

Vol 3 - No 8.

April 1990.

# FORMAT

FOR SPECTRUM AND SAM USERS



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# PCB DESIGNER

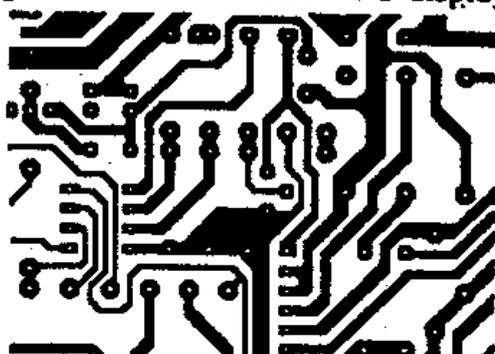
## FOR THE 48K ZX SPECTRUM

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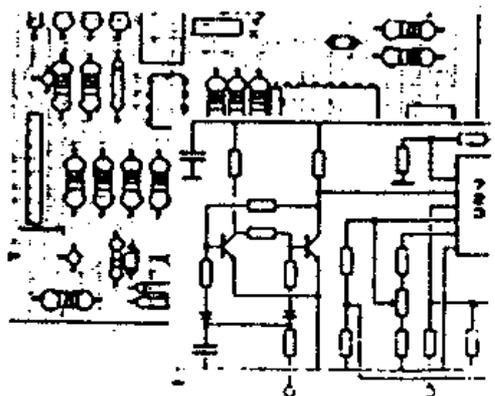
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State version required from: Disciple/+D; Discovery; +3; Microdrive & Tape. *Important! Tape and Microdrive users please state Centronics interface in use or send £1 for details.*

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# NEWS ON 4

## SAM SOFTWARE AWARDS

Fancy winning a £15,000 prize? Well sit yourself down and write a program for the SAM Coupé. At a special press conference, in London on Thursday the 8th of March, Miles Gordon Technology plc announced their 1990 SAM SOFTWARE AWARDS with a total of £20,000 up for grabs.

A first prize of £15,000 is augmented by four interim (bi-monthly) prizes of £500 and three special prizes of £1000 - Best under-12 entry, Best 12-16 entry and Best non-game entry.

The industry magazine Computer Trade Weekly will act as independent judge and jury.



The awards (totalling the same value as the famous Booker Prize for Literature) will be to the Author of the software not to the Publisher. Any

program commercially published for the SAM Coupé before December 1990 will qualify for entry. The judges will be looking for originality, use of the computer etc.

Software companies wishing to enter their authors programs for the awards can obtain further details by writing to MGT at their usual address.

## FOCUS CALL IN RECEIVERS.

The Focus Publishing group, publishers of Popular Computing Weekly and other titles, called in the receivers at the beginning of March.

Popular had had very poor distribution for some time, with some people reporting that Pop Weekly had not been on their newsagents shelves since before Christmas.

It is unclear at the moment what the future holds for Popular, the Receivers plan to carry on publication for a while as they look for a buyer for the company.

Meanwhile many of Popular's authors are very out of pocket not having been paid for many months.

## SAM SOFTWARE.

The first items of SAM Coupé software should be out in the next few weeks. Audiogenic, Atlantis, Database, Domark, Kosmos, PCG, Thalamus, and Zeppelin have all announced titles.

MGT have also announced that they are buying the rights to convert several classic games for the Coupé. These will be launched on tape or as disc compilations as soon as the conversions can be done.

## INNOVATOR OF THE YEAR.

This years European Computer Leisure Industry Conference was held in Malta over the week-end of the 17th-18th March. All the big names were there,



Acorn, Commodore, Emap, Ocean, Virgin-Mastertronics and Miles Gordon Technology. It was a good job MGT went because they won TWO top awards.

The first award went to Bruce Gordon who won the Hardware Innovation Award for his design work on the SAM Coupé. Bruce Gordon and Alan Miles also scooped an award as Newcomers of the Year. All that and a weekend in the sun, what a life...

#### DATTEL TAKE ON THE PLUS D.

Dattel Electronics are taking over the production and marketing of the PLUS D. MGT signed a deal, which gives the Stoke-On-Trent based company exclusive rights to the disc interface, in order that their efforts could be concentrated on the SAM Coupé and other new products.

Alan Miles said that he felt it was important that the PLUS D continued in production.

MGT will fill all existing orders but new orders should be made direct to Dattel who can be contacted on 0782 744707. More details next month.

#### ALL FORMATS SHOWS.

Even before the 2nd All Formats Computer Show is held the organizers have announced the 3rd show. The date for your filo-fax is Saturday June 9th and Sunday 10th.

The first show, held on Saturday February the 10th (see picture above) was a great success despite the short notice that was given to the show. The 2nd show is set for Saturday 28th and Sunday 29th April.

Described as 'the shows for the computer enthusiast' the stalls will contain the usual mix of bargains and those hard to get items. FORMAT will be there in the special SAM and Spectrum village and we look forward to seeing as many of our readers as possible.

---

URGENT we need your news. Clubs, Shows, New Releases, anything you think other people should know about. If you have any news items you want to pass on then send them in. Please mark the envelope NEWS in the top corner.



Right, lots to get through this month, so stright down to business. I keep getting letters from readers with stamped addressed envelopes or letters that obviously (from their wording) are looking for a reply. Now I've said it before (more times than I care to look up) but I will say it again just for the record - I CAN NOT REPLY PERSONALLY TO ANY LETTERS. It doesn't matter what the letter is about, I just don't have the time or the resources to answer letters. Of course I welcome your letters for publication in FORMAT, I also like to receive your comments and suggestions regarding FORMAT, just as long as you don't expect a written reply. One person has been writing, at intervals, for over a year and still hasn't got the message.

So please remember, if you want to discuss anything with me, give me a ring on the usual number 0452 412572 Monday to Saturday 2-6pm and 7-9pm. If I am out the answer-phone is switched on, please leave a message and ring back later for a reply. When I am in, you can now also send fax messages on the same number, but NOT after 9pm please.

OK, that's got that out of the way, now on to brighter things. First I have had several readers ask about the workshop I proposed in this column last year. Well, sad to say, only a handful of people expressed an interest in a full day workshop. I know it would have been a little expensive but I did expect to get a few more people willing to come to Gloucester. For now I have shelved the plan but I may raise it again if I feel the time is right. Meanwhile there is always the All Format Computer Shows where we can all meet.

SAM is generating a lot of interest and there are several items in this months news column. However, I have saved some news for this page because it directly relates to FORMAT.

FORMAT Publications is branching out into software. Our first game for the SAM Coupé should be out in early May. Called 'DRAGON TILES' it is a strategy game that really shows off the extra colour resolution. If you have any programs, games or utility, that you think may have commercial possibilities, then contact us as soon as you can. I'm sure we can make you an offer you can't refuse. Also, if you are a programmer, but can't think of a program to write, then let's hear from you as well.

Next, FORMAT is moving into book publishing. Two books are already in the pipe-line and another is being considered. I can't say when the first one will appear but it will probably be mid summer.

Finally, if you need a Centronics printer interface for your Coupé then FORMAT will soon have the right one for you. Priced at £14.95 the interface will be fully compatible with the LPRINT and LLIST commands in Basic and with the screen dump routines in Flash!

These new ventures will help to strengthen our position in the industry. Other products will be coming in the future so keep reading FORMAT, it's way ahead of the other mags.

See you next month.

Bob Brenchley. Editor.

# SHORT • SPOT

By:- John Wase.

Lots of short letters this month. Malcolm Goodman of Leeds has written to mention that on the PLUS D, the command "FORMAT dl TO 0" starts a format, runs it for about 70 seconds, and stops without doing the second part; (the flashing border bit) with the error message "Wrong DRIVE", a curious mixture of caps and lower case. However, the discs were all formatted (CAT 1 disclosed the usual 780K) and saved and loaded without problems. Malcolm asks how some 37% was knocked off the formatting time. The answer lies in the routines. For a straight format request, the disc is first formatted (i.e. the tracks are laid down) and then the integrity of each track is verified. (flashing border). However, for a sector to sector copy (which Malcolm had effectively asked for) the disc is first formatted, then each sector is first transferred and then verified, after the bytes have been read over to it. This avoids having to verify each sector twice. Malcolm avoided the sector copy routine by selecting a non-existent drive, and so verification was also avoided. It's a bit chancy, though, having lots of discs around which have been formatted but not verified: I shouldn't save anything too precious on them.

Three interesting snippets have arrived this month from Daniel Cannon of Newark. The first one is for the SAM Coupé. Normally, if you load the Spectrum ROM, the "break" button returns you to SAM. If you add the line:-

```
125 POKE 65638,195,0,0
```

to the program printed in January's "Format" on page 28, then the "break" button returns you to the Sinclair copyright message. Much better than having to load the ROM all over again.

His second point concerns the fault(s) on the Spectrum +2. To make caps M and N work in any program which doesn't alter the interrupt register (so no use trying this with Tasword+2), type in in 48K mode:-

```
FOR a=16384 TO 16388 : READ b: POKE a,  
b : NEXT a : RANDOMIZE USR 16384 : DA  
TA 62,0,237,71,201
```

On entering the line, you will find a bit of screen corruption (cleared by pressing "Enter"). You need to retype everytime you go into 48K mode, NEW or RANDOMIZE USR 0.

