

# FRED PUBLISHING SPECIAL OFFERS

*\*Prices can only be held until 19/4/97\**

Dyzonium	- £7.00	- Shoot/collect-em-up; hardened games players only!
Bulgulators	- £7.00	- Super Pacman style game; VERY 90's!
Boing!	- £7.00	- Arcade adventure; dodge the nasties and solve the puzzles.
WaterWorks	- £7.00	- Puzzle game; use your plumbing skills to escape the level.
WaterWorks II	- £7.00	- Extra levels and great new features - brilliant!
Witching Hour	- £2.50	- Arcade adventure of 'Boing!' persuasion.
Lemmings	- £15.00	- The Arcade Puzzler!
Oh No! More Lemmings	- £10.00	- Better than ever Lemmings levels.
Football League Manager	- £10.00	- Glossy and challenging football management.
Spectrum Classics	- £4.00	- Four discs full of autorunning Speccy greats (price per disc).
Best Of FRED	- £1.50	- The editor's cut. An essential addition to a FRED collection.
MOMENTUM	- £10.00	- Graham Burtenshaw's latest and greatest. A superb game.
SAMPaint	- £20.00	- Fantastic art package.
SAM Vision	- £13.99	- Set of powerful new libraries for SAM C.
SAM C	- £17.99	- Excellent version of C programming language.
ETracker	- £15.00	- The ultimate in music packages.
SpellMaster	- £5.00	- 80,000 word spell checker, anagram & crossword solver.
BASIC Guide	- £3.00	- Complete Guide to SAM Basic from Enceladus.
Machine Code Guide	- £3.00	- Compilation of FRED's machine code tutorials.

## OUT NOW!!

**KABOOM!** -£10.00 - SAM's answer to Super Bomberman and Dynablasters.

Subscriptions are 30% off when ordering £20.00 of software or more meaning that a FRED Magazine subscription would cost only £14.00!!

Orders to: **FRED Publishing**  
5 Ivanhoe Drive  
Westfields  
Ashby de la Zouch  
Leicestershire  
LE65 2LT

**FRED Publishing**  
40 Roundyhill  
Monifieth  
Dundee  
DD5 4RZ

Tel: (01530) 416207



Vol.10 Nº7.

March 1997.

# FORMAT

THE HOME OF Z80 COMPUTING



The Magazine Everyone  
Is Searching For.

£1.75 (UK R.R.P.)

ISSN 0963-8598.

# CONTENTS

Vol.10 N°7.

March 1997.

♦ News On 4	4
♦ The Editor Speaks	6
♦ Short Spot	7
♦ CP/M, The Sleeping Giant - Part 2	15
♦ Puzzle Answers	18
♦ It's Showtime	19
♦ Data Handling	23
♦ Puzzle Spot	26
♦ Spectrum Light-Gun - Part 2	27
♦ The Calendar	29
♦ Your Letters	33
♦ Small Ads	38
♦ Format Readers Service Page	39

## THIS MONTHS ADVERTISERS:-

FORMAT (SAM REPAIR SERVICE)	31
FRED PUBLISHING	Back Cover
REVELATION SOFTWARE	6
S.D.SOFTWARE	2
STEVE'S SOFTWARE	14
WEST COAST MAIL ORDER	32

**FORMAT** ISSN 0963-8598

© Copyright 1997 FORMAT PUBLICATIONS. All Rights Reserved.

No part of this publication may be reproduced, in any form, without the written consent of the publisher. The purchaser of this magazine may copy program material published herein for his or her own personal use and provided that any such programs are erased if and when the purchaser disposes of this magazine in any way. While every effort is made to ensure accuracy in FORMAT the publisher will not be held liable for any errors or omissions.

FORMAT is published by FORMAT PUBLICATIONS.

34, Bourton Road, Gloucester, GL4 0LE, England.

Telephone 01452-412572 - Email Formatpub@aol.com

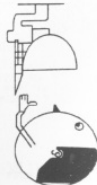
<b>Hard Bits:</b>			
IDE Drive Interface:-			For: £60.00p Sam
IDE Data Cable:-	£9.95p		Sam
Drive PSU & Case:-		£25.00p	
Uni-Dos:-	£19.95p		Disciple/Plus D
<b>Soft Bits:</b>			
Specmaker:-	£9.95p		Sam
PC Suite:-	£19.95p		Sam
Specfile+:-	£9.95p		Plus D/+3
Fractal Collection:-	£4.95		Plus D
Midi Sound:-	£22.50p		Plus D/+3
<b>Postage:</b>			
Hard Bits £1.00 per order, Soft bits £0.50p per order. 3" discs add £2.00p to price.			

Replacements/Upgrades etc. Price on Application

## S D Software

70, Rainhall Road, Barnoldswick  
Lancashire, BB8 6AB

New Email Address: Nevilley@ndirect.co.uk



# NEWS ON 4

## FRED MOVES SOUTH

Last month we told you that FRED Publishing were looking for a 'caretaker' so that Colin McDonald, erudite boss of FRED, can be free to further his career prospects.

Well we are pleased to report that a deal has been struck by FRED with Darren Wileman of Saturn Software, so from the 1st March FRED is on the move down south to Ashby de la Zouch in Leicestershire..

While orders and subscriptions can still be sent to FRED's old address in Dundee (Colin is not disappearing entirely) the fastest response will of course come from sending your orders to the new address.

Colin Anderton continues as FRED's editor and there will be no change in the discipline as such.

## FANCY A SHARE IN 2000?

The American Stock Exchange will begin trading options for 18 software and computer consulting companies expected to play critical roles in solving the year 2000 problem we have reported before in **FORMAT & FORMAT PC**.

The new 'de Jager Year 2000 Index' is designed to help investors manage the risk associated with computer misreadings of the date change from 1999 to 2000, according to officials at the stock exchange in New York. ASE officials developed the de Jager index along with IT consultancy de Jager & Co. Ltd. Trading starts on March 18<sup>th</sup>.

"This is the first and only investment vehicle based on market movements surrounding the potentially monumental global problems associated with the

simple turn of the century," said Gary Gastineau, senior vice president of product development at the ASE. "Investors in the 'de Jager Index' options have the ability to secure a position during a climate of uncertainty."

Costs associated with addressing the year 2000 problem have been estimated at \$1 trillion world-wide. So this looks like being a real growth industry (even though its longer-term future does not look so rosy).

## FALLING SATURN

In a shock move in Tokyo this week Sega Enterprises announced that it will be cutting prices on some of its major game titles for the 32-bit Sega Saturn games console by about 50 percent with effect from April 25. The titles will now retail for 2,800 yen, a company spokesman said.

What effect this will have on UK prices is still uncertain, but the price of the basic Saturn machine has been recently cut so the software is almost certain to be cut here as well.

The cuts are aimed at boosting sales of Sega Saturn game consoles which is not doing as well as the company had hoped. There are plans to cut prices on other software titles later in the year, he said.

## YOUR NEWS HERE...

Come on readers, we need your news. Anything related to computers which you think will interest other SAM and Spectrum owners. Just jot it down on a piece of paper, add your name and membership number, and send it off to us at the usual address. Please mark the envelope 'News' so that we can give it the priority it deserves.

Remember, you get three months extra subscription for every news item we print, so don't rely on others to send in an item you have seen - send it off yourself and earn our thanks as well.

## The Editor Speaks

Welcome, the sun is/has been shining, the birds are singing, Jenny has stopped complaining about the cold - so it must be spring. And that means that the Spring '97 Gloucester Show is just round the corner. Remember, it is Saturday the 19th April, so make sure you get yourself to Gloucester for this one.

Last months urgent plea for contribution has produced a few new items from our loyal readers, but we could still do with lots more so please make the effort and send something in. For those of you who want ideas on what to write, there is a demand from readers for articles that cover some of the less well documented commands in Basic (both Spectrum and SAM). There are lots of things that have not been covered before (or at least not for a long time) so there is plenty of scope. One area that I would particularly like to see an article on in the IF...THEN...ELSE structure in SAM Basic. This is an area that confuses a lot of people and an article that explains it will be very much appreciated by **FORMAT** readers.

A big thank you to everyone that braved the nice sunny weather for the Wetherby show on the 22nd Feb. I know a lot of people were rather thrown by that big bright thing in the sky - some reckon its almost unheard of in Yorkshire, especially at this time of year.

Still, the show went very well and there were lots of friendly faces to talk to. I also managed to get my wife and daughter to come north with me this time, (on the promise that they could spend the day shopping in Leeds) so we made a weekend of it and stayed with Nev Young. Spent a nice day on the

Sunday going around the Yorkshire Dales, a part of the world I had not seen before, and got soaking wet when Nev persuaded us to visit White Scar Caves (I'll get even for that sometime). Still, it was a very good weekend all-round.

Now to something completely different. SAM Development. A certain amount of money is being allocated to further the development of SAM. The idea is to produce some new add-ons for the machine to expand its 'usability'. Stage one is a project to allow the ROM to become 'soft', by adding a board containing battery-backed SRAM. This will allow for changes to be made to the ROM area (bug fixes, new features etc.) however, to start the project I need to gather together a small team of machine-code programmers who can help work out what the ROM/DOS is doing, so we can then work out the changes required. So, if you think this sounds like the sort of project you would like to be involved in, give me a ring (evenings are best) and I will explain a little more. It will probably be a couple of months before the SRAM cards are available but I need to get an idea of what level of help available so please ring soon.

Once again, I'm sorry to say, this months issue is running a bit late, I was late starting because of a bad cold, and now (just like last month) as I write this I still don't have Short Spot here because John Wase is still having problems with illness in his family. Such are the trials and tribulations of being an Editor. Still, must soldier on, and I will try to get next months out a bit earlier.

Until next month.

Bob Brechley, Editor.

## SAM GAMES AVAILABLE FROM REVELATION

### SOPHISTRY

Our latest & BEST licenced game. Originally produced for the Spectrum by CRL, and now brilliantly converted for SAM, Sophistry is a game that is big, perplexing, colourful, frustrating, musical, bouncy, and above all DIFFERENT (and it even has the Spectrum version built in so you can take a trip down memory lane).

£9.95 (£8.95 to INDUG members)

### TNT

Written by industry mega-star Matt Round - A game packed with humour, colour, sound, and above all ACTION!

Loosely based on Bomb Jack (the game SAM owners have most requested over the years). As well as the normal one player game, TNT has gone one better by giving you TWO player action - competing against each other, in full glorious technicolour - at the same time. It even has a novel feature in a SAM game - a High Score Table, how many others have that?

Avoid the meanies, collect the bonus points, Jump, Hover, Fly - what more do you want???

£9.95 (£8.95 to INDUG members)

### NEW ELITE NEW

The legendary game at last available on SAM disc. Using the code of the Spectrum version, long thought the best after the original BBC version, this game is a must for everyone who loves action and adventure. Full manuals, story book and packaging.

£14.95 (£11.95 to INDUG members)

### GRUBBING FOR GOLD

GRUBBING FOR GOLD - the most advanced, the most playable, the most enjoyable quiz game since the legendary Quiz Ball. They said it could not be done - they said bringing a TV quiz show to SAM would not work. Well let them eat their hearts out because YOU GOT IT....

Hundreds of questions, on a wide variety of subjects at levels to suit most people, it includes a question editor so you can create your own sets of questions. This is the game you can never grow out of.

£9.95 (£8.95 to INDUG members)

### More Games Coming Soon

Send SAE for full list of available games.

## REVELATION FOR THE VERY BEST IN SERIOUS SOFTWARE

~THE SECRETARY - The most advanced word-processor for SAM, powerful, versatile and easy to use. NEW Version 1.5 Available Now - The BEST just got better £14.95 (INDUG £12.95)

~COMET Z80 ASSEMBLER - The SAM assembler many professionals use, yet easy enough for the beginner - so why settle for second best? £29.95 (INDUG members £21.95)

## DRIVER

The Graphical User Interface for SAM

Comes complete with many built-in utilities and ready to run applications. Full manual and a disc-based tutorial. DRIVER gives you the ease of use only found on big office computers before. So easy to use yet so powerful. Fantastic Value £29.95 (INDUG members £24.95)

Now Includes FREE Copy Of DRIVER's Extras Disc 1

DRIVER's Extras Disc still available for existing users at £5.95 (INDUG members £4.95)

SCADs PD Yes, at last, we are pleased to re-release SCADs - the arcade game development system for SAM. Previously sold by Glenco at £24.95 we have now placed the software into the Public Domain so the disc costs you Only £2.50. The full manual (over 200 pages) is also available for £12.95 (overseas please add an extra £1 to postage rates below because of weight)

\* All prices include UK postage and packing (Europe please add £1, other overseas please add £2).  
\* Payment by UK cheque (made payable to Revelation Software), PO or cash. Sorry but we can't accept orders by Euro-cheque or Giro.  
\* Please Quote INDUG membership number clearly on order if claiming discount.

• Send orders to:-

Revelation Software

Revelation Software, 45, Buddle Lane, Exeter, EX4 1JS.

# SHORT SPOT

YOUR HINTS, TIPS AND PROGRAMMING IDEAS

Edited By:- John Wase.

March comes in like a lion. Or so they say! I'd love us to feel like lions, but health problems continually intervene; like Lorri's just had another fortnight in hospital. However, I hope most of our problems are coming to an end (well, one has to be optimistic), it's a fresh month, Spring is here, the daffodils are out along with the sun, and things are looking better. So here's the usual column of bits and pieces.

