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Vol.10 N°2.

October 1996.

FORMAT

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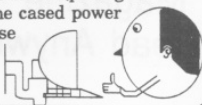
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CONTENTS

Vol.10 N°2.

October 1996.

♦ News On 4	4
♦ The Editor Speaks	5
♦ Short Spot	7
♦ Small Ads	15
♦ Double Joy	16
♦ Show Information	19
♦ Your Letters	23
♦ More New Tricks For The Secretary - Part 4	30
♦ Shine A Light On Dim Things	33
♦ Writing For FORMAT	38
♦ Format Readers Service Page	21

THIS MONTHS ADVERTISERS:-

FORMAT (SAM REPAIR SERVICE)	32
FRED PUBLISHING	Back Cover & 38
REVELATION SOFTWARE	10
S.D.SOFTWARE	2
STEVE'S SOFTWARE	6
WEST COAST MAIL ORDER	28

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NEWS ON 4

MOMENTUM

Graham Burtenshaw, famous for the highly successful SAMPaint utility, has turned his skills to games writing. Described as "a veritable feast of interactive entertainment" the game is called Momentum and is now available from Fred Publishing in Dundee.

It is a 3D arcade game, using isometric projection, where you have to work through over 150 screens. Similar in concept to the Spectrum games Spindizzy and Giroscope, but with far more features than both games combined.

Available now from Fred, priced at £14.99 (£12 to INDUG members).

WIZARD UTILITIES

Notts based software company Grafix Wizards have just released the interestingly titled 'Rather Useful Utilities' compilation for the 48K/128K Spectrum.

Available on tape, for the paltry sum of £2.99 (that's under 75p each folks). The four program pack consists of an AY Soundtracker, to use the sound chip on the 128K, it also allows the user to create tunes that can be compiled and used in their own programs. There is also a Sprite Generator with all the facilities to create sprites for your games programs, Picpak which compresses screens to save on memory and loading times. And finally, Protext, a text editor with many of the features of a full word processor. All the programs have their LOADs/SAVEs in Basic, so they can be adapted for most disc systems and other storage media.

There is also a Basic compiler available on cassette from the same company at £4.99. Contact Jonathan Cauldwell at Grafix Wizards, 5, Helmsley Drive, Eastwood, Notts, NG16 3RS.

FIRE-BOMB ATTACK

Oldham Police are appealing for witnesses to a petrol-bomb attack on the Oldham Trading Standards Office at around 10:30pm on Friday the 20th September.

The flaming petrol filled bottle was thrown through a rear first floor window and completely gutted one of the Trading Standards offices. No-one was injured.

The attack is thought to be connected with raids that took place during the previous few weeks that led to an estimated £5 million worth of pirate software being seized together with what is reported as "a five figure some of money" which was found under floorboards at one of the addresses searched. A total of 22 addresses were raided and some 12 people were arrested.

An application had been made to the court by one of the property owners, just hours before, for the money to be returned. However, this was refused pending the outcome of continued police investigations.

It would appear that someone wanted revenge and the Trading Standards office was an easy target.

EPSON CHALLENGE

Epson have launched a new challenge to Canon's number two spot in the colour inkjet market. The new Stylus Colour 200, priced at £189 incl VAT, is a little more than Canon's BJC 210 but boasts 720dpi printing as against the BJC's 360dpi.

Canon, second only to Hewlett Packard, in total inkjet sales, have nevertheless gained supremacy in the home market because of their very competitive pricing. This is a position they will now be hard pressed to maintain if Epson continue their push for a bigger market share.

The Editor Speaks

By the time you read this the October Show will be almost here. I've been very good to you and given you lots of advance warning on the date so no excuses now, you all have to turn out. I've also been very kind by arranging an extra hour in bed for you the following morning - that's right, I had made sure that the clocks go back to GMT on the Sunday so you can have a lay-in to recover from the show - nothing is too good for our members.

On the subject of shows, my thanks to all of you that turned out for the Northern show in Wetherby. Not as many of you as I would have liked, but not as few of you as I had feared. There will be a second one sometime next year and we will let you know as soon as we have a date from the organizers.

Having said that attendance was a little low, we certainly had the quality there, and I have to admit I came away with a very sore throat. It was particularly nice to see so many Spectrum users, for once I sold nearly as much Specy material as I did SAM. So now it's down to Gloucester for you all, come along and wave the flag for the Spectrum and the SAM.

The first issue of the new FORMAT PC went out during the first few days of October. I hope you all passed on, to one of your PC owning friends, the special leaflet we sent out with the August issue of **FORMAT**. I cannot over-stress the advantages to every one that will come from the expansion of the user group and I like to think that everyone is doing their little bit to help INDUG grow. If you need any more leaflets then contact Jenny with your membership number and she will send you some right away.

Of course, at the same time, we are always very pleased to see new Spectrum or SAM owners joining INDUG. If you know anyone who owns a Spectrum or SAM and is not already a member, then send us their address and we will get an intro-pack off to them as quickly as we can.

Several people have asked if we plan to do anything next year to celebrate the 15th birthday of the Spectrum. Well, so far I have not given the matter much thought - I've got to get 1996 over with first. But, it would be a shame if the Spectrum's 15th birthday, and our own 10th birthday, were not celebrated in a suitable manner. So, has anyone any ideas of how to mark these momentous landmarks in the history of home computing? Drop a line to the usual address and I will print the letter in the letters page. Sensible ideas please, ideas like putting up statues of Uncle Sir Clive and myself in London would not go down well with the London Tourist Board (scare far too many visitors that would). But I'm sure that between us we can come up with some realistic plans.

Finally, an appeal. It is almost Christmas and we need your help in finding more seasonal items for the December issue. Cartoons, puzzles, seasonal programs or stories. You name it, we want it - quickly. Please help, I want to get all nice and Christmassy good and early this year and your contributions will really help me get in the mood.

Now don't go forgetting the Gloucester Show - will you!
Until next month.

Bob Brenchley, Editor.

PHOTO SCANNING SERVICE



Have you got pictures, photos, drawings, logos, signatures you would like to include in a publication, newsletters etc. You could stick them within your printed text page, but is the picture the size you want it, if you are using colour it could cost you quite a bit in colour photo copying costs. Pictures also tend to come out more darker and less detailed when photocopied. This is where the photo scanning service may help you. All you need to do is send in your pictures upto A4 in size and state what size you would like the final output to print out to your printer. (120mm by 120mm max for Grey shade pictures, and 65mm across by 55 mm down max for colour pictures. Note 1 can convert colour pictures to grey shade).

The picture image is saved onto disc at a maximum pixel resolution of 1750 by 1750 (equivalent to 32 Sam Mode 3 SCREENS) special software then prints out your picture at high speed anywhere onto an A4 piece of paper. It costs £1 per picture (the 6th, 12th, 13th picture is Free). Then ADD £1.50 for postage & packaging. There is also a special scanning service for 720dpi Epson stylus printers, send off for the sampler pack below for details. If you would like a sampler disc with 4 pictures (2 mono, 2 colour), plus print samples, more information, order form, then send in a blank formatted disc with two 20p coins stuck on the back. *Please state which Printer you own.*

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SHORT SPOT

YOUR HINTS, TIPS AND PROGRAMMING IDEAS

Edited By:- John Wase.

I thought I'd only just finished September's offering, and it's already time for October's. Gone are the famous underpants and string vest (well, they're still here, but well covered), and, instead, we're into woolly jumpers, with the Rayburn going full belt. Nevertheless, we'll survive the filthy weather, and while the hours away with **FORMAT**.

With that in mind, the first and second items have got a lot of meat in them, and all for those who still have a working PLUS D with a Spectrum - a diminishing, but still very large band! This very morning, I've had a letter from John Redfern of Forest Hill, London. John writes about Roy Burford's comments about string commands (vests?) in G+DOS commands in September's issue, pointing out that the syntax in both BetaDOS and G+DOS requires that a delimiter is included in the command, and although the use of a null string before the variable is perfectly valid, an even simpler way is merely to use a semi colon, thus:-

```
10 SAVE d1;p$: VERIFY d1;p$
```

and this works fine for both G+DOS and BetaDOS.

John goes on to mention that on the SAM, a similar method also works, although the delimiter is put inside the quotes, (in the same way as one also gets, for instance, with MSDOS) and the string variable therefore has to be concatenated outside the quotes, thus:-

```
10 SAVE "d1:"+p$: VERIFY "d1:"+p$
```

Miles Kinloch, well-known to many of us, from Edinburgh, has also written to us extensively about this matter, together with related items. "If you remember from last month," started Miles, "Roy was having trouble with certain commands, such as the string variables in G+DOS commands".

So, in reality, we are looking at the same problem, and the same solution from two different viewpoints. John's solution is a specific explanation, but Miles is a little more general and a little more subtle. Moreover, Miles then widens his argument, as we shall see... So Miles again starts by mentioning that Roy's solution was to concatenate the variable with a null string, and then goes on to mention that in reality, what the DOS is actually looking for is a semi-colon or even a comma separator, i.e:-

```
SAVE d1;p$
```

or even

```
SAVE d1,p$
```

Although obligatory with a variable name, the separator can also be used with string quotes, but in the latter situation, it is optional and most people just omit it. It's worth bearing in mind, nevertheless, that constructions such as

```
SAVE d1;"name"
```

and so forth are, in fact, possible.

On a related theme, Miles also mentions that another syntactical anomaly of G+DOS concerns the ERASE...TO command, which again has to do with string names. Whilst:-

ERASE d1"name1" TO "name2"
 is, for example, perfectly acceptable,
 ERASE d1"name1" TO a\$
 is not! This time, the DOS is expecting
 ERASE d1"name" TO ;a\$
 Similarly, one can also have:
 ERASE d1;b\$ TO ;a\$

and so forth.

In this connection, Miles wrote, some little time ago, an article which covered many of the features that aren't explained in the PLUS D manual, and has listed them here for us.

CAT COMMAND

A selective form is possible (a stream may also be included if desired):-

```
CAT n"filename"
or
CAT n;a$!
etc.
```

The effect of this variation of the command is to display only those files matching the specified string. This can be especially useful with wildcards, to show all files with a particular prefix or suffix:-

```
CAT n"A*"
or
CAT n"?????????.C"
```

MOVE COMMAND

This command can take four possible forms, although the manual mentions only two of them. The full set of permutations is:-

1. MOVE dn"filename" TO dn"filename"
2. MOVE dn"filename" TO #a
3. MOVE #a TO dn"filename"
4. MOVE #a TO #b

In each case, the first file or stream is

read, byte by byte, and written to the second file or stream. With types 2 and 4, a CLOSE #* is needed afterwards to complete the process.