Next, in answer to Daniel Neidle's request, here is a program which will allow you to change the colours on the 128 Basic editor. Daniel (Cannon) says "If you have a nice 128K or 128K+2, then just type the program in, RUN it and answer "1" to the question. The code will then be saved (make appropriate changes for your sort of DOS if you have one). To alter the colours, type POKE 23360, colour: RANDOMIZE USR 23348 and Hey Presto! A nice coloured screen. To reload, just do LOAD "name" CODE.

But if you have a nasty +2a or a +3, then there is bad news. There are no system variables to overwrite, so your Basic programs will have to be cut down to about 24K. To use, enter the program, RUN it and this time, answer "2" to the question. The code will then be saved (again, alter the line to suit your DOS). To change the colours, type POKE 49138, colour: RANDOMIZE USR 49126. To re-load, type CLEAR 49125: LOAD "name" CODE. Once the colours are set, you can CLEAR back to USR "a"-1 and recover the program space, but you cannot alter the colours after this without the risk of a crash.

The colours are worked out as usual, by (FLASH\*128)+(BRIGHT\*64)+(PAPER\*8)+INK. Daniel doesn't think anyone will be using FLASH, though. A few examples are: white ink on black paper - 7, a soothing white on blue - 15, and a serious word-processing green on black - 68.

```

1 REM 128 Editor Col. Change
2 REM by Daniel Cannon 1990
10 CLEAR 49125: INPUT "1. 128K/128K+
2""2. 128K+2A/128K+3""a: LET add
r=23348: IF a=2 THEN LET addr=49
126
20 FOR b= addr TO addr+25: READ c: P
OKE b,c: NEXT b
30 PRINT "Set up System." : PAUSE 0:
SAVE D1"COLOUR"CODE addr, 26: VE
RIFY D1 "
COLOUR"CODE addr, 26: PRINT "O.K.
by me.": REM Write in your own d
OS commands here for saving
40 DATA 243,58,92,91,246,7,1,253,127
,237,121,62,56,50,15,236,50,17,23
6,58,92,91,237,121,251,201

```

Finally, Daniel asks if anyone has a copy of "The Complete Spectrum ROM Disassembly" for sale in reasonable condition. And Daniel; don't just ignore letters that arrive after you've bought one: send them on to me.

Mr P. H. Doughty of Stowmarket was interested in the Mathographics programs featured last month, as were several other readers. He enclosed a program which draws a bowl of flowers, together with a very clear printout on a strip of white thermal paper. This suggests an Alphacom printer, for the program uses a "COPY" command in line 90. Most users will have to amend this line to call the routine for their particular printer driver. Here's the program.

```

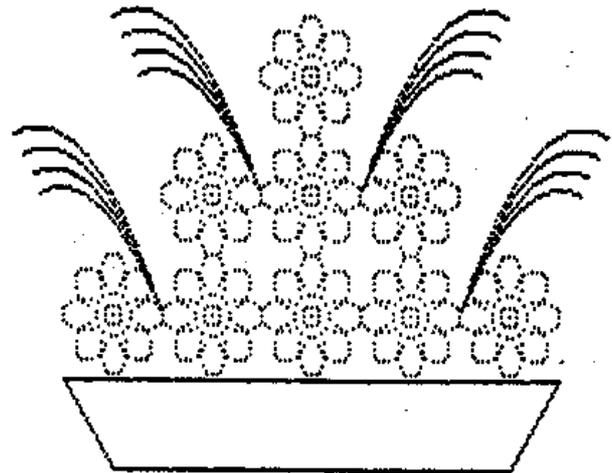
5 REM "flowers"
10 PRINT AT 10,0;"This program plot
s a picture of a bowl of flowers
and sprays using a set of math
ematical curves. It takes 6.
5 minutes tocomplete."
15 PRINT AT 16,0;"Press any key to
continue"

```

```

20 PAUSE 0: CLS
23 FOR m=0 TO 2
25 FOR n=m TO 4-m
30 FOR a=0 TO 2*PI STEP PI/36
35 LET p=40+40*n: LET q=60+40*m
40 PLOT p+20*SIN (2*a)*COS a,q+20*SI
N (2*a)*SIN a
45 PLOT p+20*COS (2*a)*COS a,q+20*CO
S (2*a)*SIN a
50 NEXT a
55 NEXT n
60 NEXT m
70 PLOT 20,38: DRAW 200,0
80 PLOT 40,8: DRAW 160,0
90 PLOT 20,38: DRAW 20,-30
100 PLOT 220,38: DRAW -20,-30
120 FOR a=50 TO 41 STEP -3
130 FOR x=0 TO 1.2*a
135 LET r=2*a*x/40
140 PLOT x+180,-(x^2)/40+r+60
145 PLOT 60-x,-(x^2)/40+r+60
150 PLOT x+140,-(x^2)/40+r+100
155 PLOT 100-x,-(x^2)/40+r+100
170 NEXT x
175 NEXT a
180 INPUT "Press c to COPY, r to repe
at";c$
185 IF c$<>"c" AND c$<>"r" THEN GOTO
180
190 IF c$="c" THEN COPY : GOTO 180
195 IF c$="r" THEN RUN

```



Incidentally, the cassette refused to load on three machines because the header had been badly recorded. If you can, please send a disc when submitting material - it does make life easier, and now they're down to around 40p will no longer break the bank. If you are not a disc user please do make sure you've recorded the program several times on the

cassette - and verified it! It then gives one a fighting chance.

Mr Doughty also enclosed a beautifully printed calendar, but not the program. It would be just the job for "FORMAT", so if you feel able, please do send it along.

D. Crabtree of Weybridge is probably well known to you as a regular contributor to this column. His contribution this month is a machine code program which will change attributes in a window. Mr. Crabtree mentions that the attributes run in a logical sequence from address 22528 to 23295 inclusive, so the low order byte of the address of the start of the change should be poked into 23317, with the high order byte being poked into 23318. The number of lines to change should be poked into 23315 and the number of columns poked into 23313. The attribute value should be poked into 23311. He also points out that readers might like to alter the values given in this program, but that they must beware - the program is not error checked, so the user must ensure that the final address does not end up greater than 23295, and the number of columns selected must not go beyond the screen to result in a new line.

I've not had time to check this one out, but David's programs usually work. Here it is...

```

5 REM *****
10 REM *** ATTRIBUTE WINDOW **
20 REM ***** CALL WITH *****
30 REM * RANDOMIZE USR 23310 *
40 REM *****
45 LET B=0
50 FOR F=23296 TO 23322
60 READ A: LET B=B+A
70 POKE F,A
80 NEXT F
90 DATA 81,229,119,44,21,32,251,30,3
  2,225,25,16,243,201,62,48,14,23,6
  ,3,33,165,88,205,0,91,201
95 IF B<>2488 THEN BEEP .5,1: PRINT
  "ERROR IN ENTRY": PAUSE 100: LIS
T

100 REM *****
110 REM ***** DEMO PROGRAM *****

```

```

120 REM *****
130 PAPER 0: BORDER 0: CLS
140 PRINT AT 6,9;"<< GAME OVER >>"
150 LET HL=22693
160 LET ATTRIBUTE=0
170 LET LINES=3
180 LET COLUMNS=23
190 LET L=HL-256*INT (HL/256): LET H=
  INT (HL/256)
200 POKE 23317,L
210 POKE 23318,H
220 POKE 23313,COLUMNS
230 POKE 23315,LINES
240 POKE 23311,ATTRIBUTE
250 LET ATTRIBUTE=ATTRIBUTE+1: IF ATT
  RIBUTE=255 THEN LET ATTRIBUTE=0
260 PAUSE 5: RANDOMIZE USR 23310: GOT
  O 240

```

#### The Source Code.

```

00010          ORG 23296
00020 PAINT
00030 LOOP1    LD D,C
00040          PUSH HL
00050 LOOP2    LD (HL),A
00060          INC L
00070          DEC D
00080          JR NZ,LOOP2
00090          LD E,32
00100          POP HL
00110          ADD HL,DE
00120          DJNZ LOOP1
00130          RET
00140 START    LD A,48 ;8*paper colour
00150          LD C,23 ;no of columns
00160          LD B,3  ; no of lines
00170          LD HL,22693
00180          CALL PAINT
00190          RET

```

Mr. L. G. Baumann of Cowies Hill, Pinetown, South Africa is another correspondent who contributes frequently to this column. This particular item is of especial interest to those who write long programs. Bad enough on the PLUS D, but on the Discovery, a big program will save, but if you try to load it subsequently, the Spectrum will set aside a section in CHANS for loading and then hasn't room, so all you get is an "out of memory" message.

