. Hangman
- 50. Account
- 51. Mastermind
- 52. Connect 4
- 53. Jny Into Dngr
- 54. Connect 4 V2
- 55. Patience
- 56. Life
- 57. Enigma

- 58. FKEY
- 59. SkyDiver
- 60. Dice

Disc 4

- 61. MPG
- 62. Spooler
- 63. Labels
- 64. Ski Version 2
- 65. PNT/BJCK
- 66. Biorythms
- 67. Perpetual Calender
- 68. Flitter
- 69. Stock Control
- 70. Fonts
- 71. Dune
- 72. Headliner
- 73. Morse Tutor
- 74. Building Societies
- 75. Measurements
- 76. Clock
- 77. Clock 80
- 78. 3D Maze
- 79. Graphics Calc
- 80. FastGraf

Disc 5

- 81. Orbiter
- 82. Card Index
- 83. Appointments
- 84. Phonebill
- 85. Calender
- 86. Bouncy Ball
- 87. Hiscroll
- 88. FastWorm
- 89. Morse Sound
- 90. Sound Editor
- 91. Cass. Inlays
- 92. Printerdraw
- 93. StarTrek80
- 94. Graph Calc 2
- 95. Blaster
- 96. Demolition

Cassette Only

- CA01 Renum III
- CA02 Merge
- CA03 Money Manager
- CA04 FKEY
- CA05 DBASE III
- CA06 Filetech
- CA07 Flight
- CA08 RAMDisc
- CA09 TextEd
- CA10 Deci_Clock
- CA11 Elements
- CA12 MkBook
- CA13 Optics
- CA14 Dbase IV
- CA15 Filetech II
- CA16 Forth Extensions

- CA17 Inprinter
- CA18 Renum IV
- CA19 New for Old
- CA20 Dumpliner
- CA21 3D Maze 512
- CA22 Fast Graf 512

**CP/M Software
(CP/M disc systems ONLY)**

- CPM01 Z80 Assembler
- CPM02 EBASIC programs
- CPM03 Mail Label
- CPM04 Turbo programs
- CPM05 Comms disc
- CPM06 Small C Compiler
- CPM07 Utilities Disc 1
- CPM08 Prolog/Valgol
- CPM09 Utilities Disc 2
- CPM10 Utilities Disc 3
- CPM11 Extended CP/M
- CPM12 Forth
- CPM13 Adventure
- CPM14 8080/Z80 Translator
- CPM15 ZBASIC
- CPM16 Car Maintenance
- CPM17 Multitasker
- CPM18 Utilities Disc 4
- CPM19 Stock System
- CPM20 dBase progs & F.Simulator
- CPM21 Utilities 5

Library Documents

- Available at 50p per document, this includes postage and packing.
- LL01 System Variables
 - LL02 VDP Chip Explained
 - LL03 NewWord ROM Review
 - LL04 RST10 Explained
 - LL05 Undocumented NewWord
 - LL06 CP/M Programming Course
 - LL07 Instructions For CA16
 - LL08 Pascal course
 - LL09 CP/M Introduction
 - LL10 Flitter
 - LL11 Enhanced Supercalc
 - LL12 Inprinter Instructions
 - LL13 Hitch Hackers Guide

The copying fees for disc software are: £2.75 on disc for 20 programs (or £3.75 if you want us to supply the disc). 3.5" disc copies are available also at £4.75 including disc, £3.75 excluding. When ordering discs please state exactly the system you have: Disc capacity, operating system & disc size. All cheques/postal orders payable to Memotech Owners Club please.

MAGAZINE INDEX

By PHIL EYRES

It has been ages since the magazine index was updated, this update includes all magazines up to Vol 3 Issue 4. Perhaps by the next issue I will have been able to produce a separate booklet for this, which should make keeping track of those valuable snippets somewhat easier.

COLUMN HEADINGS :-

NUMB - Unique number given to each entry

This number is made up of three parts:-

The first character is the Group code, the next is the Type code and the remaining three make it a unique number.

DESCRIPTION - Obvious

V - Volume

I - Issue

PA - Page

CROS - Number of related Entry

GROUP CODES

A - Utilities

B - Games

C - Graphics/Screen

D - Sound

E - Programming

F - Hardware

TYPE CODES

1 - Article

2 - Problem

3 - Hints/Tips/Problems

4 - Review

5 - BASIC program

6 - PASCAL program

7 - Assembler program

NUMB DESCRIPTION ... V I PA CROS

A1001	Magazine index 1	1	10	11	
A1002	Utility Article	2	3	5	
A1003	Newword Customising	2	6	10	
A1004	Magazine Index 2	2	6	12	
A1005	Using PIP.COM(Ooption)	2	8	11	
A1006	RS232 Troubles (CP/M)	2	8	11	
A1007	Supercalc-Investment	2	9	12	
A1008	Disaster Recovery	3	3	9	
A1009	Using SUB.COM	3	4	9	
A1010	Disc Commands (Basic)	3	4	9	
A1011	Disaster Recovery	3	4	10	
A2001	Printing d/width graphs	1	2	8	
A2002	PASCAL option \$F	1	4	8	
A2003	Newword printer ctrl	1	6	7	A3003
A2004	Date to weekday convs	1	7	9	A5006
A3001	PANEL M(ove) command	1	1	6	