It is also important to realise that MOVE is only intended for copying OPENTYPE files, and SAVE...TO must be used for all other filetypes. This is due to the structure of PLUS D files.

AUTO-RUNNING CODE FILES

By specifying a third parameter when loading or saving CODE, it is possible to make it execute automatically; for example:-

```
SAVE dn"filename" CODE 30000,123
45,32000
or
LOAD dn"filename"CODE 30000,1234
5,32000
```

The first would save a file 12345 bytes long, from address 30000, so that on loading, it would execute from address 32000. The second would load a file to auto-execute in a similar way. This feature is particularly useful for screen-resident utilities.

Once code has been saved in this way, it is possible to defeat the auto-run on subsequent loading by specifying a third address which will effectively do nothing. A good one to use for this purpose is 82, a ROM location containing just a RET instruction. For instance, the following would prevent auto-execution of a screen-resident program:-

```
LOAD dn"filename" CODE 16384,691
2,82
```

ERROR TRAPPING

Another feature, not mentioned in the manual, is the ability to make the PLUS D ignore Basic errors, by POKEing 23728 with any non-zero value. This facility is somewhat more limited than a true 'on error go to', since it simply

executes the next statement, rather than jumping to a predetermined line of Basic set up to handle errors. In certain circumstances, however, this can be adequate.

Unfortunately, there are pitfalls to be aware of with this facility, as it can result in a corrupted stack under certain conditions, such as in a subroutine, where the effect is to cause a crash or lock-up if a true error occurs later. This problem can be overcome by including a RANDOMIZE USR 8 command before POKEing 23728 back to zero. (In a subroutine condition, the RANDOMIZE USR 8 must also precede the RETURN).

HIDDEN FILES

By adding 128 to the filetype byte, i.e. to the first byte in the file's directory entry, it is possible to prevent the file appearing in the catalogue. One useful application of this is with multi-part programs, where you hide all the files apart from the loaders themselves. This has the advantage that it makes for a much clearer, uncluttered catalogue. Of course, there is a compensating difficulty, in that if you come to copy the programs later, you can't see all the files, and.....

Note, incidentally, that +SYS and AUTOLOAD files must never be hidden, or they won't boot!

USEFUL DOS POKES

- POKE @7652,0 : Resets the PLUS D's RAM
 POKE @7652,88 : Locks out the DOS (without resetting it).
 POKE @7652,68 : Re-enables the DOS.
 POKE @3780,n : Attribute byte for CLS #. (N.B. 3783 if using BetaDOS with SNAPFIX installed).
 POKE @16,n : Interrupt facility. Address 'n' will be called 50 times a

second if interrupts are enabled.

NOTE: POKE @16,8335 afterwards, otherwise the Spectrum will go into 'perpetual reset', as it tries to call the code which is no longer there!

MISCELLANEOUS

OUT 227,0 : Spins the drive motor.

Many thanks, John and Miles, for all that information: great!

Now over to SAM. SAM owners are currently shy, or so it seems, or lazy or busy or something. However, to break the drought, I have a letter from Simon Turk again: he of the wordsearch problem. Simon indeed writes, "Tis I, Simon Turk, author of 'Wordsearch Cracker'." So there we are.

Simon writes that in Vol.10 N°1 of **FORMAT**, B.C.R.Buzzard's interpretation of 'The Turk Problem' itself has a little problem - it will find words only in one direction. However, armed with this as a start, Simon went back to the drawing board and rewrote his SAMkin jobbie. And here it is; mark 2! Simon says it solves a standard wordsearch, and leaves us to sort it out. In the words of the unworldly who are not familiar with this way of procrastination, it is looking for words in a jumble of letters set out in rows and columns to form an oblong grid. Words can be read forward or backwards, and can be on a line horizontally (a row), vertically (a column), so in this case, they're up and down) and also in both ways on lines at 45 degrees to the horizontal. It's therefore not as simple as someone last month (I'm losing my grip - was it Roy Burford) suggested. While the idea of padding a string out with blanks is fine for the usual way, one also has to work backwards and up and down. This is probably no hardship with a straightforward matrix, but then you have to search the diagonals as well, and the diagonals vary in length as you go

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

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along, making things more difficult. And you don't always know the length or what you are searching for (just find 10 words describing **FORMAT** - nice to Jenny, now!) This makes it still worse! Anyway, here it is.

```
10 REM wordsearch cracker ver
sion2
20 REM Written by SIMON TURK
30 REM note that this version
searches 8 directions wit
h one loop as opposed to t
he original 8 loops
40 REM *input loop*
50 INPUT "How many columns?";
c
60 INPUT "How many rows?";r
70 DIM w$(r,c)
80 FOR i=1 TO r
90 CLS
100 PRINT "Input row ";i
110 INPUT a$
120 IF LEN a$<>c THEN GOTO 110
130 LET w$(i)=a$
140 NEXT i
150 REM *Display loop*
160 CLS
170 FOR y=1 TO r
180 PRINT AT y,1:w$(y)
190 NEXT y
200 REM *Word to search for*
210 INPUT "Word ";a$
220 LET x=0: LET y=1
230 LET x=x+1: IF x>c THEN LET
x=1: LET y=y+1
240 IF y>r THEN CLS : PRINT "N
o Match Found": PAUSE : GO
TO 150
250 READ xdisp: READ ydisp: IF
xdisp=999 THEN RESTORE :
GOTO 230
260 FOR l=0 TO LEN a$-1
265 IF x+(xdisp*1)<1 OR x+(xdi
sp*1)>c OR y+(ydisp*1)<1 O
R y+(ydisp*1)>r THEN GOTO
250
270 IF w$(y+(ydisp*1),x+(xdisp
*1))<>a$(l+1) THEN GOTO 25
0
280 NEXT l
```

```
290 FOR l=0 TO LEN a$-1: PRINT
INVERSE 1: AT y+(ydisp*1)
,x+(xdisp*1):a$(l+1)
300 NEXT l: PAUSE : RESTORE :
GOTO 150
1000 DATA 0,-1,1,-1,1,0,1,0,1
,-1,1,-1,0,-1,-1,999,999
```

C'mon, readers - let me know what you think of it!

Next, a plea for help from Mrs D. Taylor of Marton Moss, Blackpool, who, unaware of Simon's hard work, typing away in the small hours has herself been typing away in the small hours at Turk mark 1. Mrs Taylor's been most thorough, for she's sent me a disc and a huge print-out. There's clearly a problem with line 270, for it reads:-

```
270 PRINT R#1;"NO MATCH FOUND":
PAUSE 0: GOTO 190
```

and, indeed, cannot be entered unless the # sign is omitted. There's a subsequent problem which Mrs Taylor describes, in which after you've got the program to load, if you can't find the word you want, it says 'Variable not found, 270:1'. Well, Mrs Taylor, it all looks like the same problem to me. Something's wrong with line 270 - probably some hiccup down the line. So it contains some rubbish. So you fiddle with it to get the line to enter, but it's still got the bum line in, so if it uses that line, it generates an error (that's the variable not found bit; it's found something it doesn't expect, like R1, and doesn't understand on line 270 - the first variable it's come to, and it's trying to tell you).

Finally, if you've been been messed about by a defective program (and nothing's more trying), if you press 'enter', you're through to the listing and probably trying to enter another line. And if you press RUN instead of GOTO -

quite right; you'll reset all the variables and you'll have to enter the word all over again. All good learning stuff, but not much help, I'm afraid. Does anyone (like Uncle Simon the Turk) know what should have been in that line - to put poor Mrs Taylor out of her misery. And when she's got that to work, then she can have a go at the all-new all-singing and dancing one, can't she! Many thanks, Mrs Taylor.

And now, to round off with, we have one or two little bits from the Sinclair Programs Annual of 1984, sent in by Mr Round of Starchley, in Birmingham (I go up Warwards Lane to the University almost every morning, Mr Round) who is 72, and has taken **FORMAT** for 9 years! Howzat! Poor Mr Round is struggling, for though he has many Spectrums, he also has a PLUS D which has struggled - and died - it keeps on going dead, and he's not sure how to advertise in **FORMAT** to see if anyone's got a spare. Don't worry, Mr Round; I understand that Jenny arranged for your advert to go into last months **FORMAT**, I hope you get sorted out soon.

Now, back to the Sinclair Programs Annual.