The Speccy is actually very profligate of RAM when running long programs, and this short routine looks

at the VARS area and the stacks, and, with a short piece of code, rearranges them. Each cycle of the FOR/NEXT loop can save up to .6K, depending precisely on the particular cycle: it prints out the result as it goes along. After running the program and saving it, enter RANDOMIZE USR (PEEK 65519). This clears the screen, removes the listing, and resets RAMTOP. Then load the program being worked on. (RAMTOP can be moved up, but when running the program, you must type in GOTO 1, or you will muck things up).

```

10 CLEAR 64999
20 LET a$="i5x5z5q5t.n5.w..w..t"
30 POKE 23689,16: POKE 65521,201: POKE 65522,0
40 LET z$="": FOR f=1 TO 20
50 LET z$=z$+CHR$(CODE a$(f)-40)
60 NEXT f: POKE 23689,5: POKE 23689+f/8,202: POKE 65519,(f-21)
70 FOR m=1 TO 11: RANDOMIZE USR 65521: PRINT z$
80 PRINT "Cycle No- ";m: PRINT "RAM now increased by ";PEEK 65012*m

```

```

90 PRINT : BEEP .1,17+m: BEEP .1,17+m: NEXT m
1000 REM Now call up Ramtop to mote position

```

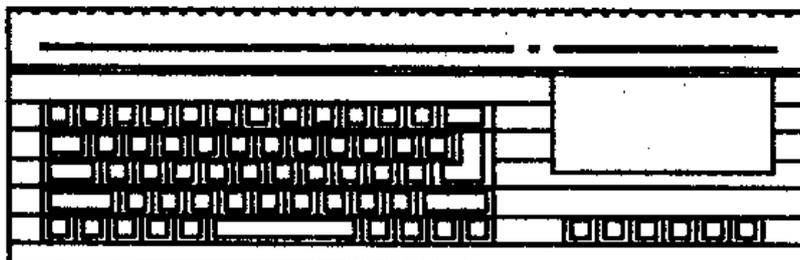
Finally, please keep on sending in contributions for "short spot". Remember "short spot" is for you small programs and routines (any language) for the Spectrum or SAM Coupé. Please include full instructions with the disc/tape. Record the program or text file several time - just in case. I am most grateful to all those readers who send in items, for without them I have nothing to type.

Next month I have an interesting disc from Italy which has just arrived, plus your usual contributions.

Keep them coming to:-

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

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**Under new ownership**

**Hackers Workbench** is the ultimate program for snapshots on the Disciple and PLUS D. **Hackers workbench** contains in a single program over 16 functions to allow any 48K or 128K snapshot to be hacked, some functions are not found on any other hacking program. With **Hackers Workbench** you can examine, search, alter, disassemble and even compare with another snapshot any part of memory or any of the 280 registers. Works in both hex or decimal with all output going to either or both the screen and printer. **Hackers Workbench** is the only hacking program for the Disciple and the best for the PLUS D. Supplied on cassette for any system for only £9.90. (£8.50 to INDUG members) Please add 50p UK postage (£1.20 overseas). Only from **S D SOFTWARE. 3 Mitchell Place, Falkirk, Stirlingshire, Scotland. FK1 5PJ.**

nb. Latest dos required

and sector numbers respectively.

3032. This routine is entered with address 15874 holding a file-number. The routine then uses the directory access routine to find that file before using the routine at 1484 to load the first sector in that file.

3068. This routine is similar to the one above, but instead finds a file with a specified filename (held at address 15878 as usual) before loading the first sector.

These last two routines will load the first sector of any kind of file. The first routine roughly corresponds to the LOAD pl command and the second to LOAD d\*"filename". In both cases any snapshot data (displacement 220 in the directory entry) is moved to 16362.

There is one more routine you do need to know about, and that is the one to change drives:

1794. This routine takes a value from address 15873 (must be 1 or 2) and then selects that drive to be used in all following disc operations. IX must equal 15043. Alternatively, you can place the drive number in the 'A' register and call 1797.

The only thing I haven't yet mentioned is that the first 9 bytes of BASIC, CODE, SCREEN\$ and array files contain the same disc header as at displacement 211 in the directory entries, so instead of getting the file's start address and length from the directory entry, you could get them from the file itself. These 9 bytes are not included in the file length so you must be careful not to treat them as part of the file.

That's all for now. Try experimenting with these routines, for example try writing a program to load just the screen picture of snapshot files - it's something you should easily be able to do by now. You're not saving any bytes on disc so you shouldn't lose or corrupt any files, but when you run the program, write protect the disc just in case.

Before using any of these routines, you will want to page in the PLUS D. The simple way of doing this is to use the machine code instruction: IN A,(231) and to page out: OUT (231),A

I'll be back soon either with details of my new DOS, or with a routine to help you hack those snapshots. Until then happy DOSing.



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# SPECCYROM ON SAM

## Revisited.

By:- Ken Elston.

In the January issue of FORMAT (Vol 3 No 5) I showed you how to load a copy of the 48K Spectrum ROM into the SAM Coupé. Since it appeared in print I have had many letters passed to me by the editor, I liked the ones that heaped praise upon me (the editor might start paying me a bit more!!).

Most of you seem to be delighted with the article but a few have slight problems have been raised. First, not all of you had 48K Spectrums or Spectrum+ machines you could copy the ROM from. So for 128/+2 users here is a list of the differences between the 128K's 48K ROM and the real 48K ROM.

Address	128K	48K
75	107	191
76	56	2
2898	195	214
2899	159	165
2900	59	48
2901	0	9
4937	205	175
4938	59	17
4939	59	54
4940	0	15
7037	205	253
7038	77	203
7039	59	10
7040	0	126
7156	205	223
7157	93	243
7158	59	13
9798	195	205
9799	108	142
9800	59	2

I have only listed the changes that make any real difference and ignored message changes like the copyright notice.

So if you have a 128/+2 then go into the 48K mode and save a copy of the ROM just as the Speccy ROM article showed you. Now type in the SAM Basic

program I gave you and add a few lines of pokes using the list above. Remember to add 65536 to the address e.g. the first one would be POKE 65611,191.

SAM disc users could mod the original program to load from disc. First type in this line then play your ROM tape:-

```
DEVICE T: LOAD "" CODE 65536: DEVICE D
1: SAVE "SPECCYROM" CODE 65536,16384
```

Then alter line 120 of the loader program to read:-

```
120 LOAD "D1:SPECCYROM" CODE 65536
```

Of course you still can't load your Spectrum software from disc but at least it will only take you a few seconds to load the ROM copy rather than two minutes plus.

On the subject of discs I've had several letters from readers who saved their Spectrum ROM direct to disc using their DISCiPLE or PLUS D. It didn't work... Well there is an easy explanation for that, when you save your System file to disc on the DISCiPLE/PLUS D you save it as a code file 6656 bytes long starting at 0 or 8192 depending on the interface. So if you type:-

```
SAVE D1"SECCYROM" CODE 0,16384
```

you save the shadow ROM/RAM from your interface - NOT the Spectrum's ROM.

Finally, last month there was a letter published from Ian Spencer giving some pokes to slow down the cassette routines. Alas the first address of the load pokes was wrong. It should have been 66945 not 66954.

Back soon with some new SAM items.

operation of recording hardware in BASIC, rather than machine coding it. Then if some user of my program has a disc system (or something) which I don't know about, or even which hasn't been invented yet, it's a fairly simple matter for him to rewrite the BASIC lines (if necessary) to work with his hardware. Sensible people like Bruce Gordon make their hardware operate with the Microdrive commands, but not everybody is that sensible.

[I would have done the same with the cassette tape commands, but I have a "thing" about the Spectrum cassette tape system. For a long time I used cassette tape for all my word processing, and the Spectrum SAVE/LOAD has a totally unnecessary delay between the header and the code which drives me barking mad. "Word Manager" does all the cassette operations in machine code, cutting out this delay (at considerable cost in memory) and it's going to stay that way!]

4. Line 280: a one-line subroutine used by several of the Microdrive

commands in 3.: it copies the file name to a variable N\$, the length of the code block to another variable L0, and the Microdrive unit number to D. All these values have already been input from machine code, and are read by PEEKs.

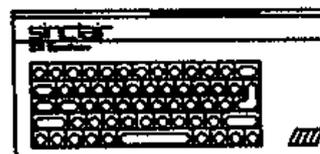
5. Lines 290 and 300: two lines used as entry points from auto-saved versions: the first when the program is auto-saved on tape, the second when it is auto-saved on Microdrive or disc. They set RAM.TOP with a CLEAR command, load the machine code, and RUN.
6. Line 320: a DEF FN for the FN p() function, a "double peek" used in reading the two-byte values input from machine code.

#### NEXT MONTH

In the final part of this series, I will go into a little more detail about jumps from BASIC to machine code and back.

# P.C.G.

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# ON ERROR GOTO

By:- Niccolo Rigacci.

This is a small program that I think many who like to do their programming in Basic will find very useful.

The routine simulates the command ON ERROR GOTO which many computers have but the Spectrum lacks.

My routine is relocatable so it will run at any address, I've used the printer buffer for the demo program below. When the routine is called by the RANDOMIZE USR it looks to see if the next statement on the same line is a GOTO command. If it is then it stores the line number and sets the ERR-SP system variable to point to the machine code. If no GOTO is present then it switches off the error trapping and returns you to normal Spectrum operation. There must be a line number after the GOTO, you can't use a variable (otherwise you get the message "Q Parameter Error") nor an expression (2000/2 will be taken as 2000).