Firstly, we have the usual tale of woe. Somewhere, somehow, we still, occasionally, get unexplained glitches in the translation of keywords across from Spectrum and SAM programs into AmiPro. Bjorn Nyberg, now of Bude, Cornwall, writes to tell us that in his 'XMAS QUEST' program there is an error in line 8910, which reads PEN 17 rather than INK 9. Rather a problem, as it's for a Spectrum. Sorry, Bjorn, we thought we'd ironed all the glitches out.

Next, a little routine for the good old Spectrum from Mr Whittle of Rainhill, Prescott, Merseyside. Like me, he worries about his electricity bill, and so has written a little program to check it. The useful thing about this is that one can also use it rather like a "what if" spreadsheet by checking the meter and making a guess as to what the reading's going to be, or changing the price. The only thing to remember is that you must input data as fractions of a pound; for instance, pence per unit 7.3400 would be 0.0734 and so on so that the answer ends correctly, as pounds.

Finally, just a sting in the tail. Mr

Whittle lives in a MANWEB area, and is not sure if other electricity companies work out their bills in exactly the same way. Once you've seen the idea, it's not difficult to copy, but do check to make sure that your bills are worked out similarly, or that you've adjusted things appropriately.

Here we are then; off we go with 'elecbill'; get typing!

```
10 REM "ELECBILL" DISK M.F26
   REM R.W.WHITTLE.OCTOBER 1996.
15 REM ENTER DATA AS FRACTIONS
   REM OF POUND :-PENCE PER UNIT
   REM 7.34 WOULD BE .0734 :-SERV
   REM ICE CHARGE 12.66 WOULD BE .
   REM 1266
20 PAPER 7: INK 0: BORDER 5: C
   REM LS
30 GOSUB 490
40 PRINT AT 1,10;"METER READIN
   REM G"; AT 3,1;"LAST TIME"; AT
   REM 3,12;"THIS TIME"
50 INPUT "Enter last time",lt
60 PRINT AT 4,1;lt
70 INPUT "Enter this time",tt
80 PRINT AT 4,15;tt
90 LET uc=tt-lt
100 PRINT AT 4,22;uc
110 PRINT AT 5,1;"PENCE PER UNI
   REM T"
120 INPUT "PENCE PER UNIT",ppu
130 PRINT AT 5,22;ppu
140 LET am=uc*ppu
150 PRINT AT 6,1;"AMOUNT"
160 PRINT AT 6,22;am
170 PRINT AT 7,1;"SERVICE CHARG
   REM E"
180 INPUT "service charge";sc
190 PRINT AT 7,22;sc
200 PRINT AT 8,1;"NUMBER OF DAY
   REM S"
210 INPUT "number of days",nod
220 PRINT AT 8,22;nod
```



```

230 LET chg=sc*nod
240 PRINT AT 9,22;chg
250 PRINT AT 9,1;"TOTAL SERVICE
    CHARGE"
260 PRINT AT 10,1;"ELEC.+SERVIC
    E CHARGE"
270 LET es=am+chg
280 PRINT AT 10,22;es
290 PRINT AT 11,1;"DISCOUNT"
300 INPUT "discount",dis
310 PRINT AT 11,22;dis
320 LET ed=es-dis
330 PRINT AT 12,1;"ELEC+STANDIN
    G CHG-DIS"
340 PRINT AT 12,22;ed
350 INPUT "Enter % VAT",vat
360 PRINT AT 13,1;"VAT%"
370 PRINT AT 13,22;vat
380 PRINT AT 14,1;"TOTAL VAT"
390 LET tv=ed/100*vat
400 PRINT AT 14,22;tv
410 LET teb=tv+ed
420 PRINT AT 15,1;"TOTAL ELEC B
    ILL"
430 PRINT AT 15,22;teb
440 INPUT "print scrn.y/n";s$
450 IF s$="y" OR s$="Y" THEN GO
    TO 470
460 IF s$="n" OR s$="N" THEN GO
    TO 480
470 SAVE SCREEN$1
480 STOP
490 PRINT AT 0,0; PAPER 5; CHR$
    141; PAPER 7;:FOR I=1 TO 3
    0: PRINT PAPER 7; CHR$ 131;
    :NEXT I: PRINT PAPER 5; CHR
    $ 142
500 FOR I=1 TO 20: PRINT AT I,0
    ; CHR$ 138; AT I,31;CHR$ 13
    3: NEXT I
510 PRINT AT 21,0; PAPER 5; CHR
    $ 135;: FOR I = 1 TO 30: P
    RINT PAPER 7; CHR$ 140;: N
    EXT I: PRINT PAPER 5; CHR$
    139;: RETURN

```

Many thanks Mr Whittle, and may your light bulbs glow bright, but not too bright!

Now to the SAM for a minute. Astute readers might note that there is a hint of desperation in my scribbles this month. Why? You'll see. For instance, there's a disc here by a Mr S. G.

Goldhawk, together with a program and a printout. As there's no envelope, it looks as though it has come through Bob, and therefore went somewhere else first before Bishampton. I don't know what adventures have befallen it, but they must have been rough, because any accompanying letter has disappeared during its journeyings! This means that it has probably kicked around the bottom of the carrier bag that serves as a filing cabinet for current Short Spot bits and pieces on my travels (for as you know I have to type these in all manner of queer places). On that basis, it could well have been there for some time, as I am busy, and a quick look will have identified it as 'difficult'. Hence the hint of desperation - I'm once again running out of stuff! C'mon, folks; do send me some bits and pieces, or I shan't do you a Short Spot! So there!

Anyway, back to Mr Goldhawk's disembodied, dis-lettered 'Hands' program. A little look at it suggests it is printing out hands of Bridge, for one to analyse, perhaps. I have the advantage of a print-out, and it shows the four hands and who is the dealer. It also shows if both or neither side is vulnerable, or if North-South or East-West is vulnerable.

And that's as much as I can deduce, for I'm a complete novice when it comes to cards. So much so that although I offer to print the best comments on what this program can achieve, I ask you to mark your replies 'serious' or 'facetious' (Mr Goldhawk will mark his reply appropriately, please, and get printed first). So here's Mr Goldhawk's program, 'hands' for you to type in.

```

1 REM Bridge Hands-copyright
  S.G.GOLDHAWK.
2 MODE 4
5 CLEAR 31999
8 MODE 4

```

```

10 mcode: REM HANDS
15 LET c=0: PRINT AT 10, 2;"H
    ow many hands do you want?"
20 INPUT h
25 MODE 3
30 DIM x(52): DIM a(52)
40 FOR x=1 TO 52: LET a(x)=1:
    NEXT x
45 RANDOMIZE
50 FOR n=1 TO 52
60 LET k=1+INT (RND*52)
70 IF a(k)=0 THEN GOTO 60
80 LET x(n)=k: LET a(k)=0
90 NEXT n
95 dealer
110 LET c=c+1: LET s=0: LET a=
    4: LET b=28
120 hands
130 RANDOMIZE USR 32013
140 printing
150 PRINT
160 LET s=13: LET a=9: LET b=0
170 hands
175 RANDOMIZE USR 32013
180 printing
190 PRINT
195 PRINT
200 LET s=26: LET a=9: LET b=5
    6
210 hands
220 RANDOMIZE USR 32013
230 printing
240 PRINT
245 PRINT
250 LET s=39: LET a=14: LET b=
    28
260 hands
270 RANDOMIZE USR 32013
280 printing
282 vulnerability
284 DUMP
285 IF c=h THEN STOP
290 PAUSE 50: CLS : GOTO 40
500 DEF PROC hands
505 FOR n=1 TO 13
510 POKE 31999+n,x(n+s)
520 NEXT n
530 END PROC
600 DEF PROC mcode
605 FOR n=32013 TO 32041
610 READ a
620 POKE n,a
630 NEXT n
640 DATA 22,0,33,0,125,94,35,1

```

```

26,187,242,35,125,20,62,12
,186,202,41,125,195,18,125
,115,43,119,195,13,125,201
650 END PROC
740 DEF PROC printing
742 PRINT AT 0,31;"HAND ";c :
    LET z=0: LET u=0: LET v=0
745 FOR n=1 TO 13
750 IF PEEK (31999+n)>39 THEN
    spades: LET z=3*n: GOTO 76
    0
751 IF z=0 THEN LET z=3*n-3: P
    RINT AT a,b+3 ; "-"
753 IF PEEK (31999+n)>26 AND P
    EEK (31999+n)<40 THEN hear
    ts: LET u=3*n: GOTO 760
754 IF u=0 THEN LET u=3*n-3: P
    RINT AT a+1,b+3 ; "-"
755 IF PEEK (31999+n)>13 AND P
    EEK (31999+n)<27 THEN diam
    onds: LET v=3*n
756 IF v=0 THEN LET v=3*n-3: P
    RINT AT a+2,b+3 ; "-"
757 IF PEEK (31999+n)<14 THEN
    clubs
758 IF v=39 THEN PRINT AT a+3,
    b+3 ; "-"
760 NEXT n
770 END PROC
1000 DEF PROC spades
1010 IF PEEK (31999+n)=52 THEN
    PRINT AT a,b+3*n;"A"
1020 IF PEEK (31999+n)=51 THEN
    PRINT AT a,b+3*n;"K"
1030 IF PEEK (31999+n)=50 THEN
    PRINT AT a,b+3*n;"Q"
1040 IF PEEK (31999+n)=49 THEN
    PRINT AT a,b+3*n;"J"
1050 IF PEEK (31999+n)<49 THEN
    PRINT AT a,b+3*n;PEEK (319
    99+n)-38
1060 END PROC
1100 DEF PROC hearts
1110 IF PEEK (31999+n)=39 THEN
    PRINT AT a+1,b+3*n-z;"A"
1120 IF PEEK (31999+n)=38 THEN
    PRINT AT a+1,b+3*n-z;"K"
1130 IF PEEK (31999+n)=37 THEN
    PRINT AT a+1,b+3*n-z;"Q"
1140 IF PEEK (31999+n)=36 THEN
    PRINT AT a+1,b+3*n-z;"J"
1150 IF PEEK (31999+n)<36 THEN
    PRINT AT a+1,b+3*n-z;PEEK
    (31999+n)-25
1160 END PROC

```

```

1200 DEF PROC diamonds
1210 IF PEEK (31999+n)=26 THEN
PRINT AT a+2,b+3*n-u;"A"
1220 IF PEEK (31999+n)=25 THEN
PRINT AT a+2,b+3*n-u;"K"
1230 IF PEEK (31999+n)=24 THEN
PRINT AT a+2,b+3*n-u;"Q"
1240 IF PEEK (31999+n)=23 THEN
PRINT AT a+2,b+3*n-u;"J"
1250 IF PEEK (31999+n)<23 THEN
PRINT AT a+2,b+3*n-u;PEEK
(31999+n)-12
1260 END PROC
1300 DEF PROC clubs
1310 IF PEEK (31999+n)=13 THEN
PRINT AT a+3,b+3*n-v;"A"
1320 IF PEEK (31999+n)=12 THEN
PRINT AT a+3,b+3*n-v;"K"
1330 IF PEEK (31999+n)=11 THEN
PRINT AT a+3,b+3*n-v;"Q"
1340 IF PEEK (31999+n)=10 THEN
PRINT AT a+3,b+3*n-v;"J"
1350 IF PEEK (31999+n)<10 THEN
PRINT AT a+3,b+3*n-v;PEEK
(31999+n)+1
1360 END PROC
1400 DEF PROC dealer
1420 IF x(5)>38 THEN PRINT AT 1
,0;"DEALER NORTH "
1430 IF x(5)>25 AND x(5)<39 THEN
PRINT AT 1,0;"DEALER WEST "
1440 IF x(5)>12 AND x(5)<26 THEN
PRINT AT 1,0;"DEALER EAST "
1450 IF x(5)>0 AND x(5)<13 THEN
PRINT AT 1,0;"DEALER SOUTH "
1460 END PROC
1500 DEF PROC vulnerability
1530 IF x(13)>38 THEN PRINT AT
1,50;"BOTH SIDES VULNERABLE "
1540 IF x(13)>25 AND x(13)<39 THEN
PRINT AT 1,50;"NEITHER
SIDE VULNERABLE "
1550 IF x(13)>12 AND x(13)<26 THEN
PRINT AT 1,50;"NORTH-S
OUTH VULNERABLE "
1560 IF x(13)>0 AND x(13)<13 THEN
PRINT AT 1,50;"EAST-WES
T VULNERABLE "
1570 END PROC

```

Thank you Mr Goldhawk, and may the

exact purpose of your program be made apparent in the next few weeks!

Next, a Celtic *crie de cour* or whatever it is from Mr Hunter of Ogmores-by-Sea, Mid Glamorganshire, who asks if anyone's actually got the 'Colour Weaver' Spectrum program from last October's issue to work in SAM Basic. Er... Beggered if I know, Mr Hunter. Mr Hunter is having trouble with line 5030, and wonders if the POKE in line 1030 is the same for SAM Basic as for Spectrum Basic.

In addition, I've got a similar letter from Mr H.Smart of Selkirk, Scotland, who is struggling with Binary input.

Well, Mr Smart's problem is initially quite easy; he's omitted to include DATA before the data to be read. But when he's got past that, he's still got other problems. A pity, because he really wanted to do something useful; put in a weave so he could get something that looked like a twill weave.

