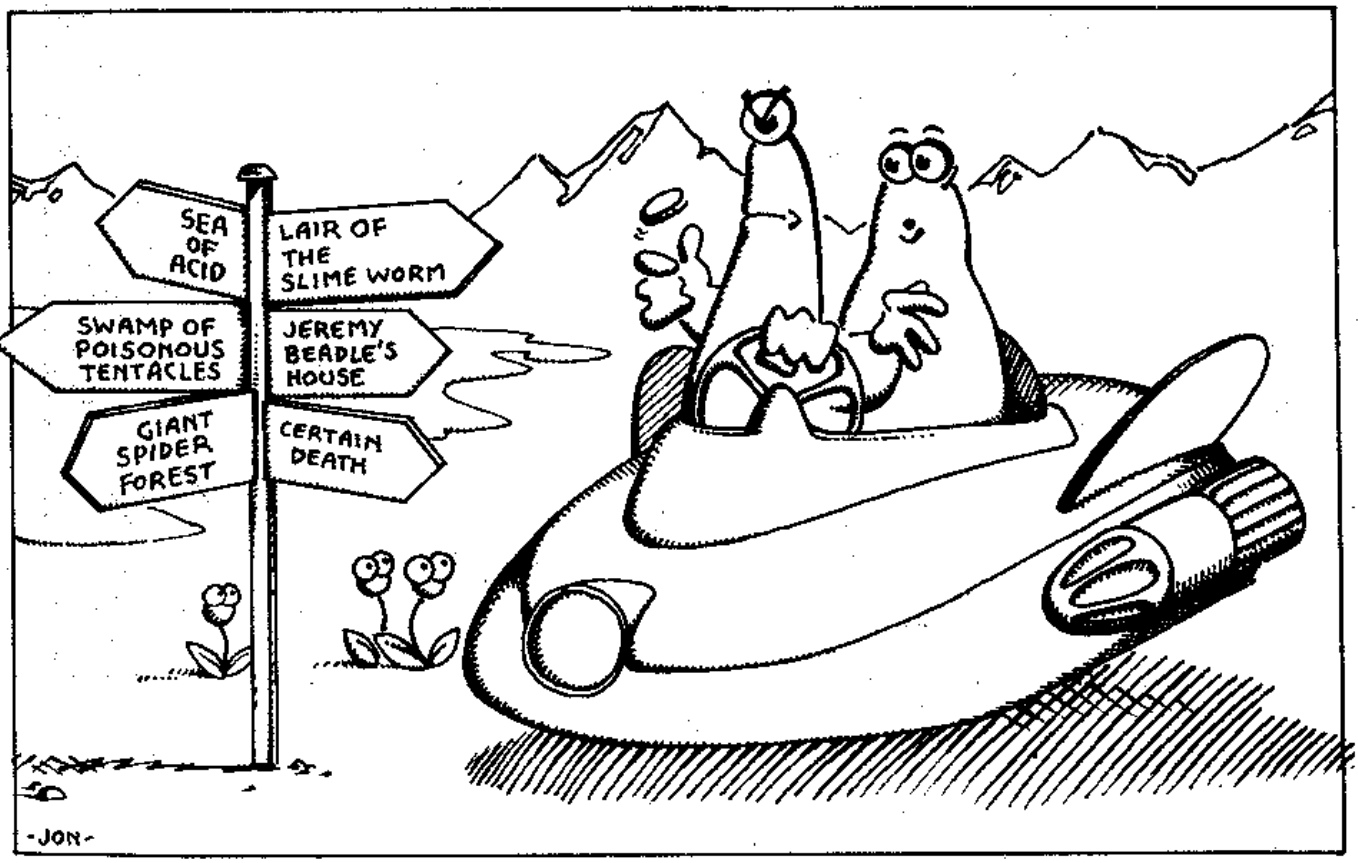
Vol 4 - No 10. June 1991.

FORMAT

FOR SPECTRUM AND SAM USERS



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NEWS ON 4

AMSTRAD CUTS

Amstrad have made ten percent of their staff redundant from their Brentwood Head Office. The cuts, from director level down, reflect a drop in sales over the past six months. Insiders say that these may not be the last redundancies Amstrad will suffer.

MESSENGER ARRIVES

SAM Computers have at last started shipping their Messenger Interface. Designed to link a SAM Coupé and a Spectrum, the Messenger allows 'Executable Images' (that's running machine code games to you) to be shot to and through between the two.

Having loaded a 48k game on your Spectrum you press a button (the equivalent of the snapshot button on the DISCiPLE/PLUS D) and transfer the program to SAM. Once there you can play the game, save it to SAM disc or Snap it back to the Spectrum. It will allow the whole of the Spectrum's memory, including the 48k ROM to be transferred to SAM.

For DISCiPLE or PLUS D owners, who can Snapshot games to disc and then load into SAM, there is little new to offer except the ability to pass a multi-loader game back to the Spectrum to load the next stage.

At 29.99 it is an expensive way to enhance SAM's already excellent Spectrum compatibility. Specmaker from SD Software, Samtape from LERM and Speclone from Steve's Software all allow Spectrum users to run most 48K software that wont run under SAM's own emulator.

JOYSTICK MOUSE

Blue Alpha Electronics has designed and launched the first mouse for the SAM Coupé. The new mouse, priced at £39.99 (plus £2 p&p), plugs into SAM's joystick port. This means that it is instantly compatible with any items of software that offer a joystick option, including FLASH! and the new MIDI Sequencer package. The mouse can also be used from Basic with a small machine code routine used to update the Basic XMOUSE, YMOUSE and BUTTON variables.

As the new mouse will plug into any 'Atari standard' joystick port it will also work with most Spectrum joystick interfaces - only the +2/+3 joystick ports are wired wrong for it.

A full review will, we hope, be ready in time to appear in next months FORMAT.

SHOW HOTLINE

Bruce Everiss, organizer of the ALL FORMAT COMPUTER SHOWS has started an 0898 telephone service to keep people up-to-date with details of forthcoming events.

Having extended the shows from London to Birmingham, and with new shows planned for Bristol and Leeds (sometime before Christmas) the show calendar is now becoming very full.

The new Hotline, on 0898-299-389, will give details of show venues, dates and times.

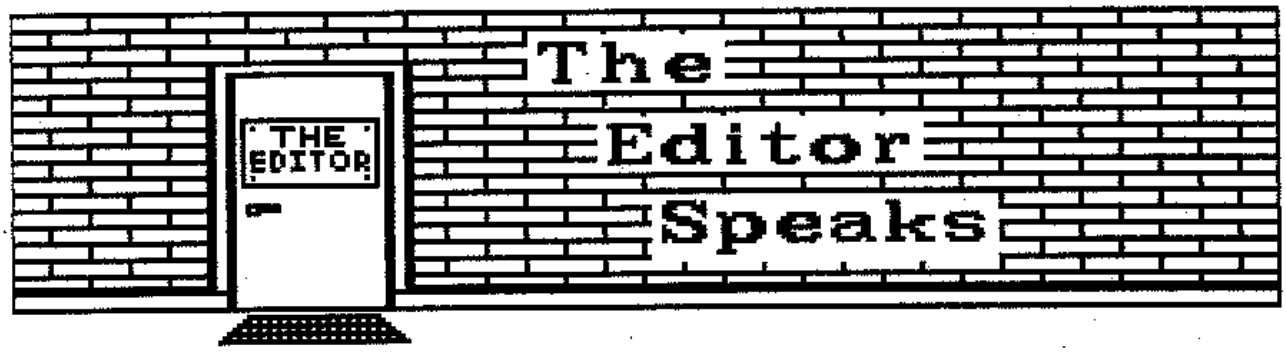
ADVANCED DISC UTILITY

Kobrasoft have launched a new utility that is a must for all serious SAM Coupé disc users. Called SAM DICE the program allows editing of files, tracks and sectors on SAM discs.

Anyone familiar with some of the Norton Utilities on IBM machines will notice many similarities in SAM DICE. Priced at £12.95 the program comes on 3.5" disc with a manual that contains many technical details on SAM's discs.

News Credits: A.Graham. C.Mason

URGENT we need your news. Anything you think other people should know about. Items printed earn contributor 3 month extra subscription. For shows etc please give us at least 6 weeks notice.



It has come to my attention that someone is casting aspersions on FORMAT's claim of being the first magazine to review the SAM Coupé. To set the record straight, the first SAM's rolled off the production line just a few days before Christmas 1989. I had spent from mid October to then in Swansea working on the SAM project.

As soon as I got back to Gloucester I started to write, in conjunction with John Wase, the review that appeared in the Jan'90 issue of FORMAT. This had to be the first review because there were no SAMs to review until then. OK there were prototypes, I had one for several months, but even three weeks before SAM was released the only ROM available was a modified Spectrum ROM. The public version of SAM's ROM was completed only hours before the first machines were shipped.

One magazine only, Computer Trade Weekly, was allowed to review the (uncompleted) machine before Christmas 1989. If you read that someone reviewed SAM before FORMAT don't believe it, we were first, and we have stayed in the lead ever since.

The London ALL FORMATS SHOWS have been a great success story, and my bet is now on the Birmingham shows to really take off as well. The venue at the National Motorcycle Museum is very smart, the parking is excellent and the road; rail and even air links could not be better. The first show was fantastic and the next one, on Sunday 9th June, looks like it will be even better. I will be there, along (I hope) with Nev Young, Carol Brooksbank and a few others. If you want a really good day out then don't miss the show.

You will notice some changes on the Format Readers Service page this month. Because of problems caused by some readers, who couldn't read the simple instructions for adding postage/packing to their orders, we have been forced to review prices to include an element to cover shipping in the UK. At the same time I have added our Printer Interface (SPI) to the FRS page, again some readers had difficulty in realising, despite the fact that it was a separate advert and they were being asked to make out the cheque differently, that they couldn't lump together an SPI order with a FRS order. The delays these problem orders were causing had become unacceptable, hence the change in the system.

Please also note that the issues in Volumns 1 & 2 of FORMAT are now only going to be available as complete volumns. This will save us money at the printing stage, so I have made a corresponding reduction in the price of the sets. For those of you who are still missing just a few of the early issues I will accept, this month only, orders for seperate issues from Vol 1&2 at £1.50 each. These MUST be ordered separately from the other FRS products (including other back issues) as they are not in our computer system anymore.

One bonus of the change. With the extra staff we now have we will be able to send out FRS orders on a weekly basis so you should be getting things through faster in future.

Sorry, no SAM Public Domain this month, Brent is tied up with exams. He will be back next month.

Bob Brenchley. Editor.

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SHORT SHOT

By:- John Wase.

The May Birmingham All Formats Fair was a resounding success. My best bargain was an Epson sheet feeder for £25.00. Chuffed, and not really concentrating I continued to circulate round the stalls, when Carol Brooksbank leapt out at me, thrusting a disc into my mucky paw. I can't really make head or tail of it, so I've reproduced it as it came....

