

## SOFTWARE FROM BETASOFT

### GAMES MASTER FOR THE SAM COUPE:

At last YOU can create stunning games and demos for the Coupe, with fast, smooth, animated sprites, complex sound effects, missiles, platforms, lifts, detailed backgrounds etc. No programming expertise required! Most of a game's design is specified by the menu-driven editor, which lets you edit graphics, animation, movement, sprite collision actions, sound effects, masking, control keys etc. A simple but very fast compiled language controls some features. A complex demo with animated bouncing sprites passing over and under each other, in front of a background, can be written with just a few commands to start the sprites off. (Once started, the sprites can act by themselves.) The editor produces stand-alone ROM-independent CODE programs that are free from any copyright restrictions - so you can sell your masterpiece! Impressive demonstration programs and an extensive sprite library are included to get you started. Backgrounds and sprites can also be grabbed from any Mode 4 screen and edited.

SIX SPRITE PLANES PLUS BACKGROUND  
BIG SPRITES - UP TO A THIRD OF THE SCREEN AREA  
TRUE COLLISION DETECTION ON SPRITE EDGE  
SMOOTH, FAST PIXEL MOVEMENT OVER 100 ON-SCREEN SPRITES  
POWERFUL EASY TO USE EDITOR COMPILED CONTROL LANGUAGE  
COMPLEX MOVEMENT PATTERNS AND ANIMATION SEQUENCES  
STEREO SPRITE-FOLLOWING SOUND EFFECTS

Written by Dr Andy Wright, author of the Sam ROM, MASTERDOS and MASTERBASIC, the program works with 256K or 512K RAM and ROM 2.0 and above. A comprehensive manual is included.

GAMES MASTER COSTS JUST £24.99 INCLUSIVE OF POSTAGE AND PACKING (ADD £1 IF OUTSIDE EUROPE). SPECIAL PRICE TO INDUG MEMBERS: £22.50 (QUOTE MEMBERSHIP NUMBER)

**NEW !!** Secrets of the SAM ROM revealed! The complete ROM 3 source listing on disk, extensively commented by the programmer, Andy Wright. Addresses and memory contents are included to make comparison with the actual ROM easy. The viewing program lets you move lightning-fast through the listing with various step sizes, perform searches, or list any part to a printer or (with MasterDOS) a disk file. A must for the serious SAM user! Just £9.95.

**FILE MANAGER** - The flexible file program. Files up to 780K. Requires MasterDOS and MasterBasic v1.7 or later (updates are free if you return your original disk. Enclose an SAE if you're not buying anything.) £12.99

**MasterDOS** - The DOS for the serious user. Faster, easier to use and more reliable than SAMDOS. Now available EXCLUSIVELY from BETASOFT. Offers RAMdisk and clock/calendar support, subdirectories, BACKUP, serial and random access files, multi-sector READ and WRITE AT, and much more! £15.99.

**MasterBASIC** - The much-praised SAM Basic extension adds many new commands for graphics, sound, printing, data-handling, improving DOS, searching and editing programs, etc. £15.99.

**STILL AVAILABLE:** Beta DOS for the PLUS D. More files per disk, much faster, random-access files, file compression, BACKUP and many other features. Fully compatible with existing disks and files. Only £9.95.  
**BETA BASIC** for the Spectrum (48K/128K+/+2) adds over 100 new commands and functions to Spectrum Basic. Versions available for Disciple+/D, Discovery, or Tape/Microdrive. A classic for just £15.95!

Prices include P & P. Make cheques and postal orders payable to:  
BETASOFT, 24 WYCHE AVENUE, KINGS HEATH, BIRMINGHAM, B14 6LQ

Vol. 6 - Nº 9.

May 1993.

# FORMAT

FOR SPECTRUM AND SAM USERS  
(Incorporating Sinclair & Sam Computing)



FORMAT - Licensed To Inform

£1.25 (UK R.R.P.)

ISSN 0963-8598.

# B.G.SERVICES

64, Roebuck Road, Chessington, Surrey, KT9 1JX. Tel: 081-397-0763.

## SPECTRUM PRODUCTS

<b>+2A MOD KIT</b>	Converts a black +2A into a genuine +2 with TWO expansion ports. This allows the PLUS D to operate properly. Includes replacement ROM, two port FIXER2 and full fitting instructions + manual updates. <b>£17.50.</b>
<b>THE FIXIT</b>	Converts the +3 and +2a expansion port so that some 48K add-ons will work.. Single port version <b>£9.50</b> , double port version <b>£10.50.</b>
<b>VTX5000</b>	<b>SPECIAL OFFER</b> - V23 direct connect modem with viewdata software in ROM. Version for 48K or gray +2 (+2A/+3 users need FIXIT) - <b>£10.</b>
<b>PD TAPE 01</b>	Comms software for VTX5000, VTX711 and RS232s. <b>ONLY £1.50.</b>
<b>Dr. SCROLL</b>	Scrolling software for VTX5000. <b>£4.00.</b>
<b>MEMBRANES</b>	Spectrum 48K (rubber type) keyboard membranes. <b>£5.00.</b>
<b>+3 PD TAPE</b>	+3 Utilities. Side 1 +3DOS. Side 2 CP/M files. <b>£1.50.</b>
<b>CURRAH µSLOT</b>	Two port adaptor. Cased <b>£3.00</b> Uncased <b>£4.50</b>
<b>OUTLET</b>	Disc magazine for DISCiPLE/PLUS D or +3 (state). Sample Issue <b>£2.00</b>

## SAM PRODUCTS

<b>SAMPLIFIER</b>	Stereo Amp powered from SAM. Drives speakers or head-phones. Plugs into light-pen socket. Amplifier alone <b>£20.</b> Speakers <b>£5.</b>
<b>PRO-DOS</b>	Allows you to run CP/M 2.2 programs on SAM. <b>£27.</b>
<b>PRO-DOS PD1</b>	PD programs to use with PRO-DOS <b>Only £1</b>
<b>THE P.A.W.</b>	The Professional Adventure Writing for PRO-DOS. <b>£16.50</b>
<b>CP/M MANUALS</b>	Genuine CP/M 2.2 DR Manuals <b>£..50</b>
<b>DAY DREAM</b>	Graphic Adventure for SAM <b>£4.50</b>

### □ **TURN YOUR PC INTO A SPECTRUM** □

Spectrum Emulator for PCs, 48K with IF1, with PD programs. (unregistered) **£2.50**  
Registration gives DISCiPLE/PLUS D disc reader and tape input. (registered) **£12.50**

### □ **RIBBON RE-INKING SERVICE** □

Star, Citizen and other standard fabric ribbons re-inked for **£1.50** each + return postage.

Please allow 28 days for delivery. All prices include UK postage and packing. Overseas customers please add £2 on modems; PRO-DOS and +3 CP/M, add £1 on all other items. Please make cheques/postal orders payable to B.G.Services.

# CONTENTS

Vol.6 N°9.

May 1993.

◆ News On 4 .....	4
◆ The Editor Speaks .....	5
◆ Short Spot .....	7
◆ Problem Solving - Part 4 .....	15
◆ The Help Page .....	17
◆ Machine Code Without Tears - Part 18 ...	23
◆ Writing For FORMAT .....	26
◆ Hardware Design Course - Part 1 .....	27
◆ Font120 .....	31
◆ Your Letters .....	33
◆ Small Ads .....	38
◆ FORMAT Readers Service .....	39

### THIS MONTHS ADVERTISERS:-

BETASOFT	Back Cover
B.G.SERVICES	2
BLUE ALPHA ELECTRONICS	29
FLEXIBASE SOFTWARE	16
FRED PUBLISHING	14
REVELATION SOFTWARE	30
RICHARDSON & CO	36
S.D.SOFTWARE	6
STEVE'S SOFTWARE	20,21
WEST COAST COMPUTING	10

### **FORMAT ISSN 0963-8598**

© Copyright 1993 **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 an 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 0452-412572. Fax 0452-380890.**

Printed by D.S.Litho. Gloucester. Telephone 0452-523198.

## REMOTE JOYSTICK

Blue Alpha Electronics have designed a new joystick interface to free you from the constraints of the joystick lead. Yep, no more direct connection to your computer.

OK, remote joysticks have been around for some years you might say. True but these have all been infra-red interfaces so you have still needed to keep clear line-of-sight between the joystick end and the computer end. The new unit from Blue Alpha uses Ultra-Sonic transmissions so in theory it doesn't matter how much you waggle that stick the receiver should still be able to pick up the transmission.

Priced at £34.99 (plus £2 p&p in the UK) the system comprises a transmitter which can be used with any Atari standard joystick, and the receiver which plugs into the computer. It will work with the vast majority of computers and interfaces provided there is a 5volt feed. Other computers will need a battery added to the receiver to power it.

For more details contact Blue Alpha on 0269 826260.

## RAS PD LIST

Radical Alternative Software, now that is a name to conjure with. Also known as RAS (no relation to SAS) it is a new venture from the music man himself Garry Rowland who is adding more fresh and original software to the Spectrum PD scene.

A new list, supplied on a re-usable C15 tape, is now available totally FREE. Now that is value for money. Just send a stamped addressed envelope to RAS, 24 Parsloes Avenue, Dagenham, RM9 5NX.

Please note that this is also the new address for Garry's other software, the old PO Box is now closed.

## CHEAP MONITORS

Trouble getting to use the family telly when you want to use your computer? Fancy the improved picture quality you get with a monitor? Can't afford £200+? Well, Bull Electronics' to the rescue. They have acquired a stock of reconditioned Amstrad CTM664 Colour Monitors which they are selling for £79 +p&p and VAT.

The monitors could be used, with a suitable adaptor lead, on all the 128K Spectrums and on SAM. There is no sound facility on these monitors but you could soon rig a small amp and speaker.

Bull Electronics are based at 250, Portland Road, Hove, Sussex, BN3 5QT.

## AVOID POWER SUPPLIES

West Coast Computers have again issued warnings about power supplies.

Following the close of SAMCO last summer a large number of untested SAM power supplies were sold by a South Wales factory to an electronics company that is now dumping them on the market at low prices. Neither the official receiver nor SAMCO's liquidator sold these units and, as they were never even delivered to SAMCO for testing they must be looked on with suspicion.

West Coast, and their official repair company Blue Alpha, warn that using these untested power supplies may cause problems. All official power supplies are identifiable, so only purchased from a recognised SAM stockist.

-----  
News Credits: J.Flood.

**URGENT** we need your news. Anything you think other people should know about. Items printed earn contributor 3 months extra subscription (please claim when renewing).

The All Formats Show in Birmingham on the 18th April was a bit of a disaster. Oh the crowds were out alright - just the wrong crowd from our point of view, few SAM users and even less Spectrum ones. This now seems to be true of so many of the shows and I can understand the reason. It has been a vicious circle - less people interested in Spectrum/SAM = less money for stall holders = less stall holders = less incentive for Spectrum and SAM users to go = less people....

Still it was nice to see those of you who did turn out and it was good to have SAM's to sell as well. However there is no way we, or anyone can cover our costs on these shows just now. So, while I will continue to support the Birmingham shows (cos they are so close it costs little to get there) I will not be attending any others until the autumn. That's the bad news, now the GOOD NEWS. We are currently looking for a suitable venue, in or close to Gloucester, to hold our own gathering in September. The intention is to have both stands (selling all things Spectrum and SAM) and meetings/lectures. The cost is yet to be worked out but will probably be £2 to £4 per person. In order to judge the size of the rooms required for this get-together we need some idea of numbers. If you would like to attend then drop us a line very soon, anyone doing so will get a discount on the eventual price as well as first option on tickets if we have to limit attendance. Send no money now - we won't need that until nearer the time.

Last month I commented on orders coming to us (and advertisers) well here is a classic case in point. In comes a renewal form and cheque - but cheque is made out for larger amount. Funny? Oh well, just give him the

extra months say I. Two days later, going through some envelopes taking stamps off (only the nice ones) out drops a bit of paper. Bit being the word. Just 2" by 1", on it the words '2 binders and the name of the sender' no address mind you.

Now I know we should have checked the envelope a little more when it came in - but I ask you.

So PLEASE use a normal size piece of paper, print your name, address and membership number, give the codes and description of the item you are ordering, and everything will be plain sailing.

The next piece of news has nothing to do with computers but will still interest many of you. I know that there is a vast interest in Science Fiction these days. The bookshelves of my local W.H.Smiths groan under the weight. But I have not found any SF mags around that provide an opening for new talent - and I intend to change that. Later this year I would like Format Publications to launch a new SF quarterly mag, concentrating on Science Fiction not Science Fantasy, and specialising in getting new authors into print. Any budding authors are most welcome to get in touch. I am also looking for an editor for the new mag, he/she needs to have access to a PC running Windows 3.x (that's needed to run the publishing software) and be prepared to work on a profit sharing basis. Get in contact if you want a chat about it.

Starting this month is the series on Hardware by Adrian Parker. I'm sorry it has been so long coming - its my fault, but I think you will all find it has been worth the wait.

Bob Brenchley, Editor.

Edited By:- John Wase.

## SPECTRAKER UNIDOS PC-SUITE

**SPECMAKER** The simplest Spectrum emulator for your SAM. 1000s of 48K programs work without the need for any conversion. Most other programs need only minor changes. All the extra SAM keys work in Spectrum mode. Uses SAM's parallel printer port and up to 360K of SAM memory as a RAMDISK. PLUS D and all OPUS disks\* can be loaded into SPECMAKER and saved to SAM disk. Can now convert files between Messenger & SPECMAKER format and so save on valuable disk space. Supplied on 3.5" disk \*Master Dos & Master basic required for single density OPUS

**PC-Suite** From the author of SPECMAKER S.D. Software brings you PC-SUITE. Now you can transfer your IBM data files by reading and writing IBM disks on your Sam. PC-Suite will let you format IBM disks on Sam. Write Sam basic programs on your PC.AT. Use PC-Suite to copy Sam data files to PC disk and print them on a high quality laser printer. Many more uses.

nb. Not a PC emulator.