I, too, have a problem: Bob's coming tonight, and I'm only as far as page 2, and I've got to call at the Doctor (some way away) tonight 'cos they've got to check before they give Lorri another prescription, and my son, his fiancée and her little step-sister are going to come up tonight for tea and to chatter about bridesmaid's dresses, and... Never mind, we'll look for the original disc... Half an hour later, I find that I remember I had trouble copying this one (Mr Round's PLUS D was obviously on the way out even then), and I struggled somewhere with it and it's not in the file. Blast!

Any road up... I've found a copy on one of the discs I sent to Bob and (only a little) is revealed.

First, the dreaded POKE in line 1030. A cursory glance tells me... Nothing! The statement is POKE 23658,8. Location 23658 holds the variable called FLAGS2,

and its contents are described as 'more flags'. So now I don't know. Can anyone help with this conversion problem?

Line 5030, mercifully, is probably a bit easier. Well, I thought it was! The original was:-

```

5030 FOR b=USR "A" TO USR "A" +1
5 ...

```

and again I'm blessed if I can remember how to convert these. Does anyone know how to convert user defined graphic stuff from Spectrum to SAM, as I'm suffering from geriatric amnesia!

Mr Smart's also got a further problem in this area; he's got a page covered with lovely pictures of A's. His problem is easier in that as he's had trouble with his user defined graphics, the poor old Speccy's doing it's best with the non-graphic 'A', and printing that everywhere! So it's a knock-on problem; sort out the UDG's, and that one's likely to go away, too. Finally, he mentions that when he presses M for 'manual', all he gets is an 'Integer out of range' error message for line 7010. That line reads in my original:-

```

7010 PRINT #0; AT 0,n+10; INK 7;
CHR$ 32; CHR$ 145; AT 7,0;
CHR$ 32 ".

```

That line could well have been fouled up by Bob's mysterious translation gremlin, so check if yours is the same; otherwise, it's probably a problem from the user-defined graphics not being correctly defined, and so the lines aren't fitting properly. Try it, Mr Smart. As for poor Mr Hunter's problems; well, over to you, folks! With any amount of luck, we'll have something for you in the next couple of issues!

I now turn with some diffidence to Mr Round. Essentially, I can't contact Bob this morning, Mr Round, and I don't know what has happened to your PLUS

D, though I *thought* it was on the way back to you. I only know that the one I bought at the last SAMshow gives similar trouble - arbitrary failing at various sectors, and the chips are, of course, long since gone. However, all might not be lost. Firstly, has anyone an old, working +D, so that Mr Round can once again send us some of those lovely programs for the Spectrum like 'Colour weaver' which caused me and lots of others so much fun!

Secondly, Mr Round mentions he has a rare item; a servicing manual for ZX Spectrum and Spectrum+ prepared by Thorn EMI Datatech Ltd., for Sinclair Research Ltd., and containing circuit diagrams for issues 2,3,3B, and issues 4A-6A, modifications and fault diagnosis and repair. Worth its weight in gold, and well worth hanging onto, Mr Round!

And thirdly, sticking with the Spectrum for a few minutes, let's once again turn to Miles Kinloch of Edinburgh, a familiar name to many of us (bless him), who writes again with a couple of tips.

"Dear John" writes Miles. "I thought it might be worth reminding readers of the availability of *gold-plated edge connectors*, which provide an effective solution to the perennial 'wobble-trouble' associated with Spectrum peripherals. Although rather pricey (around £10.00), these connectors are worth their weight in gold, so to speak, for the stability and peace of mind they confer. The PLUS D (and presumably also the DISCiPLE) seem particularly vulnerable in this respect, with symptoms ranging from occasional obscure crashes to inexplicable sector errors on discs that are known to be good."

"Fitting these accessories is a simple matter for anyone handy with a soldering iron, though a hacksaw will also be needed to cut off the excess

length, as they are initially provided with more contacts than the Spectrum connector." The connectors can be ordered from R.S. components, PO Box 99, CORBY, Northants NN17 9RS. (yes, it's good old Radio Spares in disguise). Their telephone number is 01536 204555, and the part number is 468-709. Perhaps I could also add a note at this point that Miles has sent me a cut off bit; the part number as far as I can see refers to the solder-on edge-connector for the Spectrum itself. However, there is also a similar connector for the *female* bit (yes, I know it's a bitch when all your bits and bytes wobble off heavenward), which one could get to solder onto *accessories* like the PLUS D which fit onto the male bit on the Specy. Perhaps this might help both Mr Round (and me, for that matter), with our tired PLUS D's!

A second tip from Miles concerns the composite video output on the grey Spectrum +2, available at Pin 1 of the 8-pin DIN socket. "If," writes Miles, "as a result of poor circuit design, the signal suffers sound interference patterning, one possible cure is to detach capacitor C44 (next to IC11). Doing this, however, also kills the sound to the UHF modulator, so it may be an idea to connect the capacitor via a switch, which can then be mounted on the back of the Spectrum, rather than remove it from circuit completely. This then gives the best of both worlds: interference-free composite video in one position, and RF with sound intact in the other. It's safe, incidentally, to operate this switch while the Spectrum is powered."

Thanks for all your useful stuff - marvellous as ever, Miles. Please keep it coming, as I'm very short!

Next, and in a funny way, related, I have one of those panic-letter situations from Roy Burford of Stourbridge, who wrote in some disarray in January with

the information that there was a problem with a Philips CM8833 monitor. It was several letters later before the real problem came to light; there is nothing wrong with the Philips monitor, nothing wrong with their circuit diagram; nothing indeed wrong with Sinclair's information either, except they give their information the non-conventional way, as was a little habit of Uncle Clive's! Essentially, the confusion arose because the ZX Spectrum 128 Introduction manual does not state that their view of the RGB pin-outs is on the wiring side of the DIN plug. The picture they print looks like a view of the actual socket on the rear of the computer, and leads one to believe that the red/green connections should be reversed! BEWARE!

A further comment from Roy concerns the 'Spirograph' program, featured in January's edition. "The acid test of the accuracy of such a program," writes Roy, "is to set the pen radius at zero when a true circle should be drawn: this one passes the test."

Roy has also converted Ettrick's 'kaleidoscope' program for Spectrum Basic but is a little doubtful about the descriptions and effects of the kaleidoscope. As he recalls it, the inner walls of a triangular tube were mirrored. There was a spy-hole at one end, and at the other a rotatable transparent compartment (I merely had to shake my less-posh version, Roy!), containing a relatively few translucent coloured shapes (again, mine differed in that they were of reflecting, coloured foil, if I remember rightly). This end was directed towards the light (again, mine differed, since one of the three sides was merely unmirrored for the first couple of inches or so). So you got images.

Ettrick and Matthews' programs both plot around 120 degrees, giving three

axes, but in fact, with the mirror images, one always got *six* images. The program has gradually developed because of subtleties in the way the Spectrum deals with its screen and its arithmetic. 'Ettrkaleid' and 'Kaleidosco' both suffer from a certain lack of symmetry which Roy concludes is due to using the same plot formula in line 200 throughout. Angles from 0 to 360 degrees are used about the centre of the screen, so the plots are relative to two axes in each of the four quadrants, and hence the PLOT's format should vary with the quadrant in which it falls. The snag is that if an angle increment of 60 degrees is used, the plots will occur in two adjacent quadrants. On this basis, Roy has reworked the program, using an angle increment of 30 degrees. Also, he's PLOT'ted the first point and drawn the other three. There was still a slight lack of symmetry, and here some of the quirks of the inner workings of the Spectrum become apparent. Roy decided that values 'a' and 'b' needed rounding up using an addendum of  $\frac{1}{2}$ . This produced symmetry. The odd thing is that when Roy then put the addendum into a variable 'k', the symmetry disappeared! The same result was obtained using  $k=.5$ . Using DEF FN for round up with the addendum stored in 'k' didn't work, either! Roy ended settling for DEF FN with the addendum within the definition. No doubt someone will have a fuller explanation of what is going on, but my guess is it involves the way the Spectrum rounds up or down.

Anyway, here is the result.

```
1 REM Vol.10 No5. FORMAT. Jan
  uary 1997. Short Spot. p11.
  Kaleidoscope: Ettrick Thom
  son.
2 REM Revised from SAM Basic
  on ZX Spectrum+ 128K by B.C
  .R.Burford 190197. Further
  revision 250297.
```

```
5 LET ni=1: LET d=300: LET co
  =90
6 DEF FN z(f,g)=INT (f+g+1/2)
10 INK 0: PAPER 0: BORDER 1: B
  RIGHT INT (RND*2): CLS : LE
  T f=0
20 PRINT #0: AT 0,1;"Kaleidosc
  ope Any key to exit:"
30 LET xo=127: LET yo=87: LET
  o=PI/180
35 CIRCLE INK 6;xo,yo,yo
40 FOR i=0 TO co
50 LET r=1+83*RND: LET a=INT (
  30*RND)*o
60 LET x0=r*COS a: LET y0=r*SI
  N a: LET k=SQR 3: LET z1=k*
  y0: LET z2=k*x0: LET x1=(z1
  -x0)/2: LET y1=(z2+y0)/2: L
  ET x2=- (z1+x0)/2: LET y2=(z
  2-y0)/2
100 INK (1+RND*7)
110 LET c=FN z(x0,xo): LET b=FN
  z(y0,yo): GOSUB 200
120 LET b=FN z(yo,-y0): GOSUB 2
  0
130 LET c=FN z(x1,xo): LET b=FN
  z(y1,yo): GOSUB 230
140 LET b=FN z(yo,-y1): GOSUB 2
  0
150 LET c=FN z(x2,xo): LET b=FN
  z(y2,yo): GOSUB 230
160 LET b=FN z(yo,-y2): GOSUB 2
  0
161 LET c=FN z(xo,-x0): LET b=F
  N z(y0,yo): GOSUB 230
162 LET b=FN z(yo,-y0): GOSUB 2
  0
163 LET c=FN z(xo,-x1): LET b=F
  N z(y1,yo): GOSUB 200
164 LET b=FN z(yo,-y1): GOSUB 2
  0
165 LET c=FN z(xo,-x2): LET b=F
  N z(y2,yo): GOSUB 200
166 LET b=FN z(yo,-y2): GOSUB 2
  0
168 IF INKEY$<>" THEN LET f=1:
  LET i=co
170 NEXT i
172 IF f=1 THEN BORDER 7: PAPER
  7: INK 0: BRIGHT 0: STOP
175 PRINT #0: AT 1,8: INK 6;"Do
  ne. Next coming:"
180 PAUSE d
190 CLS : GOTO 10
200 PLOT c,b: DRAW ni,0: DRAW 0
```

```

,ni: DRAW -ni,0: RETURN
210 PLOT c,b: DRAW ni,0: DRAW 0
,ni: DRAW -ni,0: RETURN
220 PLOT c,b: DRAW -ni,0: DRAW
0,-ni: DRAW ni,0: RETURN
230 PLOT c,b: DRAW -ni,0: DRAW
0,ni: DRAW ni,0: RETURN

```

Many thanks for all that information, Roy.

Finally, a little comment from Ettrick Thomson of Grundisburgh, Suffolk, who writes about the program 'Martin Fractals'. This is a version of what is now called 'Martin's Mapping', after Barry Martin of the University of Aston in Birmingham, who devised the algorithm. It has other names: 'Scientific American' called it 'Hopalong', and that name is used in the PC program 'Fractint'; 'Fractint' also has a program 'Martin', though Ettrick doesn't know what it does. SD software's 'Fractal Collection' for the Spectrum calls it 'Biology'.

Ettrick mentions that he has spent many hours in various versions of Martin's Mapping. One appeared in *Short Spot* for November 1992. Ettrick

thinks that Martin's Mapping is one of the best pattern-producing fractal algorithms, Keith Devlin, in 'Computer Guradian'(1986), called it 'Wallpapering by Numbers' (but did not divulge the secret formula, line 140 in 'Martin Fractals').

Many thanks, Ettrick.

Once again, I hate keeping on at you all, but I've hardly anything left to print. Come on; you all like *Short Spot*, but I can't do it on cheese! So send something, do! And remember, I'm having problems, so don't go sending me discs with readme bits on and no idea of which machine it goes on! Please keep all your snippets coming to me; without them I can't put a column together. Please send them to:-

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

See you next month.

# CP/M The Sleeping Giant

Part 2. By:- Darren Fowler.

Last time I gave you the disc formats for CP/M 1.4 and for the much more popular CP/M 2.2. Well this month I want to cover three more, those for CP/M 3.1, 4.1, and the special differences introduced by Amstrad (trust Sugar to modify a standard).

CP/M 3.1 uses a very similar system to CP/M 2.2, but with even more formats supported. The disc statistics are stored in a parameter block (the DPB), which contains the following information:-

**spt.** 2 byte word. Number of 128-byte records per track.

**bsh.** 1 byte. Block shift. 3 = 1k, 4 = 2k, 5 = 4k....

**blm.** 1 byte. Block mask. 7 = 1k, 15 = 2k, 31 => 4k...

**exm.** 1 byte. Extent mask, see later.

**dsm.** 2 byte word. Number of blocks on the disc minus one.

**dsm.** 2 byte word. Number of directory entries on the disc minus one

**al0.** 1 byte. Directory allocation bitmap, first byte.

**all.** 1 byte. Directory allocation bitmap, second byte.

**cks.** 2 byte word. Checksum vector size, number of directory entries/4 rounded up (0 or 32738 for a fixed disc).

**off.** 2 byte word. Offset is in fact the number of reserved tracks on the disc.

**psh.** 1 byte. Physical sector shift, 0 = 128 byte sectors, 1 = 256 byte sectors, 2 = 512 byte sectors.

**phm.** 1 byte. Physical sector mask, 0 =

128byte sectors, 1 = 256 byte sectors, 3 = 512 byte sectors...