'Kilts' is a program of 30 different kilts or tartans of Scotland. Twill weave was chosen. There is a manual facility for the Do-it yourself weaver. Press A for Auto to see all the tartans one after the other. This is quite a long program and will probably raise a howl of protest from our friends across the border, so I'm waiting for some spirited correspondence about this one!

```
10 REM "COLOUR WEAVER"
20 REM © KEN RENDELL, 1988
25 REM POPULAR COMPUTING WEEKLY
30 LET menu=1000: LET mask=200
0: LET weave=3000: LET prom
pt=4000
40 LET start=5000: LET abort=6
```

```
000: LET cursor=7000
50 GOSUB start
60 GOSUB menu
100 RUN
999 STOP
1000 REM ***menu***
1010 CLS : RESTORE 8000: PRINT P
APER 0; INK 7; AT 8,6;"KEY
A for AUTO"
1020 PRINT PAPER 0; INK 7; AT 10
,10;"M for MANUAL"; AT 12,1
0;"X for EXIT"
1030 POKE 23658,8: PAUSE 0
1040 LET choice=CODE INKEY$
1050 IF choice<>65 AND choice<>7
7 AND choice<>88 THEN RUN
1060 CLS
1070 IF choice=88 THEN STOP
1080 GOSUB 1000+10*choice: REM 1
650 for AUTO,1770 for MANUA
L
1090 RETURN
1650 REM ***AUTO***
1660 FOR t=1 TO 30
1670 READ n$
1680 PRINT R#0; AT 1,0;s$:s$:s$;
s$
1690 GOSUB mask
1700 PRINT INK 7; AT 8,0;"Q"; AT
10,0;"A"; AT 12,0;"QUIT"
1710 PRINT R#0; INK 7; AT 1,INT
((31-LEN n$)/2);n$
1720 FOR n=0 TO 21: GOSUB abort
1730 READ c: LET col=CODE (STR$
c)-48
1740 GOSUB weave
1750 NEXT n: PAUSE 100: NEXT t
1760 CLS : RETURN
1770 REM ***manual***
1780 GOSUB prompt
1790 GOSUB cursor
1800 GOSUB mask
1810 FOR n=0 TO 21
1820 PRINT PAPER 0; INK 7; FLASH
1; AT 18,1;"ANY KEY"; FLAS
H 0
1830 PRINT PAPER 0; INK 7; AT 20
,2;((0-7)*) AND n<22
1840 PAUSE 0
1850 PRINT AT 18,1;s$: AT 20,2;s
$
1860 PRINT R#0; AT 1,0;CHR$ 32
1870 LET col=CODE INKEY$-48
1880 IF col<0 OR col>7 THEN GOTO
1820
```

```
1890 GOSUB weave
1900 NEXT n
1910 PAUSE 200
1920 CLS : RETURN
2000 REM ***MASK***
2010 LET d=(1 AND choice=65)+(0
AND choice=77)
2020 FOR n=0 TO 21
2030 PRINT AT n,10-5*d;g$;g$
2040 NEXT n
2050 RETURN
3000 REM ***weave***
3010 IF choice=77 THEN GOSUB cur
sor
3020 IF col=0 THEN GOTO 3100
3030 LET s=23210-5*d: LET m=s-67
2: LET f=s-651: LET x=-32
3040 FOR b=s TO m STEP x
3050 POKE b+n,PEEK (b+n)+col
3060 NEXT b
3070 FOR b=m TO f
3080 POKE b+32*(21-n),PEEK (b+32
*(21-n))+8*col
3090 NEXT b
3100 RETURN
4000 REM ***prompt***
4010 PRINT PAPER 0; INK 7; AT 1,
0;"BLACK"; TAB 8;"0"; AT 3,
0;"BLUE"; TAB 8;"1"
4020 PRINT PAPER 0; INK 7; AT 5,
0;"RED"; TAB 8;"2"; AT 7,0;
"MAGENTA"; TAB 8;"3"
4030 PRINT PAPER 0; INK 7; AT 9,
0;"GREEN"; TAB 8;"4"; AT 11
,0;"CYAN"; TAB 8;"5"
4040 PRINT PAPER 0; INK 7; AT 13
,0;"YELLOW"; TAB 8;"6"; AT
15,0;"WHITE"; TAB 8;"7"
4050 RETURN
5000 REM ***START***
5010 RESTORE 5000: LET g$="": LE
T s$=""
5020 BORDER 0: PAPER 0: INK 0: C
LS
5030 FOR b=UDG "É" TO UDG "É"+15
5040 READ n: POKE b,n
5050 NEXT b
5060 DATA 51,102,204,153,51,102,
204,153,16,40,68,130,0,0,0,
0
5070 LET f$=CHR$ 144: LET r$=CHR
$ 32
5080 FOR j=1 TO 8
5090 LET g$=g$+f$: LET s$=s$+r$
5100 NEXT j
```

```
5110 FOR j=1 TO 3
5120 LET g$=g$+f$
5130 NEXT j
5140 RETURN
6000 REM ***ABORT***
6010 LET quit=CODE INKEY$
6020 IF quit<>81 THEN GOTO 6030
6030 IF quit=81 THEN RUN
6040 RETURN
7000 REM ***CURSOR***
7010 PRINT R#0; AT 0,n+10; INK 7
,CHR$ 32;CHR$ 145; AT 1,0;C
HR$ 32
7020 RETURN
8000 DATA "BARCLAY",1,4,4,4,2,4,
4,4,1,1,1,4,1,1,1,4,4,4,2,4
,4,4
8010 DATA "BRODIE",2,0,2,2,2,0,0
,6,0,0,2,0,0,6,0,0,2,2,2,0,
2,2
8020 DATA "BRUCE",2,2,6,2,2,2,4,
2,4,4,2,4,4,2,4,2,2,2,7,2,2
,2
8030 DATA "CAMERON",2,6,2,2,2,4,
4,2,4,4,2,4,4,2,4,4,2,2,2,6
,2,2
8040 DATA "CAMPBELL OF BREADALBA
NE",0,1,1,0,0,4,4,6,4,4,0,0
,4,4,6,4,4,0,0,1,1,0
8050 DATA "CAMPBELL OF CAWDOR",5
,0,4,4,4,0,0,0,1,1,1,2,1,1,
1,0,0,0,4,4,4,0
8060 DATA "COLQUHOUN",1,0,1,1,1,
0,0,0,7,4,4,4,2,4,4,4,7,0,0
,0,1,1
8070 DATA "CRAWFORD",2,7,2,2,2,4
,4,2,4,4,2,4,4,2,4,4,2,2,2,
7,2,7
8080 DATA "DAVIDSON",4,0,4,4,4,4
,1,4,1,1,2,1,1,4,1,4,4,4,4,
0,4,4
8090 DATA "DOUGLAS",1,1,7,1,1,1,
4,4,4,5,0,0,5,4,4,4,1,1,1,7
,1,1
8100 DATA "DUNBAR",2,0,2,2,2,0,0
,4,4,4,2,4,4,4,0,0,2,2,2,0,
2,0
8110 DATA "FARQUHARSON",6,4,4,4,
0,0,0,1,1,1,2,1,1,1,0,0,0,4
,4,4,6,4
8120 DATA "FRASER",7,2,2,2,2,4,4
,2,1,1,2,1,1,2,4,4,2,2,2,2,
7,2
8130 DATA "GRAHAM",1,0,1,1,0,0,4
,5,4,4,4,5,4,0,0,1,1,0,1,1,
```

```

0,0
8140 DATA "GUNN",4,2,4,4,4,0,0,4
,0,0,4,0,0,4,0,0,4,4,4,2,4,
4
8150 DATA "HAMILTON",2,2,7,2,2,2
,1,1,2,1,1,2,1,1,2,2,2,7,2,
2,2,1
8160 DATA "HENDERSON",4,0,0,6,0,
0,4,0,4,4,4,4,4,1,1,4,1,1,
1,1,4
8170 DATA "KEITH",4,0,4,4,4,1,1,
0,0,1,1,0,0,1,1,4,4,4,0,4,4
,4
8180 DATA "LAMONT",4,7,4,4,4,4,0
,0,0,1,0,1,0,1,1,1,1,0,1,
0,1
8190 DATA "MACARTHER",4,6,4,4,4,
0,0,4,4,0,0,0,0,4,4,0,0,4,4
,4,6,4
8200 DATA "MACDONALD OF CLANRANA
LD",4,2,4,2,4,4,4,7,0,0,0,2
,1,1,1,2,1,2,1,1,2,1
8210 DATA "MACDONALD OF SLEAT",2
,4,2,4,4,4,2,4,2,2,2,2,2,2,
4,2,4,4,4,2,4,2
8220 DATA "MACDUFF",2,1,1,0,0,4,
4,2,2,0,2,2,0,2,2,4,4,0,0,1
,1,2
8230 DATA "MACFIE",2,7,2,2,2,2,4
,2,4,4,4,4,4,4,2,4,2,2,2,2,
6,2
8240 DATA "MACGREGOR",2,2,2,2,2,2,
4,4,4,2,4,7,4,2,4,4,4,2,2,2
,2,2,2
8250 DATA "MACINTYRE",4,7,4,4,4,
1,1,2,1,1,4,1,1,2,1,1,4,4,4
,7,4,4
8260 DATA "MACLEOD",2,6,6,6,6,0,
0,0,6,0,0,0,6,0,0,0,6,6,6,6
,2,6
8270 DATA "MACQUEEN",6,0,0,0,0,2
,2,0,2,2,0,2,2,0,2,2,0,0,0,0,
0,6,0
8280 DATA "MORRISON",4,0,0,0,0,4
,1,1,1,1,2,1,1,1,1,4,0,0,0,
0,4,4
8290 DATA "WALLIACE",2,0,2,2,2,2
,0,0,0,0,6,0,0,0,0,2,2,2,2,
0,2,2
9000 SAVE "WEAVER" LINE 30
9999 PAPER 6: INK 0: BORDER 1: C
LS : LIST

```

And finally, we've a bit of wintry weather well in advance. Snowflakes

abound as the program gets into the generation game! As the program runs, you will see a selection of eight patterns, each forming its own exceptional flake - sounds rather like Cadbury's to me, and Mr Round lives near enough to the factory, after all! Anyway, here we are - and have fun. And, all you others, don't you forget the Christmas bits either - I'll need them next month!

```

1 REM **SNOWFLAKES**
2 REM **FOR SPECTRUM **
3 REM ** BY JOHN EXELL**
4 REM **POPULAR COMPUTING
MARCH 30 1989**

```

```

10 LET S=2
30 FOR C=-1 TO 1 STEP 2
40 FOR D=-1 TO 1 STEP 2
50 FOR E=-1 TO 1 STEP 2
60 PLOT 65,5
70 LET A=PI/2
80 GOSUB 160
90 GOSUB 530
100 PAUSE 200:
110 CLS
120 NEXT E
130 NEXT D
140 NEXT C
150 STOP
160 FOR N=1 TO 3
170 GOSUB 210
180 LET A=A-2*PI/3
190 NEXT N
200 RETURN
210 GOSUB 290
220 LET A=A-PI/3
230 GOSUB 290
240 LET A=A+2*PI/3
250 GOSUB 290
260 LET A=A-PI/3
270 GOSUB 290
280 RETURN
290 GOSUB 370
300 LET A=A+PI*C/3
310 GOSUB 370
320 LET A=A-2*PI*C/3
330 GOSUB 370
340 LET A=A+PI*C/3
350 GOSUB 370
360 RETURN
370 GOSUB 450
380 LET A=A+PI*D/3
390 GOSUB 450

```

```

400 LET A=A-2*PI*D/3
410 GOSUB 450
420 LET A=A+PI*D/3
430 GOSUB 450
440 RETURN
450 DRAW S*COS A,S*SIN A
460 LET A=A+PI/E/3
470 DRAW S*COS A,S*SIN A
480 LET A=A-2*PI/E/3
490 DRAW S*COS A,S*SIN A
500 LET A=A+PI/E/3
510 DRAW S*COS A,S*SIN A
520 RETURN
530 PAUSE 100
540 PLOT 173,5
550 LET A=5*PI/6
560 GOSUB 160
570 RETURN

```

Many thanks, Mr Round.

