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July 1998.

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The Editor Speaks

Jenny has been on holiday, I've had a flu-like virus, urgent repairs were needed to the office or it would have fallen down, and to top it all — its been hot. Ok, I know they are poor excuses for still being behind with *FORMAT*, but they are the only ones that are printable. Things are improving as each month goes by, I'm gradually rebuilding the stock-pile by editing more articles than I need for an issue, but I could really do with some more contributions please - even just a few short (but interesting) letters would help.

Still, rest assured I will not be doing what several people have suggested. I'm not skipping an issue to get back on track. That would not be fair on readers.

Right, down to business. This month sees the launch of our 98/99 membership drive (see centre pages) which I'm sure you will all do your bit to support. Everyone benefits from growth, even if (as we suspect) most of that growth will come as a result of new PC members. We need to attract more advertisers, and that can only be done by increasing membership. I want to see a return to 40 page issues of **FORMAT** very much, but that can't be done without advertising. Please, for your sake, take the time to read the membership drive write-up and make sure you help INDUG grow.

You will have noticed that there has been no HELP PAGE for some time. It is not Ray Bray's fault, he just hasn't had many requests for help recently. Now, this could mean that you have all become

experts in all things Spectrum or SAM and don't need any help. Or it could mean that you are just not using your computers so much these days. But a more likely explanation is that it is one of those vicious circles - no help page for a few months, you think it has finished, you don't write off with your problem, no material for the help page, no help page appears..... You get the idea? If you want a Help Page, then Ray needs some input from readers - urgently.

I've just heard that the Northern Spectrum and Sam Show (NSSS) will not now be held on the 12th September, but instead on the 28th November. We have not had any explanation of this last minute change, nor official confirmation of the new date from the shows organizer. More details if we get them

Still *ZERO* news on the FRED front I'm sorry to say. George Boyle has, apparently, been offered a contract but so far no real headway. Colin MacDonald will have a FRED stand at the October show if nothing is sorted out in the meantime, and there is a tentative agreement that Format Publications will take over the software division of Fred Publishing after the show if there is no other solution available. However, due to the commitment required, I do not feel that we would be able to take on publishing the FRED disczine (unless of course there were people prepared to help in a big way)

Until next month.

Bob Brenchley, Editor.

SHORT • SPOT

YOUR HINTS, TIPS AND PROGRAMMING IDEAS

Edited By:- John Waste

Last month I unadvisedly wrote about June, hot flaming' June. I shouldn't do such things. Tempting fate. Er; can anyone sell me a second-hand umbrella? In spite of the wet, though, I hope still to have one or two interesting snippets to report, though I have less than usual - I guess you're all getting ready for jetting off to far-off sunny places.

Anyway, I was telling you that I have, of necessity, started a little business of my own. Item one went just about as unsmoothly as it could have done. I anticipated many of the things that went wrong - but there were many more that I couldn't have foreseen. Like the stupidity of a certain Mr Gates' systems; I had a disc of my new brochure with, what I thought, was the whole shooting match saved (well that was what it had told me it had done), and when I came to load it, it had obviously not saved some files, only their positions in other programs. So that I ended up with my precious pictures that I desperately wanted ... No; I'll rephrase that: I ended up *without* my precious pictures, for they were on my friend's hard disc, miles and miles away, and all I had was some sort of internal reference to where they were. Take note, Mr Gates. Firstly, we do not all live in networked corporations. Secondly, when your accursed devices tell me they have saved my information on disc, that is what I expect. No more and no less. Not just the instructions allowing *some other machine umpteen miles away to find the original bits and pieces on its hard drive*. That's no help to me. Thank god for the

integrity of the Spectrum and SAM; that's what I say!

There; I've got it off my chest, and I feel better, now.

It was Lorri's sister's birthday the other day. I mention this because, through Susan, I have made a serendipitiously useful discovery. You see, Sus always likes pink. Like me, she doesn't care two hoots of a bicycle bell for fashion; she likes pink. I knew the most likely reasonably local place for me to find some pink jewellery was the Jewellery Quarter at Hockley, in Birmingham. And so I did. The Jewellery Quarter is always just the ticket for solving these sorts of female-oriented, tetchy birthday and other present problems. Flushed with success, we wandered round, looking at the rest of the stuff on show - if you've not been there before, well, it's a fascinating place.