The directory allocation bitmap is interpreted as:-

```

      AL0      AL1
b7 6 5 4 3 2 1 0  b7 6 5 4 3 2 1 0
1 1 1 1 0 0 0 0  0 0 0 0 0 0 0 0

```

in this example, the first 5 blocks of the disc contain the directory.

## CP/M 3.1 DIRECTORY

The CP/M 3.1 directory has four types of entry:-

### Files

**User number.** 1 byte. 0-15. The user number allows multiple files of the same name to co-exist on the disc. User number 229 is used to mark a file as deleted.

**Filename.** 8 bytes.

**Filetype.** 3 bytes. The characters used for these are 7-bit ASCII. The top bit of first is set if the file is read-only. The top bit of the second byte is set if the file is a system file (this corresponds to 'hidden' on other systems). System files with user number 0 can be read from any user number. The top bit of the third character is set if the file has been backed up.

**Extent counter.** 2 bytes, low/high. Low byte - takes values from 0 to 31. An extent is the portion of a file controlled by one directory entry. If a file takes up more blocks than can be listed in one directory entry, it is given multiple entries, distinguished by their Extent

**CLIPART PICTURE PACKS.** High resolution 750 by 750 pixel pictures to print out on your printer in super hi-res using special software anywhere to the exact mm, upto 3 different sizes and 6 colours.

- |                         |                   |  |
|-------------------------|-------------------|--|
| 1...Christmas           | 12. Transport     | £2.00 per disc set,                    |
| 2...Communication       | 13. People        | (48 pictures per disc)                 |
| 3...Computer Technology | 14. Workers       | ADD £1.50 postage. OR Postage          |
| 4...Office Equipment    | 15. Natural World | Free if ordering 5 or more packs.      |
| 5...Home Appliances     | 16. Fruit & Veg   |  |
| 6...Music/Film          | 17. Fine/Police   | <b>Sample pack £4.</b>                 |
| 7...Religion/Faith      | 18. Sport         | (Or £3 if you supply 2 discs)          |
| 8...Animals             | 19. Travel        | Pack contains 48 Grey shade and 15     |
| 9...Signs               | 20. Maps          | colour pictures, with sample           |
| 10. Medical             | 21. Miscellaneous | printouts, printed catalogue with over |
| 11. Food & Drink        |                   | 1,000 pictures in all 21 sets, where   |
|                         |                   | you can then choose individual         |
|                         |                   | pictures to purchase from all the sets |
|                         |                   | if you wish                            |

### Photo Scanning Service.

If you have pictures, photos, drawings, logos you would like to be able to represent on your printer at a high resolution of 1750 pixels by 1750 pixel (equivalent to 32 Sam mode 3 screens!) as small as a credit card, this service is for you.

For more details send for the Sampler pack below, or see previous adverts in *Format*.

**Sampler Photo pack. Free.**  
(Sent in blank formatted disc with two 20p coins stuck on back)  
In return you will receive 4 sample pictures (2 grey shade, 2 colour), plus print samples, more information and order form.

### Highly recommended Printers for the Sam.

**Epson Stylus 200 (£127).**  
Mono/Colour Inkjet Printer  
Upgradeable colour kit at extra cost for colour printouts.

**Epson Stylus Colour 200 (£161).**  
Colour Inkjet Printer  
(Need to interchange Black and colour cartridge for mono and colour printouts)

**Epson Stylus 500 (£230).**  
Professional Colour Inkjet Printer  
Black and Colour cartridge built in (no need to change cartridges over)

All 3 Epson printers print Text in 720dpi super high resolution. Compatible 9 and 24 pin 360dpi for other Sam printer software. Built in hardware micro-wave to eliminate banding (Only Steves Software printer software will take advantage of this feature).

### SC WORD pro (The DTP Package £39.99)

The most advanced word-processor, built in smooth non jagged fonts. (24 supplied, most in 11 sizes), the same output you would get from PC's. Multi column Ascii Lprint with preview page and converter. High resolution Screen dumper with 10 Sample screens. Draw lines of any thickness at any position on A4 piece of paper. Disc and Hard drive installable versions. Professional A4 Manual and Word pro guide book. Sampler Clipart and Photo Sampler above included. You will need a 512k Sam, MasterDos, Any 9 and 24 pin dot matrix printer. Any Canon and Epson Stylus printer, others supported if 360dpi. When Ordering please state Printer you own.

### STEVES SOFTWARE

NARROW CLOSE, HSTON, CAMBRIDGE, CB4 4XX.  
TEL & FAX 01223 235150 after 6pm.



bytes. The formula is: Entry number = ((32\*high byte)+ low byte) / (Exm+1) where Exm is the extent mask value from the Disc Parameter Block (see above).

**Last record byte count.** 1 byte. Number of records (1 record=128 bytes) used in this extent, low byte. The total number of records used in this extent is: (Extent Counter-low byte & Exm) \* 128 + LRBC. If LRBC is 128, this extent is full and there may be another one on the disc. File lengths are optionally saved exactly (using the LRBC byte) but this system is hardly ever used.

**Allocation.** 16 bytes. Each byte holds the number of a block on the disc. If a byte is zero, that section of the file has no storage allocated to it (ie it does not exist). For example, a 3k file might have allocation 15,26,28,0,0,... - the first 1k is in block 15, the second in block 26, the third in block 28. Allocation numbers can either be 8-bit (if there are fewer than 256 blocks on the disc) or 16-bit (stored low byte first).

#### Disc label

**Type.** 1 byte. Value 32 - Characteristic number of a disc label.

**Label name.** 11 bytes. 7-bit ASCII characters.

**Label byte.** 1 byte. A collection of flag bits. Bit 0 set = Label exists, bit 4 set = Time stamp on create, Bit 5 set = Time stamp on update, bit 6 set = Time stamp on access, bit 7 set = Password protection enabled.

**Password byte.** 1 byte. Used to decode the label password.

**Reserved.** 2 bytes. Set to zero on most systems.

**Password.** 8 bytes. Encrypted.

**Datestamp** 1. 4 bytes. Label create datestamp

**Datestamp** 2. 4 bytes. Label update

datestamp

#### Date stamps

If date stamps are in use, then every fourth directory entry will be a date stamp entry, containing stamps for the preceding three entries.

**Type.** 1 byte. Value 33. Identity number of a date label

**Date-1.** 4 bytes. File 1 create OR access date

**Date-2.** 4 bytes. File 1 update date.

**Pmode-1.** 1 byte. Password mode for File 1.

**Reserved.** 1 byte. Set to zero.

**Date-3.** 4 bytes. File 2 create OR access date.

**Date-4.** 4 bytes. File 2 update date.

**Pmode-2.** 1 byte. Password mode for File 2.

**Reserved.** 1 byte. Set to zero.

**Date-5.** 4 bytes. File 3 create OR access date.

**Date-6.** 4 bytes. File 3 update date

**Pmode-3.** 1 byte. Password mode for File 3.

**Reserved.** 1 byte. Set to zero.

The format of a date stamp is:-

**Day.** 2 bytes. Julian day number, stored low byte first. Day 1 = 1st January 1978.

**Hour.** 1 byte. Hour (0 to 23) stored in BCD format.

**Minute.** 1 byte. Minute (0 to 59) stored in BCD format.

#### Password control

**User ID.** 1 byte. 16+User number (that is 16-31). The user number will be the number of the file to which the password belongs.

**Filename.** 8 bytes. The name of the file to which the password belongs.

**Type.** 3 bytes. Filetype of the file to which the password belongs.

**Password mode.** 1 byte. Bit 7 set = password required to read from file, bit 6 set = password required to write to file, bit 5 set = password required to delete file.

**Password byte.** 1 byte. Used to decode the password.

**Reserved.** 2 bytes. Set to zero.

**Password.** 8 bytes. The password.

**Reserved.** 8 bytes. Set to zero.

#### Password encryption system

This system is extremely simple.

When making the password, add all 8 bytes together (packing with spaces if necessary). This becomes the decode byte. XOR each byte of the password with the decode byte and store them backwards in the directory (ie the last byte becomes the first).

To decode the password, XOR the decode byte with the 8 bytes of the password and read it off backwards.

~~~~~

#### CP/M 4.1 DISC FORMATS

CP/M 4.1 (DOS Plus) allows the use of two file systems. The FAT Filing System is included as part of the PC MS-DOS emulation. It is well documented from the PC's point of view so I shall skip it in these articles and instead concentrate on its support for CP/M media.

What is not well documented is how CP/M calls differ when used with FAT-formatted media - the manual I have refers the reader to a non-existent index.

The version I have seen (supplied with the Amstrad PC1512) cannot handle larger floppies than 360k, or larger hard drive partitions than 32Mb.

The Disc Parameter block is:-

**Spt.** 2 byte word. Number of physical sectors per track. This differs from previous versions.

**Bsh.** 1 byte. Block shift. 3 = 1k, 4 = 2k, 5 = 4k.

**Blm.** 1 byte. Block mask. 7 = 1k, 15 = 2k, 31 = 4k...

**Exm.** 1 byte. Extent mask, see later.

**Dsm.** 2 byte word. Number of blocks on the disc -1.

**Drn.** 2 byte word. Number of directory entries -1.

**Allocation.** 2 bytes. Directory allocation bitmap, first byte (these bitmaps are zero if the disc has a DOS format).

**Cks.** 2 byte word. Checksum vector size, 0 or 32768 for a fixed disc otherwise the number of directory entries divided by 4 and rounded up.

**Off.** 2 byte word. Offset, number of reserved tracks.

**Psh.** 1 byte. Physical sector shift, 0 = 128 byte sectors, 1 = 256 byte sectors, 2 = 512 byte sectors.

**Phm.** 1 byte. Physical sector mask, 0 = 128 byte sectors, 1 = 256 byte sectors, 3 = 512 byte sectors...

The directory allocation bitmap is interpreted as:-

| ALO              | ALI              |
|------------------|------------------|
| b7 6 5 4 3 2 1 0 | b7 6 5 4 3 2 1 0 |
| 1 1 1 1 0 0 0 0  | 0 0 0 0 0 0 0 0  |

i.e., in this example, the first 4 blocks of the disc contain the directory.

#### CP/M 4.1 DIRECTORY

The CP/M 4.1 directory has four types of entry:-

##### Files

**User number.** 1 byte. Range 0-15. The user number allows multiple files of the same name to coexist on a disc. If set to 229 then the file is treated as deleted.

**Filename.** 8 bytes.

**Filetype.** 3 bytes. Characters used are 7-bit ASCII. The top bit of byte 1 is set if

the file is read-only. The top bit of byte 2 is set if the file is a system file. (System files with user number 0 can be read from any user.) The top bit of byte 3 is set if the file has been backed up.

**Extent counter.** 2 bytes. The low byte (the first byte) takes values from 0-31. As in the other CP/M systems we have looked at, an extent is the portion of a file controlled by one directory entry. If a file takes up more blocks than can be listed in one directory entry, it is given multiple entries, distinguished by their Extent counter bytes. The formula is: Entry number = ((32\*high byte)+low byte) / (exm+1) where exm is the Extent mask value from the Disc Parameter Block.

**Last Record Byte Count.** 1 byte. The number of bytes used in the last 128-byte record of the file, with 0 meaning 128.

**Number of records.** 1 byte. Count of records used in this extent, low byte. The total number of records used in this extent is (EX & exm) \* 128 + RC. If the byte is 128, this extent is full and there may be another one on the disc. File lengths are optionally saved exactly, this is mainly apparent in files copied from DOS-formatted media.

**Allocation.** 16 bytes. Each byte is the number of a block on the disc. If an AL number is zero, that section of the file has no storage allocated to it (ie it does not exist). For example, a 3k file might have allocation 5,6,8,0,0.... - the first 1k is in block 5, the second in block 6, the third in block 8. Allocation numbers can either be 8-bit (if there are fewer than 256 blocks on the disc) or 16-bit (stored low byte first).

#### Disc label

**ID.** 1 byte. Value 32 - Characteristic number of a disc label.

**Name.** 11 bytes. Label name, 7-bit

ASCII.

**Label byte.** 1 byte. Used as flags. Bit 0 set = Label exists, Bit 4 set = Time stamp on create, Bit 5 set = Time stamp on update, Bit 6 set = Time stamp on access, Bit 7 set = Password protection enabled.

**Password Key.** 1 byte. Used to decode the label password

**Reserved.** 2 bytes. Set to zero.

**Password.** 8 bytes.

**Label create.** 4 bytes. Datestamp on creation.

**Label update.** 4 bytes. Datestamp of last update.

#### Date stamps

For details of date stamping see the section under CP/M 3.1.

#### Password control

Again, this works exactly the same as the earlier CP/M 3.1 and the password is encrypted using the same process.

~~~~~  
That is all there is room for this time round. I will leave the Amstrad CPC, the Spectrum +3 and a few other bits to next time.

## ? Puzzle Answer ?

Here is the answer to last month's Puzzle Spot.