**UNIDOS** Version 2 of the incredible new DOS from Steve Warr for the PLUS D and DISCIPLE. Same DOS file for both systems. Random files. Sub directories. Hundreds of files on one disk. Hidden files. Protected files. Copy files of any length. Incredibly versatile screen dump routines. Error trapping. Many more features. Compatible with all Spectrums\*. Over 20 programs now included on the disk. \* +2A/+3 restricted to 48K mode.

**SPECFILE+** Now a Spectrum data filing program that never gets out of date. Specfile+ holds a massive 28K of data and by using data compression makes it seem like much more. Very fast CASE selective and complex searches. Designed to be added to so it grows as you do. This program is a must have for any one with data to hold.

INDUG PRICES		NON MEMBERS	
Specfile+	£ 9.95	£12.95	
UNIDOS	£19.95	£25.95	
Createfile Manual	£ 5.50	£ 6.50	
Specmaker	£ 9.95	£12.95	
Specmaker Upgrade	£ 6.50	£ 8.00	
PC Suite	£19.95	£25.95	
IBU* /SAMIBU	£ 3.50	£ 4.90	
DBU*	£ 4.00	£ 5.50	
File Converter*	£ 4.50	£ 5.30	
Hackers Workbench*	£ 8.50	£ 9.90	

Don't forget to say if ordering for PLUS D or DISCIPLE and the size of disk required. (PLUS D, 3.5 inch 80T will be sent otherwise)

\* GDOS programs still available \*

PLEASE Add £0.50 Postage  
(£1.20 OUTSIDE UK)

DO NOT FORGET YOUR INDUG  
MEMBERSHIP NUMBER

S. D. Software, 70 Rainhill Road, Barnoldswick, Lancashire, England, BB8 6AB.

Well I never! Short Spot time again, and I'm as unprepared as ever. Now where did I put the correspondence file....

First off is Gilbert Jackson of Creigiau, Cardiff, with a little offering for the Spectrum. You probably remember last month that I suggested someone might be able to write a Spirograph program. This one is for the 48k, with Betasoft's Beta Basic and a Plus D, and could be easily modified for SAM. "The trouble is," writes Gilbert, "That it's not very good with Spectrum plain Basic for two reasons. Firstly, the Spectrum's COS and SIN are very slow. And secondly, cumulative errors arise from the use of DRAW instead of DRAW TO." So Beta Basic has it.

There is some scope for experiment with the 0.5 in line 200 where ABS(x-x3) decides whether the curve will stop when it returns to near its starting point: it is sometimes right that it should run on. Anyway, here's the program...

```

10 REM SpiroBB G.J 2/93
20 PAPER 0: BORDER 0: INK 7: IF PEEK
  23730+256*PEEK 23731<>46623 THEN
  CLEAR 46623: LOAD d1"BB"CODE :
  RANDOMIZE USR 58419: CLS
30 LET r1=80
40 PRINT " Cog(1) has radius 80. Co
  g(2),""of radius r2,rolls within
  its""circumference"" The pen i
  s on cog(3),of radius r3, rolling
  in cog(2)"
50 PRINT " Cog(2)'s centre moves in
  cog(1)at angular speed da, cog(3)
  in""cog(2) at speed db, and the
  pen goes around cog (3) at speed
  dc,(see L100)"
60 DO : PRINT AT 14,0:"Enter:-(1)
  radius r2 of cog(2) (2 to ";r1;"
  ""(2)radius r3 of cog(3) (2 to r
  2)"
  
```

```

70 INPUT "r2=";r2;"r3=";r3: IF r2>r
  1 OR r2<2 THEN PRINT "" Radius
  2 should be 2 to ";r1;" ""Start
  again.": LOOP
80 IF r3>r2 OR r3<2 THEN PRINT ""
  Radius 3 should be 2 to r2. ""Sta
  rt again. LOOP
90 CLS :PRINT "r2=";r2;"r3=";r3:#0
  ;"Key Q to quit."
100 LET c=0,b=0,a=0,dc=.5,db=r3/r2*dc
  ,da=r2/r1*db,d1=r1-r2,d2=r2-r3
110 DO
120 LET x1=128+d1*FN C(a)
130 LET y1=88+d1*FN S(a)
140 LET x2=x1+d2*FN C(b)
150 LET y2=y1+d2*FN S(b)
160 LET x3=x2+r3*FN C(c)
170 LET y3=y2+r3*FN S(c)
180 IF c=0 THEN PLOT x3,y3: LET x=x3
190 DRAW TO x3,y3
200 IF <01 AND ABS (x-x3)<.5 THEN GO
  TO 400
210 LET c=c+dc
220 LET b=b+db
230 LET a=a+da
240 LOOP UNTIL INKEY$="q"
250 GO TO 500
400 INPUT ;: PRINT #0; INVERSE 1;"Aga
  in? (y/n)": PAUSE 0: IF INKEY$<"
  n" THEN CLS: GOTO 60
500 :
  
```

Gilbert's a wonderful man. Whenever he sends me something, he always documents it carefully, and adds interesting notes, even to sending them later. This item, for instance, has two PS's. In the first, he mentions that when Beta Basic and the Plus D get together, BREAK and STOP sometimes cause trouble. Hence the use of INKEY\$ = "q" and GO TO 500. The second PS is very brief. "Try r2=30, r3=5". Good start, Gilbert. He's beaten the rest of you. How about it?

Mr Cooke-Yarborough of Chichester has written to me again. I'm surprised and gratified, after I lost his other letter behind the sideboard for a

year! Anyway, this one is a lot quicker seeing the light. He writes that he was very interested in the "varprint" program in February's Short Spot. He has several Basic programs which have grown like Topsy over the years, and so he has considerable doubt, when he looks at one of them again and tries to introduce yet another variable. He mentions that a snag with "varprint" is that it lists only one variable per screen line, and so with more than 22 variables, the screen starts to scroll, and you lose some again. So he's made the program list the variables across the screen, separated by spaces. The changes are obvious and amount to putting ";" at the ends of PRINT statements. In lines 9706, 9708 and 9710, the space can go into the existing string, which is followed by a semi-colon. In line 9709, the space has to be put into an extra PRINT statement. Because of this, only a semicolon needs to go into the PRINT statement in line 9712 of the subroutine and no change is needed on line 9713.

The display is improved by two cosmetic changes. An extra PRINT statement on the end of line 9705 puts "End of variables" on a fresh line. On line 9711, changing the space after FOR to \_ links FOR to the succeeding variable.

The program's short enough for me to reproduce it fully, with Mr Cooke-Yarborough's alterations. Here it is...

```

9705 LET vars=PEEK 23627+256*PEEK 2362
8: FOR i=vars TO 65535: LET byte=
PEEK i: IF byte=128 THEN PRINT :
PRINT "End of Variables": STOP :
REM varprint modified by E H Cook
e-Yarborough, 13 Feb 1993
9706 IF byte<=90 THEN PRINT CHR$(byte
-64+96);$ "": LET i=i+(PEEK (i+1)
)+256*PEEK (i+2)+2): NEXT i
9707 IF byte<=122 THEN PRINT CHR$(byte
e);$ "": LET i=i+5: NEXT i
9708 IF byte<=154 THEN PRINT CHR$(byte
e-128+96);$ "": LET i=i+(PEEK (
i+1)+256*PEEK (i+2)+2): NEXT i
9709 IF byte<=186 THEN PRINT CHR$(byte
e-160+96);$ "": GO SUB 9712: PRINT "
```

```

": LET i=j+5: NEXT j
9710 IF byte<=218 THEN PRINT CHR$(byte
e-192+96);$ "": LET i=i+(PEEK
(i+1)+256*PEEK (i+2)+2): NEXT i
9711 PRINT "FOR ";CHR$(byte-224+96);$
": LET i=i+18: NEXT i
9712 FOR j=i+1 TO i+100: LET sbyte=PEE
K j: IF sbyte>=129 THEN LET sbyte
=sbyte-128: PRINT CHR$(sbyte); RE
TURN
9713 PRINT CHR$(sbyte);$ "": NEXT j
```

Ted mentions that "varprint" will produce a very creditable list of variables, but may not have all of them. Immediately a program has loaded, it will contain the variables which had been assigned before it was previously saved. This list will only be complete if every possible subroutine defining a fresh variable was run. Moreover, if a program does a CLEAR then the list will contain only those variables defined in lines executed since the CLEAR. Either way, the list may be incomplete. It should be possible to write a program which ploughs through all your BASIC, recognises every variable, and checks if it needs to be added to the list. Ted asks if anyone has written such a program. Well? Has anyone....

Many thanks, Ted, for a most interesting contribution.

Next, a problem from Norman Green of Dawlish, Devon. He has a Spectrum +3 with 3" internal and external drives and a 48k Spectrum coupled to an Opus Discovery 1, with a 3.5" 40T SS drive which he sometimes uses as an external drive for the +3. And he has acquired a 3.5" Plus D disc with Artist2, Money Manager and Specfile. He wants to know if he can patch the +3 or Discovery to read this disc. Well, bluntly, No. The format of each of these discs is very different from the others. The Plus D and SAM could perhaps do it with their "read-a-sector" abilities, but sod's law demands you want things the other way round. You're in trouble. Unless you have all the time and patience in the world, and are possibly quite good at machine code, forget it. Probably, if you found a friend with a Plus D and merged the program, you could save

to tape. You could also use a magic button device (NMI button job) like Romantic Robot's. But even then, you would have to start delving deep into the code to get the thing to output anything to the printer, for instance. And you are likely to have to mess about with it to get it to load at all. The loader program's going to call the original device for which it was written: initially you're in BASIC, so it won't be too bad to modify the syntax, but later on you could well have more trouble, particularly if several bits of code are daisy-chained, each loading the next from code. However, perhaps I'm imagining the worst. The Discovery's likely to be the easier to adapt it to, so let's have a go. Acquire a Plus D from a friend; a temporary loan will do: BREAK the program in some way, get hold of the files, whack them out to tape. Now you must hope there is a reasonable amount of BASIC, hope that it's been done in Microdrive syntax. Add OPEN# 3;"B" somewhere in the opening BASIC loader and hope that this will get it to print. And keep your fingers crossed. Maybe you'll have some luck.

Carol Brooksbank wrote to me recently about her program "File Manager", which runs on SAM. Perhaps you remember; John Croghan and I reviewed it, and John's 'main, practical criticism was that he could not get the "file pointer" to appear on the printout of the record. He wanted this so that he could go straight to a record and check, say, for typing mistakes. The following lines do the trick.

```

14890 LPRINT: LPRINT: "F/P=";pointer:
16400 LPRINT: LPRINT: "F/P = "; point
r(R):
25190 LPRINT: LPRINT: "F/P = "; select
(RA):
```

Many thanks, Carol.

Next I have something from Ettrick Thomson of Aldeburgh, Suffolk, a regular contributor. Ettrick usually manages something esoteric, and this month it's a SAM program for producing

that mathematical masterpiece known as a "Dragon Curve". Ettrick writes that the Dragon Curve is closely related to the C-curve, which we have featured before. Like the C-curve, the depth needs to be fairly large; say 12, to get the effect. You can get an interesting variation by replacing Lines 160 by 165 and 170 by 175, but then it's no longer a Dragon Curve. Anyone got an interesting name for it? Anyway, here's the program...

```

5 REM dragon curve:Ettrick Thomson
:
10 INPUT #2;"depth >0:";n
20 PLOT 64,96
30 dragon n,-1,64,96,192,96
40 STOP :
100 DEF PROC dragon n,d,x1,y1,x2,y2
110 LOCAL x3,y3
120 LET x3=(x1+x2+d*(y1-y2))/2,y3=(y
1+y2-d*(x1-x2))/2
130 IF n=1
140 DRAW TO x3,y3: DRAW TO x2,y2
150 ELSE
160 dragon n-1,1,x1,y1,x3,y3
165 REM dragon n-1,d,x1,y1,x3,y3
170 dragon n-1,-1,x3,y3,x2,y2
175 REM dragon n-1,-d,x3,y3,x2,y2
180 END IF
190 END PROC
```

Fine. Let's stick with SAM for a while. And over to Lee Willis of Heswall, Wirral. He has a little routine called "multiplier". This is a procedure to multiply two numbers together. The numbers must be given as strings and must be purely numeric. The answer is in full, not Scientific form. Here it is....

```

10 MODE 3:CLS #: CSIZE 8,8
20 PRINT AT 0,0;"PLEASE ENTER TWO N
UMBERS TO BE MULTIPLIED TOGETHER
"
30 INPUT #2; AT 3,0;"Number One : "
: LINE a$; AT 5,0;"Number Two : "
: LINE b$
40 CLS
50 Mult a$,b$
60 STOP
60000 DEF PROC mult a$,b$
60005 LET carry=0
60010 IF LEN a$<LEN b$ THEN LET c$=b$,
b$=a$,a$=c$
60020 DIM ans$(LEN b$,LEN a$+LEN b$)
```

# WEST COAST COMPUTERS

West Coast Computers Ltd,  
Abernant Centre For Enterprise, Rhyd-y-fro, Pontardawe, West Glamorgan, SA8 4TY.

Below you will then find details of the range of SAM hardware that is now available from us.