The routine intercepts all standard errors (not the DISCiPLE or PLUS D DOS errors) but if the error is either "O O.K.", "9 Stop Statement" or "C Nonsense in Basic" then the normal error message is printed and the execution of basic stopped. This prevents infinite loops or other accident.

The program below not only sets up the routine from DATA statements but also gives you a demo of trapping.

```
1 REM ON ERROR GOTO
2 REM By:Niccolo' Rigacci
3 REM Firenze, Italy.
4 REM
10 LET check=0
15 FOR N=23296 TO 23452
20 READ A: POKE N,A
25 LET CHECK=CHECK+A: NEXT N
```

```
30 IF CHECK<>11967 THEN STOP
35 REM Now activate trap
40 RANDOMIZE USR 23296: GOTO 1000
45 FOR N=-5 TO 5
50 PRINT 'N,1/N;: PAUSE 30
55 NEXT N: PAUSE 100: CLS
60 REM Deactivate trap.
65 RANDOMIZE USR 23296
70 PRINT "Trap deactivated"
75 PAUSE 100: GOTO 45
80 REM
1000 REM Error Handler
1005 REM
1010 LET ADDR=23296
1015 LET ERR=PEEK (ADDR+7)
1020 LET STA=PEEK (ADDR+6)
1025 LET LIN=PEEK (ADDR+4)+256*PEEK (A
DDR+5)
1030 INPUT ;; PRINT #0;"Error Type ";E
RR; ", In Line ";LIN; " : STA: BEEP
.5,20: PAUSE 300
1035 INPUT ;; GOTO 55
1040 REM
9000 DATA 24,6,0,0,0,0,0,0,42,93,92,35
,126,254,236,40,10,42,61
9005 DATA 92,17,3,19,115,35,114,201,35
,126,254,14,40,10,254,48
9010 DATA 56,63,254,58,48,59,24,240,35
,35,35,94,35,86,33,2,0,9
9015 DATA 115,35,114,43,235,33,128,0,9
,115,35,114,33,102,0,9,237
9020 DATA 91,61,92,235,115,35,114,33,1
21,0,9,115,35,114,33,69,92
9025 DATA 17,66,92,1,3,0,237,176,235,4
3,52,52,201,207,25,33,3,19
9030 DATA 58,58,92,60,40,8,254,9,40,4,
254,12,32,1,233,17,102,91
9035 DATA 213,17,66,92,33,2,91,1,2,0,2
37,176,235,54,1,35,1,3,0
9040 DATA 237,176,58,58,92,60,18,62,25
5,50,58,92,195,118,27
```

Lines 40 sets the error trapping to go to line 1000. As a demo, line 50 will produce an error when N equals zero. The error handler will report the error and then carry on with the demo. Lines 1010 to 1040 show you how to recover details of the error that has occurred from within the routine.

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# INSIDE G+DOS

PART 5.

By:- Stephen Warr.

A I would like to apologise for the delay between this article and the last, but things weren't really my fault. If you remember, the last article in this series included a listing to produce an alphabetical catalogue. I hope you looked through the listing and could see with the help of the comments how the routines we have already looked at fitted in. If anyone had problems, or would like to ask or suggest anything at all in connection with the series, please let me know via the editor.

As you will have found, the routine does not alter the directory, it simply prints the entries in alphabetical order leaving the normal catalogue command unaffected. The program's biggest drawback is that data from the directory has to be stored in RAM until the final printout. We have to allow 1.25K free for this just in case there happen to be 80 files on the disc. Unfortunately, this uses up most of the available spare PLUS D RAM, and not many other programs are going to fit in at the same time. The only alternative is to store the data in the normal RAM, but then there is an added complication that there may not be enough space without overwriting a BASIC program or anything else important.

Still staying with directories for a moment, if you write disc routines in BASIC I'm sure you will have found difficulties in accessing the directory and generally have to resort to the LOAD @ command. My new DOS (coming out soon) has some powerful commands to help you get around this problem, but for the moment, the program below may help out. What it does is to set up a complete catalogue in the string variable a\$ which you can then examine easily. The only

warning is that it won't work with write protected discs:-

```
10 OPEN #4;d1"dir_save"OUT
20 CAT #4;l
30 CLOSE #*4
40 OPEN #4;d1"dir_save"IN
50 INPUT #4;a$a$a$a$
60 LET a$=""
70 INPUT #4;b$b$
80 IF b$="" THEN GOTO 100
90 LET a$=a$b$+CHR$ 13: GOTO 70
100 CLOSE #*4
110 ERASE d1"dir_save"
```

It's a little bit limited and is best suited, for example, to comparing the filenames in the directory to one you are trying to load. A much neater method would be to write a machine code program that uses the directory access routine and returns the result together with file lengths and whatever else is required into a BASIC variable - that's something for you to think about if you want to, and if you come up with a good routine, do send it in.

And now for something totally different. So far we have only looked at the the directory alone - as a kind of file in itself. Although we can manipulate the directory in quite a few ways, unless we have a particular file in mind all we can really do with the directory is print it out as some form of catalogue. So it's definitely about time that we started using a particular directory entry to access the actual file that it's describing. Put simply, how do we get at bytes of program data? As an introduction, let's have a look at the way your disc drive stores information on your discs.

Disc drives are really serial devices which means that they can only store 1 bit of data at a time just

like tapes. However, from the computer's point of view they are parallel devices - the PLUS D software sends whole bytes at a time (8 bits) to the disc controlling chip in the PLUS D which then does the converting for you. This pseudo parallel system does make disc drives faster than tapes, but the real advantage that discs have over tapes is that it is possible to access any part of the disc at any time, very quickly and so the data can be packed much tighter together and can be read a lot faster - if something goes wrong, you only have to wait a short while before having another go.

Every formatted disc, for any computer system, is divided into tracks. You can imagine each track as a very thin ring laid out so that the centre of the ring is also the centre of the disc. Therefore the tracks nearer the centre of the disc are actually shorter than those near the edge, so to hold the same amount of data, the data has to be packed more densely.

Each of these tracks is subdivided into blocks which we know as sectors. When you format a disc all that is really happening is that the software is telling the drive where to put these sectors, how long they are and then giving each one a number. Now to get to any sector on the current track all you have to do is tell the drive which sector you want by telling it the sector number. The drive then searches the current track by rotating the disc inside the drive at a constant speed of 5 revolutions per second until it matches your sector number with a sector number it finds on that track.

The astute among you may be wondering what happens if you want to look at a sector that's on a track other than the current one. Well, when the drive is actually searching for a sector, the drive head (the part of the drive that rests just above the disc and receives and sends information) stays motionless because if it were moving, the vibration would

reduce the reliability almost to zero. This means that as the disc rotates, the head always stays above a single track. Moving the head to a different track is a separate process and can even be done when there isn't a disc in the drive. The drive controlling chip can tell you which track it THINKS the head is above (it can get confused, for example when you change from drive 1 to 2), and the software then tells the head to either move in towards the centre of the disc (high track numbers) or out towards the edge (lower track numbers) a certain number of tracks to hopefully end up on the right track.

This combination of finding the correct track and then searching for the correct sector is entirely controlled by software. With the PLUS D, this software is in the ROM and all you need do is specify the track number in the D register and the sector number of the sector you require to read or write to in the E register and then make the call to the ROM and it will do the rest for you.

Most modern magnetic floppy discs can store 1 megabyte (1000 kilobytes) of data. This is about the upper limit because the tracks can't be too narrow and the data can't be squashed too closely together without losing reliability. Hard drives have much greater capacities of several gigabytes but this is because the disc is actually part of the drive and can't be removed. This means that there is very little vibration as the disc rotates and so the head can be positioned much more accurately, allowing more tracks to be placed closer together.

A double-sided, double-density (DSDD), 80 track disc is a 1 megabyte disc. A common question is "Hold on a minute, the PLUS D formats its discs to 80 tracks each side with 10 sectors of 0.5 kilobytes each track giving a capacity of  $80 * 2 * 10 * 0.5 = 800K$  (780K if you don't include the 20K directory). What's happened to the extra 200K?" Well the answer to this isn't entirely straight forward, but this space is

mostly taken up as gaps between sectors and as information about each sector helping to organise the data on the disc.

OK, so how is all this relevant to us? Well, whenever the software has told the drive to look for a sector, a special circuit in the drive is trying to detect a "magnetic mark" that was placed on the disc before each sector during the original formatting. The drive ignores everything until it finds one of these marks and so it's impossible to ever locate the middle of a sector, only the beginning. Therefore the entire sector must be read or written all in one go. Also the hardware isn't bothered whether the software is managing to keep up or not, it just keeps going regardless, and so it is not possible to program clever software effects whilst the disc is rotating as the CPU must concentrate on accessing the disc - even the screen border stops flashing when the data bytes are actually being moved from disc to computer or from computer onto disc. To give you an idea of their speed, at their best our drives can transfer 5K in a 1/5 of a second.

It doesn't matter if you do not understand everything, but some of the things mentioned above will certainly come in useful and it might help you to understand why things sometimes can go wrong!