		1	6	1	
5	1		4	2	
8	5		1	4	1
0	5	1	0		8
5	7	6	0		1
	2	4		2	0
	1	2	0		

# IT'S SHOWTIME

Yes folks, it's here again, Saturday 19th April is just round the corner so it's Showtime again. It may interest you to know that this will be the 8th Gloucester Spectrum & Sam Show - quite a milestone for something that really started out as a one-off. Once again it will be at our usual venue on the outskirts of Gloucester (See the map and directions printed on pages 21/22).

The show opens to the public at 10:30am and runs until 4:30pm. Entry is just £2 per person, with up to two under 14s free if accompanied by an adult - we like to look on this as being a family show so we do what we can to encourage the younger visitors.

Make sure you bring lots of money with you or at least your cheque book (we can always provide the pen).

## BRING AND BUY

The Bring and Buy stand is famous with Gloucester Show regulars. It is usually one of the most crowded stands during the day, giving you the opportunity both to rid yourself of those surplus items you have gathered over the years and of course to find that one item you have always been looking for.

If you are selling items then please remember to make sure everything is fully working, complete, and has its instructions or manual. If possible put a small label on each item giving your name and the price you are asking. The Bring and Buy table, in the back room, is not constantly manned, although Derek Morgan does try to keep an eye on things

for us if he is not too busy with his SAM PD stand. However, we leave it up to buyer and seller to get together and do the business. Each show sees many hundreds of items change hands and I'm sure there will be even more this time, but you will understand that we as organizers cannot be responsible for items left for sale, nor can we be responsible for items you purchase. Our recommendation to buyers is to make sure you get the seller's address just in case.

## STAND BOOKINGS

If anyone wants a stand at this show, and has not already had a booking form from us, then ring Jenny on 01452-412572 right away.

## HOTELS

If you want to make a weekend of your visit to Gloucester then ring the Tourist Information Centre on 01452 421188 or write to them at St. Michael's Tower, The Cross, Gloucester, GL1 1PD. They will send you a list of local hotels in your price range.

## FOOD & DRINK

The most important service at any show. There will be plenty of refreshments and snacks available inside the show, at very cheap prices I will add - not the rip-off prices you find at many shows. There is also a good pub right next door that sells midday meals and Gloucester's main Tesco is just over the road.

*See You At The Show*

# WHO'S THERE

The question everyone asks when they hear about a show is "Who will be there?". Well, I think it is safe to say that nearly all the companies that count in the SAM and Spectrum world will be there and I am sorry there is not room to mention everyone in this write-up.

**FORMAT.** Yes, we will be in our usual spot, one advantage of organizing our own shows, with all our range and those of REVELATION, WEST COAST, BETASOFT and EMIGMA.

**HALL VIDEO PRODUCTS.** Will be attending the show again with their acclaimed range of graphic display and video titling products for the Spectrum. This is one stand that drew a big crowd at the last show so make sure you see it this time.

**SAM PD.** I've already mentioned that Derek Morgan will be in his usual place in the back room. As well as the PD software there is also a growing range of commercial software under the F9 label. SAM PD now have some new Comms software for SAM to allow access to bulletin boards of linking two SAM users via telephone lines.

**DEMOS & HELP.** Carol Brooksbank will be there with both Spectrum and SAM set up and ready to give help and advice to any who feel a need for it. Anyone wishing to demonstrate something to other people will be very welcome - we will try to get you some time on one of them if at all possible.

**S.D.SOFTWARE.** Got your SAM Hard Drive yet? Well if you are behind the times then this is the ideal opportunity to take that 'giant leap for SAMkind' and attach a hard disc to your machine. Interface only, or complete systems with drive and power supply, available.

**FRED SOFTWARE and SATURN SOFTWARE.** Fred's wide range of SAM software and of course the famous FRED discine. This will be the first show under the care-taker management on Saturn Software's boss Darren Wileman - so expect something new. Colin M + Colin A should be there.

**STEVE'S SOFTWARE** will be there too, with samples of their ever growing *Clip Art* collection and with all his other SAM products. Ask about his digitizing service.

**ZX81.** To celebrate the 16th Birthday of the computer that made Sir Clive a household name we hope to have some interesting demos running during the day. We still need more help on this so anyone interested please get in touch.

There will be other stands of course, it is simply that we have to go to press far too early to get a full list in and there just is not enough space. What you can be assured of is bargains galore and lots of interesting people to talk too.

Make sure you get there on Saturday the 19th **OR YOU WILL REALLY BE MISSING OUT.**

# GETTING THERE

Gloucester is very easy to reach from most parts of the country and you will find full directions below and a map on the next page.

**By Car:** If you are travelling north on the M5 then come off at junction 12 and follow signs for Gloucester. A few hundred yards from the motorway slip-road you will come to a roundabout with a garage on your left, take the second exit and follow the A38 towards Gloucester for a short distance. Now take the turning on the left, marked B4008 with signs for Quedgeley and the Severn Vale Shopping Centre. Go straight over at the next roundabout (this is the one at the bottom of the enlarged map) and then just before the next roundabout the hall is on the left, set back a bit from the road and often slightly hidden by the mobile fruit & veg stall that uses the forecourt.

For those coming south there are two choices. Junction 12 is not available southbound, so it is easier to continue to exit 13 and then turn north onto the A38 - this only adds about 5 miles to the journey and avoids the traffic around Gloucester. The alternative is to exit at junction 11 (the A40/Cheltenham exit) and follow signs for Gloucester, follow the ring-road around - you eventually get signs for M5 South - until you reach a large traffic light controlled junction (used to be the roundabout if you've been before). This has the local BT offices on the left, go straight across, following signs for Severn Vale Shopping Centre

(see above for more details).

Anyone not using the motorway should be able to work things out from their own road atlas given the maps shown here.

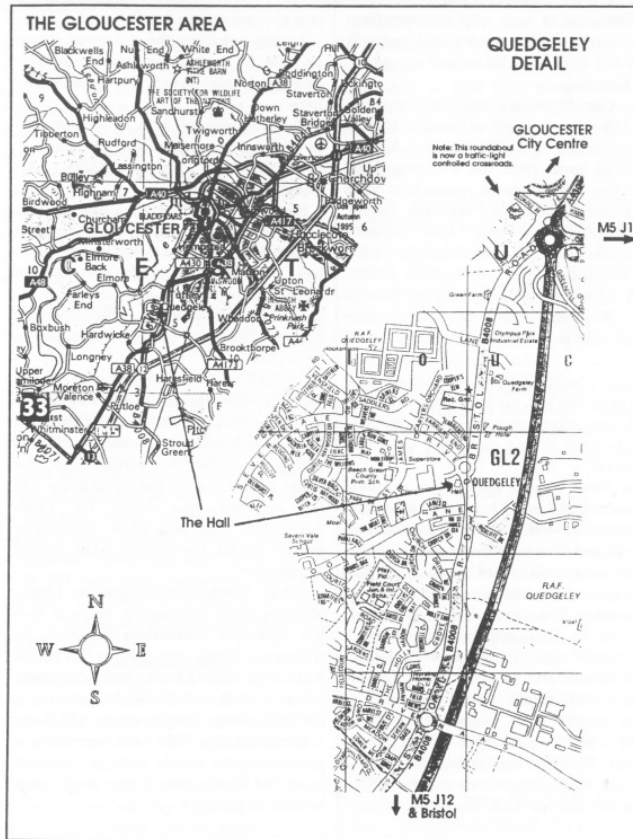
Warning, anyone with new maps may be tempted to use junction 11a, don't, it is a nightmare and even locals don't know where it goes to.

**Parking:** Please use the free parking provided, just round the corner, in front of the Tesco Super-store. Remember to lock any valuables safely away out of sight - being a busy car-park your car should be quite safe, but it is better not to take chances by putting temptation in front of thieves.

**By Rail or Coach:** Gloucester is well served by Rail and Coach services. Buses to Quedgeley run about every 15 minutes from the Bus/Coach station (which is almost opposite the entrance to the Train station) ask at the travel office. On the bus ask the driver for Tesco Superstore - he will know where you need to get off, the journey takes around 12 minutes.

**Other Attractions:** There are plenty of shops in the city centre. There is also the National Waterways Museum at Gloucester Docks, our famous Cathedral and lots of other historic and interesting places to visit and Cheltenham is only a few miles away. Just down the A38 there is the Slimbridge Wild Fowl Sanctuary, a place everyone should visit, so why not bring the family even if they don't want to come to the show

# THE MAPS



22

# DATA HANDLING

By:- Keith Williams.

In my job as a teacher I have, often, to handle large quantities of data which needs to be sorted in a number of different ways. This is the sort of task for which a computer is ideally suited, but how do you write the program to perform these tasks? Let us take an example.

The example that I shall use is one from teaching but one could very easily think of equivalent examples in business, or sports or anywhere else that some form of data base is used.

In this example I will consider a year group of 120 pupils in four classes. They are studying six subjects (Maths, English, Computer Studies, History, Geography and Science) - these are referred to by their initial letters. The information I need to store (and sort) is:-

**Name,**  
**Class,**  
**Age (dob),**  
**Results in M,E,C,H,G,S.**

So far, this is easy. I can set up a character array A\$(120,50) and put in the information for each child. As parents rarely consider how many letters there are in the name that they give to their child, the amount of string space

taken up by the name will vary. Still, this is easily overcome by taking a maximum name length of, say, 30 characters and using Sinclair's 'Procrustean' slicing-off of feet or padding with spaces to fit the name into spaces 1 to 30. The rest of the data can be put into other specific areas of the string, eg class will be held in A\$(x, 31 to 33).

This is still very simple. But the whole aim of the exercise is not just to hold the data but to be able to use it. I need to be able to sort the list in alphabetical order throughout the year and within each class, in exam result order for each subject and for the total mark overall both within each class and across the whole year. Why is this so difficult? Fig 1 can be used to illustrate this.

If they are sorted in alphabetical order then A\$(1) refers to Fred, A\$(2) to John and A\$(3) to Harold. If I then want to sort according to Maths marks, then A\$(2) has to become A\$(1), A\$(3) becomes A\$(2) and so on. If I now want to sort according to English or History or anything else, then the strings have to play musical chairs. Large amounts of data have to be moved about every time

STORE	NAME	MATHS MARK	ENGLISH MARK	HISTORY MARK
A\$(1)	Bloggs. Fred,	30	80	56
A\$(2)	Collins. John,	60	27	30
A\$(3)	Smith. Harold,	45	42	70

Fig.1.

23



INDEX	NAME	CLASS	D.O.B.	MATHS	ENGLISH	C.S.	HIST	GEOG	SCI	POINTER
i	N\$(i)	C\$(i)	D\$(i)	M(i)	E(i)	C(i)	H(i)	G(i)	S(i)	P(i)

Fig.2.

sorting, resorting and sorting again. Moving large amounts of data is slow and inefficient. Therefore, it is bad programming practice. What is needed is a more efficient way of linking and handling the data.

### DATA STACKS

This is where planned data structures come in. If we call all the data relating to one child a record, then this is divided into a number of fields as shown in Fig 2.

As you can see, each field is represented by a different array. The common index (i) links them all. So, for i = 1 then N\$(i) is Fred Bloggs, M(i) is his maths mark and so on. The importance of the pointer array will become apparent soon. The value of i will vary from 1 to the total number of students. This can be input when the program is first run.

This number held as a variable, say total, can be used to DIM the arrays. If the initial DIM statements are of the form DIM N\$(total + 5,30) then we can hold 30 character long names for each pupil and allow for five new pupils to join the school during the year.

The pointer is used to give the index of the next record in the list. Two other variables are needed, Toplist and Topempty. When the program is first run the data stack will look like Fig 3a. Topempty tells me the index of the next empty record and so on through the chain. When I input data for my first record this will go into the one indicated by i = 1. Toplist will now hold 1, P(i) will become 0 and topempty will become 2.

After 3 record entries my data stack will now look like Fig 3b.

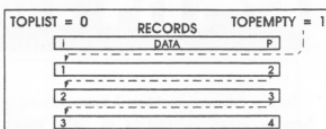


Fig.3a.

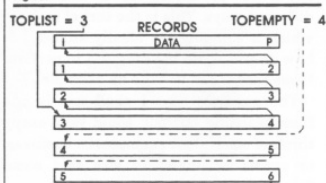
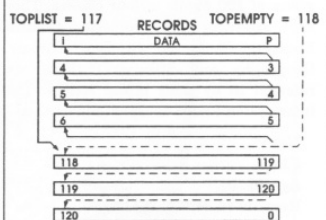


Fig.3b.

### BEFORE DELETION



### AFTER DELETION



Fig.3c. Removing a record from the list.

### ADDING AND REMOVING RECORDS

If a child leaves then I don't even have to delete his record. I just add it to the empty list (on the end) and adjust the relevant pointers. Fig 3c shows what happens to the data stack when the student whose record is held in 5 leaves the school. Note that no data has been moved, just three pointer values altered and no data moved.

### SORTING

What about sorting? My original problem was how to sort the data in n different ways efficiently and without moving masses of it around. Well, this is where my rather complex method of storing data comes in to its own. Let us take the simplest case of only sorting by one criterion, eg alphabetical order. Using the original model we would compare two strings. If one was 'greater' than the other then they would swap places using some such lines of Basic as:-

```
1000 IF A$(i)>A$(j) THEN LET B$=A$(j): LET A$(j)=A$(i): LET A$(i)=B$
1010 NEXT j: NEXT i
```

On our model we would move just two numbers, not massive data blocks:-

```
1000 IF A$(i)>A$(j) THEN LET temp=P(j): LET P(j)=P(i): LET P(i)=temp
1010 NEXT j: NEXT i
```

But this is not the end of the story. If P(i) is the pointer in sorting by alphabetical order, we can use other pointers to sort by all other criteria. For example, r(i) could be the pointer for

sorting by Maths mark, q(i) for sorting by English mark and so on. We would need new variables to act as pointer to the top of each list, eg topmaths, tophist etc.