CODE	DESCRIPTION	PRICE
W1001	SAM - 512K - Single Disc Drive Fitted.	£199.95
W1002	SAM - 512K - Dual Disc Drives Fitted	£274.95
W1003	SAM - 512K - Plus External Drive Interface. [Allows you to use your own DISCIPLE/PLUS D 3½" Drive]	£149.95
W1101	SAM Internal Disc Drive Unit.	£79.95
W1102	Parallel Printer Interface. (SPI)	£24.95
W1103	RS232/Parallel Interface (COMMS).	£34.95
W1104	1 M.Byte External Memory Pack. (Needs MasterDOS).	£79.95
W1105	Card Cage (Sambus) - needs MasterDos for real-time clock.	£49.95
W1106	SAM Mouse System.	£39.95
W1107	External Disc Interface (Includes Parallel Printer Port).	£34.95
W1108	Internal 256K Upgrade (for older SAMs with only 256K)	£29.95
W1201	SAM Power Supply.	£24.95
W1301	SAM Parallel Printer Cable (BBC type)	£9.95
W1302	SAM to TV/Monitor Scart Cable	£9.95
W1303	MIDI Cable Set	£6.95

E.& O.E. Prices valid, subject to availability, until 1st September 1993.

**UK Postage & Packing:** Add £10 for computers (sent by insured carrier). All other items add £1 per item (max £5).

**Overseas customers:** Please write for quote on Airmail Insured Delivery Service.

Write your order clearly on a reasonable sized piece of paper, state your name; address and phone number. Cheques, Postal Orders, Euro-cheques should be made payable to West Coast Computers. We will try to dispatch your orders as quickly as we can - however please allow 28 days to be on the safe side.

There are other item not listed above (including a Video Digitiser and a dedicated SAM Modem) which will be available in the next few months - watch out for our next advert.

```

60025 FOR row=1 TO LEN b$
60040 FOR p2=LEN a$ TO 1 STEP -1
60050 LET x=carry
60060 LET x=x+((VAL b$(row))*(VAL a$(p
2)))
60070 LET ans$(row,p2)=STR$(x MOD 10)
60080 LET carry=x DIV 10
60090 NEXT p2: IF carry THEN LET ans$(
row)=STR$(carry+ans$(row),carry=
0)
60110 NEXT row
60120 IF LEN b$>1 THEN FOR ex=1 TO LEN
b$-1: LET ans$(ex)=TRUNC$(ans$(
ex)+STRING$(LEN b$-ex,"0")): NEXT
ex
60130 FOR tyio=2 TO LEN b$
60135 IF LEN TRUNC$(ans$(tyio)<LEN TRU
NC$(ans$(tyio-1) THEN LET ans$(t
yio)="0"+ans$(tyio, TO LEN a$+LE
N b$-1): GO TO 60130
60140 NEXT tyio
60150 LET carry=0,columns=LEN TRUNC$(
ans$(1)
60160 LET rows=LEN b$,answer$=STRING$(
columns," ")
60170 FOR cols=columns TO 1 STEP -1
60180 LET x=carry
60190 FOR r=1 TO rows
60195 IF ans$(r,cols)="" THEN GO TO 6
0210
60200 LET x=x+VAL (ans$(r,cols))
60210 NEXT r
60220 LET answer$(cols)=STR$(x MOD 10
)
60230 LET carry=x DIV 10
60240 NEXT cols
60250 IF carry THEN LET answer$=STR$(
carry+answer$
60500 CLS : PRINT AT 0,0;a$;" x ";b$;"
";answer$
60510 END PROC

```

Bored yet? Ah, shows you're half asleep. Now, if you'd really been awake, you would immediately have deduced that this was going to be part of a larger routine. Because of the way I introduced it. You remember a guy called Nev Young? Can't remember him either? Why, you really are asleep! Well, in the September Edition, he set a challenge. This was to write a program to evaluate 701 and to produce the answer in full in under 30 minutes. In Basic! Course, Lee's done it, hasn't he. It's called "factorial". Type in these lines as well as the routine above.

```

5 MODE 3: CLS #: CSIZE 8,8
6 PRINT AT 0,0;"CALCULATE FACTORIA
L OF WHAT?": INPUT #2: AT 2,0:fa
ct: CLS : POKE SVAR 632,0,0,0
10 LET answer$="1": CLS: PRINT AT 1
0,20;"PLEASE WAIT, CALCULATING!"
20 FOR pling=2 TO fact
30 mult answer$,STR$(pling)
40 NEXT pling
50 CLS : PRINT fact;"! = ";answer$
70 LET fiftieths=PEEK SVAR 632+(256
*PEEK SVAR 633)+(65536*PEEK SVAR
634)
80 LET seconds=fiftieths DIV 50
90 LET minutes=seconds DIV 60
100 LET seconds=seconds MOD 60
110 LET fiftieths=fiftieths MOD 50
120 PRINT minutes;" Minutes,";secon
ds;" Seconds."
130 STOP
59999 REM INSERT PROC mult HERE

```

Daniel Sheridan sent me a piece of code last month. Well, several pieces of code. Faced with a disc and a piece of code, what could I do? Well, I ignored most of the items. One, however, contained a couple of Sierpinski gaskets. And since these had generated a fair amount of interest, I spent a lot of time getting a decimal printout and then typing this into data statements. Yes, clever-clogs, I know you can write a program to PEEK each item, then write the code to disc; you could even automate the writing of data statements on the disc. And then I'd have a Plus D disc of data statements and the rest of it as a program, typed in as ASCII on a word-processor running on a PC compatible, along with the rest of the text of Short Spot. Not as simple as one might think... Anyway, WASE HAS BOOBED. Don't bother to type any more in! I've just had a letter from Roy Burford of Stourbridge. He's already found one place where I've crossed my fingers, and it still crashes half way through. So I'm sending him the offending disc to unravel, which he has very kindly offered to do. I've already spent too much time on this, and too many column inches. So... WARNING! All discs sent to me with totally undocumented code will from now on be formatted. So there!

Who runs "The Secretary" on SAM? Quite a lot of you, judging by the correspondence I get. Doug Casterton of Hucknall, Nottinghamshire, transferred all his files from the pre-issue "Secretary" to the latest upgrade, and found at this point that the directory was a horrible confused mess. Having used MasterDos on the working copy, he was regretting that he couldn't date-stamp the files and sort them into sub-directories. So here's his modifications.

Before you start any modifications, make a spare working copy, just in case. And don't forget; this needs "MasterDos" to work.

1. First do RENAME "Auto\_sec" to "Sec\_bas"
2. Then type in the next six lines.

```
10 POKE DVAR 150,0
20 CLS: PRINT AT 6,1;"PLEASE ENTER
  THE DATE (ddmmyy)";AT 10,3;" IF
  DATE NOT REQUIRED";AT 11,9;"PRES
  S ENTER"
30 INPUT d$
40 IF CODE d$=0 THEN GOTO 60
50 DATE d$
60 LOAD "Sec_bas"
```

And do SAVE "Auto\_stamp" LINE 10

3. Next, you will need to break into the program when it's running, and start it up again. The handbook doesn't say how to do this, but if you make sure that there's some text on the screen and press the NMI button, it usually works. Then do the necessary modifications and restart by typing RESUME. Note that this doesn't work on a blank screen.

4. In LINES 7680, 7850 and 7865... Insert the following two statements immediately before the DIR dv"T\*! statement.

```
INPUT "DIR=????? ";dr$ DIR="\Plus Dr$
Gedditt?? Good...
```

5. SAVE "Secretary" LINE 10

These modifications mean that the

first time that you LOAD, SAVE or MERGE a file, you are prompted to provide the name of the sub-directory before the program does a DIR and asks for the file-name. If you want the ROOT DIRECTORY, then just press ENTER.

Many thanks, Doug.

Next, a little note from M. Rookyard of Tyldesley, Manchester. Who here with a Spectrum has not cursed after filling the brute with code or programs, when a careless knock has crashed the lot. This sort of problem occurs, of course, only when you've attached a peripheral on the gritty, grubby, worn and oxidising lead-striped edge of the printed circuit board, not really a very suitable long-term connector. Mr Rookyard calls it Edge Connector Disease (ECD), and his ire was fully raised one day when he typed out an extensive article on a Vintage Engine Rally for a magazine. And ended up with none of his words being stored on the disc, due to ECD-based crashes during saving. As the first cure; throwing the Plus D against a wall merely temporarily lowered his blood pressure, but exacerbated the problem, so long-term, he had to sit down and think things through.

So he removed the offending Plus D edge connector, and replaced it with a 64-pin Euro connector, SAM-style shortened to 56 pins (2x28) so that it did not obscure the power socket. The next step was to open up the Spectrum +2a and solder a similarly shortened Euro socket onto the edge connector pads, ensuring that they were both the same way round. Result - zero crashes! Snags - if you've a lot of peripherals, then you've got to treat them all similarly; multiple "fixits" and interfaces requiring simultaneous connection will present problems, and compatibility with other Spectrums is lost. Probably a small price to pay for a crashless existence. He writes that plugs and sockets come from Maplins Electronic supplies; order codes FJ51F and FJ47B, called "RAPL64AC connector" and "STSK64AC" connector respectively. He suggests that ESD protection is worn when you

work on a pcb, or else you connect yourself to earth through a 1M ohm resistor, and one should avoid, if possible, touching tracks and IC pins.

He ends by suggesting that as Spectrums age, their connectors will get more and more oxidised and corroded, and this should give them a new lease of life.

Mr Rookyard says that at one of the All Formats Fairs at Haydock Park, someone asked him how to double the line speed of the video signal from SAM? His solution involves adapting the video digitizer techniques so that high scan rate monitors can be used with SAM and Speccy. Incidentally, he is also the originator of the SAM Video Digitizer, a high speed version of which is on his bench right now.

He also suggests that as quite a few readers enjoy dabbling with electronics, maybe there's room for a small regular (or irregular) column on hardware fixes. I am dumb over electronics, Mr Rookyard. Would you be willing to put one together? Or anyone else? What about it: is there the demand? Come on, write to Format and tell us.

You remember "Alienbrain" from the Wilby's, last month. Well, to end up with, here's a couple more bits and pieces to merge into "Alienbrain" for your amusement...

**Alienegg**  
200 LET x=113\*(1+SIN t\* SIN (1.05\*t)):  
LET y=86\*(1+COS t)

**Coil**  
200 LET x=113\*(1+SIN t\* SIN (.455504\*t)):  
LET y=86\*(1+COS t\* COS (.455504\*t))

**Yarn**  
200 LET x=113\*(1+SIN t\* COS (.455504\*t)):  
LET y=86\*(1+COS t\* COS (.455504\*t))

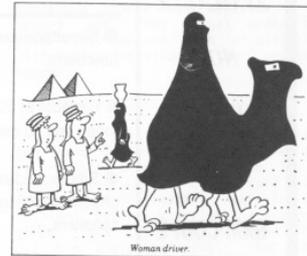
**Bow**  
200 LET x=113\*(1+SIN t\* COS (.455504\*t)):  
LET y=86\*(1+SIN t\* SIN (.455504\*t))

**Triloop**  
200 LET x=113\*(1+SIN t\* COS (.333333\*t)):  
LET y=86\*(1+SIN t\* SIN (.333333\*t))

**Diamond**  
200 LET x=113\*(1+SIN t\* COS (.222222\*t)):  
LET y=86\*(1+COS t\* SIN (.222222\*t))

Once again, our grateful thanks to the Wilbys.

And that's all for now, folks. My thanks to all who have sent - without your material, I couldn't put a column together. Please keep it coming, and please send it to me, John Wase, Green Leys Cottage, Bishampton, Pershore, Worcs, WR10 2LX, and I'll try to put an interesting column together for you. Look forward to next month. See you!



I'll ask my wife what I think and let you know.



PRESENTING

# ETRACKER

**AVAILABLE**

NOW,  
ONLY FOR  
THE  
SAM COUPÉ  
FOR  
**£29.99**

**FEATURES:**

- Simultaneous voice functions.
- Capable of 2048 tones and 96 notes.
- Edit individual channels/left/right speakers.
- Built in music compressor, BASIC & M/C music drivers and interrupt drivers.
- Runs on 256/512, 1 drive SAM.
- Runs 6 channel music/FX every 50th of a second.
- Uses the FULL capabilities of the SAM's spectacular SAA1099 sound chip.
- ETracker gives total control of your musical talent with the greatest of ease.



Send formatted 3 1/2" disk and SAE for samples of ETracker music  
**FRED PUBLISHING, 40 ROUNDYHILL, MONIFIETH, DUNDEE DD5 4RZ**

# PROBLEM SOLVING WITH YOUR COMPUTER

By:- Don Thomasson.

In this latest article we work backwards to a solution of last month's puzzle, and set a problem about sets.

in the order in which it appears. For more general use, it would be necessary to take brackets and priorities into account. For example, the equation might be:-

$$N + (4+6)*3 = 40$$

If you remember, last month's puzzle involved computation of N, where N is given by the equation below (a mathematical representation of the puzzle's structure):-

As it stands, the program would go sadly astray, giving the result as N = 3.3333. It fails to note the implication of the brackets, which mean that their contents should be calculated first, the sequence being:-

$$((((((N/2)+6)/2+5)/2+4)/2+3)/2+2)/2+1 = 5$$

The program at the end of this article will handle this particular case and some others, but would need refinement for more general application.

$$N+(4+6)*3=40N+10*3=40N+30=40N=10$$

Note that the multiplication must be processed before the addition, in accord with the usual order of priorities. However, with a slightly different equation, the process becomes:-

$$N*(4+6)+3=43N*10+3=43N*10=40N=4$$

The equation is input as a string AS. The string is scanned by subroutine at line 1000, starting at the right hand end applying the following rules:-

- \* If a numeric code is found, the subroutine sets the variable E to the number, treating it as decimal.
- \* If an '=' sign is found, E is copied into N.
- \* If a '\*' sign is found, N is divided by E. : \* If a '+' sign is found, E is subtracted from N. : \* If a '-' sign is found, E is added to N. : \* If a '/' sign is found, N is multiplied by E. : \* If an alphabetic character is found, it is set in RS.