Place: Carol's Study
Time: Thursday (am) before Birmingham All-Formats Fair

The telephone rings

BOB BRENCHLEY: (on the phone): Do you want to kill me, or shall I commit suicide?
CAROL (deeply suspicious): What have you done?
BOB: I daren't tell you!
CAROL: You never know; I might forgive you.
BOB: Not when you hear what I've done.
CAROL: (at end of tether) For heaven's sake, spit it out.
BOB: I've wiped the Format Font Library disc.
CAROL: (with amazing self control) How did you manage that?
BOB: (There follows a rambling and incoherent story about the activities of malign spirits which inhabit the "Format" office when everyone has gone home, which ends...): and I can't find the backup copy, but I've still got the paperwork.
CAROL: And I suppose you need to duplicate it in time for the Fair on Sunday.
BOB: That was the general idea.

Carol gently hangs up the phone.

There is a pause and she mutters something inaudible. Then, as the curtain falls she scrabbles madly in disc boxes, trying to work out which, of many versions of the Font Library files, is the latest one.

MORAL: No-one is immune from disc disasters. Always make a backup copy and keep it in a safe place - but not so safe that you can't find it when the gremlins strike.

Next, PRINT USING. No, it hasn't died. Geoffrey Smith of Fleet, Hants, writes that in Robert Brady's "USIN" procedure in line 10030 (actually misprinted as a second line 10020) which is intended to round "num" to the required number of decimal places, the internal pair of brackets, enclosing (decplac+.5) is superfluous and leads to the wrong result. This line should be:-

```
10020 LET rnum=INT(num*10↑decplac+.5),
      rnum=rnum/10↑decplac
```

or, slightly shorter and quicker:-

```
10030 LET p=10↑decplac,rnum=INT(num*p+
      .5)/p
```

Geoffrey also challenges Roberts claim that his routine will put an end to all other "Print Using" routines, complaining bitterly that he, too, is a contender with his 48K Spectrum routine for producing aligned columns of numbers in tabular form. All right, it was a bit long and needed a lot of typing in, so I evaded the issue (everyone please make sure you send things on disc or tape). I can't any longer, so here it is...

```
  5 REM EXAMPLE OF PRINT ROUTINE
 10 LET A$="               ": REM 15
    SPACES
 20 LET B$="0.000000000"
 25 LET print=100
 30 GOTO 500
 98 REM ************************
 99 REM PRINT SUBROUTINE
```

```
100 LET P=10↑N2
110 LET XI=INT (X*P+.50001)/P
120 LET X$=STR$ XI
130 LET S$=A$(1 TO N1+sp)+B$(1 TO N2+
    2)
140 IF XI=0 OR X$="" THEN LET LO=0: G
    OTO 160
150 LET LO=INT (LN (ABS XI)/LN 10+1E
    -9) *((ABS XI)>1)-((ABS XI)<.0999
    99) +(XI<0)
152 IF LEN X$=1 THEN GOTO 160
155 IF X$(1 TO 2)="-." THEN LET X$="-
    0."+X$(3 TO ): LET LO=LO+1
160 LET S$(N1+1+sp-LO TO N1+sp-LO+LEN
     X$)=X$
200 LET Z$=Z$+S$
220 RETURN
498 REM ************************
499 REM EXAMPLE FUNCTIONS
500 INPUT "next x =";x1
502 LET Z$=""
504 REM ************************
505 LET x=x1: LET n1=3: LET n2=3: LET
    Z sp=2
510 GOSUB print
514 REM ************************
515 LET y1=x1*x1
520 LET x=y1: LET n1=2: LET n2=4
525 GOSUB print
529 REM ************************
530 LET y2=SIN x1
535 LET x=y2: LET n1=n: LET n2=4
540 GOSUB print
544 REM ************************
545 LET y3=COS x1
550 LET x=y3
555 GOSUB print
559 REM ************************
560 LET y4=TAN x1
565 LET x=y4: LET n1=4: LET n2=6
570 GOSUB print
574 REM ************************
575 LET y5=EXP x1
580 LET x=y5
585 GOSUB print
589 REM ************************
590 LET y6=EXP (-x1)
595 LET X=Y6
600 GOSUB print
604 REM ************************
605 LET y7=(y5-y6)/2
610 LET x=y7
615 GOSUB print
619 REM ************************
620 LET y8=(y5+y6)/2
625 LET x=y8
630 GOSUB print
634 REM ************************
635 LET y9=y7/y8
640 LETx=y9: LET n1=1: LET n2=6
645 GOSUB print
698 REM ************************
699 REM INSERT YOUR PRINTER DRIVER IN
    ITIALISATION ROUTINE HERE AS NECE
    SSARY.
700 COPY : REM CHR$ 0
705 LPRINT CHR$ 27;"P";CHR$ 15;CHR$ 2
    7;"1";CHR$ 5; z$
710 COPY Z REM CHR$ 1
714 REM ************************
715 GOTO 500
```

As printed, the program allows you to be able to specify the numbers of figures to be printed before and after the decimal point separately for each column, to alter the number of spaces between each column and the next, to round each number to the number of places specified, to align all decimal points in each column of figures, to right justify without trailing zeros, but to allow for printing a leading zero before the decimal point if the absolute value of the number is less than one, and finally, to accommodate negative as well as positive numbers.

The print subroutine (lines 100 to 220) is followed by a set of calculations of natural functions of x1 - the square, sin, cos, tan, e to the power of the number and so on. With each function, the user must specify the number of figures before and after the decimal point, (n1 and n2), and the number of spaces between this column and the previous column (sp), the "print" subroutine requiring them as input along with the number to be printed. After rounding to n2 decimal places, the number is converted into a string (x$) and then superimposed on the template string (s$) set up in line 130. LO (line 150) determines the positioning of x$ within s$ to ensure alignment of decimal points. Line 155 inserts a zero before the decimal point of negative numbers (a Spectrum failing), and the actual superimposition is in line 160, whence it is appended to an accumulator string (z$) in line 200. When complete, z$ is printed as one row from lines 700-710 which are set up to print in condensed mode with a

left hand margin of 5 spaces on an Epson RX80 printer - adapt the code to your interface and printer combination - up to the maximum line length, which, for the RX80 is 137 characters and spaces. Do remember that the Spectrum only prints up to 8 significant figures in addition to the decimal point; the subroutine will pad bigger numbers with enough trailing zeros to keep the column right-justified.

x	x^2	$\sin x$	$\cos x$	$\tan x$
-1.000	1.0000	-0.8415	0.5403	-1.557408
-0.500	0.2500	-0.4794	0.8776	-0.546302
-0.100	0.0100	-0.0998	0.9950	-0.100335
-0.050	0.0025	-0.0500	0.9988	-0.050042
-0.010	0.0001	-0.0100	1.0000	-0.010000
0.000	0.0000	0.0000	1.0000	0.000000
0.050	0.0025	0.0500	0.9988	0.050042
0.100	0.0100	0.0998	0.9950	0.100335
1.000	1.0000	0.8415	0.5403	1.557408
2.000	4.0000	0.9093	-0.4161	-2.185040
3.000	9.0000	0.1411	-0.9900	-0.142547
4.000	16.0000	-0.7568	-0.6536	1.157821
5.000	25.0000	-0.9589	0.2837	-3.380515
6.000	36.0000	-0.2794	0.9602	-0.291006
7.000	49.0000	0.6570	0.7539	0.871448
8.000	64.0000	0.9894	-0.1455	-6.799712
9.000	81.0000	0.4121	-0.9111	-0.452316
10.000	100.0000	-0.5440	-0.8391	0.648361

This diagram of sample output shows how the thing works. I really think that that ought to be the end of "Print Using", so I'm not going to print anything more on it unless you convince me very hard...

Next, a letter with both brickbats and bouquets from Alan Cox of St Clears, Dyfed (again). Brickbats first (with which I agree). Typing in listings from "Format" is tortuous (I know, Alan; I've just typed in the listing above), and with the photoreduction, it is almost impossible to tell the difference between small "ell" and the cypher "1". Please avoid them in listings.

Alan also says some nice things about "Format" and asks what is the copyright position about things published many years ago. Essentially, Alan, if the magazine's defunct, there's not too much of a problem. I agree that much of the material is new to our newer readers, and would bear repeating. What do other readers think? Drop the letters page a line and tell us.

Bjorn Nyberg (I owe you a letter, Bjorn, my apologies), has written with another Spectrum routine which solves a different, yet related problem - that of printing out strings from an array without unnecessary spaces at the end. It is a simple Basic program, the initial function being the core of the whole thing. The "real" length of any string in the array is contained in a two-digit number at its beginning. The function limits any string printout to the "real" length. The maximum dimensioned length in a DIM line must be at least the length of the longest string in the DATA line, plus 2. The program is not error-trapped - add your own if you use the routine.

Line 9100 starts a short demo program. An exclamation mark is added to the strings in the array to show that they print out without any superfluous spaces. To see how it would have looked otherwise, merely insert REM behind line numbers 9000 and 9120 and add the line: -9125 PRINT a$(p)+"!"

Try it!

```
9000 DEF FN a$(x)=a$(x)(3 TO VAL (a$(x
     )(1 TO 2)))
9010 DIM a$(3,20)
9020 RESTORE 9050: FOR n=1 TO 3: READ
     x$: LET x=LEN x$+2: LET y$=STR$ x
9030 IF x<10 THEN  LET y$="0"+y$
9040 LET a$(n)=y$+x$: NEXT n
9050 DATA "sword","disintegrator","rev
     olver"
9100 CLS : PRINT "Press a key for demo
      of result": PAUSE 0: CLS
9110 FOR p=1 TO 3
9120 PRINT FN a$(p)+"!"
9130 NEXT p
```

Many thanks, Bjorn.

Next, Simon Goodwin. Yes, THE Simon Goodwin, who sends me three items. And OK, SAM owners, I know you've been waiting, but it's refreshing to have some stuff for the Spectrum, isn't it. And you can use it on SAM, after all, so I'm pretty unrepentent. Anyway, this is actually for SAM, so your wait's not in vain.

Simon thought that SAM owners ought to have a fast sort. Enter SORTDEMO. It's about thirty times faster than the usual Bubble Sort or Swap Sort when asked to put 1000 random numbers in order, is nevertheless short and simple, needs no extra storage and can easily be translated into other languages. Simon mentions that it is important that SAM users should use the best algorithms as well as the best Basic: SAM basic has structured features. that make algorithms easy to express and follow, once you are used to the conventions involved.

The program SORT DEMO demonstrates this admirably. In it, PROC SORT_UP uses a fast Shell Sort which takes an array name as its parameter, and therefore is worth saving as part of your own library of "useful procedures", since it is not "hard-wired" (I like it, Simon) with a particular name. The classic computer Scientist D. E. Knuth tabulated the "worst case sort effect for large N" for various algorithms:-

Bubble Sort	N*N/2
Swap Sort	N*N/2
Insertion Sort	N*N/4
Quick Sort	2*N*LOG2(N)
Shell Sort	1.6*N*LOG2(N)

LOG2(2)=1,LOG2(4)=2 ... LOG2(1024)=10, etc.