It is now five to midnight, and I'm packing this in as I have to be up shortly after six a.m. (yes, there is such an hour), and I've just found a disc from someone from Chertsey, Surrey, 'cos it says so on the label, but with no documentation and the cryptic note on the *inside* of the envelope - "For some reason you have to load DOS". And it's too late to fiddle, as Bob's coming tomorrow for his copy, and so I'm afraid we shan't have this this month. Please include some documentation to say what it's for and what machine it's to run on, otherwise I'll never know! And then it'll kick around, waiting for me to sort it, like this one's got to!

And that's all for this month, 'cos it's again almost all I've got, and Christmas is coming soon. Please dig around in your drawers; send me some snippets. Please send them to:-

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

Thank you.

SMALL ADS

WANTED Robot Arm for Spectrum as sold by Dattel Electronics, interface also wanted which connects arm to Spectrum. Also wanted, PCB Designer. Will pay reasonable price for each item and postage. Tel: Colin Urwin on 01388 815390 or 814634.

FOR SALE Spectrum +3 with printer lead, Tasword +3, Tasprint +3, Genius Mouse, Artist II, 17 blank discs, 2 discs and 11 tapes of games, Cheetah 125+ joystick. All good condition, with manuals. £40 + postage (or buyer collects). Ben Booth - Cheltenham (01242) 528864.

FOR SALE Old and New Spectrum software. Original full price titles like: Nodes of Yesod, Gyron, Buck Roger, etc. Hundreds of titles, budget games and magazine tapes too. Send SAE to Douglas Young, Holmrigg, Wester Essendy, Blairgowrie, Perthshire, Scotland, PH10 6RD. Also **WANTED**. Working SAMBUS, reasonable price, write to address above.

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DOUBLE JOY

By:- Andrew Gale.

Trying to play a two player arcade game using keys rather than joy-sticks can rapidly turn into a tangled game of Twister on the SAM's keyboard. How much easier life would be for hardened games-players if only the SAM had two joy-stick ports.....

The user manual hints that you can actually use two joy-sticks on the SAM and tells you that you need a mystical device called a 'splitter cable' to do it. The reason for this is simple: if you look at the SAM's back panel you will see it is well and truly jam-packed with a plethora of input and output connectors, and there simply isn't enough room for another joy-stick port. So Bruce Gordon (the SAM's designer) decided to use one of the pins not normally used on a joy-stick port to allow the one port to support two sticks. How then is it done?

Let's start at the beginning and examine how a joy-stick works. There are nine pins on the SAM's joy-stick connector - the following table shows each pin's function:-

Pin	Function
1	Up
2	Down
3	Left
4	Right
5	0 volts
6	Fire
7	+5 volts
8	Strobe 1
9	Strobe 2

Strobe 1 and Strobe 2 both have lines above their names because these are signals that are *active low*. In otherwords when these lines are held 'low', that is at zero volts, the circuit attached to them responds. Many signals in digital electronics are shown this way.

For the actual layout of the port refer to the SAM User Manual (page 173).

Each joy-stick has at least five switches - one for each of the four directions and one or more as fire buttons. Each switch is connected between its relevant direction pin and pin 8. So the left switch is connected between pin 3 and pin 8, the fire switch is connected between pin 6 and pin 8, and so on. When the joy-stick is pushed in a particular direction the associated switch is closed connecting pin 8 with whichever direction pin the switch is also connected to. For example, suppose we push the joy-stick diagonally up and right. Two switches would be closed making an electrical connection between pin 1 and pin 8 and another connection between pin 4 and pin 8.

On most computers (Ataris, Commodores) pin 8 is 0 volts and not Strobe 1 as it is on the SAM. This means that whichever pin is connected to pin 8 is forced into the logic 'low' state. When the switch is open however, the pin is held 'high' by resistors inside the SAM. Strobe 1 is different to the pin 8 we find on other computers because Strobe 1 is only at 0v when the SAM wants to read

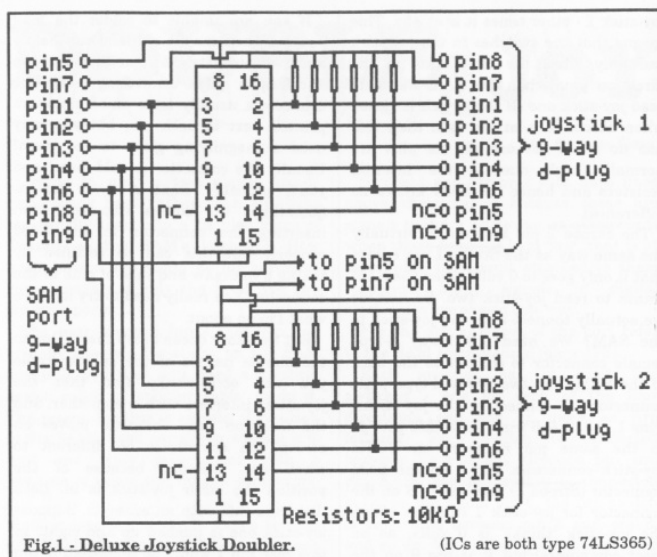
joy-stick 1 - other times it is at +5v. This means that the switches in the joy-stick can only affect the logic state of the direction pins when the SAM wants to read joy-stick one (If the switch is closed when Strobe 1 is at +5 volts then this has no effect because all the pins are normally high due to the internal resistors and hence the SAM knows no difference).

The Strobe 2 pin behaves in virtually the same way as the Strobe 1 pin except that it only goes to 0 volts when the SAM wants to read joy-stick two. So how do we actually connect a second joy-stick to the SAM? We need one 9-way d-type female connector to connect to the back of the SAM, and two 9-way d-type male connectors to connect to the joy-sticks. Pins 1, 2, 3, 4 & 6 from the SAMs port go to the same pin numbers on BOTH joy-stick connectors. Pin 8 on the SAM connector (Strobe 1) goes to pin 8 on the connector for joy-stick 1 (the pin which the joy-stick 'thinks' is 0 volts, as on most computers) but it is pin 9 on the SAM (Strobe 2) that goes to pin 8 on joy-stick two. Because pin 8 on the joy-stick connectors is not actually 0 volts, but is only 0 volts when the relevant joy-stick is being read, it is common for the 'auto-fire' function on some joy-sticks not to work. The table below summarises the interconnections for the splitter cable:-

SAM	Joy-stick 1	Joy-stick 2
1	----- 1	----- 1
2	----- 2	----- 2
3	----- 3	----- 3
4	----- 4	----- 4
5	--- no connection	
6	----- 6	----- 6
7	--- no connection	
8	----- 8	
9	----- 8 (NOT pin 9!)	

If you are unable to solder the lead yourself then maybe a friend can help - audio enthusiasts are sometimes keen to knock-up a quick connecting lead. The connectors usually have small numbers printed next to each pin, but you may need a magnifying glass to see them! Usually the connector is sold 'bare' and you'll probably want a cover for it. Sometimes the covers stop you from inserting the connector in the SAM properly but this can be rectified by taking a hacksaw and tube of glue to the connector. You really need to try it to see what I'm on about.

But the story doesn't stop there. Due to the simple nature of the splitter cable you will occasionally find that the joy-sticks interfere with one another, and the direction your character moves on screen can sometimes be different to what you intended because of the position the other joy-stick is in. Let's illustrate this with an example. Suppose joy-stick one is pushed up and right. In this case pin 1 would be connected to pin 8, and pin 4 would be connected to pin 8. What may not be immediately obvious is that pin 1 is also connected to pin 4, via their common connection to pin 8. Now suppose joy-stick two is being pushed down and right. For this joy-stick we have pin 2 connected to pin 9 (Strobe 2, remember) and pin 4 connected to pin 9. Again we have a connection between two direction pins - this time pin 2 and pin 4 are connected together, via pin 9. But as well as being connected to pin 2, pin 4 is also connected to pin 1 because of the positioning of joy-stick 1. Effectively then, pins 1, 2 and 4 are all linked together, PLUS they are all connected to pin 8 through joy-stick 1, AND they are all connected to pin 9 through joy-stick 2. It seems to the computer that both



joy-sticks are pushing at the same time and, furthermore, that each one is pushing in three directions at once: up, right and down. You can see then why we get interference between joy-sticks.

There is a solution, but it's really only for those who know a little about electronics already. I tried one solution with 10 diodes, but it turned out that, to be on the safe side, they needed to be germanium diodes which are quite expensive. I therefore opted for an approach using two integrated circuits (ICs) type 74LS365, which provided a much more reliable design. I won't go into detail about how it works or how to build it because I assume that if you're brave enough to try it then you probably

know enough about electronics already. Suffice to say that each 74LS365 chip is a bank of 6 tri-state non-inverting buffers, whose output enable, OE, control is fed by either Strobe 1 or Strobe 2. To build the device (circuit diagram shown in figure 1 above) you will need the three D-type connectors as for the splitter lead we dealt with before, plus two 74LS365 ICs, two 16-pin DIL sockets, twelve 10KΩ resistors, connecting wire and a small piece of stripboard. There's quite a lot of solder joints to be made so don't rush it!

Hopefully I've enlightened you about the mysteries of the SAM's joy-stick port - and I wish you happy two-player gaming!

SHOW PREVIEW

Its SHOW TIME again folks, Saturday 26th October is just round the corner. And as we gave you plenty of warning for this one, there is no excuse for not being there. This will be the 7th Gloucester Spectrum & Sam Show and it is held at our usual venue on the outskirts of Gloucester (See the map and directions printed on pages 21/22).

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

Make sure you bring lots of money with you or at least your cheque book and pen.

FOOD & DRINK

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

BRING AND BUY

The Bring and Buy stand is without doubt one of the most crowded stands during the day, giving people the opportunity both to rid themselves of those surplus items they have gathered over the years and of course to find that one item you have always been looking for.

If you are selling items then please remember to make sure everything is fully working, complete, and has its instructions or manual. If possible put a small label on each item giving your name and the price you are asking. The Bring and Buy table, in the back room, is not constantly manned, although Derek Morgan does try to keep an eye on things for us if he is not too busy with his SAM PD stand. However, we leave it up to buyer and seller to get together and do the business. Each show sees many hundreds of items change hands and I'm sure there will be even more this time, but you will understand that the organizers cannot be responsible for items left for sale, nor can we be responsible for items you purchase. Our recommendation to buyers is to make sure you get the sellers address just in case.

STAND BOOKINGS

If anyone wants a stand at this show, and has not already had a booking form from us, then ring Jenny on 01452-412572 right away and we will see if we can fit you in.