Since the multiplication is within the term containing the variable, it is processed after the addition. In a rather broad way, it can be said that each term of the equation needs to be resolved before applying the program given. This could be achieved by suitable analytical logic, but the processes involved would be quite complex, and there is (fortunately) no room to investigate that here. Nevertheless, the concepts involved give an interesting indication of the complexity of mathematical expressions.

When the scan reaches the start of the line, the contents of N are output as the value of RS.

**ZOO-LOGICAL**

This relatively simple routine suffices in the given case because the location of the brackets removes any doubt regarding priorities; each number and operator can be processed

Rather than pursue that line of thought too far, let us turn to pure logic problems, those which concern the association of sets of items. Given some of the associative links, you are asked to deduce the rest. In

certain circles such problems are known as 'zebras', because a well-known example ends by asking 'Who owns the zebra?', but here is an original example concocted especially for the occasion.

'In each of four houses there are a husband and wife, a car and a dog. Charles lives at No.1. Dave is married to Brenda. Ann, who does not live in the same house as the beagle, loves to drive the vintage Bentley which her husband bought last year. One dog is a collie. One man is Bob Bond. The Cooks own a boxer. Mr and Mrs Ames live at No.3. Cathy lives at No.2. Alan owns the corgi. Mr and Mrs Davy own a Ford. If the Austin is parked at No. 4, who owns the Talbot?'

This is not meant to be a particularly difficult example of this type of puzzle, but the real problem is to program your computer so that it can solve the problem for you. It will want a lot of help. Apart from learning the names of the various items and people, it will need to be taught which items are cars, which are dogs, and so on. Once it has all the data, however, it should be able to complete the job on its own.

The puzzle involves four sets, each of six items. These dimensions were chosen to suit the limitations of the Spectrum screen, but the addition of a fifth set makes such problems more interesting - and rather more difficult. If you make a good job of the program, the reason should be evident....

Listing 1. Program to back-solve expressions like the one in the first paragraph.

```
100 CLS
110 INPUT "Expression ? ";A$
120 LET D=0
130 LET E=0
140 LET S=0
150 LET X=0
160 DIM C(6)
170 LET Q=LEN A$+1
180 GOSUB 1000
190 IF S=1 THEN GOTO 600
```

```
200 IF B>47L AND B>58 THEN GOTO 300
210 IF B=61 THEN LET X=E
220 IF B=42 THEN LET X=X/E
230 IF B=43 THEN LET X=X-E
240 IF B=45 THEN LET X=X+E
250 IF B=47 THEN LET X=X*E
260 IF B>64 THEN LET R$=CR$ B
270 GOTO 180
300 LET D=D+1
310 LET C(D)=B-48
320 GOSUB 1000
330 IF S=1 THEN GOTO 600
340 IF B>47 AND B<58 THEN GOTO 300
350 LET E=0
360 FOR N=D TO 1 STEP -1
370 LET E=E*10+C(N)
380 NEXT N
390 LET D=0
400 GOTO 210
600 IF R$<>" THEN GOTO 630
610 PRINT "No variable"
620 STOP
630 PRINT R$; " = ";X
640 STOP
1000 LET Q=Q-1
1010 IF Q=0 THEN LET S=1:RETURN
1020 LET B=CODE A$(Q)
1030 IF B=32 THEN GOTO 1000
1040 RETURN
```

## FLEXIPAGE

TEXT AND GRAPHICS AUTHOR FOR BEGINNERS TO EXPERTS

Combines text, graphics and sound. Interactive, automatic & free format.

PC 3.5" disc: £8. SAM disc: £12  
SPECTRUM: £8; Plus D 3.5" and +3 3" disc or tape (Microdrive and Opus compatible).  
PCs need SPECTRUM EMULATOR.  
shareware: £3.50, full registered version: £13.50.

Flexipage exercises: CRIME QUIZ demo. (freeware): £2. ZOO-VIEW information and test: £3. POLICE PATROL 2 beat simulation: £3. OLAF THE VIKING search for Scottish treasure: £3. ROADCRAFT TEST are you up to advanced driving? £5.

Send stamped addressed envelope for further details to:-

FLEXIBASE SOFTWARE,  
20, The Parklands, Droitwich Spa,  
Worcs, WR9 7DG.

16

# The HELP PAGE

Edited By:- Kevin Gould.

Hi out there. Straight to business. Welcome to Mike Atkins who has agreed to join the Help Page panel on +3 matters. He has (naturally) a +3, multiface 3, 3.5" disc and Star LC24-200 printer. He also has CP/M, uses Tasword Plus 3, Masterfile +3 and other packages. It now means that FORMAT readers have assistance on all Spectrums and of course SAM. What else could one ask for?

Peter Ryan is first this month. He wants to re-sort data so it can be printed out alphabetically. He uses Fastfile by Clyde Bish (Format Vol.2 N°8). Well there was an excellent article from Nev Young in Vol.2 N°10 which covers all aspects of sorting in Basic which should help you.

Last month I answered the microdrive query sent by Doug Casterton. Doug, I have done some research on my day off and come up with the following:- End of file problem. Using a special marker placed at the end of a file is quite easy in ZX BASIC. There are several character codes that do not occur in normal use. Example CHR\$(0) to CHR\$(5). The marker is easy if the data stored on the file is a string but it not possible to include odd characters with numeric data. The solution is to read numeric data into a string and test this string for an EOF flag/marker. If the string is not an EOF flag then it is a valid numeric data item and can be converted to numeric form using VAL. If CHR\$(0) is being used as an EOF marker the following program will write a file with a random number of data items and then read it back without causing an EOF error.

```
10 OPEN #4,"m";1;"random"
20 LET L=INT(RND*50)+100
30 FOR I=1 TO L
40 PRINT #4;RND*1000
```

```
50 NEXT I
60 PRINT #4;CHR$(0)
70 CLOSE #4
80 OPEN #4,"m";1;"random"
90 INPUT #4;a$
100 IF A$=CHR$(0) THEN CLOSE #4:STOP
110 LET A=VAL A$
120 PRINT A
130 GOTO 90
```

How is data stored. Data is stored on a microdrive cartridge in blocks of a fixed size called sectors. During a FORMAT, as many blank sectors as possible are written onto the tape cartridge. Each sector is made up of two parts, a Header Block and a Data Block. The Header is to identify the particular sector that is currently passing under the read head of which the format is:-

```
12 bytes of lead in signal
1 byte flag
1 byte sector number
2 bytes unused
10 bytes cartridge name
1 byte check sum.
```

The purpose of the header is to mark the current position on the tape and the most important part is the 1 byte sector number. The Format creates the sectors and assigns each one a unique number between 0 and 255 (though the tape is never long enough to hold 255 sectors). The data block is in two parts, a record descriptor that holds info about the data that follows and a record that stores useful data. Its format is:-

```
Record descriptor
12 bytes of lead in signal
1 byte flag
1 byte record number
2 bytes record length
10 bytes filename
1 byte checksum.
```

17

Record  
512 bytes of data  
1 byte check sum.

I hope that fully answers your original question..

Next, my thanks to Steve Warr. It regards Animate in January 1993 edition. Steve wrote to say the error was in the copy sent to Bob. It appears in Listing 2 on page 20 and is line 60. It is printed as:-

```
60 RESTORE : FOR F = 0 TO VAL "5"
```

this should read:-

```
60 RESTORE : FOR F = 1 TO VAL "5"
```

Steve also adds that the program will not work if its run with CAPS LOCK ON (it will not accept keypresses). I think I have found another error, listing 2 line 720, change to POKE B\*X,F : RETURN. My 48K was producing an error with the current line 720. Mine now works fine in all modes.

In addition Steve also writes that those who have Miras Modula 2 compiler (thats includes me) he has found and fixed over 30 bugs in the compiler. He has also written improved disc interface routines for UniDOS and GDOS and is in the process of writing a "File System" module for UniDOS, if anyone is interested then drop him a line c/o FORMAT and Bob will pass it on.

While on the Modula-2 subject, if you are using the original version, you may and I stress may, find the bug or whatever it is when you attempt to save the source code to Plus D disc. This gives the appearance that the code is saved (disc works etc) but the code has not been saved. If you obtain a Cat using the C option you will see 0,0 as the address and length, providing you still have the source intact, re-save and all works well. The new Cat produces Filename, Type, Address,Length which should read 0,length. Don't do what I did and expect just because you saved a (long) source code file to disc, it was

actually saved, always check using the C option, unless of course you like a lot of typing!

W.V Holden of Aylesbury is next. Your problem is that you don't understand how to use the advance features of Uni-DOS. The printing and simple commands you understand, however its random access files, hidden files, directory files, create files and other advanced command operations that are causing problems. I believe in the case of hidden files that these are normal filenames but somehow you can request that the filename is not produced in the directory/cat.

In FORMATS defence, there has been several articles about Uni-DOS and some programs/utilities. I believe some previous Help Pages and Letters Pages have also covered this topic. I personally don't use Uni-DOS, I am still with G+DOS so can't say anything about the booklet or package. I would suggest that you write to SD giving as much information as possible, I am sure they would be only to pleased to help you.

Now for something completely different. A +2a and a 48K Spectrum. Using the tape method these have been networked, however, I have a problem which I feel sure FORMAT readers can solve. The +2a does not have tape sockets for the obvious reason. However, inside is a connector which gives REC, PLAY, GND, VOLTS. I have installed 2 3.5mm jack sockets and have taped off one wire from REC and PLAY to one socket, this forms the "EAR" side which when connected to the "MIC" socket on the 48K Speccy and using appropriate LOAD/SAVE transfers data perfectly - no problems. The problem is the reverse. It does not matter how on the second socket I connect the wires whether to the PLAY or/and REC in the +2a, or which socket I use on the 48K the 48K sends but the +2a refuses to accept (LOAD). I have tried an external tape cassette recorder to provide a bit of amplification and have tried using the built in tape deck. With the second

socket wired as the first, the +2a will load happily from the same external tape recorder.. I thought this would be easier than using the RS232 method. I have Interface 1 for the 48K being an ex-microdrive user.

In theory you are right and it is the simplest method seeing it is "built in". I had the same idea in mind for my two. I am not sure why it does not work, obviously the +2a requires a higher volume or audio setting. You have tried everything I tried with the same results. Like me, you have tried the cassette recorder in different combination of modes. I have drawn a blank. Like you, I am hoping that a FORMAT reader will offer some advice. I believe we have a couple of electronic geniuses - I am sure the answer is simple.

Further to the reply to Keith Bartlett's question in the March issue, Carol Brooksbank has written to me mentioning that it is inadvisable to alter the printer DIP switches to obtain the IBM character set if you can achieve the same result by re-setting the printer control codes. I certainly support this point of view and agree that the DIP switch settings should only be changed as a last resort. Carol also writes that, on receiving her copy of The Secretary, she initially changed all the printer codes to suit her Citizen Swift 9 colour printer. Despite this she found that neither the IBM line/box characters or the colour changing would work. She therefore changed all the codes back to the original settings and, hey presto, everything worked perfectly! What do we make of that?

Still on the subject of The Secretary, Dean Shepherd of Bristol has written on the problem of the appearance of a stray "1" at the start of the page, which was also raised by Keith Bartlett. Bob wrote an explanation and a fix for this in his letter column in the same issue, pointing out the cause as the printer reset routine. Dean experienced the problem with his STAR LC10 printer

and, being able to do a HEX dump with this machine, found that the problem was being caused by the code for selecting the IBM character set. By changing the code from "27 116 49 27 54" to the alternative code listed for the LC10, namely "27 116 1 27 54", cured the problem. Interestingly, I use a STAR LC10 printer, mine is running perfectly on the original code settings and I have never experienced any of these problems. Printers are and always will be a mystery to me!

Dean also wondered where he could get hold of a Version 3 ROM for SAM. Well, you only need one if you still have a version 1 ROM. Type PRINT PEEK 15 to see which you have, the number printed is the version number times ten. Anything 20 or over is OK, the latest should give 30 or 31. If 10 appears then you do need to upgrade. Kits are still available through FORMAT at £12 inclusive.

More problems with The Secretary. Tony Mugford of Welwyn was having problems with getting the BLOCK function to work and also wished to be able to print and save a block, separate from the rest of the text. The procedure for marking and moving a block is as follows.

a. Select the BLOCK sub-menu and press B to enter the SET BLOCK mode. The BLOCK sub-menu will be erased at this point.

b. Mark the required block by moving the cursor to top left hand corner of the required block and pres. F0, (the marker will become the copyright symbol at that position). Move the cursor to the bottom right hand corner of the block and press F0 again. The BLOCK sub-menu will now re-appear indicating that the block has been marked.

c. Press G to grab the block into memory and press EDIT to remove the BLOCK sub-menu.

d. Move the cursor to the point where you wish to re-position the block and press F3. The block will appear at

# SOFTWARE FOR THE SAM COUPE

## SC\_ASSEMBLER

£12.50

99% Machine code  
Utility for the Sam

If you have been reading the much praised articles in the Format Magazine 'Machine Code Without the Tears' by Carol Brooksbank and are new to the fascinating world of Machine code. SC\_ASSEMBLER is the ideal program to help you, thanks to the unique automatic autotab editor designed to help the absolute beginner.

Review in 'Outlet' Issue 53 Jan 92 'Simple enough for the beginner powerful enough for the expert'. 'Format' Vol 3 no12 'A delight to use, it's certainly the one for me'.

Highly recommended by Carol Brooksbank.

## SC\_MONITOR

£15.00

99% Machine code  
Utility for the Sam

SC\_MONITOR is an essential utility to use with an Assembler to help understand and debug machine code programs.

Single step each opcode to see what it does and the effects it has on flags, registers, memory and the screen. Various special types of breakpoints will help pinpoint bugs and resets in programs.

Unlike other monitors (incl CP/M) this monitor copes with all opcodes, paging without Sam crashing.

There is also a super fast intelligent disassembler that can also disassemble backwards!