I'm sure you all know by now that with the MGT systems, all the sectors are a fixed length of 512 bytes or 0.5K. As I've mentioned, the sectors are all numbered, and the logical order of sectors on a PLUS D disc is:-

Track 0: Sectors 1,2,3,4,5,6,7,8,9,10  
Track 1: Sectors 1,2,.....,10

and so on up to how ever many tracks (less one) there are on side 1. e.g

Track 79: Sectors 1,2,.....,10

If the disc has a second side (and providing your drive has two heads) then the next sectors are Track 128:

Sectors 1,2,.....,10 etc.

Track 79 is nearest the centre of the disc, and track 128 is right at the edge and because the two drive heads usually move together, when you want to read track 128 after track 79, the heads have to move the full distance across the disc which causes quite a delay compared to normal disc use - try it out using the LOAD @ command.

The directory is stored from track 0, sector 1 to track 3, sector 10 inclusive. Track 4, sector 1 onwards contain the actual program data. On any sector that is used by a file, the last two bytes of the sector give the track and sector numbers (in that order) of the next sector in that file. A file sector therefore contains 510 bytes of file data followed by 2 bytes of disc data which is why a 1K length program takes up 3 sectors instead of 2. When you reach the last file sector, the 2 disc data bytes are both zero.

The process of loading a file can be summarized as follows:-

- (1) Find the correct directory entry.
- (2) Get the length of the file and the first track and sector numbers from the directory entry as well as any other relevant information needed (such as auto-run line number).
- (3) Load the first sector of program data, transfer the data to where it is required and get the next track and sector numbers by reading the last two bytes of this sector.
- (4) Load the next sector and repeat until the whole file has been loaded.

The number of sectors used by the file is totally irrelevant and is only used when displaying a catalogue. The software knows when it has finished loading a file by storing the length and decreasing it until it reaches zero.

This method, whereby every sector

gives the "disc address" of the next sector, means that any unused sectors near the start of a fairly full disc can get used up rather than leaving odd sectors here and there all over the disc which was the case with the Discovery drive or BBC disc systems. They saved programs to the biggest available continuous space and if there was no space big enough for the whole file then you had to find a new disc to save the program on, and then load a special program to compress the files together on the original disc and free the spare sectors. But of course the disadvantage with all disc systems is that a file may end on the first byte of a sector leaving the rest of the sector unusable.

All this may sound complex, but from a software point of view it is actually reasonably easy to do and from our point of view it is extremely easy as we have a number of PLUS D ROM routines to help us. Bear in mind that my new DOS does include a new EPROM and so the addresses given below and in my previous articles will be different when you have installed the new DOS.

Before using the first three routines below, the machine code IX register should be set to 15043 (#3AC3). The significance of this is that it tells the PLUS D ROM where various pointers and flags are stored (the only exception to this rule is when you are using an otype disc stream from machine code so you should avoid these files for the moment). If the directory access routine was used previously you needn't worry about setting IX as it will have been done for you.

1484. The routine at this address loads the sector specified by the DE register to address 15318 (#3BD6). Before calling this routine, set D to the track number (0-79=side 1, 128-207=side 2) and E to the sector number (1-10) of the sector you want to load. The routine will load any sector from disc including unused sectors and sectors in the directory. Initially the bytes at (IX+13) and

(IX+14), (addresses 15056 and 15057) will be set to zero, but as when reading a directory entry, you can point to any byte in the sector by setting them to the displacement from the start of the sector and then calling 3479 to set HL to the required position in the sector (IX+14 holds the most significant byte and since the sector is only 512 bytes long, it can only hold 0 or 1) - SEE PREVIOUS ARTICLE. If you just want HL to point to the start of the sector without altering the contents of (IX+13) & (IX+14), CALL 3462 will do the job for you.

1919. Once a file sector has been loaded into the PLUS D RAM using the above routine, this routine can be used to get an individual byte from that sector. It returns with the A register holding the value of the next byte in the file and it uses (IX+13) & (IX+14) to step through the sector, so if you alter their values while using this routine you may end up reading part of the file twice or missing out part of the file. If the end of a sector is reached, this routine automatically reads the last two bytes and loads the next sector for you so you could load the entire file byte by byte simply by repeatedly calling this routine, but there is a better method:

1950. Again, the first sector in the file must have been loaded, but this routine will load the next 'DE' bytes from the file to address 'HL' in RAM (can either be the normal or PLUS D RAM). If after DE bytes the end of the file still hasn't been reached, you can still use this routine again or the one above to load the remaining bytes.

The following three routines do not require IX to be set to 15043.

12244. This routine is in fact the LOAD @ command and is included for completeness, but really you are better off using the other routines given above and below. It is entered with IX holding the address to load the sector to, 'A' holding the drive number and 'D' & 'E' holding the track

# THE SECRETS OF WORD MANAGER

## SPECTRUM MACHINE CODE MADE EASY

Part 11.

By:- Francis Miles.

### MULTIPLE PROGRAMMING Part 1.

Word Manager, as marketed commercially, consists of three interdependent programs, recorded as separate entities on disc or tape:

- "WORDIV", a BASIC program of about 300 lines; WORDIV consists of two separate sections, lines 1-320 being the operating BASIC for the word processor and lines 1000-9999 being a separate "configuration" program;

- "w mc", the main machine code block of 17,408 bytes, loaded at 48128 and extending to the end of RAM;

- "w driv", an "initialization" machine code program, 1750 bytes loaded at 45000 (this was originally written by James Hutchby of OCP Ltd for use with many different programs, and adapted by me for "Word Manager").

When the tape or disc is loaded, it starts the WORDIV BASIC running at line 1000. This first loads the two machine code sections and then displays a series of menus and prompts relating to the control of the user's line printer and interface. It then POKes an interface number (as selected by the user) from 1 for the Kempston 'S' interface to 17 for the DISCiPLE, into the "w driv" machine code, and a variety of numbers into the "w mc" machine code controlling things like automatic line feed, "underline on" and "off" and other printer operations. Finally WORDIV activates the "w driv" machine code by a command RANDOMIZEUSR 45000.

Now "w driv" begins to operate. First it scans the BASIC program, by getting its start address from the Spectrum system variable 23635 PROG and then jumping on from line start to

line start by reading the BASIC line length from the two bytes following the line number (see Chapter 24 of the old Spectrum handbook, Part 24 of the Plus 2 book); it does this till it finds BASIC line 1000.

It marks line 1000 as the end of the BASIC, as follows:-

```
0480 ;DE is on the first address
0490 ;of line 1000
0500 LD (23627),DE;VARS
0510 LD A,128
0520 LD (DE),A
```

[This is the "80-byte" marking the end of the variables area.]

```
0530 ;Chinese copy of part of 4633
0540 ;RAM.SET, in the ROM
0550 INC DE
0560 LD (23641),DE;E.LINE
0570 CALL 5808;SET.MIN
```

[SET.MIN reclaims all the working areas above the variables area; effectively therefore it now deletes all the BASIC from line 1000 onwards. Now the machine stack and GOSUB stack are reduced to a single address and put below the new RAM.TOP at 25341.]

```
0580 LD SP,(23613);ERR.SP
0590 POP BC
```

[This BC is the return address to the "main sequence" of the ROM; it is saved and put as the only value on the new stack.]

```
0500 LD HL,25341
0510 LD (23730),HL;RAM.TOP
0520 LD (HL),62;RAM.TOP marker
0530 DEC HL
0540 LD SP,HL
0550 PUSH BC
0560 LD (23613),SP;ERR.SP
```

[The new machine stack is now ready, with the saved return address on it but nothing else. Now the "next statement" system variables are loaded so that on return to BASIC execution will begin with line 1, statement 0:]

```
0570      LD HL,1
0580      LD (23618),HL ;NEWPPC
0590      XOR A
0600      LD (23620),A ;NSPPC
```

The "w driv" program now proceeds to find the print interface routines or "print drivers" corresponding to the serial input by the user (from 1 for Kempston 'S' to 17 for DISCiPLE): the routines to operate each interface are coded successively as part of "w driv". When the right driver has been found, it is copied to the address ORIGIN, 48136; this is the start of a 142-byte space reserved for the selected print driver near the start of "w mc" - long enough to hold the longest of the drivers. The driver for DISCiPLE is quite short, and looks like this:-

```
1770 DSSTRT DW DSEND-DSSTRT
1780      DW DSINIT-DSSTRT+ORIGIN
1790      DW DSBUSY-DSSTRT+ORIGIN
1800      DW DSPRNT-DSSTRT+ORIGIN
```

[If you work it out, you will find that the above four words come to:-

1. the length of this driver - used for copying it to the address ORIGIN in w mc
2. the new start address of the DSINIT routine, ie after the driver has been copied to ORIGIN in w mc
3. and 4. the new start addresses of DSBUSY and DSPRNT.]

```
1810 DSINIT EQU $
```

[DISCiPLE doesn't need an initialisation routine, but many of the other interfaces do.]

```
1820 DSBUSY IN A,(31)
1830      XOR 0100000B
1840      BIT 6,A
```

```
1850      RET
```

[The "busy?" routine; DISCiPLE sends a code with bit 6 set if it is not busy, so this must be reversed to give "Z for clear".]

```
1860 DSPRNT RST 8
1870      DB 57
1880      RET
```

[The "print code in A register" routine.]

```
1890 DSEND EQU $
```

Now "w driv" concludes by calling a clever routine to print a title screen with enlarged letters, which I won't go into here, makes a four-second pause, and then jumps out to 7030 (1B76 hex) STMT.RET in the ROM, going into BASIC execution - this is equivalent to a BASIC command RUN.