Back in June '89's "Format" (Vol 2 No 10), Nev Young explained the first three, but not the last two, which are particularly fast where there are lots of data to be sequenced. Note that the Bubble Sort is not too bad when the items are ALMOST in order - which is why "Football Manager" is slow at the start of the League season, and much faster later when the club order does not change as much...

```
100 CLS #
110 LET n=9+RND(45)
120 PRINT "Generating table of ";n;" n
    umbers:"''
130 DIM Table(n)
140 FOR i=1 TO n: LET r=RND(999),Table
    (i)=r: PRINT r;" ";: NEXT i
150 PRINT ''"Sorting ";
160 SORT_UP Table()
170 PRINT "complete."''
180 FOR i=1 TO n: PRINT Table(i);" ";:
     NEXT i
190 : STOP :
200 DEF PROC SORT_UP REF a()
210 LOCAL i,j,n,d,count,temp
220 REM Uses a Shell Sort  -much faste
    r than Bubble Sort!
230 REM Sorts elements of array A into
     ascending order of A
240 REM See Burtiss AT, Data Structure
    s Theory and practice
250 REM 2nd Ed., Academic Press, New Y
    ork, 1975, p 464-465.:
260 LET n=LENGTH(1,a())
270 LET d=1: DO : LET d=d+d: EXIT IF d
    >=n: LOOP
280 REM "Otherwise: if D>1, D:= 2 ↑ (L
    N(n-1) DIV LN(2))-1"
290 DO
300 LET d=(d-1) DIV 2
310 EXIT IF d=0
320 LET count=n-d
330 FOR i=1 TO count
340 LET j=i
350 DO
360 LET l=j+d
370 IF a(l)<a(j)
380 LET temp=a(j),a(j)=a(l),a(l)=temp
390 LET j=j-d
400 LOOP IF j>0
410 END IF
420 LOOP UNTIL 1
430 NEXT i
440 LOOP
450 END PROC :
```

That's all for now, folks. See you next month. And please keep sending your short spots to me (on disc or tape please):-

John Wase, Green Leys Cottage, Bishampton, Pershore, Worcs, WR10 2LX.

Without them, I can't write a column. Many thanks.

SUMMER'91 CHARITY MEMBERSHIP DRIVE

It is mid May as I write this, the April issue has only been in readers hands for just over a week. But it is nice to say that we are already receiving subscriptions under our SUMMER'91 MEMBERSHIP DRIVE.

It is still too early to have any idea how successful this years drive is going to be but I will be reporting progress each month. Still, Bob tells me I've got to write something for this months FORMAT so I thought readers would like to hear how successful our last membership drive (in 1989) was.

Bob started the 1989 Membership drive in the August issue (Vol 2 No 12). Like our new SUMMER'91 drive the idea was for existing readers to introduce new people. (Word of mouth having proved, time and time again, the best way to spread news of the benefits of INDUG membership and FORMAT). As an incentive Bob put 50p for each new member introduced into a fund which was to go to a winner selected from those who introduced the new members.

The Autumn'89 membership drive finished at the end of December 1989 and the results were published in the March 1990 issue (Vol 3 No 7). In the end there were 126 new members introduced and this resulted in Alister Marsh walking of with £63 after introducing two people (his brother - Jeff, and a friend from work) to INDUG. Alister had been a member himself for nearly two years and had tried to persuade Jeff to join before, but it was only when he shoved a copy of the membership form in front of him that Jeff signed up.

Now, remember that for each new member introduced under our SUMMER'91 membership drive there is £1 going into a special account. The real winner of this years pot will be charity and if we only get as many new members as we did in 1989 then the selected charity will benefit to the tune of 126 plus the interest earned on the account. Remember it could be your favourite charity that wins the money, just introduce a new member using the form we printed last month (extra copies available on request) and if you are the one pulled out of the hat at the end of September then you get to nominate which charity receives the money. Of course there is also an added incentive for you to introduce someone to INDUG, as well as nominating the charity you also win a LIFETIME SUBSCRIPTION - no more renewal notices ever.

In 1989 Bob pointed out that there were an estimated 1.5 million Spectrums still in circulation. While this number has fallen over the last two years there are must be at least 1 million still going strong. Add the growing ranks of SAM users, and FORMAT still has a large potential audience that needs to be tapped. It is up to you, our readers, to help us achieve the growth we need. As members of the largest Spectrum & SAM User Group in the world you owe it to yourself and other members to spread the word. In 1989, there were around 1400 members. We now have over 2500 so I expect the new membership drive to produce much better results. You all know someone with a Spectrum or SAM Coupé so, if they are not already members, all of you know at least one person you can introduce. No excuses now, copy the form from last months issue and get someone to fill it in and send it off - TODAY.

Jenny Bundock. Membership Secretary.

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DECISION TABLES FOR PROGRAM DESIGN

By:- Jacob Minidor.

INTRODUCTION

This short series of articles will deal with a very important tool of software design, called DECISION TABLES. In what follows those tables will be defined, explained and it will be shown how to produce and use them in software design and implementation (coding) then (if FORMAT's Editor, and magazine space, permit) the subject will be enhanced to include state transition tables.

CONCEPT DEFINITION AND STRUCTURE

Decision tables are (as the name suggests) a tabular way of specifying a number of possibilities and the actions to be taken on each occurrence. The basic structure of the table is made of four quadrants as shown in Fig 1 below.

Condition Stub	Condition Stub
Action Stub	Action Stub

Fig 1.

The conditions are binary. That is, only two outcomes are possible for each condition - Y (for yes) and N (for no). Below the list of conditions comes a list of actions which can be taken and below each condition entry combination a sign is made if the action should be taken or not.

Lets try a simple example. Suppose we design a small adventure game consisting of just three locations. The first contains a lamp, the second contains an apple and the third location is empty. The description of a room's content can be dealt with by using the table in Fig 2, where X means to take the action and n/a means not applicable.

Is it location No 1.	Y	N	Y	N
Is it location No 2.	Y	Y	N	N
Display "Room contains:"	n/a	X	X	
Display " a Lamp."	n/a		X	
Display " an Apple."	n/a	X		

Fig 2.

Some points should be noticed in this table.

All the combinations are listed, even those that are impossible like the first combination which imply being at locations 1 and 2 at the same time. Impossible combinations should be marked as such.

Combinations 2 and 3 mean being at locations 2 and 1 respectively and combination 4 mean being at location 3 (by not being at locations 1 and 2).

Generally, it can be said that if there are N binary conditions, the table will consist of 2^N combinations columns. This make decision tables hard to be used when the number of conditions becomes greater then 4 or 5 and there are ways to reduce the number of combinations such as using equivalence classes consisting of identical columns.

What I would like to present is a way of designing and using decision tables which is simpler to use.

First lets rotate the table so that it will look like the one in Fig 3.

The number of lines depends on certain values which will be explained soon. Also, instead of using the title

	Cond. n	...	Cond. 3	Cond. 2	Cond. 1	Actn. 1	Actn. 2	Actn. 3	...	Actn. 4
Comb. 1										
Comb. 2										
Comb. 3										

Fig 3.

"condition" it is preferred to use the word "parameter" on which the decision depends. In order to construct a decision table we first build a preliminary table in which we define the parameters and their possible values. The structure of this table is that of Fig 4.

Some explanations for the column titles:-

The parameter name could be any representative name (i.e. room) or just a letter (i.e. R).

Values are the values that are valid for the parameter (i.e. 1,2,3 or "A", "B", "C") or range of values (i.e. 1 to 2 or "a" to "p").

Representative values are values which represent the actual values. It is recommended (for reasons which will be explained later) that these values should start from 0 (zero) in steps of 1 (it may happen that the two sets of value will coincide).

The number of possibilities is the number of different representative values.

The multiplier is computed as follows:-

The multiplier for the first parameter is always 1.

If parameter i has m_i possibilities and its multiplier is k_i then the multiplier k_{i+1} of parameter (i+1) equals $k_i * m_i$.

The role of the multiplier is to indicate how the representative values should cycle alternatively in the table.

To demonstrate these concepts lets return to our simple example and suppose that only the first location is lit and the others are dark so that in order to describe anything in locations 2 and 3, the lamp must be on. The preliminary table will look like the example in Fig 5.

No.	Parameter Name	Values	Representative Values	Possibilities (number of)	Multiplier

Fig 4.

No.	Parameter Name	Values	Representative Values	Possibilities (number of)	Multiplier
1	Room # R	1,2,3	0,1,2	3	1
2	Lamp L	off,on	0,1	2	(3*1=)3

Fig 5.

The decision table produced from it will look like Fig 6. Where:-

Action 1 is: Display "room contains:"
Action 2 is: Display " a lamp"
Action 3 is: Display " an apple"
Action 4 is: Display "It's dark in here. You see nothing".

L	R	Actn 1	Actn 2	Actn 3	Actn 4
0	0	X	X		
0	1				X
0	2				X
1	0	X	X		
1	1	X		X	
1	2				

Fig 6.

Note that the parameters appears in the table from left to right in descending order of their sequence number in the preliminary table (i.e. R - parameter #1 - is first from the right and L - parameter #2 - is second from the right).

Also note how the values of the parameters alternate in the column according to the multiplier: R with multiplier 1 has its values alternate every time, while L with multiplier 3 has its values alternate every 3 times.

We have 6 different combinations in the table, the result of the multiplication of the last multiplier (3) with the last number of possibilities (2). This is always true.

If we denote by v_i the representative value of parameter i and by k_i its multiplier, then the sequence number J of any combination is computed by the following formula:-

$$J = 1+v_1*k_1+v_2*k_2+...+v_n*k_n$$

For example, being in room 2 with lamp on is combination #5 but then $v_1(R)=1$, $k_1=1$, $v_2(L)=1$, $k_2=3$ so that $J = 1+1*1+1*3 = 5$.

The above formula work correctly only if the representative values starts from 0 in steps of 1.

Any mathematicians reading this may like to note that if the conditions are all binary then the combinations lines will have binary numbers which are 1 less then the line number of that combination.

Note that if we stick to the conventional way of using decision tables (that is, using only binary decisions) we would have to use a table with 3 condition stubs and 8 ($=2^3$) combinations columns.

USING DECISION TABLES IN PROGRAMS

The main idea of implementing a decision table in a program is to compute the number J of the combination (using the above formula) and using a "case", "select" or "computed goto" structure of your chosen programming language to invoke the correct actions.

Using a conventional flowchart the implementation could look like:-

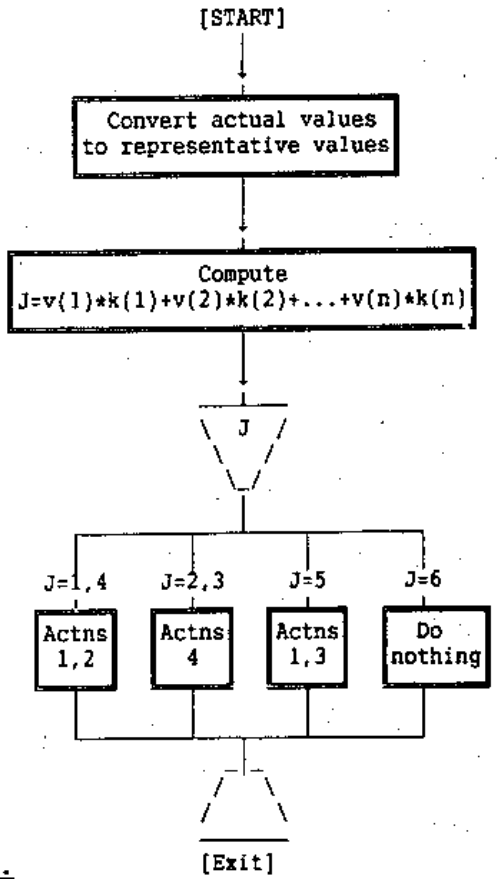

Fig 7.