## SC\_PD3

£2.50

Public Domain  
Software

A Completion of SC\_PD1 (Specclone-Spectrum Emulator, needs copy of Spec 48K Rom on Disc) Disc Directory Utility Examines Dir in detail, unerase, alpha sort files etc, Screen Compressor 1, SC\_PD2 (Screen Comp 2). Bonus SC\_DISCLONE a clone Disc copier.

## SC\_FILER

£12.50

99% Machine code  
Utility for the Sam

SC\_FILER is a powerful Database program allowing massive storage of data. You can set up the database to your exact requirements, with fields of any size, position, colour and charset in 4 different Mode 3 layouts and printouts.

Review in 'Sam Supplement' Issue 7 'Very versatile userfriendly database'. 'Outlet' Issue 47 'Most professional looking file management program'. 'Enceladus' Issue 7 'The definitive filing system, if you need to file anything buy this'. 'Fred' Issue 9/14 'I would recommend you buy SC\_FILER'. 'Excalibur(Sam Prime)' 'Best Database around 94%'.

## SC\_AUTOBOOT

£15.00

NEW ver.1  
Feb 93

The all New chip brought up to date with some of the earlier problems with ver 1.0 cured.

When you now turn on the coupe there is an instant reset, no need to wait 3 secs. If a Disc is already in the Drive, or you push a Disc in, it will automatically BOOT up.

Now fully 100% compatible with Sam Software, with a mimi ROM 3 reset dos routine should you have any problems.

The chip now has an improved reset button to Break into any running program. The chip is easy to fit with an easy to follow manual.

## LABELS

All Printer labels White, incl tractor feed holes! Add £2.00 Postage

DISC LABEL (large)	Width 70mm	Height 70mm	£2.00
DISC LABEL (Small)	68mm	46mm	£1.50
ADDRESS LABEL	95mm	36mm	£1.50
VIDEO LABEL (2 Size labels)	146mm	20mm A(72by48)	£1.50
MINI LABEL	48mm	19mm	£1.00

## DUSTCOVERS

High Quality, Pure White with Blue Rim Trimming  
SAM COUPE £5.50 PRINTERS £6.50 MONITORS £7.50  
(If ordering Printer or Monitor cover please state Model)

# SC\_DTP

£25.00

Desk Top Publishing  
with Full Wordprocessor

This Advert was produced using SC\_DTP the 99% Machine-code utility.

Desk Top Publishing allows you to organize text and graphics together to produce professional printouts to the printer

SC\_DTP allows you to plan your layout on screen so what you see is what you get on your print out.

The whole design area can occupy upto 2 SAM Screen\$ across (1024 pixels) and 4 SAM Screen\$ down (768 pixels).

Graphics, Screen\$ and Flash! files can be loaded from Disc and parts of the screen placed on the large design area. You can also design your own graphics within the program.

SC\_DTP also has a built in, full word-processor allowing you to type in your text with full editing, searching etc.

Word-processor text can then be set in a choice of 48 typeface designs ranging in size from 8 to 24 pixels high. You then position your text just where you want it, proportionally spaced out around graphics.

You can load Spellmaster, Secretary and Outwrite text files into SC\_DTP.

Special 'ready designed' layouts supplied for labels and other jobs, can be re-configured to meet your exact needs.

Output can be made to most modern 9 pin Printers or you can make enhanced hi-res 'gray scale' outputs to many 24 pin Printers.

SC\_DTP works with a mouse and keyboard. More fonts and other enhancements later this year but don't delay - buy now and upgrades will be supplied FREE as they are ready.

SC\_DTP does not work on a 256K SAM.

## BUY NOW Pay Later

Prefer to purchase Software once you have recieved it? Then this popular service is for you. Software is dispatched, next working day, by first-class post with an invoice and a SSAE for you to pay.

Just Phone 0223 235150 from 6pm-9pm with your order.

## Need More Information?

Then just send a blank formatted disc with a stamped addressed envelope for Demos/ Screen Shots and more detailed information on current titles from STEVE'S SOFTWARE.

# STEVE'S SOFTWARE

7 NARROW CLOSE, HISTON, CAMBRIDGE, CB4 4XX. TEL 0223 235150 From 6pm-9pm

# MACHINE CODE

## WITHOUT THE TEARS

Part 18.

By:- Carol Brooksbank.

that position.

e. If no longer required, delete the original block using the most appropriate method.

To print the selected block by itself you will have to select a new page, place the block by pressing F3 and then print that page using the normal method. To save a block by itself you will have to mark and grab the block as detailed above and then, having saved your text as necessary, delete the whole text using EDIT,DELETE,A (page 12 of the User Guide). The grabbed block is however not deleted, and can be placed on the blank screen by pressing F3 and then saved in the usual way.

Charles Pickford of Leeds wants to know whether the Amstrad CTM644 colour monitor can be connected to SAM. He also wishes to know how to link up a pair of speakers to SAM, as the monitor does not have sound. I am informed that the CTM644 can be hooked up to SAM. The monitor has a 6 pin DIN socket which accepts linear red, green and blue signals. The other connections are for composite sync, intensity and ground, (see your handbook for pin numbers). These can be connected to the linear red, green and blue outputs of the SCART socket, (pins 7, 11 and 15 respectively). You also have to connect the GRND connection (pin 21) and the CSYNC signal, (pin 16). You may have to attenuate the CSYNC signal by including a resistor in series with it in order to be able to centre the screen using the horizontal hold control.

With respect to connecting up speakers to SAM, these cannot be connected directly to the sound output, but have to be linked via a stereo amplifier. Output can be taken either from pins 1 and 3 of the SCART socket or from the 5 pin light pen socket, (pins 2 and 5). If you are not into DIY electronics, I suggest you invest in the SAMPLIFIER stereo amplifier from B G Services who advertise in FORMAT.

Charles also wished to know if the 3" discs that fit the Spectrum 3 will also work on the Amstrad CPC6128, and where can he buy 3" discs. Yes, they are identical Charles as are those advertised for the Amstrad PCW.

Bob's Editorial in March touched on requests for other languages apart from BASIC and machine code. 10 letters hit the door mat on this subject asking "What other languages are available?" and several asked "are there any solely for the 128K?"

My answer to the second, first. To the best of my knowledge, there are no languages exclusive to the 128K computers to make use of the additional memory, however, several make use of the 128Ks RAMDISC for various purposes. I have seen one, in an old glossy which I bought, that gave a couple of extra features to use that extra memory, possibly Forth. Now to answer the first part. These are available for both 48K and 128K machines. Pascal, Forth, Modula 2 (similar to Pascal) and Logo.

I believe I saw Fortan advertised once. COBOL to my knowledge is not available (unless you know better). Does anyone know of any others?

### Addresses are:-

Info, answers/questions Spectrum, project printer, to:-

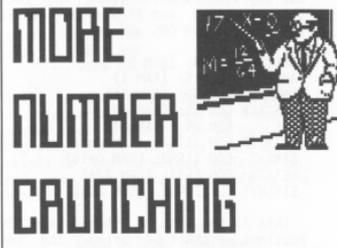
Kevin Gould, Format Help Page, 2 Barleyfield Close, Heighington, Lincs, LN4 1TX.

Project VDU and answers/questions SAM related, to:-

Ray Bray, Format Help Page, 4 Tidworth Road, Porton, Salisbury, Wilts, SP4 0NG.

Anything on +3 and CP/M to:-

Mike Atkins, Format Help Page, 70 Rudgwick Drive, Bury, Lancs, BL8 1YE.



Last month I made sure that all the numbers we used in our sum, all the values produced at any stage of the calculations, and the final answer were integers in the range 0-65535, because I wanted to use small integer form for the 5-byte arithmetic, and be able to retrieve the answer in the BC register. So long as you are sure that those conditions apply, that is the easiest and quickest way to do FPC calculations.

But, of course, it would be very awkward if we always had to work within those limits. How do we manage with numbers with digits after the decimal point, or numbers bigger than 65535?

There are various ways of handling decimal numbers. For instance, to stack 2.5 you could stack 2, use the FPC and STACKHALF to stack the .5 and ADD to leave the top number as 2.5. Or, you could stack 25, stack 10 and use the FPC and DIVID which would also do the trick. These are valid ways which you may use from time to time when they are appropriate, but they still have their limits. How would you stack 75.234? You could not stack 75234 and divide that by 10, because it won't fit in a register pair.

The secret lies in the FPC's ability to work with strings. Every value put on the FPC stack uses 5 bytes. Up till now we have considered the bytes only as the 5-byte form of a number, in small integer or full floating point form. But they can also be used to hold the details of a string stored in memory.

On both the Spectrum and Sam, you put the length of your string in BC and its start address in DE. On Sam the start address is the address from which the string starts when its page is paged in, and the A register holds the page number.

The Spectrum assumes that the string has a name (a\$, b\$ etc.), and that it may be from either a numerical or string array. The A register must hold a byte with bits 0-4 holding a number between 1 and 26 to represent the name letter, (a=1, b=2 etc.) bits 5 and 6 set for a string array or reset for a numerical array, and bit 7 set. So, on the Spectrum, BIN 11100001 (225 decimal), would mean a string named a\$, and is a suitable number for us to put in A. We don't really need to call our string a\$, but it keeps the Spectrum happy. Having loaded the registers, you use the STK5BYT routine on both machines to put the address of your string on the FPC stack.

If you use

```
NUM1 DEFM "23.25"
```

somewhere in your machine code, load the address NUM1 in DE, 5 (length of the string) in BC and 225 in A (for the Spectrum), or the page number in A (for Sam), and stack the bytes, the VAL literal can be used to put the value of your string - 23.25 - in full floating point form, in place of its

parameters on the FPC stack.

You now have to work in floating point form, so any integers you stack in the ordinary way must be translated into that form. There is a literal - RESTACK - which does the conversion if the top number is in small integer form.

On the Spectrum you can put machine code involving VAL anywhere in memory, but before you enter the FPC you must put the VAL literal in the B register, because VAL and VAL\$ call the same routine and the FPC looks at the B register to see which operation it should be doing.

On Sam, you don't need to put the literal in B, but you do have to be careful where you put your machine code in memory. During operation it must lie between addresses 23733 (after the system variables) and 32768 (the end of the page in slot B). Whatever page your machine code is on must be paged to slot B before you call the code.

This is because VAL is a very complex command which indulges in some frenzied paging during its activities, involving slots C and D. If your machine code which uses VAL is in one of those slots it is liable to be paged out just when it is needed, and your program will stop with the message: - 51 FPC error.

In this example, we don't want to get involved in paging, so we put 0 in the A register - the page which is in slot B on power-up.

The final problem is that we can't retrieve the answer in BC, because it may not be a number which will fit into a register pair. Spectrum has a routine at 11747 which prints the top number from the FPC stack as a string to whatever stream you set. Sam only has a routine at 382 for retrieving the number as a string and storing it in a buffer among the system variables, so we have to write our own printing routine for Sam.

So let us do a sum involving numbers held as strings in the memory.

ORG 25000

This ORG address will suit both Spectrum and Sam, but Spectrum users can use any address they like, for Sam use any address which keeps the code between 23733 and 32768. The code is called from the ORG address.

```
MULTIP EQU 4; (SAM 0)
ADD EQU 15; (SAM 1)
ENDCAL EQU 56; (SAM 51)
RESTACK EQU 61; (SAM 59)
VAL EQU 29; (SAM 84)
PRINTFP EQU 11747; (SAM omit)
STKBYT EQU 11560; (SAM omit)
SETSTR EQU 5633; (SAM 274)
STK5BYT EQU 10934; (SAM 295)
```

This is the list of literals and ROM routines we shall be using. The two Spectrum ROM routines which Sam users omit will be replaced by subroutines for Sam in our program.

```
START LD DE,NUM1
LD BC,NUM2-NUM1;length of string NUM1
LD A,225; (SAM 0)
CALL STK5BYT
LD B,VAL; (SAM omit)
RST 40
DEFB VAL
DEFB ENDCAL
```

We begin by loading the parameters for the first string into the registers and putting them on the FPC stack. Spectrum users must then copy the VAL literal to the B register before entering the FPC. VAL replaces the string parameters on the FPC stack with the number held in the string, in floating point form.

```
LD A,3; (SAM LD B)
CALL STKBYT
RST 40
DEFB RESTACK
DEFB MULTIP
DEFB ENDCAL
```

We now stack the number 3. We want it in full floating point form, so RESTACK is the first FPC operation.

This will convert the number if it is not already in the right form. We then multiply the numbers.

```
LD DE,NUM2
LD BC,END-NUM2; string length
LD A,225; (SAM 0)
CALL STK5BYT
LD B,VAL; (SAM omit)
RST 40
DEFB VAL
DEFB ADD
DEFB ENDCAL
```

The second number held as a string is stacked. It is not a decimal number, but is too big to be held in a register pair. This is added to the result of our previous calculation, and our final answer is left on the stack.

```
LD A,2; (SAM omit)
CALL SETSTR; (SAM omit)
CALL PRINTFP
RET
```

Spectrum users open a channel to the screen and call the ROM routine which prints the number on top of the FPC stack. Sam users call our own subroutine to print the number.

```
NUM1 DEFM "23.25"
NUM2 DEFM "72314"
END EQU $
LENGTH EQU END-START
```

The program ends with our two numbers. The sum is  $(23.25 \times 3) + 72314$ , but 3 can be handled as a small integer, so there is no need to store that as a string.

Sam users must put last month's library routine STKBYT, and the routine PRINTFP below, between RET and the number strings.

```
PRINTFP CALL 382
```

This is the subroutine we need to write for Sam to print the number on screen. This ROM call creates an ASCII version of the number on top of the FPC stack in a buffer in the system variables at 23456. It exits with DE holding the start of the string, and

BC the number of bytes in it.

```
PUSH DE
PUSH BC
LD A,2
CALL SETSTR
POP BC
POP DE
```

We must open a stream for the printing, but we need to use the values in DE and BC later, so they are preserved using PUSH and POP.

```
PRLP LD A,(DE)
RST 16
INC DE
DEC BC
LD A,B
OR C
JR NZ,PRLP
RET
```

The subroutine ends with a simple printing loop of the type we have used many times before. Sam users should save PRINTFP as a library routine.