The BASIC has now been reduced (see line 0570 above) to its first section only, the operating BASIC of the word processor.

This BASIC is short - little more than a single screen - but not simple! It includes no REMs except a title and copyright claim (leaving maximum space for text buffer), but it falls into six parts:-

1. Line 10, giving variable names to various line numbers and RAM addresses, to economize on memory.
2. Line 200: LET L=USR 65018: GO TO L. See comments next month on the USR function
3. Lines 210-270: six Microdrive-type commands - CAT, FORMAT, ERASE, LOAD, SAVE/VERIFY, and SAVE the program, each followed by GOTO 200.

Each of the lines in section 3. is a free-standing BASIC routine, entered only from machine code and returning (via line 200) to machine code. See comments next month.

I prefer always to leave the

# NEV'S

# HELP PAGE

By: Nev Young.

OK I'm sorry. It's a fair cop. I'll come quietly guv. Slap on the cuffs. I did it. etc etc etc.

But seriously it was only a little mistake. Nonetheless thanks to the twenty odd people who wrote to tell me. If you have no idea what I'm going on about then let me explain. In issue 3/5 I gave a printer driver for one of the OCP +80 programs. It was wrong. So here it is again but correct:-

```
START  ORG 40000
        DEFW START
        DEFW INIT
        DEFW BUSY
        DEFW PRINT
        DEFW LENGTH
PRINT  RST 08H
        DEFB 39H
BUSY   XOR A
INIT   RET
LENGTH EQU $ - START
```

And for those who have got the OCP +80 Editor/Assembler there now follows a full configuration and conversion. This may well be suitable for other OCP +80 programs as well.

First of all write and run the following program:-

```
10 REM PLUS D/DISCIPLE PRINTER DRIVER
20 REM FOR OCP +80 EDITOR/ASSEMBLER
40 DATA 64,156,77,156,76,156
50 DATA 74,156,14,0,207,57,175,201
60 FOR N=57344 TO 57357
70 READ D: POKE N,D
80 NEXT N
90 SAVE D1"DRIVER" CODE 57344,14
```

This will save a code file "DRIVER" on to disc 1. This is the printer driver to use with the OCP Assembler and may well work with other programs by that company. Just see that the addresses used in lines 60 and 90 are correct. The ones needed should be

given somewhere in the manual.

Next for the Assembler only write the following program:-

```
10 REM PLUS D/DISCIPLE CONVERTOR
20 REM FOR OCP +80 EDITOR/ASSEMBLER
30 REM COPYRIGHT FORMAT PUBLICATIONS
40 CLEAR 31743
50 LOAD D1"+80 Edt/Asm" CODE
60 FOR N=45522 TO 45531: POKE N,0: NE
  XT N
70 POKE 46549,201
80 FOR N=46551 TO 46553: POKE N,0: NE
  XT N
90 FOR N=46556 TO 46558: POKE N,0: NE
  XT N
100 POKE 46574,175: POKE 46575,201: PO
  KE 46576,0
110 FOR N=46646 TO 46655: POKE N,0: NE
  XT N
120 SAVE D1"+80Edt/Asm" CODE 31744,160
  37
```

Now save that to disc with the command:- SAVE D1 "OCPCONV" LINE 1

Now for the fun. Take your original tape of the OCP +80 Editor/Assembler and load it (in 48K mode) with the command: LOAD "". After about 3 minutes a menu of printer drivers will appear. Break into the program (press SHIFT and 6 together). Then enter the command:- LOAD d1"DRIVER" CODE

Then restart the program by RUN 100. Select own driver by entering the number 255. Now answer the questions the program gives you:-

```
Code to be sent at start of line = 0
Code to be sent at end of line = 13
Blank lines at top = 2
Print lines = 60
Blank lines at bottom = 4
Save to microdrive = Y
Save to cassette = N
```

You will now have the Basic program

"run" and the code file "+80Edt/Asm" on disc 1. Now load and run the conversion program given above and you will now have a fully working Editor Assembler with all functions working.

Another problem with printer spacing is caused by the sidewriter program from issue 2.1. This program requires you to a POKE @6,1 before running it but this also causes the problem that some printers no longer give a line feed so all the lines print on top of each other. This is because some printers will give an automatic line feed with a CHR\$13 and others do not. To find out which type of printer you have run this little program:-

```
10 POKE @6,1
20 LPRINT "O O O O O"
30 LPRINT " X X X X"
```

If you get two lines printed than your printer will space the paper by it self, however, if you get "OXOXOXOXO" printed then your printer does not. This is often not realised as the value at POKE @8 is normally set to 0 or 1 for the number of line feeds that the PLUS D needs to send. When you do a POKE @6,1 then the PLUS D never sends any line feeds other than those you send by a CHR\$ 10. But If you do a POKE @6,0 then any escape sequences need to have CHR\$ 27 put in front of EVERY special character.

The sidewriter program must have a POKE@ 6,1 or it cannot correctly generate the escape codes for the printer, but this also means that you may not get a line feed. To fix this you need to insert two lines in the assembler source after sequence number 1430:-

```
1432 LD A,10
1434 RST 16
```

For those without an assembler change the basic poke program as follows:-

```
10 FOR I=0 TO 245: READ A : etc etc
20 DATA 197,221,225,33,246, rest of
   line is the same
165 DATA 62,10,215
200 SAVE D1"SIDEWRT_C" CODE 50000,246
```

Of course it is always best to set the dip-switch on your printer to give an Automatic Line-Feed after Carriage-Return which is the standard most software expects.

Another little problem with Sidewriter is that RAMTOP must be at least 7 less than the load address of the program otherwise you will get a crash after printing once.

Chris Ingram from Hillview School, Limbe in Malawi, says that EXECUTE files seem like a good idea but how can he use them as he doesn't know machine code. This is because he has a number of small routines from Vachha's Supercode III (never heard of it!) that would probably make excellent EXECUTE files if only he knew how. Well Chris I'm sorry but no you can not use them as EXECUTE files. These files have to be specially written to run in the DISCiPLE or PLUS D buffer so they must run at either 1A00H or 3A00H and they must be less than 511 bytes long and, this is the big one, make no direct calls to the Spectrum ROM as it is paged out, but use the RST 16 and DEFW commands instead. However, you can probably use these routines by saving them with an auto run address.

For example to make the SIDEWRITER program load and run at address 50000 you would save it like this: SAVE D1"SIDEWRT\_C" CODE 50000,246,50000 When this is reloaded by the command LOAD D1 "SIDEWRT\_C" CODE it will load into address 50000 and then auto run at address 50000. It should be possible to do the same with the routines that you have without the need to create EXECUTE files.

Well that's all for this month. Keep those letters coming. I will answer as many queries as possible but only through the magazine so please do not send me return postage etc. Also it is in your interest to send me as much info as possible such as program listings etc. Write direct to me at:-  
FORMAT Help Line,  
3, Mitchell Place, Falkirk,  
Stirlingshire, Scotland, FK1 5PJ.

# MULTI COPIES

## From PCG's Wordmaster & DTP

By:- Carol Brooksbank.

P.C.G.'s WORDMASTER, which is available separately or as part of the SPECTRUM DTP PACK desk top publishing program, has become my favourite word processor.

It is very straightforward to use. Its text editing features, especially the block handling and search/replace options, are, to my mind, better than Tasword's and even if you use Wordmaster as a stand-alone ordinary word processor, you can include graphics in the printout, putting the text to the left, right, or above and below the illustration. And, of course, any Wordmaster document can be printed using DTP if you decide later that you want the professional appearance of good typefaces and layout.

But both Wordmaster and DTP have one major disadvantage - you can't print multiple copies. For me, that often ruled out using them, because I couldn't face printing 150 copies of something one at a time!

So something had to be done, and this is the something. I had hoped to produce two stand-alone programs which would print out Wordmaster files or DTP page files, but that proved impossible. Both programs call so many subroutines which in turn call other subroutines that I should have had to reproduce most of the original code to do that! As it was, I had to disassemble the whole 11K of Wordmaster and 5K of Typeliner! code before I made any headway at all.

So I have produced two overlays. The Wordmaster overlay is simply loaded into Wordmaster from BASIC whenever you want to produce multiple copies. The Typeliner! one is used to make a new file called 'Typemulti!', which you use instead of the regular

'Typeliner!' when you are ready to print off the multiple copies.

These overlays are not meant to stay in place all the time. Use the normal programs to prepare your documents. In both programs, most of the facilities are still available for emergency use when the overlays are in place, but in 'Typemulti!', the only options available from the page preview are NLQ printing or return to editing mode. So think of these as just multiple copy printing programs, and unless that is what you want to do, stick to the originals.