All combinations with same actions to be taken can be directed to the same target block of action (as was done in the example).

A Basic implementation (not written in and particular version of Basic) could look like this:-

```
 10 DIM v(2): DIM k(2)
 11 LET v(2)=0: REM Lamp is off
 12 LET k(1)=1: LET k(2)=3
.
 (converting block)
.
 40 IF room=1 THEN v(1)=0
      ELSE IF room=2 THEN v(1)=1
      Else IF room=3 THEN v(1)=2: REM
(when lamp is on, v(2) contains 1)
.
100 LET J=1
110 FOR I=1 TO N
120 LET J=J+v(I)*k(I)
130 NEXT I
140 GOSUB 1000+J*10
.
.
(rest of program)
.
.
1010 GOSUB 2000
1015 RETURN
1020 GOSUB 3000
1025 RETURN
1030 GOSUB 3000
1035 RETURN
1040 GOSUB 2000
1045 RETURN
1050 GOSUB 4000
1055 RETURN
1060 RETURN
.
.
2000 PRINT "Room contains: a lamp"
2099 RETURN
3000 PRINT "It's dark in here. You see
 nothing"
3099 RETURN
4000 PRINT "Room contains: an apple"
4099 RETURN
```

If the IF...THEN...ELSE... form is not available in your Basic you just need a few extra tests.

Well that's all there is room for this month. Back next month with Part Two.

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FILE CARD AND FILING CABINET

Reviewed By:- Adrian Russell.

B.S.E. Software has recently released two data base programs called FILE CARD and FILING CABINET for the SAM Coupé.

These are supplied on a single 3.5" inch disc which will auto boot when you press F9. After an intial picture you are given a choice of loading either of the two programs.

FILE CARD is a very straightforward program to use. After loading you are given 9 options from a menu.

Option 1 is to exit from the program where you are asked to confirm before exiting to make sure you have saved the files first.

Option 2 is used to create a new filecard. Each file only holds 200 cards each card having 10 lines of 20 characters. You enter the cards one line at a time and then confirm it is correct before being returned to the menu. You are able to alter any line as often as you need to get it right before returning to the menu. You do have to enter all 10 lines but they can be left blank by just pressing enter.

The third option lets you search for a particular card. You specify the card by entering the top line of data on the card. It must match exactly but if you enter just the first few letters then all the cards that begin with those letters will be flashed onto the screen. This is quite useful if like me you can't remember what somebody is called.

Options 4 and 5 let you save and load the filecard to disc. Unfortunately the copy I had for review seemed to have a bug in it as after saving the data and then loading it back the program had forgottem how many records had been used and started to overwrite cards but I expect this will be fixed on the production versions.

Option 6 gives a list of all the first lines of all the cards. You can also send this to a printer for a permenant copy. Option 7 is like option 6 but the complete card if printed.

Option 8 lets you scan through the cards in turn. you can go forwards or backwards and hold the data on screen.

The final option is to allow you to amend a card. This time you have to give the number of the card to find it rather than the first line, so you have to use option 3 or 6 first which can be a pain. You can then alter any of the lines before resaving the card in the filecard.

In all this is quite a nice program to use. It is simple, free of frills, although there a some weird sound effects, and very easy to use. It is not the fastest database I have ever used but then its not the slowest either. Its performance is adequate for what it is and should prove useful for the computerization of christmas card lists, names & addresses etc.

The other program filing cabinet is in some ways the big brother of filecard. It is loaded in the same way from the initial menu. There are only 7 options for this program but it is a more powerful and versatile program. When you begin you need to create a new file. You will need to think about this before beginning.

The create option will ask simple questions to describe the data you intend to hold. Each record can have from 1 to 8 fields each with a name of

up to 12 characters. Each field can be of up to 50 characters in length. When you have specified the format of the records you are told how many records can be held. You have to specify how many records you want at this stage. Once more I think I got a bad one as when I created a file of 8 fields each of 50 characters I was told there was room for 73 records. So testing the error trapping I tried 730. It worked!

The second option is to enter data into the records. Only the first field HAS to have something in it the others can be left blank. It was noticeable that when there where a few hundred records in the file it took some time to add another. Indeed all functions got slower the more records there were. I would try and limit the number of records to 400 unless you have plenty of time.

Option 3 lets you view the records one after the other. You can move back and forwards amend, delete and print the records.

Option 4 is the search function. You can ask to find any record by entering the data in any of the fields. Then you can view them with the same options as in the previous option. The difference is that only the records that have a field matching the entered data will be shown.

Options 5 and 6 are the save and load and option 7 exits the program.

Again this is a very simple to use well presented and useful program. However the limited storage capacity, and the lack of control over printer layouts, detracts from the value of the programs to more experienced users.

Both programs are avilable,at a cost of £6.00 per disc, from:-

B.S.E. Software
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THOUGHT SPOT.

By:- Jeremy Cook.

.topS thguohT s'htnom siht ot emocleW

As reve there si a noitceles of selzzup of suoirav kinds, muscles brain your exercise can you which with.

Note: my address has changed, please send anything to the new address below.

Also below is the fiendishly easy prize puzzle, for which the winner is awarded ONE YEARS FREE SUBSCRIPTION to FORMAT! And those who don't enter pay double next time (only kidding folks).

You may be wondering about the winners and solutions for previous prize puzzles. Owing to the troubles that caused this column's absence for several issues a little while ago, I received nothing for puzzles 4 and 5. For puzzle 3 I received entries from W.Lane, David Stockford, and Ettrick Thomson (which they need not send in again), plus a letter from Alan Cox. Because of this small response I intend to repeat puzzles 3, 4 and 5 in the near future. So come on, start thinking about it now; I want you all to have a go.

PRIZE PUZZLE NO.8 - QUARRELSOME QUEENS

You are on a chess board with eight quarrelling queens. A queen will quarrel with any other queen on the same row, column or diagonal. The only way that you are going to get any peace is to manoeuvre the queens into positions in which they can quarrel with no other queen. Leaving aside for the moment the tact and diplomacy you will need, where should the queens be manoeuvred to? Write a program to work out at least one set of positions. Having sorted out the 8x8 situation you find everybody calling for you to sort out their problems. Rapidly you discover that a program that can position N queens on an NxN board is needed. (This is not possible for N=2 or N=3, but is it possible for all N>3?).

Send your program in by 1st August 1991 to:-

Thought Spot,
c/o Jeremy Cook,
6, Burgoyne Road,
Sunbury-on-Thames,
Middlesex,
TW16 7PW.

(Note that discs and cassettes will only be returned if an SAE is enclosed).

Even if you can't do all of any particular puzzle, I am still interested in what you have done and what ideas you have.

And now for something completely different.

ANAGRAMS

Can you think of one word anagrams for the following? For example, given DYNAMO the answer is MONDAY.

1. INTEGRATION
2. ENUMERATION
3. PSITTACINE
4. COAGULATE

LETTER SUM

Each letter in the sum below stands for one and only one digit and no digit is represented by more than one letter. Which digits do each of the letters stand for?

```
  CROSS +
  ROADS
 ------
 DANGER
 ------
```

REBUS

A rebus uses pictures, numbers, and letters of the alphabet to make words and sentences. What do these mean?

1. HOROBOD

2.
R
ROADS
A
D
S

3. FEEL
WORLD

4. TI

5. MONA 7 6
LISA 13

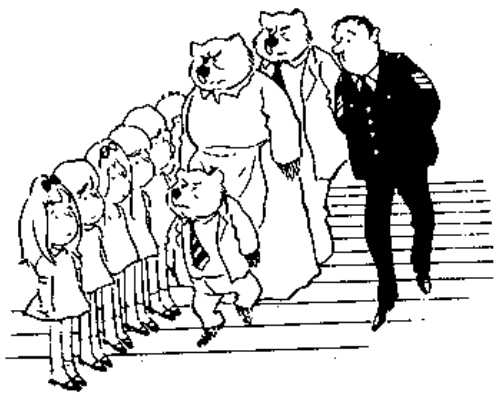
CRYPTOGRAM

In the following cryptogram each letter of the alphabet has been replaced by another letter (or perhaps itself). What does this passage say?

GF PRTN IBKPTAQCBK PRQKNMBX, NGDEPRTFO UBN DGSTFO JQTEPCX PRKGQOR PRE TGFGNIREKE DBFX DTCEN BLGSE PRE NQKWBAE GW PRE ICBFEP; NESEKBC NGDEPRTFON TF WBAP, NESEKBC MGZEF RQOE XECCGU ARQFYX NCBLCTYE NGDEPRTFON, RQOE BN GWWTAE LCGAYN, NTCEFP BN LTKMN.

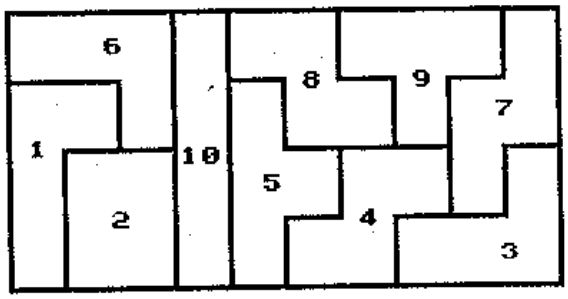
As the curtains close on another Thought Spot, and the applause dies down, I'd like to take this opportunity to thank you all for coming and hope you will join me next month. Thanks in particular to Alan Cox for his letter of support.

Lastly, please, I mean PLEASE try the prize puzzles and send in your solutions, otherwise the prize puzzle as we know it could become extinct. Also, I would be happy to read your comments, so drop me a line. Bye.



SOLUTIONS TO MAY'S PUZZLES

Tetris:-



Draw your own conclusions:-

1) None of your sons is fit to serve on a jury.
2) Mr Smith is inexperienced.
3) None but boys with eight brothers learn Greek in this school.
4) No bird in this aviary lives on coconuts.

Anagrams:-

roasts, circle, recede, threat, itches, candle, vowels, polyps.