CALL your ORG number (25000 if you used the one I suggested) which will print the answer, 72383.75, on screen. You could send the answer to the printer of course, by opening stream 3 - loading 3 to the A register before CALL SETSTR.

This has been a simple program, but you can expand it to perform complicated calculations using numbers of any size. The largest number which can be held in floating point form is 1.7014118E38. This form of number means "put enough zeros on the end to enable you to move the decimal point 38 places to the right." The number is actually

170,141,180,000,000,000,000,000,000,000,000,000,000

The smallest number that can be held is minus that number. If you want to use numbers outside that range I am afraid you will have to count on your fingers!

Having said that, you should be aware that there are some limitations

to floating point arithmetic. This little BASIC routine will illustrate one of them:-

```
LET X=1: FOR Y=1 TO 10: LET X=X-.1:
PRINT X: NEXT Y.
```

If you think that will print:-

```
.9
.8
.7
.6
---
.2
.1
0
```

you will be surprised. Try it and see. Don't think your Spectrum or Sam is faulty. It is just that floating point arithmetic can't handle that sequence with total accuracy. The remainder is a tiny fraction. The E-10 at the end of the number means you move the point one step to the left, and insert 9 zeros between it and the first digit - the opposite of a number ending E10, when you would be adding zeros and moving the point to the right.

You will also find that Spectrum and Sam, when printing a number converted to ASCII from the top of the FPC stack, will only print 8 digits plus any leading zeros. Try the sum  $(23.25147*3)+72314$  in either machine code or in BASIC as a direct command. You will get the answer 72383.754. Try the same sum on a calculator, and the answer you get will depend on the number of digits your calculator prints. Mine gave me 72383.75441. If you divide your answer by 1,000,000,000 Sam and Spectrum will give you 0.000072383754 - still the same 8 digits but with the leading zeros inserted correctly. Trailing zeros are handled by moving the decimal point and using the E abbreviation. Sam and Spectrum will always truncate to 8 digits, whether your calculations are in BASIC or machine code.

Next month we will finish our tour of the calculator, and I will give you the book list I promised you.

## Writing For Format

FORMAT has always been a magazine written for its readers by its readers and that's the way we all like it.

Writing for FORMAT is easy, many do it each month just by sending a letter for publication or sending a small item to John Wase for the Short Spot. But we are always in need of new material for larger articles. Spectrum or SAM articles are obviously in demand but so are more general articles on almost any subject related to computers. Articles can be any length, half a page to several dozen. We can accept any Spectrum (DISCIPLE or PLUS D), SAM or PC word-processor files on 5.25" or 3.5" disc. Record at least two copies for safety, do not include any special printer control or formatting characters, and make sure you include a printed copy.

As we've said in the past, don't worry to much about spelling and punctuation, just get your ideas down as best you can and we then have something to work on. If it is a program you have written (and FORMAT readers love programs to type in) and you don't feel able to write an accompanying article just jot down a few notes and leave the rest to us.

Items we can't use will be returned within a few weeks, after that your work may appear in print as early as the following month or it may take much longer before it makes it into FORMAT because we always need to balance the content of FORMAT.

So come on, Write for FORMAT, and make other readers happy.

Every article that appears in FORMAT will earn its author some reward. This varies from article to article depending on length, content and several other variables. However, at the very least, you can expect an extension of your membership.

# UNDERSTANDING DIGITAL ELECTRONICS

By:- Adrian Parker.

Those of you who were following the Hardware Articles published on the 'SAM Newsdisk' probably thought that you'd seen the last of me! Well I'm back, and through the auspices of FORMAT, we are going to be exploring the heart of your computer, and other things electronic.

As many of you will not have seen the articles on the Newsdisk I am going to have to cover the basic principles again. This means that although you would benefit from having the Newsdisks (because I had more space there) these articles in FORMAT will stand on their own.

Right. Have you ever thought 'If only somebody made one of those, I could plug it into my computer and write the most amazing program for it'? Well, those were my feelings about seven years ago, and so I set out to learn how to build electronic peripherals for myself.

Over the next few months, I will be explaining the various aspects of electronics that you will need to be able to design your own electronic devices and peripherals. We have to cover a certain amount of theory first, but this will be kept to a minimum, and then various circuits will be described, along with their theory of operation. A series of inexpensive kits will also be available as the series progresses. You won't need any expensive oscilloscopes or other test equipment (although they would be useful), but enough of this, lets get on with it.

All electronic circuits can be broadly classified into two types - analogue or digital circuits. We are going to concentrate on digital circuits initially as they are the most interesting to us in connecting

to micro-computers. Before I explain what I mean by digital electronics, we need to get a few ideas clear in our minds.

'Logic', Mr Spock's favourite subject, is at the centre of everything digital. It is based upon an idea that any statement can be in one of two states, either true or false. So we can say:-

**IF (expression is true)  
THEN do something**

Those of you who program in BASIC will already be familiar with this idea. We can also make more complicated statements, for example:-

**(A<5) AND (B>10)**

Now this entire statement will only be true if both of the statements contained in the brackets are true. Also consider:-

**(A<5) OR (B>10)**

This statement is true if either of the bracketed statements are true. One final example of a logical statement:-

**NOT (A<5)**

This statement isn't quite so obvious as the other two. It is only true if the bracketed statement is false! ie. The NOT operator effectively reverses our evaluation of the expression which follows.

You're probably wondering what all of this has to do with electronics. Well, using the above three expressions (and a bit of practice) you could set out to design a Z80 microprocessor, (but I don't recommend that you attempt this yet, that will take at least one more article!) The

functions AND, OR and NOT are called logical, or Boolean Operators. Operators just means that they 'operate' on other statements, to change their meaning in some way. These operators have been known for many years, as the ideas were developed by the mathematician George Boole (hence the name, Boolean Operators), and in the mid fifties, these ideas were applied to electronics, and digital electronics was born. The principles are identical to that above, except that now our true and false ideas are represented by voltages (5 Volts and zero Volts respectively).

Now we have to modify our ideas slightly. Consider the following idea - there are two wires, each of which can be connected to 5V or 0V (0V is often referred to as GROUND or EARTH). Now let us call the two wires 'A' and 'B', then valid expressions include:-

**A AND B : A OR B : NOT A**

This might look a bit strange at first, but if you remember that although we are connecting A and B to a voltage, we can think of them as being either true or false. So the expression 'A AND B' will only be true if both A is true and B is true. If either A or B is false (ie connected to GROUND) then the expression will evaluate as false. Similarly 'A OR B' will evaluate to true if either A or B is true. 'A OR B' will also be true if both A is true and B is true. Finally, 'NOT A' will be true if A is false, just the opposite of the expression 'A', as described in our analogy earlier.

These results are normally summarised in what are called 'truth tables'. You don't need to know these, as provided you understand the above arguments, you should be able to work them out for yourselves. However, writing true and false all of the time can be very tedious, so true is normally represented by '1' and false by '0'. (Don't confuse these numbers with the voltages, they have no relation to voltage, they are only a

different form for representation of true and false.) The truth table for AND, OR and NOT are shown below, the table for AND is also shown first in its true/false form for comparison, the same could be done for any of the tables. The input columns are shown as A and B, and the evaluation as E.

**A AND B**

A	B	E
false	false	false
false	true	false
true	false	false
true	true	true

**A AND B**

A	B	E
0	0	0
0	1	0
1	0	0
1	1	1

**A OR B**

A	B	E
0	0	0
0	1	1
1	0	1
1	1	1

**NOT A**

A	E
0	1
1	0

Try to follow the truth tables properly, take any horizontal row and think about the ones and zeros as trues and falses so that you evaluate the expression as the result, under E.

Each table has every combination of A and B that is possible, so that we know what the expression will evaluate to under every possible input circumstance.

Well, that completes this introduction into digital electronics, but before we proceed any further, I should say that these simple operators can be combined to give more complicated expressions, such as:-

**((A AND (NOT B)) OR ((NOT A) AND B))**

Try to draw the truth table for this expression, it's quite an important one. (Hint:- Evaluate the expression by starting with the innermost brackets, and work your way outwards until you have the full expression. Remember to keep the combinations of A and B in the same order as in the above truth tables). The answer will be printed next month.

Next time we will look at what all these truth tables have to do with voltages - then we can get down to something a little more practical.

In the meantime the Hardware Development Kit which I designed for SAMCO is now available direct from me.

As I mentioned earlier, to further your understanding I am making kits available to cover the experimental circuits we will be working with over the next few months. More details on the first of these next month. See you then.



**BLUE ALPHA ELECTRONICS**

We are pleased to be able to offer a full repair service for Sam and Spectrum users. All repairs carry a 3 months guarantee against the same fault recurring.

Sam + PSU + 1 Drive *	£30
New PSU	£20
All Sam Interfaces	£18
Spectrums	£30
Plus D	£18
DISCIPLINE	£30
MGT Lifetime Drive*	£20

\*Disc drive repairs exclude cost of replacement mechanisms.

**Please ring before sending items for repair.**

All prices include UK return postage, overseas customers please write for details of cost of postage and insurance.

**ALSO AVAILABLE** We can make and supply all types of cables - send us a Stamped Addressed Envelope with detail of cable required (pin-outs, length, etc) and we will send you a quotation.

**Blue Alpha Electronics,**  
 Abernant Centre For Enterprise,  
 Rhyd-y-fro,  
 Pontardawe,  
 West Glamorgan,  
 SA8 4TY.  
 Tel: 0269 826260.

NEW  
RELEASE

# CAMPION The Spreadsheet

NEW  
RELEASE

For The SAM Coupé or ZX Spectrum

Spreadsheets are one of the most useful tools of the modern computer.

**Revelation** - in association with Danish software house **CAMPION** - are proud to present 'CAMPION - The Spreadsheet' with versions available for both SAM and Spectrum (with DISCIPLE or PLUS D). Featuring over 70 built-in functions and ready made formula, this program is easy to use and yet powerful enough to rival many expensive PC spreadsheets. A very comprehensive manual (over 80 pages with examples) allows even a new-comer to be up-and-running in no time. Available now at £29-95

State which computer version and disc size required. **INDUG members price £24-95.**

## OTHER SERIOUS SAM SOFTWARE AVAILABLE FROM **Revelation**

- > **THE SECRETARY** - The most advanced word-processor available for SAM, powerful, versatile and easy to use. - £14-95 (£12-95)
- > **SOUND MACHINE** - Make beautiful music with your SAM - Only £14-95 (£12-95)
- > **COMET Z80 ASSEMBLER** - The professional one - £29-95 (£24-95)

Prices in brackets () are for INDUG members.

## SAM GAMES AVAILABLE FROM **Revelation**

- > **ASTROBALL** - Boldly bounce where no ball has bounced before.
- > **MANIC MINER** - The classic game, now three times the size and with the full colour graphics you would expect from SAM.
- > **BATZ 'N BALLS** - An arcade nightmare - fiendishly difficult but hours of fun.

- > **VEGETABLE VACATION** - Dare you enter a world where alien vegetables have gone wild.
- > **WOP GAMMA** - Our latest game. A Super-Fast 'Boulder Dash' game with Full Screen Scrolling - '99' Levels.

All games cost £9-95 each  
or £8-95 to INDUG members

## MORE NEW GAMES COMING SOON - INCLUDING SPECTRUM TITLES.

- All prices include UK postage and packing. Overseas add £1 surface, £2 airmail.
- Payment by UK cheque, Eurocheque or PO, Payable to Revelation Software.
- Please quote INDUG membership number clearly on order if claiming discount.

Send orders to-

Revelation Software,  
PO Box 114,  
Exeter,  
Devon,  
EX4 1YY.

# Revelation Software

REV.D

# FONT120

By:- David Zambonini.

Quite simply, all this program does is to allow you to make fonts for your Citizen 1200+ printer (well, that's the printer I've got anyway), although it will probably work on any compatible 9-pin printer. It is written for SAM but the principle could be applied to the Spectrum with a little rewriting.

All designing takes place on the one screen, with a grid on the left-hand side of the screen and a menu on the right. The grid shows the pin positions for the character you are designing, and operates in much the same way as a UDG grid except that no pin strike can be placed horizontally adjacent to another (see the Citizen manual for an explanation).

The keys are Q A O and P to move the cursor, M to place or remove a pin strike (ie a dot on the paper) and W S to alter the current character (displayed on the right). The right hand menu, quite briefly, allows you to save and load created fonts to and from disc, download the completed set to the printer (which will then print all characters designed, and will continue to do so when anything is printed, MAKE SURE THE PRINTER IS ON LINE WHEN DOWNLOADING! otherwise nothing will happen).

The other options on the menu are to alter the character being designed and to select whether the character is an ascending or descending one. The program will automatically calculate proportional printing widths, for use when printing proportionally with the downloaded font.