Now for some weeks previously, I had been trying to sort out the problem of putting batch and serial numbers and a product code on some of the items I'm making. Easy; all I needed was a FOR-NEXT loop in a little Spectrum program, and some little tractor-feed labels. I've never tried something like this on a laser-printer, and I wonder if it would work. (If you know, please write and tell me: I'm interested). Why was I even wondering? Well, because, all of a sudden, when I needed tractor-feed labels, I couldn't find them. Anywhere. Well, that's not quite true. You could get disc labels and envelope labels. But that was about it. The sort of label I wanted

was miniscule in comparison. Like half an inch long and three-sixteenths deep. Viking supplies let me down. So did the University of Birmingham Computer Supplies. The big Office suppliers in Birmingham regretted, but... Usual story; no demand. When you get that from a real, disinterested 'Jobsworth', my standard reply is "Oh, yes, there is. I want some!" But in this case, they really tried hard, with no success. Never mind, there's a man called Brenchley. But he didn't know, either. Temporarily baffled, I put the problem to one side, hoping a solution would come to light.

Well, as I mentioned, having found the pink jewellery, I was moseying around, when I found this marvellous shop. It sells all sorts of small amounts of things you and I are always needing; little boxes and envelopes, tractor feed labels. *TRACTOR FEED LABELS!!!* Whoopee! A couple of thousand tiny ones (four per row) cost £17.45, including VAT, and they are willing to send stuff by post. Enquiries to Mr Brian R. Simpson of Lansa U.K. Limited, 4-5 The Big Peg, Warstone Lane, Hockley, Birmingham, West Midlands B18 6NA. Their phone is 0121 233 4588, and their Fax is 0121 233 4655.

I guess you've all heard the whiskey old one about the grocer who sat on his bacon slicer and got behind with his orders. Well, Bob is not the only one who is behind - so am I. I'm therefore grateful to those of you like John Thornborrow, who take the trouble to write and express thanks - at times, Short Spot is quite hard work. John has written to hope my house alterations are going to a smooth conclusion, and you will, I'm sure be glad to hear that this is so. Replacing half-timbering is a specialist task involving seeing much daylight one day where there was wall the previous - usually with the wry comment that "it

was almost *all* rotten when I got down to it". It's a gritty, dusty business which is just the job for gritting up computers and ideal for losing documentation, and I'm glad all that remains is to fill and paint the thing, now that the green oak has shrunk and the tenons have been gripped tightly in the mortices.

Anyway, John has details of the Index program in which Maurice Smith is interested - he wrote some time ago, and if he drops me a quick line, I can ring him and put the two of you in contact.

I also asked about the Fader or Fuzzy program. It's possible, writes John, that I am thinking of the Fizzle programs which appeared in my columns. The first one in the June 1993 **FORMAT** by Alan Cox was followed up by Fizzle2 by Ettrick Thomson the following November. John's also convinced that he has seen another program, but the name might not represent the program content well, or it might have appeared on a FRED disc. Anyway, he can't find it.

Finally, John mentions that he has a saver program for SAM, which he uses when he is developing a program, versions of which will need saving from time to time. You see, John's a man after my own heart - he leaves saving until the last minute, so it's essential he knows if he's made a backup copy or not. This utility tells him at which stage the saving was when he left SAM. It's also, for those relatively new to Basic programming, a good example of the use of procedures; have a look. You will have to amend Line 10020, where you have to make s\$="Your own program name". Type it in and try it...

```
10000 REM SAVE PROGRAM
10010 DEF PROC savefile
10015 REM LET s$=THE NAME OF THE
        PROGRAM YOU WISH TO SAVE
10020 LET s$="SAVEPROG": CLS: me
        dium
```

```

10030 CLS: savedt
10040 CLS: PRINT AT 7,0; "DO YOU
      WISH TO MAKE A BACK UP CO
      PY? "
10050 yes_no
10060 IF Y$="N" THEN STOP
10070 CLS: PRINT AT 7,0; "ARE YO
      U USING THE SAME MEDIUM?"
10080 yes_no
10090 IF Y$="Y" THEN savedt
10100 IF Y$="N" THEN medium: sav
      edt
10110 CLS: PRINT AT 12,0; "DO YO
      U WISH TO MAKE A THIRD COP
      y?"
10120 IF Y$="N" THEN STOP
10130 IF Y$="Y" THEN savedt
10140 END PROC
10150 DEF PROC medium
10160 CLS: heading: PRINT "'PLE
      ASE SELECT THE STORAGE MED
      IUM"
10170 PRINT "'      1) DISC DRIVE
      1"
10180 PRINT "'      2) DISC DRIVE
      2"
10200 PRINT "'      3) RETURN TO P
      ROGRAM.  "
10210 PRINT AT 18,0;"PLEASE ENTE
      R 1, 2, OR 3": GET med
10220 IF med <1 OR MED >3 THEN b
      leep 0.1,0.1: GOTO 10210
10230 IF med=1 THEN dev1
10240 IF med=2 THEN dev2
10260 IF med=3 THEN STOP
10270 END PROC
10280 DEF PROC dev1
10290 DEVICE D1: CLS: PRINT AT 6
      ,0;"PLEASE PLACE DISC IN D
      RIVE 1": presskey
10300 END PROC
10310 DEF PROC dev2
10320 DEVICE D2: CLS: PRINT AT 6
      ,0;"PLEASE PLACE DISC IN D
      RIVE 2"; presskey
10330 END PROC
10370 DEF PROC savedt
10380 CLS: PRINT AT 14,0; "Pleas
      e WAIT while Saving"
10390 SAVE s$
10400 END PROC
10500 DEF PROC yes_no