HOTELS

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

See You At The Show

WHO'S THERE

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

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

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

SAM PD I've already mentioned that Derek Morgan will be in his usual place in the back room. As well as the PD software there is also a growing range of commercial software under the F9 label. Hopefully he will also be demonstrating the Video Digitiser for SAM (and, maybe, taking orders).

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

S.D.SOFTWARE Got your SAM Hard Drive yet? Well if you are behind the times then this is the ideal opportunity to take that 'giant leap for SAMkind' and attach a hard disc to your machine.

FRED SOFTWARE Fred's wide range of SAM software and of course the famous FRED disczine will be on show together with at least two new titles including their new SAM game from Graham Burtenshaw called 'Momentum'.

SAM SUPPLEMENT now have a wide range of SAM software at very competitive prices.

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

REVELATION SOFTWARE will be launching the new SAM implementation of Elite. One of the most addictive games of the early 80s, the Spectrum version has at last been moved to SAM disc so you can load and save to disc.

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

Make sure you get there on Saturday the 26th **OR YOU WILL REALLY BE MISSING OUT.**

GETTING THERE

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

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

For those coming south there are two choices. Junction 12 is not available southbound, so it is easier to continue to exit 13 and then turn north onto the A38 - this only adds about 5 miles to the journey and avoids the traffic around Gloucester. The alternative is to exit at junction 11 (the A40/Cheltenham exit) and follow signs for Gloucester, follow the ring-road around - you eventually get signs for M5 South - until you reach the roundabout marked at the top of the enlarged map. This has the local British Telecom offices on the left and is currently under major reconstruction, follow signs for Severn Vale Shopping

Centre (see above for more details).

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

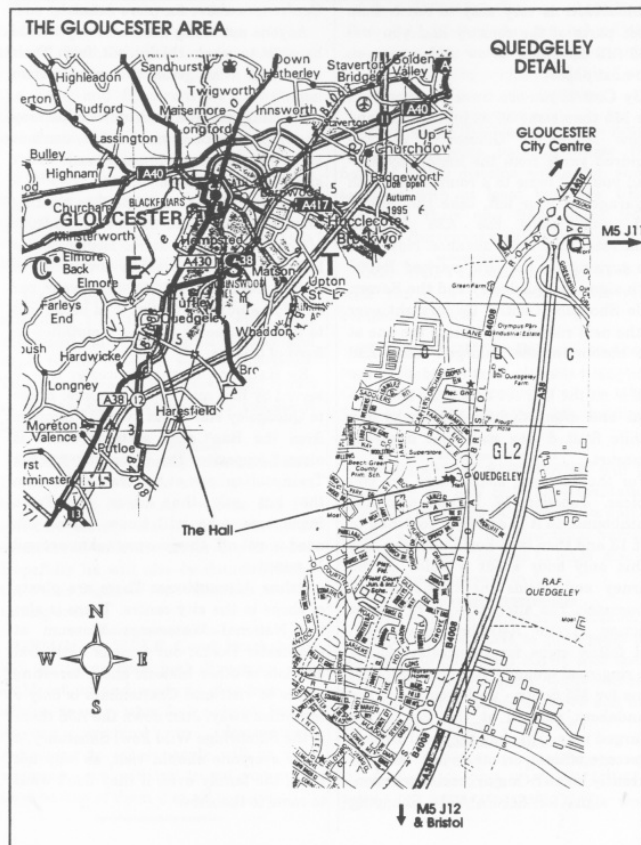
Warning, anyone with new maps may be tempted to use junction 11a, don't, it is a nightmare and even locals don't know where it goes to.

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

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

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

THE MAPS



22



YOUR LETTERS

Dear Editor,

West Coast Computers have been asking for a hardware designer to develop a new version of the 1Mb RAM Pack for SAM. According to an ad in my local free paper a 4Mb SIMM only cost £29 including VAT. Therefore it would seem better to have a 4Mb RAM pack, this would also get rid of the need for a card cage. A port of PsiChess, with a 4Mb starting moves library, would help sales.

I have enjoyed your Pro-Dos column. I think if a 40Mhz Z80 based SAM was produced, that PCW and other CP/M users would upgrade to SAMs. Someone on the Internet who made their own Z80 based computer has got UNIX to run on it, perhaps a port to SAM might be possible.

While talking about the Internet I noticed you mentioned a WWW site. I know of a good SAM site that's been around a long time it is: <http://whilgig.ecs.soton.ac.uk/~tsp93/Coupe/home.html> (SAM Coupe Scrap-book.) I have not checked it for a while, it has links to other SAM sites.

UCSD pascal OS runs on other Z80 platforms how about SAM.

Further information on Z80 UNIX. phr@netcom.com (Paul Rubin) writes:

Rather than Linux, you may be better off starting with UZI (Unix Z80 Implementation), a public domain Unix-like kernel written for the Z80 by Doug Braun of Intel. The kernel is less than 32K in size, there is a Z8000 version with demand paging that is only a little bit larger, and it runs a fair

number of old-time Unix applications with no changes. It only works on one machine - Doug's hand-wire-wrapped Z80 box - but porting it to the PC shouldn't be that big a job. It's about 10K lines of C and maybe 1K of assembler if I remember correctly.

Coherent a unix clone was written for Z8000.

Yours sincerely, Tarquin Mills.

You lost me completely on the Linux bit Tarquin but on the other subject, the 4Mb Memory, I do know that what WCC are looking for is an interface where you can start off with, say, 1Mb and just plug in SIMMs to go to 4Mb (or why not 16Mb). The problem is that even in the old 1 Meg, only certain makes of RAM chips would work - something I believe to do with refresh timing and the like. I think it will be a brave man who takes on the task but I, for one, will give any help I can. Sixteen megabytes - WOW!!!
Ed.

Dear Editor,

You may remember I sent my PLUS D disc drive to Blue Alpha in August '94 to be converted to a two drive system.

Since then it has disappeared with Blue Alpha.

Now I am thinking of using my PLUS D again and am looking for a new disc drive. Could you please recommend where I can get 1 or 2 drives and how much they will cost.

Yours sincerely, Mr A.Thomson.

Any disc drives compatible with the BBC will work with the PLUS D Mr

23

Thomson. Although they may be a little difficult to track down these days the best start would be to consult your local computer dealer. On the other hand you should be able to pick up something second-hand without too much difficulty. **Ed.**

Dear Editor,

Thank you for the renewal reminder which I now enclose with my cheque for another 12 months.

As usual, I am not able to answer your questionnaire, as I find something of interest on most pages. So, more of the same please. I wish I could contribute more as I realise that the more material you receive the easier? or the more satisfying it is for the Editor to produce the magazine.

In the 'Writing for **FORMAT**' item in the August issue it was suggested that Spectrum programs from earlier magazines would be welcomed. I have a good selection of the mags mentioned and enjoy transferring and modifying programs so maybe that is something I can contribute with the long winter evenings arriving. And yes, I learnt a lot from debugging dodgy, hard to read listings.

Thanks for the Resource Directory, I am sure this will be useful, provided it is updated. (My issue had two copies of the centre page).

In Peter Deane's letter in the August issue he mentioned the problems he was having contacting FDOS. I too was intending to obtain some more C/PM software and wonder whether the Poole address is where Chris Pile (who wrote SAM Pro-dos) lives or lived who was jailed in November '95 for distributing computer viruses (see **FORMAT** Vol 9 N°4, page 4).

I also enclose my request form for the first issue of **FORMAT** PC which although I do not own a PC at present I would like to keep in touch as I may well have to

succumb eventually. Also, I think current PC users that I know would prefer to see a copy of the mag to assess whether it is for them before committing themselves to a year's subscription.

Still no reaction from Bob regarding the possibility of hardware kits being issued as suggested in earlier letters. I know a digitiser will soon be available, but if a genlock could be produced I probably would not bother with a PC. These devices are probably beyond the scope of DIY kits, but if I keep mentioning the need for it maybe someone will make it happen.

Thank you all again for everything you do in support of SAM.

Yours sincerely, Maurice Smith.

Dear Editor,

If I buy a SAM from you, will I need a VDU?

Can I use my old TV? Will I have to buy a cassette recorder? Can I use my old tapes (Spectrum 48K) or will I have to buy discs?

Is there anyone in Cheltenham or Gloucester doing Spectrum repairs?

Don't forget I am deaf, housebound and in a wheel chair.

Yours sincerely, A.J.Harding.

SAM Elites normally come with Scart leads for connection to a monitor or Scart TV. However, it is possible to get the version with TV modulator although this often causes a little delay.

Reconditioned SAM Coupés always have the TV modulator fitted to the PSU.

However, you will find the quality of the picture so much better on a Scart TV or monitor that the investment in one will be well worth while.

While SAM will load tapes, it is not as happy at doing this as the Sinclair machines were. SAM is really disc based these days and certainly there is no commercial software produced on tape - discs are so cheap that (even if it were

not for the added benefits like faster loading) tapes are now rarely used. **Ed.**

Dear Editor,

I was sorry to have to complain about the condition of the last issue of the **FORMAT** magazine and thank you for your offer to replace it. I had words with the customers service department of the Post Office. They were very apologetic especially as the package had not been noticed in the office. If any letter is damaged in the post it is the practice of the Post Office to put it in a plastic bag with a note of apology. (I wonder).

I hope that there is some way of recouping the losses occurred by yourselves from the Post Office if you have difficulties, let me know.

Please to enclose a request for your new **FORMAT** PC. I have only a Spectrum 128 and a SAM, the latter is the main machine.

Thank you for your excellent service and am sure that the new venture will succeed as soon as the word gets around.

PS Thank you very much for the replacement magazine. Received by mid morning post.

Yours sincerely, John Thornborrow.

Given the numbers of **FORMAT**s and other post, we send out each month there always has to be a couple of packets that either get lost or damaged. Glad you took it up with the Royal Mail, the more people get on to them the less they will think they can get away with it. **Ed.**

Dear Editor,

Thanks to all the team for the enjoyment I, and many others, have had over the years from **FORMAT**. Now for my problem. There are from time to time programmes listed in **FORMAT**, such as Carol Brookbank's interesting 'Autograph' in the August issue, which I would very much like to try, but at my age (79) I find that I make too many errors in trying to copy the listings. Is

there any kind member who would provide a tested copy on disc if I sent a disc with a £1 coin attached and a SAE for return. Apologies for not sending this letter also on disc but I use Masterscratch and I wasn't sure whether to send in that form.