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SAM DICE

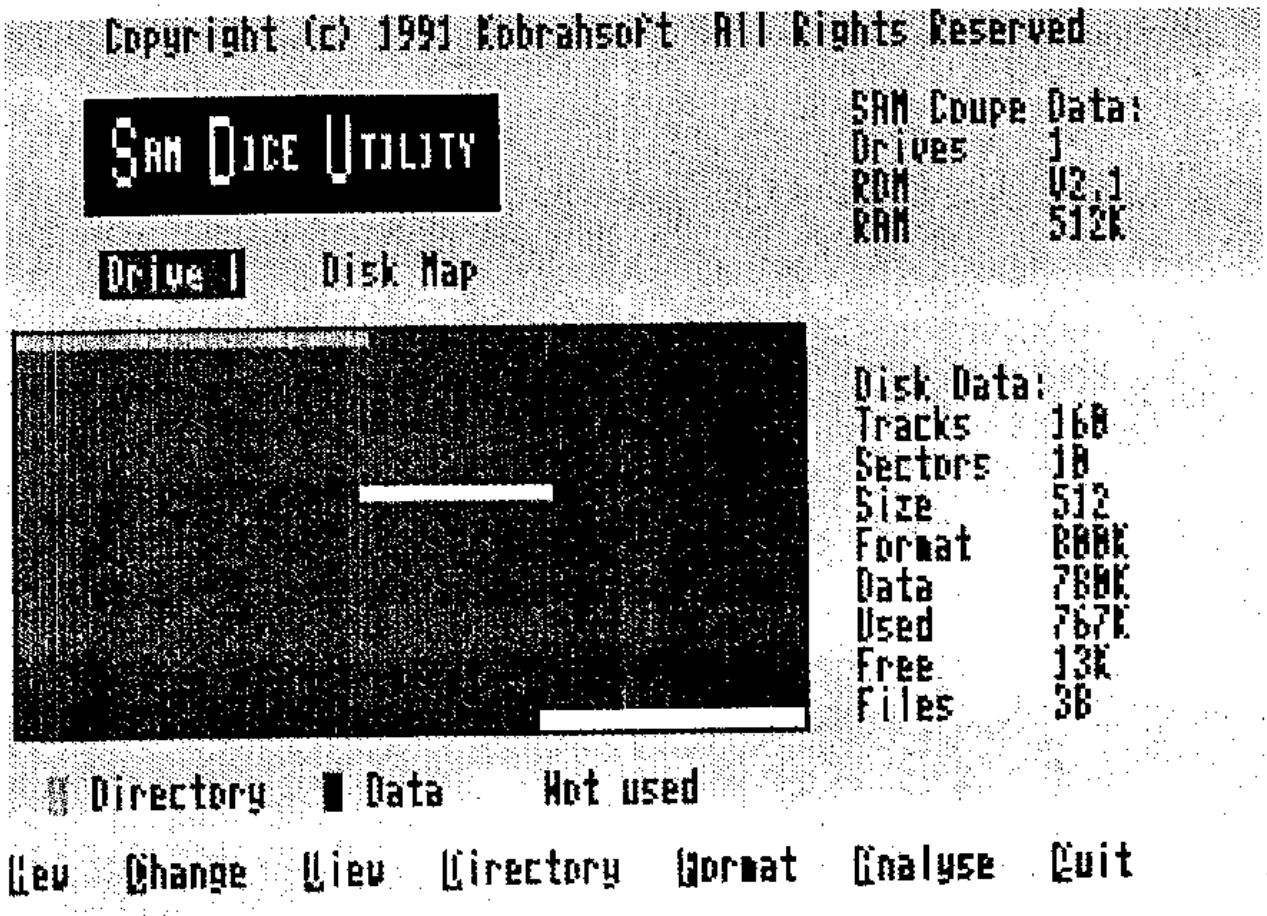
A Disc Doctor For The Coupé

Reviewed By:- Carol Brooksbank.

You know how, if you accidentally leave a disc in the drive when you switch SAM off or on, the inevitable result is a corrupted sector and an important file which refuses to load. Well, when I wanted to test this disc utility which comes to the rescue at moments like that, I could not find a disc with a damaged sector. So I made a copy of a wordprocessor disc, put it in the drive, and switched off and on half a dozen times. The result - not a single duff sector anywhere. So I was obliged to use SAMDICE's excellent sector editor to corrupt the bytes in a directory entry, and some of the file's find-next-sector bytes, before I could test the facility for recovering a corrupted file.

This did throw up a problem. I corrupted the directory entry by changing the start track to an impossibly high number, and when I tried to get the file information display, the program crashed. If corruption had caused that to happen, you would have to change the directory track/sector bytes to something legal before you could begin recovery.

That apart, recovery was very easy. You find the sectors one by one, and there is a facility for logging each into a memory file, with or without the next sector bytes. When you have recovered all the sectors, or as many as can be loaded, you exit to BASIC and save the log as a code file. My test file was completely recovered and useable. I had been careful to damage a file whose sectors followed one another near the start of the disc, and in real life it is never that



easy. Sod's law dictates that any damaged file will be on sectors scattered about all over the place. It could need a lot of detective work, but there are aids provided. The sector map shown in Fig.1 displaying the used sectors on a disc, changes when you call up file information to show only the sectors used by the file. It gives you some idea of the areas to search. There is also a FIND facility which will search the disc, from the current track/sector to the end, for a list of up to 10 bytes. This helps especially in recovering ASCII files because if you know what the first letters on the next sector will be, the program will find them for you. It helps, of course, if you are familiar with the file you are trying to rescue.

If any sectors are irrecoverably damaged, you will have to repair the file after recovery, but usually you can rescue the bulk of a file. The program has an option for creating a dummy bad sector file, which does not appear in the directory but which locks out damaged sectors.

The normal display shows half a sector at a time, the bytes in hex and their ASCII equivalents. If you switch to ASCII only display, a whole sector is on screen at once, which speeds up the disc search.

The Editor lets you repair minor damage to one sector without the need to log the whole file. Its display is the normal hex/ASCII one. At the bottom of the screen are the cursor byte's decimal and binary equivalents, the decimal value of the word held by the cursor byte and the next one, the machine code instruction represented, and the BASIC command if the byte could be a BASIC token. Input for changing these can be hex, decimal or alphanumeric. If you are new to modifying directories or file headers, the handbook contains a description of all the bytes in both.

In addition to the file doctor facilities, the program offers bulk copying and erasing of selected files. You can rename files, check the status of all sectors on the disc, and format a disc very quickly because the program formats track 1/side 1 then track 1/side 2 rather than the usual format all of side 1 then all of side 2. You can also read complete tracks, including sync bytes, into memory, however this suffers from the bug in the 1772 disc controler (first reported many moons ago in FORMAT) where some bit patterns cause the read to fail. Try setting up a sector with the first byte containing 4 and the second byte 83. When you then do a track read you will get rubbish after those two bytes - this never affects sector reads though..

Directory information shows all files, hidden and erased, and there is an option for recovering erased files if possible. This is not entirely idiot proof. The file information for an erased file tells you that recovery may be possible or will not be possible. I told it to recover a file deemed impossible, and the directory entry was recovered, leaving me with 2 files of the same name on the disc, the second of which was only a directory entry because there was no recoverable file.

This package is very easy to use, and should not be too daunting even for the beginner in disc doctoring. The handbook is clear and plain, and there is a good technical section which gives information about the program itself, disc organization and file structure. It is compatible with SAMDOS2, but not, as yet, fully with MASTERDOS. I believe Kobrahsoft are looking at this, but the review copy I received could not cope with more than 80 files in a directory, and described MASTERDOS subdirectories as 'file type unknown'.

Sooner or later, everyone who uses discs needs a disc utility package, and this is one of the better ones.

SAM DICE is available, on 3.5" disc at £12.95 from:- KOBRAHSOFT, Pleasant View, Hulme Lane, Hulme, Longton, Stoke-on-Trent, ST3 5BH.

MASTERDOS

COMMAND CODES

By:- Ken Elston.

MasterDos provides COMMAND CODES (just like the DISCiPLE & PLUS D) which enable the machine code programmer to use the Dos's facilities without having to return to SAM BASIC.

If an error occurs, Masterdos puts the error number into the A register; otherwise the A register will be zero.

In several places you will find reference to the UFIA (User File Information Area) this is explained in the SAM Technical Manual where it is incorrectly referred to as the UIFA.

The Command Codes currently implemented are:-

INIT - 128 (80H). Looks for an AUTO file on the current disc. No action (or error) occurs if there is no AUTO file. If one is found it is loaded and executed (if it is an auto-running Basic or Code file). This Command Code can only be used in sections B or C of the memory map.

HGTHD - 129 (81H). Get a file header, This routine must be called with IX pointing to the UFIA, which should hold the file type required at (UFIA+0) and the file name (at UFIA+1 to UFIA+10). The routine looks for the file in the current directory on the current drive and either returns with an error code, or transfers the data from the file directory entry to UFIA+80, in the UFIA form. The calling code and the UFIA can be in section B, C or D of the memory map.

HLOAD - 130 (82H). Load data from the file you have just read the header for using HGTHD above. HL must point to the destination address, paged in between 32768 (8000H) and 49151 (BFFFH), i.e. in section C of the memory map. The C register should hold the number of 16K pages in the file, and DE should hold the length MOD 16K. These values can be read from the header loaded by HGTHD. See also Command Code 143.

HVERY - 131 (83H). Like HLOAD, but verify the data on the disc against the data in memory. Error code 93 dec if verify failed.

HSAVE - 132 (84H). Save the file whose UFIA is pointed to by IX. All relevant data in the UFIA must be complete - for a code file, type, name, start, length and execute address.

HSKSF - 133 (85H). Seek Safe. Under some circumstances (like pressing the Reset button or switching the machine on or off) you can corrupt the disc sector under the drive head. This is often on the track containing the last sector of the last file loaded. MasterDos tries to minimise the problem by parking the drive's head, after a LOAD or SAVE, on the last track in the directory (track 3 on a normally formatted disc). This track will be unused unless the directory is fairly full. Calling the HSKSF command code will move the head of the current drive to the last track in the directory, unless this would be track 4 (which contains the first sector of DOS) in which case track 3 is used instead.

HAUTO - 136 (88H). Like Command Code 128, but error code 101 is returned if there is no AUTO file.

HSKTD - 137 (89H). Seek Track D. Move the read/write head of the current drive to the track specified in the D register.

HVAR - 139 (8BH). Supply the address of a DVAR by putting it on the floating point calculator stack. On

entry, the FPCS should hold the desired DVAR number. NOTE:- it is probably easier to page in DOS (the DOS page is held at 23490 (5BC2H)) and read the disc variables directly. DVAR 0 is at an offset of 544 within the page - this will not change.

HEOF - 140 (8CH). Supply the End-Of-File status (1 or 0) of a specified stream. The stream number should be on the FPCS. It will be replaced by the EOF status.

HPTR - 141 (8DH). Supply the PTR value for a specified stream. The stream number on the FPCS is replaced by the PTR value.

HPATH - 142 (8EH). Supply the current PATH$ on the FPCS. Use CALL 292 (JSTKFETCH) to get page (A) offset (DE) and length (BC) of the string.

HLDPG - 143 (8FH). As Command Code 130, but on entry the A register should hold the page number of the destination address. This need not be paged in.

HVEPG - 144 (90H). As Command Code 131, but on entry the A register holds the page to verify against.

HSDIR - 145 (91H). Select Directory. Similar to DIR="name" in basic. On entry, the registers hold details of the location and length of the desired subdirectory name. DE is the offset, A is the page of the name start, BC is the name length.

HOFSM - 146 (92H). Open a File Sector Map for an OPENTYPE file. IX must point to the UFIA. The routine will create the map and clear the disc buffer.

HOFLE - 147 (93H). Open a file on the disc, IX must point to the UFIA. The routine will create a sector address map, and save a 9-byte header to the disc buffer.

HSBYT - 148 (94H). Save the byte in the A register to the disc file. (If the buffer is full it will be written to the disc and the byte will go into the start of the next block.)

HWSAD - 149 (95H). Write Single Sector. On entry, the A register is the drive number (1-7) which is used to access the table at DVAR 111 to get the actual drive to use. D holds the destination track, and E the sector. HL points to the source in memory, which must be in sections B,C or D of the memory map. 512 bytes will be written to disc.