The sort routines can be as above so that if m(i)>m(j) then r(i) and r(j) would swap values.

To print names in order of maths mark we would use a routine such as:-

```
5000 POKE 23658,8
5010 INPUT "Hard copy or to screen (H/S)";LINE B$
5020 IF B$(1)="H" THEN OPEN #2,"p"
5030 LET i=topmaths
5040 IF i=0 THEN RETURN
5050 PRINT N$(i)
5060 LET i=r(i)
5070 GOTO 5040
```

Line 5000 locks on CAPS SHIFT.

Line 5010 and 5020 direct output to printer or screen. 5030 print the names held in the topmaths-r(i) pointer chain in the sorted order.

### FINAL TIDYING UP

All that really remains now is to tidy up the many arrays and then sit down to coding.

The neatest way to hold all the pointers and numerical data is in one three-dimensional array. If we do this in the array a() then it would be DIMmed a(m,2,i).

The first dimension - m - represents the number of fields which will be stored or sorted (don't forget to allow for the string arrays). The second dimension - 2 - represents pointer or data. The numerical data held in 1 and the pointers held in 2. Finally, the third dimension - i - holds the actual data and pointers (i here is the index that we have used throughout).

If maths, for example, were held in field no 3, then the maths sorting routine

described above would be written comparing a (3,1,i) with a(3,1,j), if it is larger then we would swap pointers a(3,2,i) and a(3,2,j).

Only two routines are needed to sort the data - a string sort routine and a numerical sort. First a string array is set up to hold the names of the fields - say S\$(3) holds MATHS and so on. Remember to hold these as capitals and to convert all input into capitals. Then a simple FOR - NEXT loop will find the correct field:-

```
8050 INPUT "Which field do you want to sort?"; LINE B$
8060 FOR n=1 TO Number of fields
8070 IF S$(n,1 TO 3)=B$(1 TO 3) THEN GOTO number sort
8200 REM number sort
8205 IF a(n,1,i)>a(n,1,j).....
..... and so on as before
```

The routine above can also be used to automatically direct operation to the string sort routine. Similarly, the print subroutine can use Ss.

A data saving and loading facility needs to be written to make the data base program complete: now all that is left is the coding!



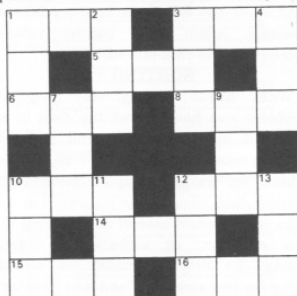
Our leisure will never be the same again!



## PUZZLE ? SPOT ?

From some of your telephone calls it seems Puzzle Spot went down quite well last month, nice to hear you enjoyed it. I found 1 down a bit of a problem but I got the answer in the end. The answer to last month's is on page 18.

Here is a new puzzle for this month. If anyone has any ideas for other types of puzzles we would love to hear from you.



### Across

1. Five times 12 down
3. 1 across minus sixty-four
5. Two gross
6. 14 across plus 100
8. Inches in ten feet
10. 10 down minus twenty-eight
12. 4 down plus sixty-eight
14. 11 down minus 153
15. Pounds in six hundredweight
16. 8 across plus sixteen

### Down

1. 13 down plus 172
2. 15 across minus 143
3. 6 across plus sixty-two
4. Fluid ozs in six pints
7. A square number
9. 7 down plus 118
10. Two times 9 down
11. Four times 9 down
12. 5 across minus ninety-seven
13. 10 across times two

Again the answer will appear next month. No prizes, its just for fun.

# The Spectrum Light-Gun

Part 2.

By:- Paul Farrow.

In the first article (Vol.10 N°1) I looked at the theory behind the Spectrum's Light-gun. This time I want to explain how you can use it.

When a request is made to read the light-gun co-ordinates, the routine will first execute a HALT instruction. This will effectively stop the CPU until an interrupt arrives. Upon its arrival, the entry in the interrupt vector table points to the start of the interrupt routine and in this case this simply consists of a RETI instruction. This causes a return to the instruction after the HALT and the code here will then accurately 'follow' the generation of the TV field and will monitor the light-gun at the end of each scan line.

Thus the use of interrupts is solely used to synchronise with the start of each TV field. To accurately 'follow' the generation of a TV field, the machine code instructions must be chosen such that they not only perform the required task but that they also perform it in a specified time.

As each field takes 0.02 seconds to produce its 312.5 scan lines, each scan line therefore takes  $0.02 / 312.5 = 64$  microseconds to generate. Now all Spectrums operate at a frequency of 3.5469MHz and thus each clock cycle (T-state) takes 0.281936 microseconds. Thus in one scan line there are  $64 / 0.281936 = 227.0016$  T-states. As each machine code instruction takes at least 4 T-states to execute, at best we can only

perform  $227 / 4 = 56$  instructions. In practice, the average number of T-states per instruction is generally about 8 and so we can only really expect to execute 28 instructions. It is this fact that prevents us from repeatedly reading the light-gun per scan line, and limits the number of reads to about 6. Thus the program is to monitor the light-gun at intervals of exactly 227 T-states and to ensure that each read occurs at the end of each scan line. Once all the scan lines of interest have been tested and the bottom border is being generated, more general, non-time critical tasks such as highlighting columns can be performed. Refer to a Z80 data book such as 'Programming the Z80' by Rodney Zaks for details about the number of T-states taken by each machine code instruction.

When monitoring the keypad, I/O register 14 of the AY-3-8912 programmable sound generator is used. This is accessed via I/O address 65533 (FFFDhex). Register 14 must be selected before the light-gun can be monitored. When a read is made from I/O address 65533, bit 5 returns the state of the light-gun trigger. It will be set normally and is reset when the trigger is pulled. Bit 4 is used to read the light sensor and will be set when light has been detected.

The software routines developed provide four entry points which are accessed via a USR call. These are as Given in Fig.1 at the top of the next page.

Address	Function
63762	Find the row and line number.
63772	Find the column number for a specified row/line.
63782	Find row, line and column numbers.
63795	Test the trigger.

Fig.1 - Entry Points.

The values returned by these routines are stored in the memory locations given in Fig.2 below.

Address	Function
64248	Line number.
64249	Row number.
64250	Column number.
64251	Temporary attribute colour.
64252	Replace all attributes flag.

Fig.2 - Store Locations.

The replace all attributes flag determines whether all of the screen attributes are replaced by the temporary attribute colour value. This is used in situations where there are scan lines that are coloured black, and hence the program would not be able to identify whether the light-gun was pointing at one of these. A value of zero POKEd into this flag prevents the attributes from being replaced; any non-zero value will cause the replacement. The colour that the attributes are changed to is defined in the temporary attribute colour location. This is composed in exactly the same manner as the normal screen attribute bytes, i.e. 128\*FLASH + 64\*BRIGHT + 8\*PAPER + INK. Neither the paper or the ink colour should be set to black.

When testing the trigger the value

returned to Basic by the USR function identifies its current state. A value of 32 is returned if it is pulled, otherwise a value of 0 is returned.

When replacing the screen attributes, these bytes are stored at address 64253. There are 768 bytes allocated for this purpose.

Here is a simple example which displays the light-gun co-ordinates whenever the trigger is pulled. Note that if the light-gun is not pointing at the main screen area then values of 24, 192 and 32 are returned for the row, line and column numbers respectively.

```

10 BORDER 0
20 POKE 64251,64+5*8+5: REM Select bright cyan
30 IF USR 63795=0 THEN GOTO 30
35 RANDOMIZE USR 63762
40 PRINT AT 0,0;"LINE=";PEEK 64248;" "
50 PRINT AT 1,0;"ROW=";PEEK 64249;" "
60 PRINT AT 2,0;"COL=";PEEK 64250;" "
70 GOTO 30

```

The performance obtainable from the light-gun can be improved by customising the software that reads it. For example, imagine a game where there are several large aliens on the screen just waiting to be shot. Now rather than determining the row and column positions that the light-gun is pointing at, it might be faster to highlight each alien in turn whilst blanking everything else and then checking if the light-gun can see light. If it can, then you know that the alien has been shot. This works well for large screen objects, irrespective of their shape. The performance of the light-gun can also be improved by reducing the screen area of interest and hence the

Please Turn To Page 31.

Everything You Ever Wanted To Know About

# THE CALENDAR

But Never Got Round To Asking...

By:- Ken Elston.

The problems described in recent articles about the impending 'Millennium Glitch' prompted me to dig out a some information I had filed away about how our calendars work and how they came into being. I thought it would interest other readers, so here it is.

Although one can never be sure of what will happen at some future time, there is a strong historical precedent for presuming that the present Gregorian calendar will still be in affect by the year 2000 (after all it is nearly upon us and I don't see the Government rushing new laws through the House to change things). I mention the year 2000 because it is one of those unusual years that will be a leap year even though it is also a century year (end of, not start of). They only come round once every 400 years so it is a landmark none of us will see again. But the question is, why is it a leap year?

The purpose of a calendar is to reckon time in advance, to show how many days have to elapse until a certain event takes place in the future, such as the harvest or the publication of the next issue of **FORMAT**, or even one's impending birthday. The earliest calendars, naturally, were crude and tended to be based upon the seasons or the lunar cycle. There is strong evidence that Stonehenge in Wiltshire was originally built to help people keep an accurate track of the seasons and astronomical events.

The calendar of the Assyrians, for example, was based upon the phases of the moon. They knew that a lunation (the time from one full moon to the next) was 29½ days long, so their lunar year had a duration of 354 days. This fell short of the solar year by about 11 days. (The exact time for the solar year is, approximately, 365 days, 5 hours, 48 minutes, and 46 seconds.)

After three years, such a lunar calendar would be off by a whole month, so the Assyrians added an extra month (from time to time) to keep their calendar in synchronization with the seasons.

The best approximation that was possible in antiquity was a 19-year period, with 7 of these 19 years having 13 months (leap months). This scheme was adopted as the basis for the religious calendar used by the Jews, whose influence spread far and wide.

The Arabs also used this calendar until Mohammed forbade shifting from 12 months to 13 months. Why? Well maybe because even then 13 was considered unlucky.

When Rome emerged as a world power, the difficulties of making a calendar were well known, but the Romans complicated their lives because they had a superstition that even numbers were unlucky. Hence their months were 29 or 31 days long, with the exception of February, which had 28 days. Every second year, the Roman calendar

included an extra month called Mercedonius of 22 or 23 days to keep up with the solar year. Talk about complicated.

Even this algorithm was very poor, and so it came to pass, that in 46 BC, having been advised by the astronomer Sosigenes, Julius Caesar (the one who came/saw/conquered and brought us Brits the delights of civilisation like hot baths and taxes) ordered a sweeping reform. By imperial decree, one year was made 445 days long to bring the calendar back into step with the seasons. The new calendar, similar to the one we now use was called the Julian calendar (named after Julius Caesar himself of course). It's months were 30 or 31 days in length, although February was still left with 28 days, and every fourth year was made a leap year (having 366 days). Caesar also decreed that the year would start with the first of January, not the vernal equinox in late March.

Well, good though it was, Caesar's year was 11½ minutes short of the calculations recommended by Sosigenes, and eventually the date of the vernal equinox began to drift again. Englishman Roger Bacon became alarmed and sent a note to Pope Clement IV, who apparently was not impressed.

Pope Sixtus IV later became convinced that another reform was needed and called the German astronomer, Regiomontanus, to Rome to advise him. Unfortunately, Regiomontanus died of the plague shortly thereafter and the plans died as well.

It was therefore not until 1545 that the Council of Trent authorized Pope Gregory XIII to reform the calendar once more. Most of the mathematical work was done by Father Christopher Clavius, S.J. The immediate correction that was

adopted was that Thursday, October 4, 1582 was to be the last day of the Julian calendar. The next day was Friday, with the date of October 15. There were riots over these 'missing' days as many believed that the days had been 'stolen' by church decree.

For long range accuracy, a formula suggested by the Vatican librarian Aloysius Giglio was adopted. It said that every fourth year is a leap year except for century years that are not divisible by 400. Thus 1700, 1800 and 1900 would not be leap years, but 2000 would be a leap year since 2000 is divisible by 400. This rule eliminates 3 leap years every 4 centuries, making the calendar sufficiently correct for most ordinary purposes.

This calendar is known as the Gregorian calendar and is the one that we now use today.

It is interesting to note that in 1582, all the Protestant princes in Europe ignored the papal decree and so many countries continued to use the Julian calendar until either 1698 or 1752. In Russia, it needed the revolution to introduce the Gregorian calendar in 1918. This does, in some cases, make even recent history a little confused. Did the Russian revolution take place in October or November - it depends on which calendar you work to.

Despite the greater accuracy of the Gregorian calendar, it still falls behind very slightly every few years. If you are very concerned about this problem, I suggest that you obtain the equipment to tune in to the Rugby MSF transmission - this is a special time signal (sorry I don't know what MSF stands for) to which special radio clocks can tune (see a Maplin catalogue if you are interested). It is *incredibly* accurate, to within 1

second in 1,000,000 and clocks tuned to it will even reset themselves to GMT/BST when the change occurs. Well, about once every 3 years, they declare a leap second at which time your clock will adjust, while all the normal clocks will remain one second behind.