## Listing 1.

```
10 REM CITIZEN 1200+ FONT
20 REM DESIGNER: WRITTEN
30 REM BY DAVID ZAMBONINI
```

```
40 MODE 4: PALETTE : CLS #: PALETTE
   0,120: PALETTE 15,0: PEN 15
50 disp
60 setvar
70 DO
80 update
90 inp
100 CLS
110 GOSUB (VAL a$*1000)
120 disp
130 newchar
140 LOOP
150 DEF PROC disp
160 CLS
170 PRINT AT 0,0: INVERSE 1;" CITI
   ZEN 1200+ FONT DESIGNER "
180 FOR x2=1 TO 11: FOR y2=1 TO 8
190 PLOT (x2*8)-2,y2*16: DRAW 4,0: D
   RAW -2,0: DRAW 0,-2: DRAW 0,4
200 NEXT y2: NEXT x2
210 PRINT AT 3,15;"1. Save File"
220 PRINT AT 5,15;"2. Load File"
230 PRINT AT 7,15;"3. Download Font"
240 PRINT AT 9,15;"4. Clear File"
250 PRINT AT 11,15: INVERSE 1;" CHA
   RACTER - "; AT 13,15: INVERSE 0
   ;"W/S."
260 PRINT AT 15,15: INVERSE 1;" Let
   ter type "; AT 17,15: INVERSE 0
   ;"Z."
270 END PROC
280 DEF PROC setvar
290 LET cha=32,x=1,y=1,da=1
300 DIM cf(95,12)
310 END PROC
320 DEF PROC update
330 PRINT AT 17,20;("Descending" AND
   NOT da)+("Ascending " AND da)
340 PRINT AT 13,20;" ";CHR$ cha;" "
350 END PROC
360 DEF PROC inp
370 CIRCLE OVER 1;x*8,y*16,3
380 LET a$=INKEY$: IF a$="" THEN GOT
   O 380
390 BEEP .05,10: CIRCLE OVER 1;x*8,y
   *16,3
400 LET x=x+(a$="p" AND x<11)-(a$="o
   " AND x>1)
410 LET y=y+(a$="q" AND y<8)-(a$="a"
```

```

AND y>1)
420 IF a$=" " THEN swap
430 LET c2=cha,cha=cha+(a$="w" AND c
ha<126)-(a$="s" AND cha>32): IF
c2<>cha THEN finchar:newchar
440 IF a$="z" THEN LET da=NOT da:upd
ate
450 IF a$<"1" OR a$>"4" THEN GOTO 37
0
460 END PROC
470 DEF PROC finchar
480 LET cf(c2-31,1)=da*128
490 IF c2>32 THEN LET cf(1,1)=cf(1,1
)+10: GOTO 560
500 LET pe=12,ps=0
510 IF cf(c2-31,pe)=0 THEN LET pe=pe
-1: IF pe<2 THEN GOTO 510
520 IF cf(c2-31,ps+2)=0 THEN LET ps=
ps+1: IF ps<7 THEN GOTO 520
530 IF pe>10 THEN LET pe=10
540 IF pe<ps THEN LET pe=ps
550 LET cf(c2-31,1)=cf(c2-31,1)+pe+(
ps*16)
560 END PROC
570 DEF PROC swap
580 LET n$=BIN$ cf(cha-31,x+1)
590 IF VAL n$(9-y) THEN LET n$(9-y)=
"0",cf(cha-31,x+1)=VAL ("bin"+n$
): CIRCLE OVER 1;x*8,y*16,8: GOT
0 630
600 LET n1=0: IF x>1 THEN LET n1=VAL
((BIN$ cf(cha-31,x))(9-y))
610 LET n2=0: IF x<11 THEN LET n2=VA
L ((BIN$ cf(cha-31,x+2))(9-y))
620 IF n2=0 AND n1=0 THEN CIRCLE OVE
R 1;x*8,y*16,8: LET n$(9-y)="1",
cf(cha-31,x+1)=VAL ("bin"+n$)
630 END PROC
640 DEF PROC newchar
650 LET da=1: IF cf(cha-31,1)<128 TH
EN LET da=0
660 disp:update
670 FOR n=2 TO 12
680 LET b$=BIN$ cf(cha-31,n)
690 FOR ay=1 TO 8
700 IF b$(ay)="1" THEN CIRCLE OVER 1
:(n-1)*8,(9-ay)*16,8
710 NEXT ay: NEXT n
720 END PROC
1000 DIR 1
1010 INPUT "SAVE: "; LINE s$
1020 SAVE s$ DATA cf()
1030 VERIFY s$ DATA cf()
1040 RETURN
2000 DIR 1
2010 INPUT "LOAD: "; LINE s$
2020 LOAD s$ DATA cf()
2030 RETURN

```

```

3000 PRINT AT 8,4;"DOWNLOADING FONT T
O 120D+"; AT 10,0;"PLEASE ENSURE
PRINTER IS ON LINE"
3010 CLOSE #7: OPEN #7;"b"
3020 FOR c=1 TO 95
3030 PRINT #7;CHR$ 27;"&";CHR$ 0;CHR$
(c+31);CHR$ (c+31);: FOR c2=1 T
O 12: PRINT #7;CHR$ cf(c,c2);: N
EXT c2
3040 PRINT AT 12,10;INT (c/95*100);"
% Done"
3050 NEXT c
3060 PRINT #7;CHR$ 27;"%1";CHR$ 0
3070 FOR c=32 TO 126: PRINT #7;CHR$ c
;: NEXT c: LPRINT
3080 RETURN
4000 PRINT AT 8,1;"DO YOU WISH TO CLE
AR THE FILE?"; AT 10,12;"( Y /
N )"
4010 IF INKEY$="n" THEN RETURN
4020 IF INKEY$<>"y" THEN GOTO 4010
4030 DIM cf(95,12)
4040 RETURN

```

Now, as an extra bonus, a little program to download a copy of the SAM's own character set (loaded at address 20880) to the printer.

#### Listing 2.

```

10 CLOSE #7: OPEN #7;"b"
25 DIM b$(8,8)
30 RESTORE : FOR n=0 TO 94: PRINT A
T 0,0;n: FOR n2=0 TO 7
40 LET b$(n2+1)=BIN$ PEEK (20880+(n
*8)+n2)
50 NEXT n2
51 PRINT #7;CHR$ 27;"&";CHR$ 0;CHR$
(n+32);CHR$ (n+32);CHR$ 10;
60 FOR n2=1 TO 6
65 LET cha=0
66 FOR n3=7 TO 0 STEP -1: LET cha=c
ha+((2↑(7-n3)) AND b$(n3+1,n2+1)
="1"): NEXT n3
70 PRINT #7;CHR$ cha;
71 IF n2<6 THEN PRINT #7;CHR$ 0;
80 NEXT n2
90 NEXT n
100 LPRINT
110 PRINT #7;CHR$ 27;"%1";CHR$ 0

```



# YOUR LETTERS

## Dear Editor,

Please find enclosed my subscription for another year's FORMAT.

I often have difficulty filling in the likes and dislikes on the renewal notice as I find all of FORMAT useful in some way. On the subject of articles which I disliked I do not own Specfile+ or a modem so found these to be the least relevant to me. I also wrote my own inlay designer, a few years back, to work with a Tandy 4 colour printer which I have, I could have sent the program in but I don't suppose many people have a TRS-80 CGP-115!

Concerning printers I now have a Canon BJ-10ex working with my SAM and found the Epson Standards article useful. The manual supplied with the latter does not explain the escape codes, it just lists them, a separate programmers manual gives more detailed information. After writing to Canon concerning the poor information in the user manual, they supplied the programmers manual free of charge to me, ten out of ten for customer relations. I have since been able to write a 16 grey shade dump for mode 4 graphics using the 360 x 360 dpi mode on the BJ-10ex, do you think anyone else would be interested in this?

If you are still collecting data on Monitors? TVs then I use a 14 inch Sony Trinitron (KV-1430UB) with my SAM. The clarity is pretty good considering there is only UHF input but pale colours e.g. yellow tends to look white when there is a black border and have a bright edge on the left side of the colour block. The sound also has interference on it when displaying complicated pictures with black borders.

Are you still looking for people to work on specific programs? I have written a fair amount of small programs for my own use especially on my old Spectrum. However, when I

bought my SAM I was approaching my final year in Electronics at Aston University and have now started work so have not been able to spend as much time with my SAM (which I think is a great little computer). A specific project to work on would give me some incentive to get to know the Coupe even better.

Keep up the good work at FORMAT, I look forward to my monthly read!

Yours sincerely, Anthony Henn.

I'm sure there will be other readers interested in your screen-dump routines, just write a short article explaining briefly how they work and send it in. If you want guidance give me a ring any time and I will point you in the right direction. As to programming projects, there are just so many. Again, give me a ring sometime and we will have a chat. Ed.

## Dear Editor,

In the March issue of FORMAT, Don Thomasson (Problem Solving...) says about methods of change-ringing 'it seems impossible to obtain a manual on the more complex methods'. This seemed to me unlikely, so I had a word with a bell-ringer I know, who tells me that such literature is advertised from time to time in a periodical called 'The Ringing World'.

This periodical has recently had a series about using computers for bell-ringing studies, and my friend has sent me some photocopies, which are enclosed.

Perhaps you could send them, and this letter too, to Don Thomasson.

Yours sincerely, Etrick Thomson.

Sorry Etrick, but Don has gone missing since he sent in the articles early last year, so I can't send on the photo-copies just yet. However I've no doubt he will return to the

scene sometime soon so I will hold them on file until then.

While on the subject, Don's articles seem to be going down very well with people and I'm pleased to say we still have a few more to run. Ed.

Dear Editor,

It is quite some time since I last wrote to you, but I feel I must write and congratulate you on the most interesting magazine. My copy arrives around about the thirteenth of each month and when it is late I am most disappointed.

I am still using all three of my computers, the Spectrum, the Sam and a P.C., they are so situated that I can couple up the printer and use any one of them. Strangely enough I often hear complaints about the old Tasword 2 word processor, but I find it a very handy and easy to use program, in fact I have a P.C. Tasword which I have had to fall back on when something has gone wrong with my P.C. through some virus or other. (Thank goodness this doesn't happen in the case of the Spectrum or the SAM.)

A few months ago I bought the Spectrum emulator by G.A.Lunter, for the P.C. and have used it extensively to transfer many of my favourite games and programs to the P.C. I have still to find one that doesn't work, even the VU-File is used to sort and find my slides. This emulator works so easily on Disciple and Plus D "snapshots" that it is almost unbelievable that the programs were not actually written for the P.C. I haven't built the printed circuit boards to try the tape loading etc., but one day I will get round to it.

Although the P.C. is claimed to be the be-all and end-all of computers, I find that many of the old Spectrum games are hard to beat. Recently while in the UK I bought a copy of "Boulder Dash" for the P.C. but even after trying four different discs, (each time the disc did not load I sent it back and received another copy), not one loaded. In the end when I received the emulator I was able to make a perfect working copy. This game is still one of the favourites with my grand-children. Perhaps the graphics

are not as good on the Spectrum as the P.C. but many of the games that were written for the good old "Speccy" are far more entertaining.

Keep up the good work, I would certainly miss my copy of FORMAT each month. I am returning my renewal form with this letter.

Yours sincerely, Peter Hyde.

Thanks Peter. Many PC users seem to be buying the emulator (available from B.G.Services) in fact I have a copy running on my 386. Often it is easier to run-up the emulator to write a small program than it is to try to use GW Basic on the PC. Ed.

Dear Editor,

Thank you for the new lid to the power supply, which did arrive in one piece. Hooray!

I don't know if anyone experienced any difficulty in getting the cut & paste options to work with FLASH. In case there is anyone who is a bit baffled I am supplying the quick method to get it to work.

1. Select CUT from the menu.
2. Mark out the shape by pressing M the requisite number of times (and moving the cursor).
3. Press N the outline turns white, now the important bit.
4. Press F9 then F7 or F8. A square containing the current fill pattern will appear in the top left corner of the screen. By pressing F7 or F8 you can cycle the patterns. Do this until you get a solid black square. (You can experiment with the other fills in due course). (If the F9 key is not used when you position the cursor inside your shape and press M the default setting of the fill (small checkerboard) comes into play even if you have altered it to something else by using the menu.)
5. Press M once you have positioned the cursor inside your shape and wait. Now the FLASH occurs. 6. You will now be able to drag your shape using the cursor keys. But only those pixels which correspond to the black pixels in the fill pattern will be affected. This is

why a solid fill pattern is so important.

I hope this makes sense.

Yours sincerely, Andrew Rycraft.

Dear Editor,

Thank you for sending me FORMAT Utility Disc #1. I was wondering whether or not there is a 128K version of the program 48K snap poker. If there isn't, is there some way of altering 48K snap poker to work on 128K snap shots.

Yours sincerely, A.R.Price.

There is no 128k specific version but it should be possible to adapt the 48K one to work.

A 128K Snapshot file has the extra memory pages stored in sequence after the normal 48K pages. It also has one extra byte, stored at the start of the file, which holds the page number to be output to the control port after loading to reset the memory map as it was when the snapshot button was pressed. Ed.

Dear Editor,

I noted in the anniversary edition of FORMAT that you were involved in the development of the Memotech MTX.

Although SAM is now my first computer I still use my MTX 512 as I find the in-built assembler and front panel very convenient.

The MTX no longer has a user group and I wondered whether any INDUG members still use an MTX machine.

I am not suggesting that FORMAT takes another machine, but I did wonder if there was any interest, if we could somehow keep in contact through our membership of INDUG.

I haven't thought it through any further as there will probably not be much interest, but I wondered whether it might be worth asking members.

If you don't agree fair enough, it's just a thought.

Yours sincerely, John Avis.

Ah, the Memotech, brings back many memories. Yes John, the software company I was involved with in the

early '80s provided several programmers to help write the original ROM for the MTX. This never saw the light of day as Memotech got cold feet over the high degree of Spectrum compatibility that was built into it.

I'm sorry to hear the user group has closed - they used to be quite large. Anyone out there with a MTX? Drop John a line and we will pass it on. Ed.

Dear Editor,

First, thank you for the printer Control Codes article - it was actually simple enough for me to understand! In fact, have I spotted an error? Should the BASIC lines at the bottom of Page 13, Column 1 read:-

```
LPRINT CHR$27; CHR$87; 1;  
LPRINT CHR$27; "W";1;
```

And why does each of these lines end with a semicolon (;)?