The Wordmaster overlay is very short and simple, just a loop which repeatedly calls the print routine. (Listing 3). Save the code as:-

```
SAVE dl"WMmulti" CODE 55234,18
```

It replaces some instructions which fiddle about with the ERR\_SP system variable, so I suspect that if you were to get an error for some reason while the printing is going on, the program might crash. That has never happened while I have been using it, but it is one of the reasons that I suggest not leaving the overlay in place permanently. Make sure everything is SAVED before you use it - and make sure too that you have opted for 'Form Feed on' at the printing menu before you start.

To set up the number of copies, you have to go into BASIC, load the overlay, and POKE 55237 with the required number. (It is 2 in the code as written). The easiest way into BASIC from Wordmaster is to go to the main menu and try to load a non-existent file. The error message will leave you in BASIC, and it will not crash, even with the overlay in place.

The Typeliner! overlay is a bit more complicated. Printing from the unmodified Typeliner! is one of the options available after the page has been previewed, and if you want to print a second copy you must first select page preview again, and then go to printing. There is no form feed at the end of a page printout, so you must do a manual form feed between copies.

So a form feed had to be introduced somewhere for multiple copy printing, and I soon discovered that if you try to print two copies without doing the page preview first, the second copy is gibberish.

I decided that room for the overlay would have to be made by overwriting the code which checks for the other options available from page preview - draft quality printing, and stepping through the text blocks to check the text at the start of each block. Obviously we must retain the check for NLQ print, and any other keypress should exit to page editing. This gave me 50 bytes to play around with. Two other complications then showed up.

The address at which Typeliner! is stored on disc is not the working address. You have to write code to one address, but if you want to call it, you have to deduct 4281 from the 'real' address. This was OK once I had got the hang of it, but it made disassembling the program, to find out what is going on, very fiddly.

The other difficulty is that the page preview runs straight into the keyboard check, which is fine for the first copy. You must be able to select printing or exit the option. But you don't want to stop for a keypress between each copy or it negates the whole purpose of multiple copy printing. So I had to make the program poke a RET instruction at the end of the page preview code, to turn it into a subroutine which could be called before printing each copy.

Unfortunately, I had now used up 49 of my 50 bytes, so there was no room

to poke the RET out again at the end. If you want to print other copies after a print run, you must go to BASIC (return to main menu and try to load a non-existent file), and POKE 27385,205 - untidy I'm afraid, but I could not find an alternative. The number of copies in the code as written (Listing 4) is 2. To change this, go into BASIC and POKE 27396, with the required number. (4281 below what appears from the listing to be the address to poke).

Save the overlay:-

```
SAVE dl"overlay" CODE 31675,50
```

Then

```
LOAD dl"Typeliner!" CODE
LOAD dl"overlay" CODE
POKE 29026,109
POKE 29027,117
POKE 29028,108
POKE 29029,116
POKE 29030,105
SAVE dl"typemulti!" CODE 29015,5081
```

The POKES change "Typeliner!" to "Typemulti!" so that it is listed correctly in the Wordmaster list of files in memory. Keep it on disc alongside the original Typeliner! so that you have the original for document preparation and the new one for multiple copy printing.

I can only guarantee that these overlays work with the PLUS D version of Wordmaster and DTP Pack . Those of you who have other versions may like to try them out and see what happens (and let us all know through FORMAT's letters page).

#### LISTING. 1.

#### Source Code For Wordmaster Overlay.

```
10 *SCREEN ON
   *LIST ON
11 *PRINTER ON
   *LLIST ON
15 ;OVERLAY FOR "WORDMASTER"
   MULTIPLE COPIES
20     ORG 55234
30     NOP
   NOP
```

```

40 LD B,2
loop :PUSH BC
CALL 55248
POP BC
DJNZ loop
JP 58594
60 NOP
NOP
NOP
NOP

```

LISTING. 2.

Source Code For Typeliner Overlay.

```

10 *SCREEN ON
*LIST ON
11 *PRINTER ON
*LLIST ON
20 ;OVERLAY FOR "TYPELINER!"
MULTIPLE COPIES
30 ORG 31675
RET NZ ;return if print
;option not selected
40 LD B,2 ; this is the
;number of copies.

```

Required number is POKED from BASIC

```

LOOP :PUSH BC
PUSH IX
CALL 27444
POP IX
PUSH IX
CALL 25291
CALL 26094
50 POP IX
CALL 26839
LD A,3 ; print to printer
CALL 5633
LD A,12 ; send a form feed
RST 16
LD A,2 ; print to screen
CALL 5633
60 LD A,201
LD (27385),A ; poke a RET
instruction to avoid stopping for keyp
ress between copies

```

CALL 27241 ; routine which sets up page, now a subroutine because of poked RET instruction

```

POP BC
DJNZ LOOP ; go back if more
copies to print

```

```

RET
NOP

```

LISTING. 3.

Code Poker For Wordmaster Overlay.

```

10 REM WORDMASTER OVERLAY
20 CLEAR 55233: LET N=55234
30 FOR X=0 TO 17
40 READ A
50 POKE N+X,A
60 NEXT X
70 DATA 0,0,6,2,197,205,208,215
80 DATA 193,16,249,195,226,228,0,0
90 DATA 0,0
100 SAVE d1"WMmulti" CODE 55234,18
POKE 55237 with the number of copies
required.

```

LISTING. 4.

Code Poker For Typeliner Overlay.

```

10 REM TYPELINER! OVERLAY
20 CLEAR 29014: LET N=31675
30 FOR X=0 TO 49
40 READ A
50 POKE N+X,A
60 NEXT X
70 DATA 192,6,2,197,221,229,205,52
80 DATA 107,221,225,221,229,205,203
90 DATA 98,205,238,101,221,225,205
100 DATA 215,104,62,3,205,1,22,62,12
110 DATA 215,62,2,205,1,22,62,201,50
120 DATA 249,106,205,105,106,193,16
130 DATA 211,201,0
140 SAVE d1"overlay" CODE 31675,50
150 LOAD d1"Typeliner!" CODE
160 LOAD d1"overlay" CODE
170 POKE 29026,109: POKE 29027,117: P
OKE 29028,108: POKE 29029,116: PO
KE 29030,105
180 SAVE d1"Typemulti!" CODE 29015,50
81

```

POKE 27396 with the number of copies required

POKE 27385,205 before starting another printing run.



It's the same every weekend. As soon as I get the tools out he locks himself away upstairs with his computer.



# YOUR LETTERS



\*STAR\*LETTER\* \*STAR\*LETTER\*

Dear Editor,

Thank you very much for producing such a varied and interesting magazine each month. I look forward to its arrival and it never fails to teach me something new about my Spectrum and discs.

The main reason for my letter is to tell other readers to beware. Many glossy magazines contain adverts for repair companies offering to guarantee the computer for three or six months after repair. When my 48K+ was sent of to Vidio Vault a few weeks ago it came back with the expansion port seal with tape and a letter saying that the guarantee was only valid if the seal remains unbroken. What good is a computer without an expansion port?

I feel I was conned into paying more for the repair - because I thought it worth the extra to get a guarantee - and I don't want others to fall into this trap.

Yours Sincerely, Bill Marshall.

Dear Editor,

I've seen a fair amount of material in your pages recently on SAM. Almost without exception, it has praised this computer with great enthusiasm. The only complaint was nit-picking about having to type LOAD 6 instead of LOAD p6.

But what about the horror stories so many of us could tell which make the early days of the Spectrum look almost good? After all the launch delays, no DOS for 2 months. Many machines will not load tapes. In fact, many of the tapes with Flash etc were "under-recorded."

The DOS itself is seriously flawed. You can't even autoboot it. Its favourite trick is to corrupt your precious system disk. I have had endless trouble trying to use the wild card options. Phoning MGT is a waste of time. Their very nice helpdesk

girls breathe soothing platitudes down the phone and nothing else ever happens to fix the problem. When I returned my SAM as requested by one of their young ladies, their courier collected it and immediately lost it!

So come on, Bob, fair do's. The SAM spec is wonderful, but I have yet to hear of a single machine that met it. How about some honest reporting?

Finally, don't take it personally - I am very satisfied with Format as the only sensible paper-based maggie for my prized Speccie and PLUS D setup.

Yours Sincerely, Dave Ellis.

*First I don't consider DOS syntax to be nit-picking, it's very important that commands - both in Basic and the DOS - should be easy to learn and easy to use, SAM DOS fails in this area.*

*But now let me deal with some of your other comments. SAM was late, yes, but so is every computer, it's a very difficult task to bring together all the parts of the machine (I know, I was there) and to launch just three months after the original plan is not bad. O.K. the DOS took another two months (and still isn't really finished) but again that is a small delay compared to some past launches. I know it's no real excuse to point out delays in other machines but it does put thing in perspective.*

*Tape loading has caused problems for some people although they are in a minority. There problems are normally down to the cassette deck. The Spectrum would load just about any rubbish you chucked at it but SAM is a little more fussy. I have encountered VERY FEW people who could not load the tapes that came with SAM, nearly all problems relate to trying to load old Spectrum titles which are often poorly recorded on sub-standard tapes that have then been kept in far-from-ideal conditions. Using the Spectrum ROM, one or other of the MGT Emulator programs, and a good tape machine the*

vast majority of 48K Spectrum software can be loaded. Having said that, I see little point in using SAM as a Spectrum emulator when most people still have their Spectrums. It's like buying a Rolls Royce and then trying to fit a Mini engine to it.