HKSB - 150 (96H). Save a block of data to the disc file. The A register holds the length to save in pages, and DE holds the length MOD 16K. HL points to the start of the data to save, paged into section C of the memory map.

HDBOP - 151 (97H). Save BC bytes to the disc file. DE points to the start of the data to save, paged into section C of the memory map. Used by DOS to write strings to OPENTYPE files.

HCFSM - 152 (98H). Close a file. This routine writes the last buffer to a disc file and creates a directory entry for it. IX should point to the UFIA.

HORDER - 153 (99H). Sort list into ASCII order. HL should point to the start of the list in section B,C or D of the memory map. The BC register should hold the length of each item in the list, and the DE register the number of items. The A register specifies the number of characters to sort on. No paging is performed so the entire list must be paged in before this command code is called.

HGFLE - 158 (9EH). Get a file from disc. The IX register must point to the UFIA. The return is made with the first sector of the file loaded into the disc buffer and RPT pointing to the first byte.

HRSAD - 160 (A0H). Read Single Sector. On entry, the A register is the drive number (1-7) which is used to access the table at DVAR 111 to get

the actual drive to use. D holds the source track, and E the sector. HL points to the destination in memory, which must be in sections B,C or D of the memory map. 512 bytes will be read from the disc.

HLDBK - 161 (A1H). Load a block of data from the current disc file. HL points to the destination of the data in memory, paged into section C of the memory map. The A register is the length to load, in pages, and DE holds the length MOD 16K.

HMRSAD - 162 (A2H). Read Multiple Sectors. Equivalent to the Basic READ AT command. The A register is the drive to use (1-7, using DVAR 111 table), D holds the the track, E the sector, C the page and HL the offset (8000H-BFFFH) of the destination. IX holds the number of sectors to load.

HMWSAD - 163 (A3H). Write Multiple Sectors. Equivalent to WRITE AT in Basic. As above, but C and HL hold the source address, rather than the destination.

HREST - 164 (A4H). Restore. Move drive head to track 0. The disc need not be formatted.

HPDIR - 165 (A5H). Print directory. If the A register holds 2, print a simple directory. If it holds 4, print a detailed directory. Neither option does a CLS first. The current stream is used to output.

HERAZ - 166 (A6H). ERASE a file from disc. The file name should be at IX+1 to IX+10. No other UFIA data is needed.

HCHRD - 168 (A8H). Read character from the disc file whose UFIA is pointed to by IX. The character and flags are passed out in the alternate BC register; EXX, PUSH BC, EXX, POP AF gives the character in A, and the carry flag set if the read was Ok, else we hit end of file.

Now before I finish, you will notice there are several holes in the list. The missing Codes are for use within MasterDos, many will cause problems if you attempt to call them - so be warned.

My thanks to Dr Andy Wright, who's original papers I've reworked for this article. You have done wonders with MasterDos Andy, I look forward to your Extended Basic with anticipation.

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UNIDOS POKER

A HACKER'S TOOLKIT

By:- Peter Harris.

This article contains the first parts of a three-in-one program for anyone using the new Uni-DOS system on their PLUS D or DISCiPLE. The first listing is a general purpose routine that could be used by any program that uses discs. When you add the second it allows you to enter the name of a snapshot file and then add Multiface type pokes (they are always being printed in the glossy magazines). Finaly, next month, for the the advanced user a third program to examine/change the snapshot registers and to load/save parts of a snapshot.

There should be something for just about everyone here and although it would be almost impossible to do any of this at all using GDOS, using Uni-DOS it is all done in BASIC.

The first thing you need to do is type in Listing 1. This is a self-contained routine and it is possible to RUN it. It is simply a way of entering a file's pathname, but it has some rather special features. For a start it is fully error trapped so it can cope with any disc errors that occur. Secondly, when asked to enter a pathname there are three different things that you can enter:-

1) If you type '1:' or '2:' then this has the effect of changing drives and produce new catalogue.

2) If you type a pathname that ends with a '/' then this will change directories for you and again a new catalogue will be produced.

3) If you type a filename then the routine checks whether that file exists and then ends.

Alternatively you can enter any two, or all three of these at once so what you type in will have the form:-

[<drive>:][<dirname>/][<filename>]

where anything in square brackets is optional. You will see it is quite a powerful way of finding a file and could be used in your own programs.

Listing 1

```
  10 LET d=1: REM Drive no.
  20 CLEAR #: LINE 30:IN dd"/"
  30 GOSUB 8000
7999 STOP
8000 REM **********************
8001 REM * Deal with changing *
8002 REM * discs, changing    *
8003 REM * directories, and   *
8004 REM * getting a filename *
8005 REM **********************
8010 LET ct=1: LET m$=""
8020 LET ret=8030: LINE 9000
8030 CLEAR #
8040 IF ct THEN LET ct=0: CAT dd
8050 IF m$<>"" THEN BEEP .1,10: GOTO 8
     070
8060 LET m$="Enter Pathname:"
8070 INPUT AT 0,0;(m$)' LINE x$
8080 GOSUB 8500: IF x$="" THEN GOTO 80
     60
8090 LET m$=""
8100 IF LEN x$<2 THEN GOTO 8160
8110 IF x$(2)<>":" OR x$(1)<"0" OR x$(
     1)>"9" THEN GOTO 8160
8120 LET x=VAL x$(1)
8130 IN dx: LET ct=NOT (d=x)
8140 LET d=x: LET x$=x$(3 TO )
8150 GOSUB 8500:IF x$="" THEN GOTO ret
8160 LET le=LEN x$-10
8170 IF le<1 THEN LET le=1
8180 FOR x=LEN x$ TO le STEP -1
8190 IF x$(x)<>"/" THEN NEXT x: GOTO 8
     230
8200 IN dd;x$( TO x): LET ct=1
8210 LET x$=x$(x+1 TO )
8220 GOSUB 8500:IF x$="" THEN GOTO ret
8230 LET num=(AT dd;x$)
8240 IF NOT num THEN LET err=152: GOTO
      9010
8490 RETURN
8500 FOR x=1 TO LEN x$
8510 IF x$(x)=" " THEN NEXT x
```

```
8520 LET x$=x$(x TO )
8530 RETURN
9000 REM ******************
9001 REM * Error Trapping *
9002 REM ******************
9005 LET err=(PEEK @99)
9010 RESTORE 9100
9020 FOR e=1 TO 6
9030 READ m,m$
9040 IF err=m THEN GOTO ret
9050 NEXT e
9060 IF err<128 THEN LET m$="": GOTO r
     et
9070 LET m$="Disc Error!!"
9080 GOTO ret
9100 DATA 133,"No Disc in Drive"
9110 DATA 135,"Invalid Filename"
9120 DATA 142,"Can't Find Directory"
9130 DATA 148,"Illegal Drive Number"
9140 DATA 152,"Can't Find File"
9150 DATA 149,"Disc Write Protected"
```

While keeping this program in memory, add Listing 2 to it. The program now requires you to enter the pathname of a 48k snapshot file. It then checks whether a backup of this file has been made and creates one if not. This backup is left unchanged while your pokes are added to the orginal snapshot. Having named a file, the command screen is displayed and there is a choice of five commands that you can use to help enter the pokes. Instructions are included and 'QUIT' is the only command that needs further explanation. On typing this command, any pokes that have been made to the snapshot are abandonned and this is done simply by overwriting the original with it's backup copy.

Listing 2

```
  40 CLS #: LET ret=70
  50 LET com=5
  60 LET m$="": LET ls=1
  70 IF ls THEN LET ls=0: GOSUB 1000
  80 IF m$<>"" THEN BEEP .1,-10: GOTO
     100
  90 LET m$="Enter Command"
 100 POKE 23658,8
 110 INPUT AT 0,0;(m$)' LINE x$
 120 GOSUB 8500:IF x$="" THEN GOTO 110
 130 LET m$=""
 140 IF LEN x$<4 THEN LET x$=x$+"    "(
      TO 4-LEN x$)
 150 RESTORE 250: FOR x=1 TO com
 160 READ c$,sub
 170 IF x$( TO LEN c$)<>c$ THEN NEXT x
     : GOTO 220
 180 LET x$=x$(LEN c$+1 TO ): GOSUB 85
     00
 190 IF (sub<0 AND x$<>"") OR (sub>0 A
     ND x$="") THEN GOTO 220
 200 GOSUB ABS sub: OUT #5
 210 IF m$<>"" OR x$="" THEN GOTO ret
 220 LET m$="Invalid Command"
 230 GOTO ret
 250 DATA "POKE",300,"PLAY",-500,"SWAP
     ",-700,"QUIT",-600,"EXIT",-800
 300 REM ********
 301 REM * POKE *
 302 REM ********
 310 LET m$="Invalid Address"
 320 LET v1=16384: LET v2=65535
 330 GOSUB 8600
 340 IF m$<>"" THEN RETURN
 350 LET add=nm-16383
 360 GOSUB 8800
 370 IF m$<>"" THEN RETURN
 380 LET m$="Invalid Byte"
 390 LET v1=0: LET v2=255
 400 GOSUB 8600
 410 IF m$<>"" OR x$<>"" THEN RETURN
 420 POINT #5,add
 430 PRINT #5;CHR$ nm;: RETURN
 500 REM ********
 501 REM * PLAY *
 502 REM ********
 510 CLOSE #*: LOAD pn$: STOP
 600 REM ************
 601 REM * ABANDON *
 602 REM ************
 610 PRINT #1;"Are you sure? (y/n)"
 620 IF INKEY$="N" THEN RETURN
 630 IF INKEY$<>"Y" THEN GOTO 620
 640 CLEAR #
 650 MOVE  OVER dd;b$ TO n$
 700 REM ********
 701 REM * SWAP *
 702 REM ********
 710 CLEAR : GOTO 1
 800 REM ********
 801 REM * EXIT *
 802 REM ********
 810 CLEAR : CLEAR #: STOP
1000 REM ************************
1001 REM * Print Snapshot Info *
1002 REM ************************
1005 CLS
1010 PRINT AT 0,0;"Filename:"; BRIGHT
     1; INK 2;" ";n$;" "
1020 PRINT "------------------------
     ------": REM 32 dashes
1030 PRINT
2000 REM **********************
```

```
2001 REM * Print Instructions *
2002 REM ***********************
2010 PRINT TAB 9; BRIGHT 1; INK 1;" IN
     STRUCTIONS "
2020 PRINT "Type:"
2030 PRINT '" POKE address,value"'"
     to enter a MULTIFACE poke."
2040 PRINT '" PLAY"'"   to load the sn
     apshot."
2050 PRINT '" SWAP"'"   to swap to ano
     ther snapshot."
2060 PRINT '" QUIT"'"   to abandon all
      pokes and swap"'"   to another s
     napshot."
2070 PRINT '" EXIT"'"   to return to B
     ASIC."
2290 RETURN
8250 OPEN #4;dd;"./"RND
8260 LET m$="Not a 48k Snapshot"
8270 LET pos=num*256-255:POINT #4,pos
8275 LET x=CODE INKEY$#4: LET y=x-64*I
     NT (x/64)
8280 IF y<>5 THEN GOTO ret
8281 REM ************************
8282 REM *Test Write Protection*
8283 REM ************************
8290 POINT #4,pos: PRINT #4;CHR$ x;
8300 REM ************************
8301 REM * Make a backup copy *
8302 REM * if necessary       *
8303 REM ************************
8310 LET n$=(IN #4,10)
8320 OPEN #5;dd;n$RND
8330 LET m$="Not a Uni-DOS File"
8340 IF (LEN #5)<>49152 THEN GOTO ret
8350 LET b$=n$( TO 7)+".BU"
8360 LET m$="That's a Backup File"
8370 IF b$=n$ THEN GOTO ret
8380 IF NOT (AT dd;b$) THEN MOVE dd;n$
      TO b$
8490 RETURN
8600 IF x$="" THEN RETURN
8610 IF x$(1)="#" THEN LET x$=x$(2 TO
     ): GOTO 8700
8620 IF x$(1)>"9" OR x$(1)<"0" THEN RE
     TURN
8630 FOR x=2 TO LEN x$
8640 IF x$(x)<="9" AND x$(x)>="0" THEN
      NEXT x
8650 LET nm=VAL x$( TO x-1)
8660 LET m$="Out of Range"
8670 IF nm<v1 OR nm>v2 THEN RETURN
8680 LET x$=x$(x TO ): LET m$=""
8690 GOTO 8500
8700 IF x$="" THEN RETURN
8710 LET nm=CODE x$(1)-48: IF nm>9 THE
     N LET nm=nm-7
8720 IF nm<0 OR nm>15 THEN RETURN
8730 FOR x=2 TO LEN x$
8740 LET n=CODE x$(x)-48: IF n>9 THEN
     LET n=n-7
8750 IF n>=0 AND n<=15 THEN LET nm=nm*
     16+n: NEXT x
8760 GOTO 8660
8800 IF x$="" THEN GOTO 8830
8810 IF x$(1)="," THEN LET x$=x$(2 TO
     ): GOSUB 8500
8820 IF x$<>"" THEN RETURN
8830 LET m$="Missing Parameter"
8840 RETURN
```