Next, E-Tracker. Your review does not say whether the notation used is proper musical staves or a "computerized" version similar to the Sound Machine?

As I understand your takeover of S&SC, Mr Perry's analogy should really go more like:- You go into Currys and hand over £30 for a tape player. Currys then put up a notice saying "Gone away" when you go to collect it, Dixons, next door, see your plight and offer you free a £20 model, of superior quality, partly out of the goodness of their hearts, but mainly in the hope that you will become/stay a good customer. Am I right?

Finally, can I point out a couple of habitual spelling errors? "Console" has an e, and "lose" has only one "o" - though to "loose my marbles" conjure up a wonderful mental image!

Yours sincerely, Guy Inchbald.

The semi-colon at the end of a PRINT or LPRINT statement stops the computer sending a carriage return. In other words - it tells the computer to leave the print position where it is.

I'm not sure on the Etracker question because I'm not into computer music. The worse thing anyone ever did was to come up with the idea of putting a speaker into a computer - noise is not my idea of what a

computer is for.

As to the spelling. Two problems, first spell checkers only pick up words that are not in their dictionary so if the incorrect spelling of a word is the correct spelling of another word - tough. Second, with just a few hours to proof-read all the pages of FORMAT before final paste-up Jenny does her best but a few still get through. Ed.

Dear Editor,

Don't bother printing this letter. Many thanks for finding more copies of Prince of Persia There should be a cheque enclosed - please can you send me one soon!

To whoever answered my letter in the letters section: Why would I like things like PKZIP etc., on SAM? Well, it would be useful to be able to compress files, to get more on a disk, it would make backups easier, software distribution easier (and safer - e.g. some archivers have a 'security envelope' once compressed, so if they're tampered with they won't extract). Need I say more? Knowing

Bob, probably...

I'd love to get my Great Aunt to buy a SAM, unfortunately she's dead...

If anyone offers a Rolls Royce for my SAM, not only would I take it, I'd even swap it with you, although not for two SAMs. Why would I swap it? Well, Mum doesn't like large cars, Dad can't drive, and I'm only fifteen!

Chess is coming?!? When? Where? Who from??? I didn't know you knew Sieg....

I'm sorry to hear about SU, but I guess we all saw it coming. The last issue I saw was only about 40 pages at most, and shrinking fast.

Multiface pokes:-

Supersprint  
Always upgrade 40968,205  
Always qualify 49359,201

Nebulus  
Infinite lives 32941,0  
" time 43650,0

I ball  
Infinite lives 49165,0/48790,0  
No gun overheat 49781,33

Ikari warriors  
Infinite fuel 40618,0  
" tanks 63284,190

Uridium

Immunity 55419,0/55420,255

Metrocross

Infinite time 43006,195  
" 44490,0

Target renegade

Infinite lives 63160,50

Flying shark

Infinite lives 54462,201

Smart bombs 54379,3

No enemies 51631,201

All die 68082,201

Immunity 48114,0/48115,1

Goto next level 39997,3

Extra lives 42464, no. of lives

Extra bombs 42490, no.

And there's a little (lot) more where that came from; not only multiface, but other types as well. If you want them, just let me know.

Yours sincerely, Paul Walker.

P.S. You do not spell favourite 'favorite' unless you're American!!!!

Oh no, not another spelling mistake...

PKZIP and its like are more needed on the PC because programmers seem to expand data to fit the space available. On our computers there is often much more thought given to the space the program will use on disc.

Still, sometime I will try to get an article together that looks at data compression. It is an interesting subject.

More news on chess as soon as we are free to publish. And thanks for the pokes - keep them coming. Ed.

Dear Editor,

Please find enclosed the subscription renewal form plus a cheque for £12.

I thought I would write a letter while I was sending you something anyway. First of all, in reaction to Mr Perry's latest debacle - I was disgusted to read his comments concerning the transfer of issues from S&SC to FORMAT. He should be grateful to receive anything for his money. After all, did anybody receive anything for their money lost with either MGT or SAMCO? I was also in the unfortunate position to lose money

with PBT Electronics, who have seemingly totally disappeared.

Secondly a question. If I were to buy a Commodore 1084ST colour monitor, or possibly a Phillips CM8833mk2 monitor, do you know if I would be able to connect (and use!) it to my SAM. I believe there are monitor cables available (or is the Scart cable used for both Scart and monitors?) I'm looking at these two monitors in particular, as they will definitely work with my Amiga, and it makes sense to buy one which works with both. If neither of these will work with SAM, perhaps you could recommend any good colour monitors which will, and I can investigate their Amiga compatibility.

Thank you for supplying FORMAT for the past few years - keep up the good work.

Yours sincerely, Nigel Kettlewell.

The Phillips would definitely work on both SAM and the A\*%\$A. Blue Alpha will be able to supply you with the leads, just give them a ring. Ed.

Dear Editor,

In reply to Malcolm Perry's letter in April's FORMAT he should consider the following points.

The cover price for FORMAT is £1.25 therefore 12 months FORMATS should cost £15, and if he pays his annual subscription promptly he will get 13 copies of FORMAT which should cost £16.25 but still only costs 12 which means that he will actually be the grand sum of £4.25 in pocket. This I feel should more than make up for the few pounds he may have lost on his S&SC subscription. In addition to the magazine he also has access to the HOTLINE and virtually all the advertisers in FORMAT offer good discounts on both Hardware and Software.

Additionally if FORMAT had not taken up the outstanding subscriptions he would probably have ended up with nothing at all!

Furthermore there is absolutely no comparison between the two magazines. S&SC consisted mainly of Software reviews and advertisements with little

**sinclair**

W.N.RICHARDSON & CO  
(EEG)

**QL & SPECTRUM PRICES REDUCED**  
**QL £85 SPECTRUM +2 & +2A £70 SP+3 £80**

**ALL PRICES INCLUDE 17.5% VAT**

★ MICRODRIVE EXPANSION KIT ★ Includes microdrive & interface 1, booklet, introduction cartridge & flex connector & Wallet of 4 Cartridges ..... £59.95 As above with extra microdrive ..... £69.95 NEW MICRODRIVES ..... £24.95 - 2 for £40 (WITH CONNECTOR)	★ MICRODRIVE CARTRIDGES ★ 4 new cartridges in wallet ..... £10.00 20 in plastic box with separators ..... £50.00 8 new (program cartridges) for (reformatting) in wallets ..... £15.00 Power Supplies ..... 48-128k £9.99 plus 2A and 3 £12.25 QL £12
---	---

★ PRINTERS ★  
ALL PRICES INCLUDE 17.5% VAT  
SAMSUNG SP093 80 col, 300 CPS, 50NLQ, 3K Print Buffer Centronics, T/Feed & S/Feed. Paper park facility ..... £149  
CANON BUBBLEJET BJ10EX Portable 142CPS (17CPI) 83CPS (12CPI) 64 nozzle, resolution 360 x 360 D.P.I. .... £225

UK delivery. Please add £9 for PRINTERS etc. Other items £3  
Outside UK add £15. Other items £5. C.W.O. or VISA ACCESS  
Spectrums may be reconditioned  
ALL OFFERS SUBJECT TO AVAILABILITY - ORDERS TO:

★ UNIVERSAL 3.5 DISK DRIVE FOR MOST MICROS ★  
1Mb and 2Mb 3.5" cased, complete with built-in PSU, mains switch & 13 amp plug. EXTERNAL dip switches adapt drive for Spectrum, QL, PC, Atari, Amiga etc. Comes with full instruction book, and free DS/DD disk (DS+HD with 2Mb). Price includes free lead (Spectrum & QL need 1 face) - Disk Drive 1Mb £69 2Mb £89 Additional Leads - for above £12  
Uncased 3.5" Disk Drives low profile 1Mb £29 2Mb £36

18-21 MISBOURNE HOUSE, CHILTERN HILL, CHALFONT ST PETER, BUCKS SL9 9UE  
FAX: 0753 887149 TEL: 0753 888866

original material or articles of interest in general. There was very little SAM material apart from Software reviews and PLUS D/DISCIPLE users were not catered for at all.

So come on Mr Perry, stop whingeing and accept the fact that FORMAT has given you more than you would have had otherwise and bear in mind that petty, unconsidered actions like yours could well cause the demise of small concerns like FORMAT which as you know operate on a shoestring and mainly for the benefit of their members.

Yours sincerely, John E.Redfern.

Dear Editor,

I have been a subscriber for 3 years, ever since I bought a SAM in fact, and this is the first letter I have written to your excellent magazine. What has moved me to write this letter is the letter in the April issue from Malcolm Perry. Doesn't he realize if it wasn't for FORMAT he would most likely have lost all the money left on his subscription, instead he is getting an excellent and, by all accounts, superior magazine. In a time when all computers are getting less and less support from all quarters, he moans over trivial matters and threatens to report one of the few magazines that supports and takes the Spectrum and SAM seriously to trading standards officials over a few pounds at the most, which as far as I can see is owed to him by Garner Designs and not my FORMAT. I will certainly continue to support both FORMAT and the SAM.

Before ending this letter I would just like to say a big thank you to Carol Brooksbank for the excellent machine code tutorial, and a thank you to all the other contributors who have helped me to get to know my SAM and find out what it is capable of doing.

Yours sincerely, R.E.Harvey.

Our thanks to everyone who wrote in on the Mr Perry subject.

Our thanks also to several people, including Mr Giovannacci, who felt strongly enough to ring us up on the subject. Ed.

\*\*\* SMALL ADS \*\*\*

WANTED DISCIPLE Interface (or possibly Plus D) Ring Grant on 0989-62715.

WANTED the program SOLAR SYSTEM from Mirror Soft on tape or disc. Will pay new price and p&p. Contact I.Ordog, Budapest, Vezer ut 143, Hungary. or fax 36 1 25 26 025.

YOUR UNWANTED Spectrum or SAM Coupé software purchased (any age or type considered). Send priced lists to: J.G.Marshall, 7 Claborough Drive, Arnold, Nottingham, NG5 7LL or tel (0602) 264471.

FOR SALE 512K Sam, 128K Spectrum, Spectrum+, 2x DISCIPLES, Panasonic KXP1081 printer, Huge amount of serious and recreational software, many rare books, complete set of FORMAT. Offers to Phil on 0734-312427.

WANTED The Complete Spectrum ROM Disassembly and other Machine Code books. Old software such as Phipps Adventures (e.g. Knights Quest). Also The Hobbit, Fred etc. Tel Fraser on 0246 412547.

YOUR ADVERT

Selling, Buying, Pen Friends, etc.

Any PRIVATE advert, up to 30 words (subject to acceptance), will be printed FREE in the next available issue. Any software sold must be original, in working order and with full instructions. The publishers will not be held, in any way, responsible for adverts in this column. Trade advertisers contact the publisher for rates.



SOFTWARE

SAM Coupé SOFTWARE - On 3½" Disc

SAM DEMO DISC #1 Utilities, demos, screens, a game, and lots more. A real bargain for any SAM owner.  
Order Code SCD-02 Price £1.50

SAMCO NEWSDISC SET Issues 1 to 5 (six discs) packed with things no SAM owner should miss.  
Order Code SCD-03 Price £12.00

SAMSPEC SOFTWARE  
SAM + Spectrum software on one disc. (3½" or 5¼" - please state on order)

FONT LIBRARY #1. 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 £6.95

MONEY MANAGER Advanced Personal Budgeting System for both machines, Spectrum version needs 128k/+2 (not +3/+2a). RRP £15.95  
Order Code SSD-02 Price £12.95

DISCIPLE/PLUS D SOFTWARE  
Please state 3½" or 5¼" disc

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. RRP £19.95  
Order Code SPD-01 Price £16.95

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

HARDWARE

PRINTER LEAD Top quality parallel printer lead (BBC Standard). 2 meters long. For use with DISCIPLE, PLUS D or SAM. RRP £9.95  
Order Code PPL-01 Price £7.95

SAM COUPE TECHNICAL MANUAL Version 3 The real inside info on SAM. As published by SAMCO. RRP £16.99  
Order Code STM-01 Price £12.95

FORMAT  
READERS SERVICES

SPI. - SAM's Parallel Interface A full feature Parallel Printer Interface. Totally compatible with SAM's ROM and DOS printing routines and with utility programs like FLASH and TASWORD 2. Uses standard BBC lead (see above). RRP £24.95  
Order Code SPI Price £19.95

SAM KEYBOARD UNIT Brand new (ex-SAMCO) stock. Easy to fit. RRP £15.95  
Order Code SPI Price £12.95

SAM POWER SUPPLY Full spec, fully tested, with guarantee. RRP. £29.95  
Order Code SPS Price £22.95

FORMAT BACK-ISSUES  
Volumes 1, 2 and 3 of FORMAT now available only as complete volumes.  
Order Code FBI-V1 (Vol.1) Price £10.00  
Order Code FBI-V2 (Vol.2) Price £12.00  
Order Code FBI-V3 (Vol.3) Price £12.00  
All issues, from Volume 4 No 1 to the latest issue, are still available separately. To order quote the Volume/Issue No. Price £1.50 each, (5 or more £1.25 per copy)

FORMAT BINDERS  
Hardcover binders to protect your valuable magazines. Each will hold 12 issues, easy to insert/remove.  
Order Code FMB-01 Price £4.50

ORDERING

All prices include UK Postage and Packing. Overseas readers please add 10% to total order for extra postage. Please WRITE YOUR ORDER ON A PIECE OF PLAIN PAPER, and mark envelope ORDER.  
Clearly state Order Code; Title; Quantity required; price & add any postage as above. Remember to quote your membership number or we can't send out your order. Payment in STERLING by Cheque (UK bank), P.O. Euro Cheques or Cash. Make cheques payable to FORMAT. Payment MUST accompany order. Please allow 28 days for dispatch. FORMAT Publications will not be held liable for delays or non-delivery due to circumstances beyond its control.