Yours sincerely, Vic Taylor.

Many thanks for your kind comments Vic, glad to be of service. If you send me the SAE and a blank disc then I will pass it to Carol who I'm sure will copy the program to disc for you.

Short letters are OK just in printed form. When Jenny really gets going on the letters page each month her little fingers fly across the keyboard. However, if the letter is not so short, and especially if it is either highly technical or full of programming, then we do like to have it on disc. Any Spectrum/SAM or PC file will do (except +3 I'm sorry to say) but please give a printed copy as we sometimes lose the format information when we read strange files so we need the hard copy to see where things like paragraph breaks occur. **Ed.**

Dear Editor,

I hope you don't mind me writing to you but I have decided to upgrade from a Spectrum to SAM Coupé which I am buying second-hand.

Would it be possible for you to list the following for the SAM.

1. Best Game.
2. Most used utility.
3. Best WP/DTP package.

Is there any books about the SAM available or is it only the manual? I do own a PC which is only used for work but I will be getting **FORMAT** magazines for both computers.

Yours sincerely, John Adams.

Nice to see the second-hand market is alive and well on the SAM front. Hope you enjoy your new computer.

As to the list of what is best. I would

like to throw that one open to the readers. Come on SAM users. List your answers to the three questions above, and then give your reasons for choosing each program, and we will print any replies over the next few issues. It will be interesting to see the variety of lists we get. **Ed.**

Dear Editor,

Just a short note to confirm my change of address. Not much else to say really other than that I am still using my SAM for many different purposes and that I have no intention of 'up-grading' to a PC.

FORMAT is doing an absolutely great job in helping to maintain interest alive amongst us non-PC users. Any chance of one of your more enlightened and technically minded readers doing a series on how access the MIDI for keyboard functions? I know there was one short piece a while ago, but a more in depth look would be very, very useful.

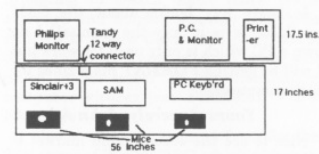
Yours sincerely, Clive White.

We did have a series many moons ago, back when I had far fewer gray hairs. But, if someone out there wants to have a go, I will be pleased to see the results. **Ed.**

Dear Editor,

Re: **FORMAT** Vol.9 No.12. 'Your Letters'.

Mr John Ree need not relegate his Sinclairs to the airing cupboard. Our SAM, Speccy and PC co-exist within a relatively small area, as shown.



The front unit is supported at the RHS and at 36 inches, the remaining LH 20

ins. is a foldable leaf to enable the unit to be moved to accommodate a bed for visitors. under the LH support is a small shelf for all the handbooks with room for a cup of tea! The lot sit on four casters. The rear unit is more rugged and supported by the wall and two columns, enabling the front unit to be partially slipped underneath. One mains splitter feeds the PC and a second the two eight bit.

The SAM Scart is wired to a Tandy 8-pin socket as is the Spectrum RGB/Peritel. The printer is switched between the three at the printer input via Centronics parallel cables.

Mr John Turner asked about 'Peking', It won't load across with the Messenger either. However a similar game, but without the time penalty, named 'Shanghai' was on Turbo PD Disc No.12 and I enclose a copy for you to send on to him.

I eagerly await the first copy of **FORMAT** PC, it will then be hawked around local PC owners and schools to show them what they could be enjoying. The best of luck with the new venture.

P.S. There is a further twist to your News of the closing down of ESCOM. Rumbeloes or Thorne, being the original leaseholders, find their name back on the leases! What will they do with the shops?

Yours sincerely, Gerry Smith.

As you see, your little illustration worked well, the file converted without too much hassle and I think the effort was worth it.

For other readers information, Gerry sent his letter on PC disc with the illustration included in a **Microsoft Office** format file, **AMI-PRO** (the package we use to produce **FORMAT**) would not import the file directly, but by using another word processor we imported the original file and saved it in **AMI-PRO** form which then loaded without any problem. This goes to illustrate that we

are very rarely beaten by disc formats and the choice of word processor our readers prefer to use. We always get at your text somehow.

We are passing on the disc you sent to Mr Turner with this months **FORMAT**. Our thanks to you, and to several other readers for helping him so much. **Ed.**

Dear Editor,

Thank you very much for the Directory of Spectrum and Sam Resources you printed last month. I hope you plan to update it from time to time as I think something like this will prove very useful to many readers.

Congratulations on a job well done.

Yours sincerely, Alan Lord.

Your's is one of many letters we have received this month Alan. All, I'm glad to say, in praise of the directory. We will keep it up to date and will try to reprint it sometime next year (space permitting of course).

As we said last month, if you know anyone we missed then please drop us a line with details and we will try to get them listed for next time. **Ed.**

Dear Editor,

I've heard that there is a new disc interface being produced for the Spectrum in Germany (I think). Do you have anymore details about it?

Yours sincerely, Bill Chapman.

There is an interface, reported to work with modern high-density drives, that has been designed in Eastern Europe. At the moment Sintech in Germany are selling a few, but so far they have been unwilling to supply one on loan for review. Another problem is dealing with a foreign currency transaction to buy an interface, and I doubt that there will be many sales until the originators sign up with a UK company and licence production. There is a hole to fill now the PLUS D is no longer in production.

Only time will tell, but hopefully we will be the first to bring you any news as it develops. **Ed.**

Dear Editor,

Well done **INDUG** and **FORMAT** on reaching your 9th Birthday. I've been with you since the start of volume 3 (but I did buy vols 1&2 when they were available) and have enjoyed every issue.

However, some of my older issues are now very well thumbed and getting to look a little tatty. Are there any plans to do a 'best of compilation of the early issues? You did mention it to me at one of the Gloucester shows last year but I have not seen anything in print. If not, would it be possible to reprint the early issues again?

Keep up the good work, and long live the Spectrum.

Yours sincerely, Ross McAlister.

Ummm. Yes. Well. Oh why do I open my big mouth at shows.

Ok Ross, yes it would be nice to do a best of compilation. But it will require more than just a little work because all the old files are on BBC discs and I will have to find a way of reading them on the PC before I can re-set the pages. Certainly it would be fun to do it but there would need to be a reasonable number of sales to make it economical.

Still, if there is enough interest, then I will get my nose to the grind-stone.

So readers. Would you buy a booklet entitled *The Best Of - FORMAT - The Early Years?* If I get a little encouragement then I will see if we can do it for you. **Ed.**

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

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

SAM elite 512

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

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

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Plus LOTS More....

ONLY £199.95

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

Reconditioned SAM Coupé

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

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

ONLY £139.95

SAM Coupé Replacement Disc Drives

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

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

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

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

Kit Form Assembled

Internal Disc Interface Type 1 £19.95 £29.95

(without 1772)

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INTERFACES

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

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

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

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

MORE New Tricks For The Secretary

Part 4

By:- Rev. Tony Kinch.

In my previous articles in this series I have demonstrated how *The Secretary* may be modified so as to give enhanced copy using printers with Epson ESC P2 control codes. The only problem with the modifications is that the 'Help' screen (CTRL H) still shows all codes as for the original version. Since control codes are changed quite considerably for some of the fonts in the revised program, it would obviously be helpful to create new 'Help' screens to deal with these.

Fortunately, this is not too difficult to achieve because the 'Help' screen is simply a text file loaded at a different code location within the program.

To load this file go into root directory and using the S (for Store) menu press I (for Import file). Import the file "Sec_Help". At the prompt:-

SELECT: S- Strip, L- Leave, file control codes

press L for leave, otherwise all the graphics lines will be removed. I find it helpful at this point to alter the page length to 21 lines and then immediately save the file before any alterations are done as a normal text file (T_Sec_Help).

The file can now be modified in exactly the same way as any other text file. I find it most helpful to have the Help page with the printer control codes as the first to be displayed rather than the third. This is achieved by using the Block menu. Page 1 of the text file is set and marked, and then put in place to become page 4. Because I found the instructions

for this in the *The Secretary* manual to be most unclear I am outlining the steps to be taken:-

1. Press EDIT to call up the menu bar.
2. Press B (for Block) to call up the Blocks menu.
3. Press B (Or RETURN with SET BLOCK highlighted). The Blocks menu disappears.
4. Move the cursor to the top left hand side of the block to be copied - in this case line 1 column 1 of page 1 - then press F0: a block marker symbol appears at the cursor position.
5. Move the cursor to the bottom right hand side of the block to be copied - in this case line 21 column 64 of page 1 - and press F0 again. No block marker symbol appears, but the Blocks menu reappears.
6. Either press G (for Grab Block) - or use the cursor keys to highlight GRAB BLOCK and press RETURN. The Blocks menu does not disappear unless ESC is pressed (other keys can be used, but the use of ESC is consistent).
7. After clearing the Blocks menu, move the cursor to the top left hand corner of the new position for the block - in this case line 1 column 1 of page 4.
8. Finally press F3, and the block will reappear in its new position.

Remember that with *The Secretary* there is no facility to Move a block as with some other word-processors, so that the block in its original position now

PRINTER CONTROLS		PRINTER COLOUR	
*B	Bold	Press INV followed by a number representing one of the following colours:	
*I	Italics		
*U	Underline		
*A	Subscript		
*S	Superscript		
*E	Expanded		
*D	Double Height	0	Black
*O	Optional	1	Red
*N	Normal Size	2	Blue
OF	Form Feed	3	Violet
OP	PICA Pitch	4	Yellow
OE	ELITE Pitch	5	Orange
α	Back space	6	Green

Fig. 1 - The Original Help Page 1.

needs to be erased. There are two ways in which this can be done: The page can be erased line by line or it can be deleted by use of the Delete Page option in the Delete menu. (Using the Erase Block option from the Blocks menu will simply leave a blank page 1.)

Repeat the process with the new page 1 so that what was originally page 3 is now page 1, and the original pages 1 & 2 are now pages 2 & 3.

It is now just page 1 which requires modification. The following diagram shows what is now page 1 from the

original file Sec_Help (fig.1 above). This should be edited to produce the new version (fig.2 below).