Back to the DOS I agree that early versions have several major bugs, but fair does, MGT are sorting them out. A new version of the ROM and the DOS will be released as soon as testing is finished. What other computer company has promised free upgrades in this way?

A large percentage of SAM users read *FORMAT*. For every letter or phone call I receive from people with problems I get far more heaping praise on the machine.

Nothing in this world is perfect. SAM is a new machine and with anything as complex as a computer there are bound to be some problems. Do not let these detract from SAM's excellence. *FORMAT* is here to help SAM users to get the best from their computers. It's no good filling our pages with bug reports when MGT are in the process of sorting them out. There are so many positive things to say about SAM.

By being one of the pioneers you have the benefit of being one step ahead. But because you bought early MGT wont let you loose out in the long run. Ed.

-----  
Dear Editor,

Thank you for my subscription renewal notice, I enclose a cheque in payment.

As a beginner with computers there are a lot of articles that I don't understand fully but by reading most of them I think in some way that it has helped me to learn.

I keep finding out how some of the small routines work. The articles I think I get the most out of is "SHORT SPOT" by John Wase. It always has something for me.

Yours Sincerely, Brian Mains.

I'm glad you enjoy *FORMAT*. *SHORT SPOT* is very popular and I would like to take this opportunity to thank

everyone who send items into John Wase. Keep them coming. Ed.

-----  
\*STAR\*LETTER\* \*STAR\*LETTER\*

Dear Editor,

An item appeared in your January issue, concerning the loading of the Spectrum ROM into the SAM Coupé, resulting in a high degree of compatibility with Spectrum software. This works well, but suppose you have a SAM disc drive and wish to save your favourite game, utility etc, on disc. After all life is too short to load too many 48k games from tape!

Well, here is a solution. First get your Spectrum ROM on tape as instructed in the January article. Now load the utility software on SAM and when you're asked to chose 'emulator or patch' press the ESC key. This gets you into SAM Basic. If you examine the basic utility program you will see that the 'rom.bin' code is loaded at 65536. This is evidently a simulation of some ROM routine to fool some Spectrum software. To save a Spectrum snapshot to disc it is necessary to press the BREAK button, followed by key '4' (see SAM drive user guide).

Now all that the BREAK button does is generate a non-maskable interrupt, so that the processor jumps to location 102 (66 hex) in the ROM, where an appropriate routine is carried out, before returning to the main program. In our case, because of SAM's ability to 'page' the memory, a jump to location 65536+102 occurs. If we examine the 'rom.bin' code at this address we find the instructions:-  
PUSH AF and JP 3928. Now this indicates a jump to a routine at 3928 which allows saving to disc. In the Spectrum ROM there are unused locations at this address so our next step is to save this routine from the 'rom.bin' area to disc and thus capture the routine for our own use. To do this type:-

SAVE "D1:NMI" CODE 79982,1170

Now load in the Spectrum RM with:-

LOAD "" CODE 65536

and merge the NMI routine by:-

LOAD "NMI" CODE

Then add the following pokes:-

POKE 65638,245,195,40,57

Finally save the code for future use:-  
 SAVE "D1:convrom" CODE 65536,16384  
 so that the BREAK button will jump to  
 the routine.

At this point entering CALL MODE 1  
 will mystically transform the SAM into  
 a 48k Spectrum so you can load  
 software from tape in the usual way.  
 But now, if you press the BREAK  
 button, followed by key '4', a  
 snapshot will be saved to disc. Key  
 'x' will return you to SAM Basic, from  
 which the command CALL MODE 1 will  
 resume the Spectrum program.

For future use, load the SAM utility  
 software and replace the 'rom.bin'  
 file with the 'convrom' file. You can  
 then reload any snapshot files from  
 disc. You could of course alter the  
 utility basic so that it automatically  
 loads the 'convrom' file.

I have found this approach to be  
 successful with a number of games  
 supplied free with magazines, which  
 would not load with the normal  
 emulator, apparently because of the  
 level at which they were recorded.  
 Pure machine code utilities can also  
 be loaded from tape and saved to disc,

for example Devpac from Hisoft.

As an added bonus, if you 'lock-up'  
 in the Spectrum mode then return to  
 SAM Basic and use the undocumented  
 CALL MODE 0 to return to Spectrum  
 Basic.

Yours Sincerely, Nick Carthey.

*What can I say, FORMAT readers  
 always seem to come up with the goods.  
 I'm sure a lot of SAM users will thank  
 you for your hard work Nick. So good  
 is this letter that I am, in a fit of  
 unaccustomed generosity, making it our  
 second STAR LETTER of the month. Ed.*

FORMAT welcomes readers letters on any  
 subject related to computers. As space  
 is limited each month please try to  
 keep your letters short and to the  
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\*\*\*\*\*  
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Shimon Young, 21 Colchester Road,  
 Southend-on-Sea, Essex SS2 6HW.

# Writing For FORMAT

FORMAT is a magazine written by enthusiasts FOR enthusiasts. We are always on the look-out for articles and programs to publish in these pages. Articles can be on any computer-related subject not just the Spectrum or SAM Coupé. They can be just half a page, a long series, or any length in between.

Don't worry too much about spelling and things like that (the Editor can't spell either) we will sort things out. Just put it down as clearly as you can.

It is best if you send your article as a word processor file, on disc or tape, but please include a printed copy so we can look at it straight away. Pack any pictures flat or better still include SCREEN\$ files so we can print them out here.

We are urgently looking for writers to produce articles on the following subjects:-

THE SPECTRUM 128K ROM

COMPUTERS IN EDUCATION

PROGRAM CONVERSIONS TO DISC

HARDWARE PROJECTS

We also require REVIEWS of software and hardware, both new and old. If you want to do a review please ring first to confirm no-one else is reviewing the same product.

Each month we try to print a mix of articles in FORMAT, this means that some articles may appear in print almost immediately while others may take several months.

Send your work to our address on page 3 or give us a ring on 0452-412572 to talk about it.

# SKREW

By:- C.Grant Dixon.

This program produces a very interesting pattern using 'Skewed' rectangles. They are generated by a short mathematical routine which, from a number random number in the range 0 to 1, will produce very varied effects.

Line 30 sets the 'step' control variable for the first run but from then on line 240 produces a random number and therefore a different pattern.

Line 230 gives a short pause so you can see the finished pattern before the next one is drawn. You could change this to meet your own needs.

```
10 DEF FN M(J)=INT (4*(J/4-INT (J/4)
)+.001)
20 BORDER 1: PAPER 1: INK 7: CLS
30 LET S=.9
40 DIM X(100): DIM Y(100): DIM P(100)
): DIM Q(100)
50 LET X(1)=237: LET Y(1)=0
60 LET X(2)=X(1): LET Y(2)=Y(1)+170
70 LET X(3)=X(2)-219: LET Y(3)=Y(2)
80 LET X(4)=X(3): LET Y(4)=Y(3)-170
90 CLS : PRINT #0; INVERSE 1;" S
KEW by C.Grant Dixon. " INVER
SE 0;"STEP RATE = ";S
100 LET R=1-S
110 FOR I=1 TO 5E6
120 LET X=X(4): LET Y=Y(4): PLOT X,Y
130 FOR J=1 TO 4
140 DRAW X(J)-X,Y(J)-Y: LET X=X(J): L
ET Y=Y(J)
150 LET T=FN M(J)+1
160 LET P(J)=R*X(J)+S*X(T)
170 LET Q(J)=R*Y(J)+S*Y(T)
180 NEXT J
190 FOR J=1 TO 4
200 LET X(J)=P(J)
210 LET Y(J)=Q(J)
220 NEXT J: IF NOT PEEK 19055 THEN NE
XT I
230 PAUSE 200
240 LET S=RND
250 GOTO 40
```

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# NOT SO SOFTWARE

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### FASTWORD PLUS

Here is a great programme that rejuvenates an old favourite. How often when using TASWORD TWO, have you been stuck for the right word? FASTWORD PLUS offers a complete reference book of words, waiting, ready for use at the press of a key!

This is the Plus D and Disciple Disc version of the successful program FASTWORD, a THESAURUS for the Spectrum. Features include ● Full alphabetical index of over 6,000 words ● A display of almost 600 screens ● Equivalent to a 120,000 word printed Thesaurus ● Sense identification for each word ● Select a word from the index using the first 2 letters and displayed on the screen is an average of 20 synonyms and associated words ● 2 way scrolling index ● Fast response ● Overlays Tasword 2 ● Words can be looked up in the Thesaurus as you are working on a text file in Tasword 2!

Also supplied is a NEW TASWORD 2 BASIC PROGRAM, specially written for Disc drive operation, offering new features such as selective catalogue, Wordcount etc. A CONVERTER program tailors your Tasword 2 code to give any combination of screen colours plus a new highly readable Tasword 2 character set.

Complete with instructions these 4 programs represent amazing value. Supplied on Disc.

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