Today our calendars are fixed to cover things for many thousands of years into the future. By international agreement these leap seconds I've mentioned are added so that it should never be necessary to alter the calendars again - but that does not stop some from trying. There is a 'Decimal' calendar where the year is divided into 10 months. There is also the Star Trek *STAR DATE* system which also works on a decimal system. Could any of them catch on? I doubt it. We still use Seconds, Minutes which are based on the ancient Babilonian predilection to the number 60, and anyway, the system works, so why change it?

All we now need to do is hope we survive the Millennium Glitch, and come through the parties that celebrate the start of the new century. Parties? Well yes, there are some who will raise their glasses as Big Ben strikes the start of the year 2000, but there will also be the true and faithful who know that the real 21st century does not start until 1st January 2001.



"We just fed it a list of the food the average student eats!"

Continued From Page 28.

number of columns to test.

Finally, there are two main areas that may or may not be different when using these routines with a 48K Spectrum. I do not have access to a 48K Spectrum light-gun and so can confirm the following possibilities. Firstly, the I/O port address of the trigger and sensor may be different. Secondly, the main screen area of a 48K Spectrum does not appear to be as centralised as it is on a 128K Spectrum.

Happy shooting!



## FORMAT

### SAM REPAIR SERVICE

We are pleased to be able to offer readers an official, West Coast approved, repair service for SAM Coupé and SAM elite computers and add-ons.

**PRICING** Because every fault is different we can't guarantee a fixed rate. When we receive your machine it will be tested and, if it is going to cost more than £35 for the repair then we will contact you for authority to continue.

Pack your machine well (we will use your packing for its return). Please phone us on 01452-412572 for advice on dispatch (we can even arrange UK Mainland collection and overnight delivery for an extra £12.95). In many cases we can also give an estimate over the phone. All repairs returned by overnight carrier so tell us which days there will be someone in to sign for the parcel. Please quote your INDUG membership number and give a evening contact phone number.

Send your machine to:-

**Format (SAM Repairs),**  
34, Bourton Rd, Gloucester, GL4 0LE.



# SAM elite 512

The advanced computer that retains a user friendly appeal which makes even the beginner feel right at home. An easy to learn Basic and disc operating system (no messing with slow tapes here) will allow you to do things you never thought possible before. Your SAM comes with a very easy to read manual and everything you need to get started - it even has some pretty impressive demo software for you to run, just to give you a few ideas for starters.

If you already own a Spectrum then this is the machine for you because you don't have to throw away all you have learnt so far - just be prepared to be amazed at the extra power and features.

POWER AT A PRICE YOU CAN AFFORD...

## FEATURES INCLUDE

512K RAM  
32K ROM  
800K Floppy Disc Drive  
6 Channel Stereo Sound (mono through TV)  
Z80B 6Mhz Processor  
Centronics Printer Port  
Joystick Port  
MIDI & Networking  
128 Colours  
4 Screen Modes  
SCART Output (for Monitor or TV)  
Plus LOTS More....

**ONLY £199.95**

Includes 1 year return to base warranty on full computer  
PLUS extended 2nd year warranty on main board.

## Reconditioned SAM Coupé

We are able to supply a small number of professionally reconditioned SAM Coupé computers. These have been fitted with a modern style disc drive, a version 3 ROM, new keyboard unit, and are supplied with new manuals and DOS system disc. They carry a full 90 day full return to base warranty. Because these are reconditioned machines there may be slight blemishes to case or base.

Has All The Features Of The SAM Elite, Except That There Is No Built-in Printer Port On The Coupé (see the SPI, under interfaces below)

**ONLY £139.95**

## SAM Coupé Replacement Disc Drives

The original slot-in slim-line drives produced for the SAM Coupé are no longer made. If your existing drive is now showing signs of terminal decline perhaps it is time you gave your SAM a new lease of life by fitting a modern style (PC type) floppy drive.

In most cases we find the faults with old drives are mechanical (due to worn heads, stepper motor failure, etc.) In these cases you need an internal Interface Type 1 to which you transfer the 1772 disc controller chip from your old drive - thus making the upgrade as cheap as possible.

If you want to fit a second drive (or first drive, if you don't have one or the 1772 on your old drive is faulty) then order a Type 2. Both types are available in either kit form or ready assembled. For the kit you will need screwdriver, soldering iron, solder and a reasonable level of soldering skills. All you need for the assembled version is a screwdriver. Full fitting instructions are given and the only other thing you need is a standard PC type disc drive from your local supplier (cost about £20 to £25).

If you have any doubts about which type of interface you need, or any questions about the drive fitting in general, then please give the FORMAT hotline a ring on 01452-412572 and they will be pleased to help you.

Kit Form | Assembled

Internal Disc Interface Type 1 (without 1772)	£19.95	£29.95
Internal Disc Interface Type 2 (including 1772)	£29.95	£39.95

## INTERFACES

These interfaces work with both the SAM elite and the SAM Coupé unless otherwise stated.

**SAM MOUSE SYSTEM** Interface, High Quality Mouse and the Software to drive it. The interface plugs into the mouse port on the back of SAM so you don't need a spare expansion socket. More and more software now works better if you use a mouse. **Only £39.95**

**SAM PRINTER INTERFACE** The SPI (Coupé only) allows connection to any standard parallel printer. Allows standard LPRINT, LLIST & DUMP commands to work on compatible printers. Plugs straight into the expansion port. Requires BBC type 26 way ribbon printer cable (see below). **Only £24.95**

**TWOUP** Allows two interfaces to be connected to SAM's expansion port at same time. **Only £19.95**

**XDI** The eXternal Disc Interface. Allows external 3 1/2" or 5 1/4" drive to be connected to SAM Coupé. Also includes Parallel Printer Interface. **Only £44.95**

**ALSO AVAILABLE:** Printer Cable - £7.95, SCART Cable - £7.95, Replacement Keyboard £14.95, Replacement Power Supply - please ring. Plus spare parts service - tell us what you want and we will give you a price..

Send Your Orders To:

West Coast Mail Order,  
c/o Format Publications,  
34, Bourton Road,  
Gloucester,  
GL4 0LE.

**West Coast Computers**



# YOUR LETTERS

Dear Editor,

I thoroughly enjoyed reading the latest issue (Vol.10 N°5) of **FORMAT**. I always do anyway, but that's beside the point. I did however find the program items on pages 13-15 great fun.

I always regret not being able to find enough time to do more creative things on my Spectrum 128, as it is mostly needed for rather more mundane things on WordMaster and Specfile+, which by the way have made life somewhat easier.

There is one request I would like to make, with regard to the Martin Fractals item (above issue), and that is, can anyone tell me if it's still possible to find a Spectrum Basic Compiler to help run programs like the one mentioned, as Matthew Westcott said "it's extremely slow unless you compile it".

He was not kidding!

**Yours sincerely, C.A.Walford.**

I don't know of any compiler still on sale, there used to be several around and I think one was actually put out on the cover-tape of one of the old Speccy mags a few years ago. However, I'm sure one of our other readers will be able to come to your aid - over to you readers. **Ed.**

Dear Editor,

I read with some interest the December 1996 edition of **FORMAT** where it was mentioned in the letters pages that you have a chip and socket set available to replace a faulty Philips 1099 sound chip.

My SAM has been showing similar symptoms as Mr Gasson's machine, therefore I would be grateful if I too, could also be sent a replacement sound chip, please.

I have very little experience with a soldering iron but, on the other hand, what experience I do have is not 'totally non existent' so I have decided to have a go.

Do, please, give me plenty of instructions. Those supplied with the 512K Upgrade which I purchased a few years ago were excellent so I anticipate that I will have no worries on this point, but I thought I should mention it anyway.

I enclose a cheque for the amount of £11.95, made out to **FORMAT** Publications, which I understand includes postage.

**Yours sincerely, Dean Shepherd.**

Well Dean, by now you have your replacement chip, so would you tell us how easy it was? Just a short note for next month's issue, I'm sure other readers will appreciate your comments.

Personally, provided you can solder, and you have a good soldering iron and solder-sucker tool, I think it is quite a simple job. **Ed.**

Dear Editor,

I know this renewal is late and not on your little blue form but I've just got over a dose (of flu!).

I've got two questions and wonder if I

could have help with. The SAM Elite with Scart - can it be used on an ordinary non scart set as well?

The next concerns the CCS game 'Ancient Battles'. It's the only game I play and I keep a 128 Speccy just to play it on. They offer details of how to create your own army lists if you write to them. I did write to them but got no reply (as I expected). I presume they have gone. Do any readers have the details? I'd willingly pay postage and photo copying. By the way is there any war games software for the SAM? and don't suggest I write some - because if I could I would.

*Yours sincerely, Ian Beardsmore.*

Hi Ian, hope the flu was not too bad. I managed to escape with just a cold last week but I've known several people laid really low by this years flu - you have my sympathies.

Anyway, New Elite computers do still have the modulator built into the power supply. However, WCC recommend using the Scart (because it is so much better) and do not consider certain TV picture problems to be covered by warranty. In other words 99.9% of Elites will work on a TV, but its not guaranteed. Ok, if you have problems then we try to help, but the truth is that SAM deserves a monitor or Scart TV (I recommend the Scart TV because you can then have double use).

CCS have not been around for some years now, so I think it is going to be down to other readers to help. If anyone has any information that can help Ian then please send it through to us and we will pass it on.

I've not seen any wargame software as yet on SAM, pity because I would have thought it would go down well with the typical SAM user. Still, perhaps your

letter will prompt someone to have a go, even if it is only converting some older software so it can use the beter graphics on SAM. *Ed.*

**Dear Editor,**

Please find enclosed a photo copy of the invoice concerning a repair to my Spectrum+ 128, and to a faulty PLUS D drive.

The faults were due to a loose wire in the Spectrum, which was resoldered and both faults cleared. I was charged only £2.

The young proprietor agreed to allow me to submit his name as an entry in an update of the Resource Directory.

The company is Micro Fun and are at four different addresses:-

Unit 12, Guardian Centre, Rotherham. Tel 01709 36000.

10, Peel Street, Barnsley. Tel 01226 207063.

14, Stephenson Place, Chesterfield. Tel 01246 550202

3, All Saints Walk, The Ridings, Wakefield. Tel 01924 200286.

*Yours sincerely, Dick Shepherd.*

Thanks for the information Dick, rest assured that we will send them a form for the next issue of the Resource Directory which will appear sometime later in the year. *Ed.*

**Dear Editor,**

Reading the news in the January issue, we commemorate with you and with many of my friends here in Hungary the 16th Birthday of the ZX81. I also keep my first computer in excellent condition, a ZX81 which is still ready to work, and I use to switch it on now and then remembering on the good old days. Nowadays youngsters looking for more and more gigabytes for their PC-s could

not imagine the skilfulness and brains racking of the old programmers to bring a full chess program into one kilobyte of memory!

A friend of mine has not only the old ZX81 but the complete range of all the products of Sir Sinclair, a collection starting from the ZX80, the ZX81, all of the Spectrum family till the 128, the Interface 1 and 2, Microdrives and the nice little Spectrum printer, it was amazing to watch how the one little needle burnt and burnt diligent on the very right place...

Please find enclosed a copy of the letter from the ZX-Team, Borco Rola con Zaluskowski, Philipp-Melachthon-Str. 21, 92224 Amberg/Opf, Germany. They said they are the last ZX81 user club in Germany. I got the letter nearly two years ago, but I hope they are existing and working now, too.

I hope you will find someone in England who has a ZX81 and could make a demonstration at the April show. That would be the best commemoration!

*Yours sincerely, Istvan Ordog.*

Nice to hear from you again Istvan, and glad to hear your ZX81 is still going strong. My original ZX81 is still in the loft, boxed up to keep it safe.

I have had a couple of ZX81 owners offer to come along to the April show, but would love to hear from a couple more if anyone is interested. Would really like to find someone with a ZX81 disc system if I can. In addition I've also just received a new peice of software for the ZX81 that give hi-res graphics with pixel plotting and lots of other features. The programmer can't make it to Gloucester but if someone is coming with their ZX81 I will gladly pass on the program for them to demo - from the detail given in

the manual it looks very good. *Ed.*

**Dear Editor,**

I am having difficulty in obtaining Midi programs or software for the SAM Coupé. I would be extremely grateful if you could send me some information, programs or a list of discs that could be ordered from you. Any other help would be very gratefully received. Thank you for your time and I look forward to hearing from you.

*Yours sincerely, Edward Williams.*

Your letter got passed to us with a batch of Revelation orders and we thought it worth printing here.

Sorry Edward, but unless you can pick up a copy second-hand, the SAM MIDI Sequencer is no longer sold. However, I'm sure one of our readers will be able to help you so we will pass on any letters we receive. *Ed.*

**Dear Editor,**

I find my Spectrum programming days are over, I just use the excellent WordMaster and Artist + Tasword 3 on the Discovery. So I hesitated before renewing my subscription. Then I heard that you are struggling for material, and I thought I should ask you to bury the hatchet with the excellent SDC of which I am also a member. They are almost at an end having exhausted the ingenuity of members: but what a wealth of Spectrum related material they have, and possibly the best programmers of the Spectrum alive today. Give Brian Mumford a ring and start the ball rolling. **FORMAT** will be the richer with everyone under one banner.