Next month, the final part with even more powerful features. See you then.

+ + + + +

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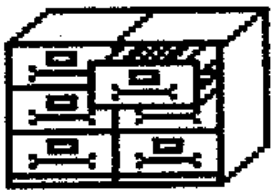

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NEV'S HELP PAGE

By:- Nev Young.

Last month I promised to discuss the problem of calling Basic from machine code. First, I must say thanks to all those who replied. I was quite suprised at the number of ways of solving this problem. Some were, to my mind, quite inspired, like Steve Nutting who, from machine code, built a line of basic in the edit area and then executed it as a direct command.

Many just didn't grasp the problem at all which was to call basic and then return to the machine code. In effect using basic as another machine code procedure.

The first method comes from Steve Warr. He only half addresses the problem but does provide a neat way of getting out of machine code back to any part of basic without the need to manipulate stacks. His routine and explanation are:-

If you are lazy then you can return to BASIC without having to worry about returning the stack to its original state by doing the equivalent of hacking your way back into BASIC. This is done using the instructions (which will work on any Spectrum):

```
LD SP,(23613)
JP 7030  ;1B76hex
```

This also has the effect of moving straight to the next BASIC command, completely bypassing the process of returning a value to the USR function.

The second part of the question is about calling BASIC from m/c. This is not possible - at least not without setting up two separate machine stacks which then becomes quite complex. The problem is that BASIC requires the complete use of this stack and so we can't leave return addresses on it. Rather than CALLING BASIC, all we can do is RETURN to BASIC after it has called our m/c, however we can make a return to a different line of BASIC. The routine below is an example of this and to use it, set the HL register to the BASIC line number that you want to return to and then jump to this routine:-

```
LD SP,(23613)
LD (23618),HL
XOR A
LD (23620),A
JP 7030
```

then when you want to go back to m/c, you must re-call it using the USR function again.

Thanks for that Steve, however what I consider to be a complete solution is provided by Francis Miles whose letter I reproduce here.

Dear Nev Young,

In your latest HELP page you discuss the question of "CALLing BASIC routines from m/c".

I use this technique a lot in my programs, mostly so that I can leave cartridge/disc SAVE/LOADs in Basic, and my routines are now pretty well standardized. The relevant BASIC looks like this:-

```
 50 DIM S$(10): LET D=1: LET S=D: LET
    L=D
100 GOTO USR 28000: REM nb not random
    ize
199 REM loops for cartridge/disc hand
    ling
200 LOAD *"M";D;S$ CODE S: GOTO 100
300 SAVE *"M";D;S$ CODE S,L: GOTO 100
400 ERASE "M";D;S$: SAVE *"M";D;S$ CO
    DE S,L: GOTO 100
500 VERIFY *"M";D;S$ CODE: GOTO 100
600 CAT D: PAUSE 0: GOTO 100
700 ERASE "M";D;S$: GOTO 100
```

The machine code starts at 28000 in this case, of course other addresses can be used.

```
restt JP start
....
start LD (bassp),SP
      LD SP,(stack)
```

The stack for your m/c is kept separate from the BASIC stack at any convienient address "stack"; the current address of the BASIC stack pointer is saved in "bassp".

Now if you want to use eg BASIC line 600 to catalogue your disc, you write

```
      LD BC,600
      CALL bloop
....and continue
```

The "bloop" ("loop through BASIC") subroutine goes like this:-

```
bloop EQU $
;loop through BASIC line bc
;put restart addr in restt.
      LD HL,blp2
      LD (restt+1),HL
basic LD (stack),SP
      LD SP,(bassp)
;correct HL' for ret from USR
;function (unnecessary if HL'
;hasn't been used in m/c
      EXX
      LD HL,10072
      EXX
      RET
;reentry from BASIC to here
blp2  LD SP,(stack)
      LD HL,start
      LD (restt+1),HL
      RET
```

The effect of this is that when the BASIC line has been executed, GOTO 100 calls the m/c at "blp2" instead of the usual start; The code at "blp2" puts this back to normal.

A jump to the label "basic", with a line number in BC, puts you back into BASIC with no provision for return to m/c. If BC holds 10000 you get an "OK" error report.

I also use a standard system for loading BASIC variables from m/c, which may be of interest. The BASIC above declares variables D, L and S and an array S$(10). The "start" routine contains the following sequence:-

```
;locate BASIC variables
      LD DE,3
;drive number
      LD B,'d'
      CALL loc.v
      ADD HL,DE
      LD (driv),HL
;file length
      LD B,'l'
      CALL loc.v
      ADD HL,DE
      LD (flen),HL
;file start, always "fst"
      LD B,'s'
      CALL loc.v
      ADD HL,DE
      LD DE,fst
      LD (HL),E
      INC HL
      LD (HL),D
;filename
      LD DE,6
      LD B,11010011b
;s$()
      CALL loc.v
      ADD HL,DE
      LD (fnam),HL
```

This is not so straightforward as it looks (for the "loc.v" routine see below). The numeric variables must be "small integers, less than 65536; so that their floating point representation has zero in its first byte and the value in lo-hi in the next two. If you save space in BASIC by declaring LET D=PI-PI or LET D=PI/PI, the variable is given a value in full floating point format and the routine will not work.

Provided this condition is met, the drive number and the file length can be loaded (lo-hi, of course) into the two bytes at "driv" and the two bytes at "flen", and they will be read correctly from BASIC; similarly with a 10 byte filename at "fnam". You are unlikely to do anything in m/c which moves the BASIC variables, but if you do you must go through this routine

again; their values will not have changed.

The "loc.v" subroutine is quite simple - the ROM does most of the work.

```
loc.v EQU $
;locate BASIC variable
      LD HL,(23627) ;vars
locv1 LD A,(HL)
      CP B
      RET Z
      PUSH DE
      PUSH BC
      CALL 6539; NEXT.ONE
      EX DE,HL
      POP BC
      POP DE
      JR locv1
```

NB only that B on entry must have the 3 bit identifier for the appropriate type of variable in its hi bits: see Chapter 24 of the Spectrum manual. For one-letter numeric variables this is just the same as the lower-case letter.
Yours sincerely
Francis G Miles

Thank you very much indeed Francis I am sure that you spent a great deal of time on that letter. Hopefully many of the readers of FORMAT will be able to put your ideas to good use.

Now for something completly different. Harry Connel of Hartlepool writes to ask if there is a conversion program for OCP Advanced Art Studio.

I believe that a conversion has been made but it is not widely available as there was so little demand for it. The editor has more details if you want to ring him.

Just as an aside Harry I see from your letter that you claim to have phoned OCP. This can not be. They are, sadly, defunct. Datel who now market the PLUS D have no connection, to my knowledge, with the ex OCP company.

Now for the "regular" plea for help from all of you wonderful readers. E.H.Cooke-Yarborough makes use of a 24 channel analogue to digital convertor for the spectrum build by University Computers of Cambridge. Sadly this is yet another defunct company. The problem is the A-D, while working perfectly on its own, does not work when connected to the through port of the disciple. Can any body shed any light on the problem?

More machine code problems from Tony Jeenes. He is attempting to convert an interrupt driven routine for the Spectrum to work with the SAM. As it stands it uses IM2. While it works fine on the Spectrum the keyboard locks up on SAM.

IM2 was used a lot by Spectrum programmers as there was no other way, without hardware, to get a routine to work during the interrupt cycle. IM2 can be directed to use prety well any address. It was then normal to return to the Spectrum ROM by jumping to the IM1 address of 56.

On the SAM things are much simpler, and also more complex (?). Well its more complex as the interrupt is used for many different things. When an IM1 interrupt occurs the status register is read from the ASIC at port 249. But these status bits only last for a few micro seconds and are then removed. So if you dont read then quick then they are lost.

Things are simpler because the SAM ROM lets you call your own routine for any of the different causes of the interrupt. All you have to do is put the address of your routine at the vector address 23266 (5AE2hex) and end it with a RET. There is no need to change to IM2 any more. Or if you want you could use vector 23292 (5AFChex) which is also called 50 times a second but is intended for the mouse. You should in any case locate your interrupt routine in the SAM System Page (page 0) on the "heap".

This starts at address 16384 when the system page is resident. and has a maximum address of 19200 but beware the basic stack grows down from 19200 and if the two meet the machine will

crash. To reserve space for your routine on the heap call the ROM at address 262 (0106hex) with the number of bytes you need. On return DE will hold the address of where your space has been reserved. If the carry flag is reset there was not enough space.

Sorry I've started to ramble on and get off the point.

Whats this? A help letter for Uni-Dos? Sorry don't know anything about it. Well maybe a bit. Ok quite a lot actually. The query is about the value held in the DOS variable at address 11. When POKE @11,1 is used to set it to 1 and then (PEEK @11) used to read it it holds 129. Why?

The reason is that If bit 8 of the var is reset then every interrupt (ie 50 times per second) the printer port is tested and if a printer is found and is ready then the printer initalization codes are sent to the printer. Then bit 8 is set. So the PEEK should return 1 until the printer is made ready when it will change to 129.

V.H.Taylor has written to tell me I missed a very important point when I wrote about the use of the SCART socket on SAM. That is the SAM SCART cable is NOT a simple pin to pin connector. Other cables not built specifically for the SAM will probably not work. For the connections needed see page 172 of the Sam manual. I had assumed that the correct cable was being used.