Pages 2 & 3 of the Help Screen do not require any alteration. When the editing is completed, the edited file should be saved as a straightforward text file (T_HLP_cour), so that if anything goes wrong it can be called back, and also so that it can be used to create the further help screens later on. Finally save the file by breaking into Basic (ESC+RETURN) and executing the following commands:-

FONTS: Courier/Prestige/Roman(np)/San serif(np)																				
PRINTER CONTROLS		SELECT FONT			PRINT COLOUR															
*A	Subscript	Courier	np	CHR C	Press INV followed by a number representing one of the following colours															
*B	Bold	Prestige	np	CHR O																
*D	Double Height	Roman	np	CHR L																
*E	Extended	San serif	np	CHR S																
*I	Italics	Roman	p	MISC PRN																
*N	Normal Size	San serif	p	MISC PRN	<table><tr><td>0</td><td>Black</td></tr><tr><td>1</td><td>Red</td></tr><tr><td>2</td><td>Blue</td></tr><tr><td>3</td><td>Violet</td></tr><tr><td>4</td><td>Yellow</td></tr><tr><td>5</td><td>Orange</td></tr><tr><td>6</td><td>Green</td></tr></table>		0	Black	1	Red	2	Blue	3	Violet	4	Yellow	5	Orange	6	Green
0	Black																			
1	Red																			
2	Blue																			
3	Violet																			
4	Yellow																			
5	Orange																			
6	Green																			
*O	Optional	T Roman	p	MISC PRN																
*S	Superscript	H_Sans	p	MISC PRN																
*U	Underline	FONT SPACING																		
OE	Elite Pitch																			
OF	Form Feed																			
OP	Pica Pitch	p	proportional																	
α	Backspace	np	non-proportional																	

CHR = Accessed from CHR Menu MISC = Accessed from MISC Menu
_ = CNTRL * = symbol Ø = INV followed by character

CHR = Accessed from CHR Menu MISC = Accessed from MISC Menu
 - = CNTRL * = symbol Ø = INV followed by character

Fig. 2 - The New Help Page 1.

DIR="/"

(Only required if you are using my sub-directories modification from **FORMAT** January 1995).

SAVE "HLP_couri" CODE 147456,407
4

At this point, whilst in Basic, it is useful to add the missing line from article 3:-

```
11185 ON ERROR prgd: IF fnt>0 and
d fnt<4 THEN LET a$="HLP_"
+font$(fnt,1 TO 5): LOAD a
$ CODE 107500: ELSE LOAD "
Sec_Help" CODE 107500
```

Then execute the save routine for the program by typing saveprog (followed by RETURN). Return to the operating program by typing resume (followed by RETURN). Whenever the 'Courier/Prestige' font is loaded, the new help screen (HLP_couri) will be loaded as well and will appear on screen whenever CTRL+H is used. The process is repeated to create the other two help screens. This time, however, it is only necessary to recall the newly created text file "T_HLP_cour" and start from there. Page 1 of this file should now be edited as follows to match figure 3. Once again

the edited file should be saved as a straightforward text file (T_HLP_rom), so that it can be used to create the final help screen. Then break into Basic (ESC+RETURN) and execute the following:-

DIR="/"

(Once again only required if you are using my sub-directories modification from **FORMAT** January 1995)

SAVE "HLP_roman" CODE 147456,407
4

Now recall the newly created text file "T_HLP_rom" in order to create the final Help screen. Page 1 of the file should now be edited to read as follows: (fig 4) Although this is the last file it is still useful to save it as a straightforward text file (T_HLP_T_ro) just in case any mistakes have been made. As before, break into Basic (ESC+RETURN) and execute the following:-

DIR="/"

(Still only required if you are using my sub-directories mods.)

SAVE "HLP_T_rom" CODE 147456,407
4

The program is now complete. In use, whenever CTRL+H is pressed the HELP

FONTS: Roman/Sanserif(proportional)										
PRINTER CONTROLS			SELECT FONT				PRINT COLOUR			
CHR O CHR L	*A	8pt	Roman	p	CHR C	Press INV followed by a number representing one of the following colours	0	Black		
	*S	10pt	Sanserif	p	CHR S					
	*E	12pt	Courier	np	MISC PRN					
	*D	14pt	Prestige	np	MISC PRN					
	*N	18pt	Roman	np	MISC PRN					
		24pt	Sanserif	np	MISC PRN					
		30pt	T Roman	p	MISC PRN					
	*B	Bold	H_Sans	p	MISC PRN					
	*I	Italics	FONT SPACING						3	Violet
	*U	Underline								
	*O	Proportional off/on				4	Yellow			
	α	Backspace	p	proportional	5			Orange		
			np	non-proportional		6	Green			
CHR ~ = Accessed from CHR Menu MISC ~ = Accessed from MISC Menu										
CHR _ = CNTRL * = symbol Ø = INV followed by characte										

CHR = Accessed from CHR Menu MISC = Accessed from MISC Menu
 - = CNTRL * = symbol Ø = INV followed by character

Fig. 3 - The New "T_HLP_cour"

FONTS:T_Roman/H_Sanserif(proportional)									
PRINTER CONTROLS			SELECT FONT			PRINT COLOUR			
*A	8pt	T Roman	p	CHR C	Press INV followed by a number representing one of the following colours	0 Black 1 Red 2 Blue 3 Violet 4 Yellow 5 Orange 6 Green			
*S	10pt	H Sans	p	CHR S					
*E	12pt	Courier	np	MISC PRN					
*D	14pt	Prestige	np	MISC PRN					
*N	18pt	Roman	np	MISC PRN					
CHR O	24pt	Sanserif	np	MISC PRN					
CHR L	30pt	Roman	p	MISC PRN					
*B	Bold	Sanserif	p	MISC PRN					
*I	Italics	FONT SPACING							
*U	Underline								
*O	"Hard" Space	p	proportional						
a	Backspace	np	non-proportional						

CHR _	= Accessed from CHR Menu	MISC _	= Accessed from MISC Menu
CHR _	= CNTRL	_	= INV followed by character
	* = symbol		

CHR = Accessed from CHR Menu MISC = Accessed from MISC Menu
 ^ = CNTRL * = symbol 0 = INV followed by character

Fig. 4 - The New T_HLP_rom

screen for the font in use at the present time will be displayed. This facility is also useful to check the font in current use. The versatility of *The Secretary* has now been considerably increased for ink-jet printers using Epson P2 control codes, and I am currently working on the code files required to effect the same changes for Hewlett Packard Desk Jet printers which I shall publish in due course.

If you have followed all the instructions in these four articles carefully, you will have a word-processor package which combines the simplicity of *The Secretary* with the enhanced printing qualities of ink-jet printers. It is not, of course, as versatile as some of the WYSIWYG word-processor packages for PCs. But these are extremely expensive (if they are any good!) and not at all easy for the non-specialist to operate. I have now been using my modified *The Secretary* package for six months, and until someone is able to bring out a true WYSIWYG word-processor for SAM that is easy to use, it will answer all my needs very effectively.

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Shine A Light On **DIM** Things

By:- Carol Brooksbank.

What is an array? It is just a list. Computer handbooks often make arrays look horribly complicated, by using phrases like 'subscripted variables', but don't let that put you off. Even the most complicated array is only a table.

In Spectrum and SAM Basic you can have two kinds of array, numerical and string, and you set them up by using the DIM command. For instance, DIM A(5) will set aside a block of memory for a list of 5 numbers, the list being called 'A'. Each of the five places in the list (which is what is meant by a 'subscripted variable') will hold the number zero until you put some other number in it. So, if you don't put a number in each location yourself, the unused ones will hold zero. You can put the numbers in the list in any way you like: input them via keyboard prompts; read them in from data statements; have your program insert them as you go along - if they are the results of calculations perhaps; transfer them from variables using statements like LET A(3)=Z; or any way you like to devise.

The numbers in your list can be any size, and you can retrieve them in various ways.

```
FOR X=1 TO 5
PRINT A(X)
NEXT X
```

will print all the numbers in your list A. LET B=A(3) will assign the number held in the third place in your list to the variable 'B'.

All this is pretty straightforward, but people often get confused by string arrays, which are slightly different. Each position in a numerical array can hold any size of number, one digit or more, integer or decimal, it doesn't matter.

In a string array, every string must be exactly the same length. This means that DIM A\$(8) will NOT set up a list of 8 strings of indeterminate size. The last figure given in the brackets after a string DIM command is the number of characters in each string, so DIM A\$(8) will only reserve enough memory for one string of 8 characters. When the string is set up, every character will be filled with a space, so when you put something in the string, any unused characters will be left holding spaces - often called 'padding', or bulking, the string out with spaces.

The computer will not reject commands like:-

```
DIM A$(8)
LET A$="Racehorses"
```

but your string will only hold 'Racehors' and the leftover characters will be lost. If you come across the term 'Procrustean', it only means the string will always be made the right length, either by chopping characters off the end or padding out with spaces. You can retrieve the individual characters in the string by PRINT A\$(4), which will print 'e'.

DIM statements with only one parameter in the brackets set up

NUMBERS DIM X(8)		STRINGS DIM A\$(8)	
X(1)	1530	C o c k R o b i n	
X(2)	27		
X(3)	310		
X(4)	5		
X(5)	61		
X(6)	7265		
X(7)	108		
X(8)	11347		

UNUSED LOCATIONS IN A STRING
ARRAY HOLD A SPACE

UNUSED LOCATIONS IN A NUMBER
ARRAY HOLD ZERO

Fig.1 - One Dimensional Arrays

one-dimensional arrays. Fig. 1 shows you what you get in a one-dimensional array, numerical or string - a simple list of numbers or a single string of a specified length.

But you can have more parameters after the variable name. Fig. 2 shows two-dimensional arrays - set up by having two parameters in the brackets. The numerical array is a table, with eight rows, each with two positions in the row. You can put a number of any size in each position, so there is now room to accommodate 16 numbers. The top left position in the diagram is X(1,1), and the bottom right is X(8,2).

However, the two-dimensional string array has given us only a single list of

DIM X(8,2)		DIM A\$(8,2)	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	

IN A 2-DIMENSIONAL
NUMBER ARRAY THE
FIRST PARAMETER IS
THE NUMBER OF
ROWS, THE SECOND THE
NUMBER OF COLUMNS.
EACH POSITION CAN
HOLD A NUMBER OF
ANY SIZE

IN A 2-DIMENSIONAL
STRING ARRAY, THE
FIRST PARAMETER IS
THE NUMBER OF
ROWS, THE SECOND THE
LENGTH OF EACH STRING. YOU
HAVE ONE LIST OF STRINGS,
EVERY STRING THE SAME LENGTH.

Fig.2 - Two Dimensional Arrays

eight strings, each two characters long. If you want to set up a table of strings with eight rows, two strings per row, you need a third parameter, the length of each string. Fig. 3 shows what you get when you add this third parameter. Remember that the last parameter in a string DIM statement is ALWAYS the length of each string in the list. The numbers before it set up the number of rows and columns in the table.