A3002	BASIC VERIFY breakout	1	1	6	
A3003	Newword printer ctrl comds	1	7	8	A2003
A3004	CGEN sprite gen correction	1	8	6	
A3005	Ed/Asm Problems	2	6	9	
A3006	Ed/Asm Cures	2	7	8	
A4001	Brunword	1	1	10	
A4002	Brunword	1	2	10	
A4003	Utilities	1	3	11	
A4004	Datafile	1	7	11	
A4005	Simplex Tableaux	1	8	6	
A5001	Screen Dump Routine	1	2	7	
A5002	Clock	1	3	2	
A5003	Drawing Board	1	4	10	
A5004	Display used variables	1	6	7	
A5005	Nodprint	1	7	2	
A5006	Date to week day conv'n	1	8	10	A2004
A5007	Conv CSR pos'n - PLOT pos	1	9	9	
A7001	Keyboard Debounce	1	4	3	
A7002	PANEL LPRINT routine	1	4	6	A7005
A7003	Typewriter program	1	8	5	
A7004	Clock prog-uses interrupts	1	8	6	
A7005	PANEL LPRINT routine	1	8	10	A7002
A7006	Bubble Sort	1	9	7	
A7007	Panel Find Article	2	2	7	A7002
B2030	Dungeon Adventure	1	3	8	
B2001	Tri-com problems	1	9	9	
B3001	Alice; getting out of forest	1	2	7	
B3002	Hackers guide to P Hle Pete	1	8	9	
B3003	Alice/Zoo help line.	1	8	10	
B3004	Pot Hole Pete Update 1	1	1	10	B3002
B3005	Pot Hole Pete Update 2	2	1	9	B3004
B3006	Pot Hole Pete Update 3	2	3	8	B3005
B3007	Alice Hints!	2	2	9	
B3008	Agrovator Pokes	2	8	10	
B3009	26 * 26 Spreadsheet Funct	3	3	7	
B3010	26 * 26 Spreadsheet Funct	3	4	8	
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B4002	Cobra	1	2	9	
B4003	Felix in the Factory	1	3	9	
B4004	Obloids	1	4	9	
B4005	Charmkatz	1	5	6	
B4006	Tumbledown Tower	1	5	6	
B4007	Emerald Isle	1	7	10	
B4008	Son Of Pete	1	7	10	
B4009	Escape From Zarkos	1	7	11	
B4010	Surface Scanner	1	8	12	
B4011	Fathoms Deep	1	8	12	
B4012	Lords Of Time	1	3	9	
B4013	Qogo2	1	7	10	

B4014 Iceburg	2	1	11	
B4015 Bouncing Bill	2	1	11	
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B4017 Quantum	2	2	11	
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B4020 Memosketch	2	5	12	
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B4030 Highway Encounter	3	2	12	
B3031 Doodlebugs	3	2	12	
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B5002 Ski II	1	7	6	
B5003 Ball Fall	2	1	4	
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C2001 Avoiding adjacent dist colrs	1	4	8	
C2002 Loss of character off screen	1	5	7	
C3001 Sprite coincidence flag	1	1	7	
C3002 Screen control	1	6	8	
C3003 Wide Text Characters	2	5	9	
C5001 Polygons	1	1	4	
C5002 More Polygons	1	2	2	
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C5004 Spiroplot	1	2	6	
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C5006 Lisajoux patterns & figures	1	5	2	
C5007 Rotation (with sound)	1	6	6	
C5008 Basic Shape Filling	1	8	3	
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D3001 Sound Demo	2	2	9	
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E1002 Assem. Prog Pt 2: Bin/Dec & 2's compl.	1	2	3	
E1003 Assem. Prog Pt 3: ROM RST10 info	1	3	3	
E1004 Assem. Prog Pt 4: ROM RST10 continued	1	4	4	
E1005 Assem. Prog Pt 5: VRAM memory	1	5	4	
E1006 Assem. Prog Pt 6: VRAM & VDP	1	6	3	
E1007 Assem. Prog Pt 7: VRAM demo & pseudo ops.	1	7	5	
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E1012 L Basic Pt 5: Delete Routine	2	3	2	
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