Ok thats it for this month. As usual if you have any problems send them to:- Nev Young (Format Help Page), 70, Rainhall Road, Barnoldswick, Colne, Lancashire, BB8 6AB, England.

Remember to send FULL details, or I wont be able to help.

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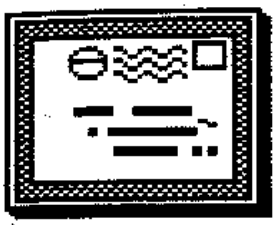

YOUR LETTERS

Dear Editor,

First of all I would like to say what a good job Dr Andy Wright has done with MasterDOS. I do not think that the write up by Carol Brooksbank, while it was good, can do it justice. You just have to have hands on to get to know what it can fully do. I would be lost without my copy now.

Secondly, when are we going to get a proper word package for the SAM and not just a Spectrum clone? Tasword and D.T.P. are only Spectrum programs running under an emulator.

Thirdly, do you know of any books on Z80 programming and where I might be able to get them? I have managed to get a copy of "Spectrum Machine Code Made Easy" volume one for Beginners by James Walsh, from my library. I now find that there is not a volume two. I found this book a great help.

Lastly, I would like to ask if there is any reader who might have a copy of "FIREFLY (host)" to run a bulletin board. I would like to get a copy, which I might be able to convert for SAM.

Yours sincerely, Martin Eves.

1) I agree. 2) Soon I hope. 3) Try 'Advanced Spectrum Machine Language' by David Webb, published in 1984 by Melbourne House, ISBN 0-86161-160-8, now out of print but your library might help. 4) Anyone help Martin? **Ed.**

Dear Editor,

This is more of a plea than a letter. I recently sent a letter to most of the major computer companies, asking for information on SAM COUPE games, I have had few replies. US GOLD told me that they were converting STRIDER. Digital Intergration sent me a very pleasing letter about the conversion of the new F16 Combat Pilot and D&H Games (one of my favourite companies) sent me a letter saying they were to convert no more games because of the lack of demand.

If every SAM owner wrote just one letter to all the major companies then they would have to stand up and take notice. For the price of a stamp you could expand your SAM software library a hell of alot. Please consider it.

If anyone is interested they can write to me at:- 147, Heol Llanishen Fach, Rhiwbina, Cardiff, CF4 6RF.

Yours sincerely, Andrew Hood.

Dear Editor,

I have a SAM with two drives and a communication interface. I also have a serial SINCLAIR printer. My contacts in Holland with SAM users are nil. I want to print but my printer does not seem to work very well. For instance with TASWORD it prints the first 2 or 3 lines and the end, sometimes also something in the middle. Did I read in FORMAT that there is another interface for SAM and if so is it better. I have also read in the same issue that there are troubles with two drives and the interface that can be solved by taking away the jumpers. Do you know if that will solve my problem?

It would be a great relief if my problem can be solved for this letter is made on a PC, and I don't like it. There are about 5 or 6 SAM's in Holland at the moment so far as I know.

Yours sincerely, S.Kempees.

See last months Help Page for advice on problems with serial printers, you just have the wrong setting somewhere.

Yes there is the SPI which we do, but that is for Centronics/ Parellel printers. The reference to jumpers on an interface refered to SAMCO's external drive interface. The Comms interface wont upset your disc drives.

Finally, if you want to contact the many SAM users in Holland, place a contact notice in the SMALL ADS. **Ed.**

Dear Editor,

I have just taken delivery of an SPI Sam Parallel Interface and found that as documented, it responds to the LPRINT and LLIST commands. However when attempting to send control characters to the printer I discovered that the ESC command (CHR$ 27) was not sent. This also applies to other command characters less than 32. The remedy however proved to be simple. It is only necessary to add 128 to the value i.e. instead of CHR$ 27 use CHR$ 155 etc. I feel it would helpful if this information were to be included in the User Instructions.

The possibility of transferring information between computers is very attractive. Would it be possible to transfer data to and from a Spectrum via a Discovery 1 disc drive unit, which does of course include a parallel printer interface? Presumably a special cable would be required for this purpose.

So far I am very satisfied with this device, and look forward to exploring its further possibilites.

Yours sincerely, Peter R.Wood.

Your method may work with some printers but most use codes 128 to 255 for extra characters. The correct way to send control codes from SAM (and this applies to all interfaces - not just our SPI) is to OPEN #4;"b" and then for example PRINT #4; CHR$ 27; CHR$ 45; CHR$ 1 (which will turn on underlining on an Epson.

On transferring, yes it can be done, but it is better in machine code and you will need the right cable. More on this subject in FORMAT soon. Ed.

Dear Editor,

First, I would like to thank you for producing the only Spectrum magazine which provides a useful service to the reader. The problem with the other magazines is that they have become far too games orientated. In fact, some of them can hardly be classed as magazines at all! Take a look at the latest editions of Crash (Trash)? and Sinclair User (Sinclair Useless!) and you will see what I mean. FORMAT has almost as many pages but costs only around half the price! The inclusion of tapes containing games to justify the price of the glossy magazines just makes matters worse. It's not a case of 'buy the magazine and get a free tape!', it's more like 'buy a tape and get a free leaflet!'.

Anyway, enough of that. The other thing I wanted to write to you about is that my poor PLUS D has died on me recently. It came off the edge connector whilst I was moving the computer when it was switched on! I was hoping you could tell me where I may be able to get it fixed. I remember reading some time ago that MGT had sold the PLUS D to Datel. So I sent a letter to Datel and still have not received a reply after over 3 months now. I have also phoned them up and they told me they didn't do any repairs at all! Now that MGT has become SAMCO, I was wondering if they still repair PLUS D's and also what their address is. Thanks for any help you can give!

Yours sincerely, K.H.Tang.

Don't knock other magazine just because they are designed to apeal to a different audience. I get CRASH and S.U., I don't read them - just pass them on to someone who does. But I do get a report of what goes on in their pages. Not my cup of tea, but they still sell many thousands each month.

For PLUS D repairs contact PBT Electronics (their advert is in this issue) they will also repair DISCiPLEs. Give them a ring and arrange to get your PLUS D down to them. Ed.

Dear Editor,

I don't know if you can help me but I've just got the Hisoft C Computer (from Hisoft). Unfortunately they no longer supply the DISCiPLE/PLUS D versions. It is supposed to be microdrive compatible but things are not that simple, because although the program activates the drive when loading or saving, absolutely nothing is put on the disc. (Although I can still snapshot it).

What I need is the patch code (it was in Vol 2 no. 8 as well) that was originally supplied. I asked Hisoft

and they suggested contacting you.

I'm at University and I'm trying to learn C and I find it a lot easier to use a Spectrum than the single Unix Mainframe intended for 3000 undergraduates! If you could be of any help I would be most grateful either through FORMAT (although I appreciate that you probably have not got the time for the latter).

Yours sincerely, G.New.

All back issues of FORMAT are still available, and yes it was 2/8 that had the Hisoft C article. However I have been unable to find out from Hisoft why they no longer do the disc version. Perhaps a reader may be able to help you out of your fix. Ed.

Dear Editor,

I have just read SAM Supplement issue #8. I borrowed a copy from a friend to see what it was like, and thought you should know about a letter that has been printed (if that is the right term when it is on disc). The letter, from a Mr S.G.Greenfield, was very uncomplimentary about INDUG and FORMAT.

I was surprised that SAM Supplement would waste so much space (eight screens full of text) on a tirade of abuse against you and the user group. How can he claim that coverage of SAM is minimal in FORMAT, you have just finished a long and detailed series (Carol's wonderful Money Manager) that really put life into SAM Basic in a way that the manual failed to do. Your reviews of SAM products, the coverage in Short Spot, and the many articles that appear, can't possibly be called minimal coverage.

As to his complaints about postal deliveries he wants to try living in London as I do. Last week I had FIVE poll tax letters delivered, not one addressed to my property. In the last year I have twice had to complain to the Royal Mail because my copy of Computer Shopper never arrived.

You have explained the relationship between INDUG and FORMAT so often that I fail to see how anyone can misunderstand.

My thanks to INDUG, FORMAT, yourself and your writers, if Mr Greenfield wants to stop his membership then the user group is better of without him.

Yours sincerely, Chris Morris.

I had seen the issue of SAM Supplement, and I have had several readers ring to me about it. I'm sorry I've had to cut your letter so severely, but as it was even longer than Mr Greefield's I did not want to bore our readers with all the details.

Mr Greenfield is entitled to his opinions, provided of course they are based on fact (I have covered one of his erroneous comments in the editorial this month). Another point he raises is our lack of replies to his letters. All readers will know that we do not have the staff to allow us to give personal replies to the hundreds of letters we receive. What time we do have for letter writing has to be reserved for overseas members who cannot use the telephone 'Hotline'. ALL letters are read, but few can be replied to without the rest of our services to readers suffering as a result. The hotline is open, even in the evening (though then it is really for technical queries only) and it is, in 99% of cases, easier to solve problems when I can talk to someone and ask questions.

We don't like to loose any member, you are all important, but I must sometimes look to the needs of the majority. If Mr Greenfield had been co-operative over his alleged missing issue of FORMAT there would never have been a problem, sometimes people are their own worse enemy.

Thank you for your support, but perhaps next time it would be better to write to whoever publishes anti INDUG comments. Ed.

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Letters may be shortened or edited to fit on these pages.

This is YOUR letters page so it is up to you, our readers, to fill it. Send your letters to the usual address and mark the envelope LETTERS in the top left-hand corner. Keep your letters as short as you can so we can fit in as many as possible.

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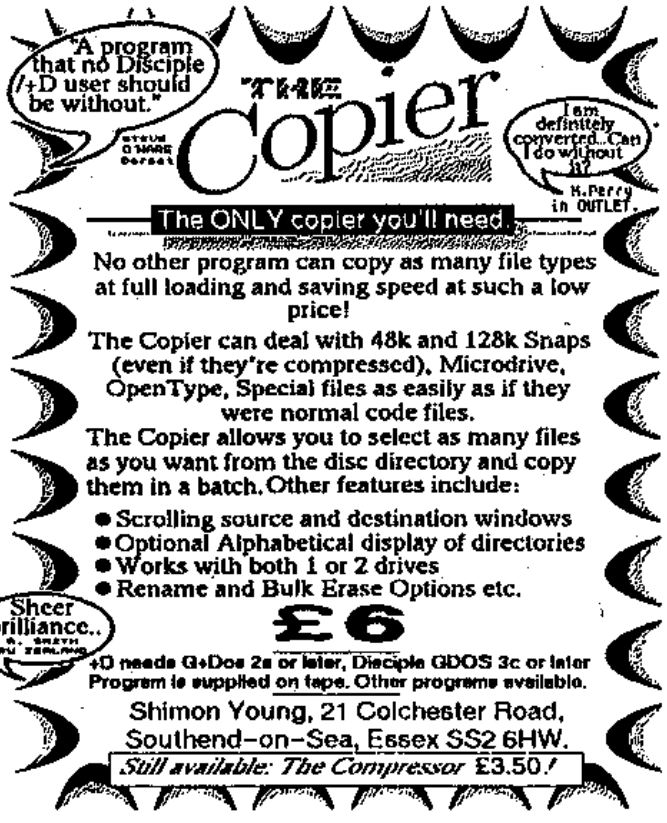

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