So what is the point of an array with more than one dimension? Arrays let us link together numbers or strings, in a table, but also allow us to use them separately if we wish.

DIM C\$(8,2,5)	
1	
2	
3	
4	
5	
6	
7	
8	

TO SET UP AN ARRAY OF 8 ROWS OF 2 STRINGS PER ROW
3 PARAMETERS ARE NEEDED - 2 WHICH SPECIFY ROWS
AND COLUMNS, AND A THIRD WHICH SPECIFIES THE
LENGTH OF EACH STRING

Fig.3 - Three Dimensional Arrays

Suppose, for instance, you want to write a quiz program. You want the user to see with each question three possible answers, only one of which is right. You could set it all up using loads of data statements - holding the question, the three possible answers, and the right answer for checking purposes. So you would have five strings per question, repetitive strain injury from all the typing, and a severe shortage of memory if you want this to be a big program.

But think of the time and memory you could save if you let the right answers to some questions be the wrong answers to

others. All it needs is a couple of arrays. You need a string array with three parameters - the number of questions, 2, and the length of the longest string you need to accommodate. This array will hold the questions and right answers, so if A\$(1,1) is "Who killed Cock Robin?", A\$(1,2) is "The Sparrow"; if A\$(2,1) is "Who fell off a wall?", A\$(2,2) is "Humpty Dumpty" and so on. 'Humpty Dumpty' can be one of the wrong answers to question 1.

To index into the list of answers, you have a numerical array, of the same number of rows as you have questions, and four columns. Columns 1-3 hold the positions in A\$'s second column of the three answers you want to offer with the question in A\$'s first column. Column 4 will hold a number between one and three, because it indicates which of the other three columns points to the right answer.

You can see this in action in listing 1. There is an array of ten rows of two columns, each holding a string of 100 characters. (I could cut down the number of characters to 77, - the longest string in the DATA statements - if it is certain there will never be a longer one.) Positions A\$(1,1) to A\$(10,1) hold the questions, and A\$(1,2) to A\$(10,2) hold the right answers. The array is dimensioned (memory filled with spaces is set aside for it) in line 20, and its positions are filled by lines 40-100, using the DATA statements in lines 1000-1090. Line 30 sets up a numerical array, having the same number of rows as the string array. Its positions are filled by lines 110-170, using the DATA statements in lines 3000-3090. This is the index as described above.

The rows in the numerical array correspond with the rows in the string

array, so the question in A\$(1,1) will have answers indexed by C(1,1-3). The second one of these is the correct answer to question 1, so C(1,4) holds 2.

Once the arrays have been set up, lines 180-320 run through all the questions, offering three choices of answer per question and asking you to reply 1,2 or 3. If you get the answer wrong you are asked to choose again. If you are right, pressing a key moves on to the next question.

Obviously there are all sorts of ways you could improve on a program like this, introducing random selection of wrong answers and random selection of order of questions and so on, but I have kept it simple just to show you how arrays can be made to work, saving you time, effort, and above all, memory. A program like this can hold far more questions and answers than one in which all the wrong answers are typed out individually for every question. It is easy to expand. All you need to do is increase the first element of the arrays, the number of times each 'X' loop is to repeat, and add new DATA statements. If you suddenly use a longer string than ever before, you may need to change the third parameter of the string array.

You could, of course, have held all the information in one string array, A\$(10,6), holding the index numbers as strings, and using VAL to convert them when they are used. But this would have been very wasteful of memory, because every number would have had 100 bytes reserved for it. It is more efficient to put number lists and string lists into separate arrays, but you can maintain the link between them, as we have here, by ensuring that related strings and numbers are in matching rows in their arrays.

So far we have looked at two dimensional arrays - I know the string arrays have an extra parameter but the arrays produced were still simple tables of rows and columns. But that may not always meet your requirements.

Suppose you are a class teacher. You want to keep a record of your pupils' monthly marks in 7 key subjects. DIM A(12,7) will give you an array to hold the marks for one pupil - the table on the left of Fig. 4. But what about all the other pupils? Simply add another dimension to the array. A(2,12,7) will give you the two records you see in Fig.4 below. A(1,2,3) will hold the February mark in subject 3 for pupil 1, A(2,8,1) the August mark in subject 1 for pupil 2. Change the array to A(30,12,7) and you can hold the records for the whole class. You will also need a string index list, A\$(30,50), to hold the pupils' names in the same order as the records, so that you know which record belongs to which child.

PUPIL 1 SUBJECTS 1-7							
JAN							
FEB							
MAR							
APR							
MAY							
JUN							
JUL							
AUG							
SEP							
OCT							
NOV							
DEC							

PUPIL 2 SUBJECTS 1-7							
JAN							
FEB							
MAR							
APR							
MAY							
JUN							
JUL							
AUG							
SEP							
OCT							
NOV							
DEC							

Fig.4 - Part Of Class Array

You can get all sorts of statistics from a record like this. How many marks did pupil 1 get in subject 1 for the whole year? Add together A(1,1,1) to A(1,12,1). How many marks did pupil 2 get for all subjects in March? Add together A(2,3,1) to A(2,3,7). How many marks did the

whole class get in April? Add together A(1,4,1-7) to A(30,4,1-7). You would use FOR-NEXT loops like this:-

```
LET TOTAL=0
FOR X=1 TO 30
  FOR Y=1 TO 7
    LET TOTAL=TOTAL +A(X,4,Y)
  NEXT Y
NEXT X
PRINT TOTAL
```

If you had ten classes in the school, you could keep records for the whole school by adding yet another parameter: A(10,30,12,7). Theoretically, the possibilities are endless. But bear in mind that every time you add a dimension to an array, the amount of memory needed to store it goes up by leaps and bounds. Your records for 1 pupil need memory to store 84 numbers, for 1 class 2,520 numbers, and for the whole school 25,200 numbers. If you wanted to keep the records for 200 schools, you would be storing 5,040,000 numbers. Even a 512K Sam would long ago have protested 'out of memory'. Generally speaking you would run out of memory even faster with string arrays, unless you were using improbably short strings.

I have suggested a way of indexing into an array in Basic, by using another array. In machine code, assuming that param1 = total number of groups of strings, param2 = number of strings in a group, and param3 = length of strings, you would set aside a block of memory for your table equal to:-

param1 * param2 * param3

For the equivalent of A\$(10,2,30), you would set aside 600 bytes. You would insert your first pair of strings in bytes 0-29 and 30-59 - the equivalent of A\$(1,1) and A\$(1,2). The second pair would occupy bytes 60-119, and so on. To index

into your table you would point IX to the start of your table. IX+0 would point to string (1,1), IX+30 to string (1,2). So, to find a particular string, you would add 30 to the IX displacement for every string you want to bypass. To find string (7,1), you would bypass 6 pairs of strings, so IX+360 would point to the start of (7,1). The formula for finding the displacement is:-

((param1 - 1) * param2 * param3) + ((param2 - 1) * param3)

In C, pointers can be used to index into arrays.

```
char tab le[10][2][30];
int *p;
```

p=table; sets p to the address of the start of the string array 'table', an array just like the one we have been talking about in the machine code example. You can put strings into the array by using:-

```
table[0][0] ="Siamese";
table[0][1] ="cat";
table[1][0] ="Corgi";
table[1][1] ="dog";
```

You move the pointer to a particular string by a similar formula to the one above:-

p=p+((para m1 * param2 * param3) + (param2 * param3));

C arrays are numbered from 0,0, so the array above runs from table[0][0] to table[9][1]. This means we don't have to deduct one from the parameters to get the calculation right, as we did in the previous example.

p=table; will move the pointer back to the start of the table when you want to look for another string.

So there you have a quick look at arrays. I know they will help you to manage your data better, whatever programming language you use, and

whether you are storing numbers, strings or both. They are much simpler and easier to use than most computer handbooks seem to suggest, once you have cut through the jargon.

Listing 1.

```
10 REM array demo program
20 DIM A$(10,2,100)
30 DIM C(10,4)
40 RESTORE 1000
50 FOR X=1 TO 10
60 FOR Y=1 TO 2
70 READ Y$
80 LET A$(X,Y)=Y$
90 NEXT Y
100 NEXT X
110 RESTORE 3000
120 FOR X=1 TO 10
130 FOR Y=1 TO 4
140 READ Z
150 LET C(X,Y)=Z
160 NEXT Y
170 NEXT X
180 FOR X=1 TO 10
190 CLS
200 PRINT AT 0,0;A$(X,1)
210 LET Z=C(X,1)
220 PRINT AT 4,0;"1" ;A$(Z,2)
230 LET Z=C(X,2)
240 PRINT AT 8,0;"2" ;A$(Z,2)
250 LET Z=C(X,3)
260 PRINT AT 12,0;"3" ;A$(Z,2)
270 PRINT AT 16,0;"Enter the number of your choice"
280 INPUT Q
290 IF Q<>C(X,4) THEN PRINT AT 16,0;"Your answer is wrong, choose again": GOTO 280
300 PRINT AT 18,0;"CORRECT Press a key to continue"
310 PAUSE
320 NEXT X
1000 DATA "Who painted the Mona Lisa?","Leonardo da Vinci"
1010 DATA "Who painted The Hay Wain?","John Constable"
1020 DATA "Who was born and died on April 23rd?","William Shakespeare"
1030 DATA "Who wrote The Rivals?","Richard Brindsley Sher
```

idan"

1040 DATA "Who sued the Marquis of Queensbury for libel, lost, and went to jail him self?","Oscar Wilde"

1050 DATA "Who designed the gar dens at Blenheim Palace?","Capability Brown"

1060 DATA "Who painted Sunflow rs?","Vincent Van Gogh"

1070 DATA "Who wrote The Crucib le?","Arthur Miller"

1080 DATA "Who writes about gar dening in the Radio Times?","Geoff Hamilton"

1090 DATA "Who designed the gar dens at Sissinghurst?","Vi ta Sackville-West"

3000 DATA 7,1,2,2

3010 DATA 2,1,7,1

3020 DATA 5,7,3,3

3030 DATA 4,3,8,1

3040 DATA 4,5,10,2

3050 DATA 6,10,8,1

3060 DATA 7,2,1,1

3070 DATA 5,4,8,3

3080 DATA 9,8,10,1

3090 DATA 6,9,10,3

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