So I'll go for one more year just to see what happens. Keep the faith.

*Yours sincerely, B.Twyman.*

Not quite sure what you are on about

Mr Twyman. Brian Mumford and I have always been on friendly terms, ever since the old ZX Microfairs in London where we were often on adjacent stands. We send Brian **FORMAT** each month and he sends us the Discovery disc mag whenever it gets published (although I must admit my Discovery ain't working at the moment so I have not been able to look at the disc for some time).

However, to avoid treading on his toes so to speak, we have printed very little Discovery material in **FORMAT** over the years - instead referring Discovery owners to Brian direct.

Now if someone would like to do a regular Discovery spot I would always be interested in talking about it - perhaps reusing some of the SDC material as a way of advertising their existence a bit more? **Ed.**

**Dear Editor,**

Following on my letter that you kindly published in the February **FORMAT** re binders for our magazines, I said I was in the process of a follow-up, well here it is, my final offer! Try contacting this firm for Cordex Patent Self Binding Cases. Give them the page size and how many cords you require, they will want to know how thick the contents will be and the size of the book. My informant said the cost about a year ago was £2.50 plus postage. They will put a title on the outside for you. The name of the firm is Modern Bookbinders.

The company that is using this firm is The Rare Breeds Survival Trust based in Warwick. They recently changed their magazine size to a much larger size and now publish quarterly. I have used one of their binders for some of my **FORMAT** mags, and they're just right, that is the old style binder. Unfortunately when I

phoned the Rare breeds ST they hadn't got any old ones left. I do hope this will be of some use to you, and I'll place my order now for half a dozen! Wouldn't it be nice to have a nice new binder for the **FORMAT** PC as it's in its infancy. I'm so excited about all this I do hope something will come of it. More things to ask about later, thanks again for the wonderful Feb mag - that crosswords a blinder!

PS Wife says I never could spell. The RBST title on their binders is 'The Ark' so my **FORMAT** mags look right in one as I read that Sinclair was the first computer out?!!

**Yours sincerely, Eddie Bye.**

Modern Bookbinders were the company that we used to use to produce the **FORMAT** binders. However, there were problems. First, they did not run A5 size very often, so any orders we placed took at the very least two months to come through. They were also expensive in the 'smallish' quantities we ordered. Added to this they let us down very badly on the last order we placed with them - we don't know if it was really their fault or their carriers, but two of the three boxes never arrived and they have only just recently (nearly three years after the event) agreed to write off the invoice for the missing binders. Needless to say, we are reluctant to deal with them again.

Still, I am working on something. **Ed.**

**Dear Editor,**

I've not written previously of this since I thought that it would be robbing you of some profit, so I'll not be offended if you don't use it, but letters regarding filing **FORMAT** keep recurring.

My library of **FORMAT** is now filed in A5 ring binders minus the rings. I

dispense with the rings and back plate by tweaking the pressed out tube of the rivet (from the inside) with a small screwdriver; removing the backing plate and rings and retaining the rivets themselves by tapping back the inside end.

Each issue of **FORMAT** is then held in by a loop of 5mm wide plastic tape such as used for Christmas presents and available from most stationers. A slip knot is the easiest way to get the best tension on the loop.

When the 12 issues are complete you can pass an adhesive address label behind the outside loops and the spine of the binder (at top and bottom) and fold it back on itself. This holds the loops together and gives a label to hold the volume number.

It's effective, available, cheap and occupies two thirds the shelf space used by the commercial binders you supplied. Thank you once more for **FORMAT**.

**Yours sincerely, Doug Casterton.**

Sounds a bit like hard work to me Doug, but if it works for you that is the main thing. **Ed.**

**Dear Editor,**

Further to my letter of 18th April 1996 the 'Two' interface continued to give problems connecting a SAM printer interface and hard disc drive. The effect was odd 'drop-outs' familiar to those of us who have had gadgets attached to a Spectrum edge connector. I just wonder if there is a specific problem with the hard disc drive. I have not tested it with other systems so extensively as frankly I've got better uses for my time. If you have any ideas I'd be grateful.

Best wishes with **FORMAT**.

**Yours sincerely, G.S.Hathorn.**

Could be a couple of things. First, test each interface on its own in both slots. If that works then it is not the Two'. The other possibility is some form of power glitch caused by something in the system - this would need more detailed testing so if you still have problems give us a ring on the hotline. **Ed.**

**Dear Editor,**

Having made up a Scart cable as per the wiring diagram in the appendix of the SAM manual, and successfully tried it out on my Sony 21 inch TV, I decided to buy a Nokia TV to use as monitor as recommended in **FORMAT**.

Unfortunately all I could manage to receive was a barely perceptible image on the screen, (despite the helpful comments I received on the helpline).

Looking back at my past copies of **FORMAT**, it seems that many readers have encountered problems with this and other TV's.

A cure was outlined in the Help Page of **FORMAT** (October 94). This concerns the wire link between pins 16 and 20 of the scart cable at the input to the TV. Pins 16 and 20 are each terminated with 75 ohm resistors in parallel, which reduces the input impedance to 37.5 ohms, thereby reducing the signal input to the TV, whilst at the same time increasing the loading on the SAM.

Replacing the wire link with a resistor as suggested in the above issue **FORMAT**, overcomes the problem. With the Nokia a value below 1K caused break-up of the picture, whilst a value of greater than 2.7K caused the picture to shift due to the reduction in the level of the sync pulses. The optimum value of 1.8K was chosen, and gives a perfect picture. Ensure that the SAM connects directly to pin 16 and not pin 20.

I am unable to explain why my Sony should operate with the wire link in place, I can only assume that it is more tolerant of voltage levels than the Nokia.

However, even the Sony picture is improved with a resistor of greater than 1K, replacing the wire link.

*Yours sincerely, Ken Powley.*

Many thanks for putting pen to paper with that little lot Ken. Glad your back-issues proved useful in solving your problem. *Ed.*

**Dear Editor,**

Would it be possible for me to get a copy of File Manager as produced by BetaSoft? I remember reading you would be handling all the BetaSoft products after Andrew Wright became too busy to keep marketing them. File Manager was available at I think £12.99.

I believe there is another SAM program called File Manager so I had better emphasize it is the BetaSoft one I am looking for. (I want to try to follow Carol Brooksbank's article in **FORMAT** Vol.7 N°4 which describes how to get it working with Driver).

*Yours sincerely, Norma Wrangham.*

At the moment we do not have a master for File Manager but I will see what I can do to get one organized for you soon. *Ed.*

Letters may be shortened or edited to fit on these pages although we try to edit as little as possible.

This is YOUR letters page so it is up to you to fill it with interesting things. Come on, get writing, any subject even remotely related to computers. Just keep things as short as you can so we can fit in as many as possible each month. Please write clearly or type your letters. Send them to the address on page 3 or Email them to use at: [FormatPub@AOL.com](mailto:FormatPub@AOL.com)

## SMALL ADS

**Wanted** Spectrum +3, with or without power supply, also software, not games. Also wanted, Sinclair QL complete. For sale or exchange, Sinclair ZX81 with Ram Packs (32K). J.Woodhead, 9, Unity Street, Hebden Bridge, Yorkshire, HX7 8HQ.

**SAM COMMS SOFTWARE** Two comms programs on disc for £1.50. Programs allow connection via phone lines to Bulletin Boards or direct to other SAM users. Requires MGT Comms interface, a 14,400 Modem and lead. Information on making the lead is on the disc or ready-made leads available for £6.50. SAM PD, 18, Mill Lane, Skelmersdale, Lancs. WN8 8RH.

**SAM COUPE** Twin drives, several original utility programs incl: Secretary, Campion, MasterDOS, MasterBasic, Specmaker, FileManager. Epson RX80F/T Printer. For sale £100. W.Holden, Aylesbury (01296) 612886.

**WANTED** I require a copy of the manual for the OCP Address Manager (not the +80 version). A photocopy will do, or willing to purchase program and manual. Please write to Sam Quigg, 21, Benevenagh Drive, Limavady, N.Ireland. BT49 0AQ, or phone 01504 722623 after 6pm.

**FOR SALE** Spectrum 128+2, Grey model, good working order, clean, £25. Phone John Critchley on 01491 834403.

**WANTED** SamBus (Card Cage). Please ring George Munro on 0171 7221620.

**WANTED** Multiface+3 for Spectrum+3 computer. Phone Mr D.Barnett on 01782 776073.

### YOUR ADVERTISEMENTS

Selling, Buying, Pen Friends, etc.

Any PRIVATE advert, subject to acceptance, will be printed FREE in the next available issue. Any software sold MUST be original. The publishers will not be held, in any way, responsible for the adverts in this column.

Due to shortage of space, if your advert remains unpublished after two months then please send it in again. Trade advertisers contact the publisher for rates.

## SOFTWARE

**SAM Coupé Software On 3 1/2" Disc**

**PCGS DTP PACK** The famous package including WordMaster, TypeLiner & HeadLiner. Complete on disc for SAM. Includes 2 extra font packs bringing the total value to £53.40.

Order Code: SCD-04 Price: £24.95

**COLOUR DUMP** Screen dump software to work with Epson compatible colour printers. RRP £12.95

Order Code: SCD-05 Price: £7.95

**MasterDOS** The advanced Disc Operating System for SAM. Includes random access files, sub-directories and lots more.

Order Code: SCD-31 Price: £15.95

**MasterBASIC** Extended Basic for SAM, works with either MasterDOS or SAMDOS.

Order Code: SCD-32 Price: £15.95

Order Both MasterDOS & BASIC Together and SAVE £5.

### SAMSPEC SOFTWARE

SAM + Spectrum versions on 3 1/2" disc (5 1/4 or 3 1/2")

**FONT LIBRARY**, 100 screen fonts plus support software, easy to use on either computer. (Special 3" disc available - Spectrum files only). RRP £8.95

Order Code: SSD-01 Price: £5.95

**MONEY MANAGER** Advanced personal budgeting system for both machines. Spectrum version needs 128K+2 (not +2a or +3). RRP £15.95

Order Code: SSD-02 Price: £9.95

### SPECTRUM SOFTWARE

Unless otherwise indicated these are DISCIPLE/PLUS D programs. Please state 3 1/2" or 5 1/4" disc (80 track only) on order.

**ARTIST 2** The best art package ever written for the Spectrum. 48K and 128K versions on the same disc. With page-maker and utility software. Full manual. RRP £19.95

Order Code: SPD-01 Price: £12.95

**UTILITY DISC #1** Six of the best and most useful disc utilities for DISCIPLE or PLUS D. Added bonus program - not to be missed. RRP £9.95

Order Code: SPD-02 Price: £6.95

**PCGS DTP PACK** The famous package including WordMaster, TypeLiner & HeadLiner. Includes 2 extra font packs bringing the total pack value to £53.40.

Order Code: SPD-04 Price: £24.95

+3 Version: SPD-04C Price: £29.95

**MUSIC MAESTRO** Write music either just for fun or to include in your own games. Full manual, lots of demo tunes. The ideal way to write music on the Spectrum. RRP £9.95

Order Code: SPD-05 Price: £7.95

+3 version: SPD-05C Price: £9.95

# FORMAT

## READERS SERVICES

### FORMAT BACK-ISSUES

Volumes 1, 2 and 3 are now out of print. Volumes 4,5,6,7 and volume 8 are available as complete volumes. Order by giving the Volume N° (i.e. V5).

Price: £14.00 per volume.

All issues, from Volume 8 N° 1 (September 1994) to the latest issue, are available separately. To order just quote the Volume and Issue N°.

Price: £1.75 each, (5 or more £1.50 per copy).

### HARDWARE

**DUC LEAD** For use with DISCIPLE or PLUS D. This 'Dualing Up Cable' allows two disc drives to be attached without the need for opening one drive to alter its ID. Allows you to switch drives to even out wear without opening cases. RRP £16.95

Order Code: DUC-01 Price: £11.95

**PRINTER LEAD** Top quality parallel printer lead (BBC standard). 2 metres long. For use with DISCIPLE, PLUS D or SAM. RRP £10.95

Order Code: PPL-01 Price: £7.95

+3 PRINTER LEAD. For +3 or +2a. RRP £12.95

Order Code: PPL-02 Price: £9.95

### SAM COUPÉ TECHNICAL MANUAL Version 3.

The real inside info on SAM. No SAM is complete without one. RRP £16.95

Order Code: STM-01 Price: £12.95

### NEW SAM CLOCK NEW

The SAM CLOCK is fully compatible with the TIME and DATE functions of MasterDOS and has an integral battery that keeps the board functioning when your SAM is switched off. The board fits onto the expansion connector at the back of SAM but comes with a built-in through-connector so you don't need a Two-Up to use it in conjunction with another interface. RRP £29.95

Order Code: SCH-01 Price: £24.95

**ORDERING** All prices include UK p&p, overseas readers please add 10% to for extra postage.

Clearly state Order Code, Product description, Quantity required and Price. Remember to add any postage and don't forget your Membership Number or we can't process your order. Payment in STERLING by Cheque (drawn on a UK bank), P.O. Euro Cheque or Cash. Make cheques payable to FORMAT. Payment MUST be in same envelope as order. Send to FORMAT's address on page 3. Normally dispatch is at the same time as your next issue of **FORMAT**. We will not be held liable for delays or non-delivery due to circumstances beyond our control