```

```

10510 INPUT "ENTER Y FOR YES OR
      N FOR NO"
10520 POKE SVAR 618,8: GET Y$
10530 IF Y$<>"Y" AND Y$<>"N" THE
      N GOTO 10520
10540 END PROC
10550 DEF PROC heading
10560 PRINT ; INVERSER 1; AT 0,7
      ;2 SAVING PROGRAM ": INVER
      SE 0
10570 END PROC
10590 DEF PROC presskey
10600 PRINT #1;"PRESS ANY KEY
      TOCONTINUE": PAUSE
10610 END PROC

```

Many thanks, John.

Enough of the SAM. The Spectrum's dead; long live the Spectrum. You just ask Roy Burford of Norton, Stourbridge, West Midlands, on whom I rely (far too much) for interesting and original material. Just a little bit of fuss and bother. This all arises if you take a more sophisticated machine and try and adapt a program originally written for it to run on the Spectrum. And Roy, for all his Specoriginality, is also always trying to adapt things for it isn't he.

It all started off with Ettrick Thomson's 'Biomorph' program (Vol.11, N°5, P7). As this sounded fascinating, Roy decided to convert it to Spectrum Basic. Apart from a little colour clash of very little consequence, it produced an excellent screen display. However, and here comes the rub, the Spectrum doesn't have the clever KEYIN command which SAM uses to change conditionally the instructions within the current program, and therefore has to wade through a number of IF...THEN instructions. As the number of IF...THEN instructions increases in direct proportion to the biomorph number selected, this makes the Spectrum adaptation glacially snail-like for larger numbers. For instance (Roy's a devil for punishment), biomorph 5 takes well over 2 hours!

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

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

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

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**West
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Although it works, and is reproduced here, Roy was dissatisfied, and tried to increase the speed by putting each biomorph into a subroutine of its own. This gives a useful gain in speed, but still cannot compete with SAM's reported 25 min. It's pretty obvious what has to be done, but this further revised version, of course, takes up so much more room, since the subroutines are now separated that I've had to leave printing it for now, otherwise everyone's going to be bored to tears. If anyone is desperate, let me know and I will send a copy. Here's the original Burford adaptation; get typing.

```

1 REM Vol.11 No5. Format. Jan
  uary 1998. Short Spot. pp7.
  biomorph Ettrick Thomson.
2 REM Revised on ZX Spectrum+
  128K by B.C.R.Burford 0203
  8.
3 REM Ranges:  2,1.6 b3,2.
  25 b4,1.8 b5,1.7
4 REM Constant: b2,0.6 b3,0
  7 b4,0.8 b5,0.8
5 REM Above recommended but t
  ry other values for constan
  t. Running time about 2h on
  zx.
20 PRINT "To select biomorph"
  "2 or 3 or 4 or 5""enter t
  he appropriate number"
30 INPUT "biomorph number: ";n
  i""maximum range: ";max,"co
  nstant: ";cr
35 IF ni<2 OR ni>5 THEN GOTO 3
  0
40 PAUSE 20
70 CLS
75 PRINT #0; AT 1, 5 ; "Biomorph
  ";ni;"/";max;"/";cr
80 LET d=max/87: LET r0=-max
90 FOR x=42 TO 214
100 LET r0=r0+d: LET i0=-max
110 FOR y=1 TO 87
120 LET r=r0: LET r2=r*r
130 LET i0=i0+d: LET i=i0: LET
  i2=i*i
140 FOR n=1 TO 10
150 IF ni-1=1 THEN LET i=2*r*i:

```

```

GOTO 160
151 IF ni-1=2 THEN LET i=i*(3*r
  2-i2): GOTO 160
152 IF ni-1=3 THEN LET i=4*r*i*
  (r2-i2): GOTO 160
153 IF ni-1=4 THEN LET i=i*(5*r
  2*r2-10*r2*i2+i2*i2)
160 IF ni-1=1 THEN LET r=r2-i2+
  cr: GOTO 170
161 IF ni-1=2 THEN LET r=r*(r2-
  3*i2)+cr: GOTO 170
162 IF ni-1=3 THEN LET r=r2*r2-
  6*r2*i2+i2*i2+cr: GOTO 170
163 IF ni-1=4 THEN LET r=r*(r2*
  r2-10*r2*i2+5*i2*i2)+cr
170 LET r2=r*r: LET i2=i*i: LET
  c=n/1.7
180 IF r2+i2>100 THEN LET n=10
190 NEXT n
200 IF ABS r<10 OR ABS i<10 THE
  N PLOT PEN c;x,y: PLOT PEN
  c;x,174-y
210 NEXT y
220 NEXT x
230 PRINT #0; AT 0,0;"Any key E
  xits:"
240 PAUSE 0
250 STOP

```

Once again, Roy, many thanks for your valued contribution: there's a little program left on curves for another time, with further Burfordtips on some of the odd things that happen during conversion, colour clashes, and all the other bits and pieces his wealth of experience gives us. Bless you.

This column gets typed in the queerest places. To give you an idea, this morning, I attended a church service, in Welsh, first, before continuing with Short Spot. Now, you remember last month, we featured some of George Siougas' fine work with a Spectrum running various versions of BetaDOS, together with one of the issues of Dr Andy Wright's Beta Basic. Regrettably, tokenisation differs from SAM, and many of the Beta Basic keywords are not at first obvious, so if you are not immediately at my elbow,

you find yourself wondering just what the shambles on your screen might represent. Well, Bob; I've solved the problem. You've no need to read any Beta Basic discs this time, and there's no need to guess what language you have on your screen! It's Welsh! Diolch y fawr iawn! (Nicole says she would have preferred French, but it's just tough!)

Enough of this. Here's a little fix, all the way from George Siougas, in Trikala, Greece (again, bless him), for Campion for those who use BetaDOS and extended directory formats. Campion uses the following disc commands (all handled from machine code): LOAD, SAVE, VERIFY, ERASE, INDEX (it CATs its own files) and RENAME. "They all work perfectly, believe me," says George, "Except INDEX and RENAME, which are supposed to search the directory for CAMPION files, using CC 63 repeatedly. In reality, what happens is that they stop, when the 4th track is reached. We can fix this simply; just POKE 50477,t, where t is the track number of the directory on the disc we are using. The easiest way to do this is to add the following lines to the Campion Basic loader:-

```
10 DEF FN s(x)=USR 8
20 LET t=FN s(124+8192): POKE
5044,t
```

Now INDEX and RENAME will search the whole directory, and not just a small section of it.

Finally, from George, we have some tips about Beta Basic 3.0+D and 4.0+D (DISCiPLE and PLUS D versions of Beta Basic 3.0 and 4.0). The exact issues of your program can be found at address 47272, after the program has been loaded. So PEEK 47272 should be 52 for 3.0+D and 7 for 4.0+D. These are the latest issues. Although these issues are almost bug-free, there is an improvement

recommended by Dr. Andy Wright himself. He recommends as follows. 'Using SPLIT when the line being edited contains numbers to the left of the '<>' gives unexpected results, due to one of my modifications to cope with the habit of the DISCiPLE (and the PLUS D) of stripping the invisible forms of the numbers from Beta Basic statements. POKE 58539,89 will get rid of this problem, though the action of SPLIT is now slightly altered from the description given in the manual. When the first part of the split line has been entered, your cursor will be left at the start of a line which has **no** line number, rather than the same number that the first part has. In some ways, this might be better than the original system, and users of non-DISCiPLE version of Beta Basic might like to use this POKE as well.

Another problem George discovered is about LLISTing a Beta Basic program, and this information might be of use to Bob, when he's got Beta Basic programs to convert (not many, fortunately for him!). The new commands (tokens) can't be printed correctly, because the PLUS D's printer interface can't expand them and therefore prints them out like UDG graphics. George messed about with it a lot before he found that the solution is, in fact, ludicrously simple. Add at the start of line 2 of Beta Basic's loader program (i.e. before RANDOMIZE USR 58419), the command POKE @11,1. So the line now looks like:-

```
2 POKE @11,1: CLEAR rt: ....
```

What this extra command does is to disable the PLUS D's printer interface. Now Beta Basic's printer interface takes control, and it LLISTS correctly. Whoopee!!!

However, if you try and be clever and first load Beta Basic and then POKE @11,1, it doesn't work unless you also

re-initialise Beta Basic with RANDOMIZE USR 58419 again. Why? When G(+)DOS or BETADOS is loaded, address @11 contains 0, which means that the printer interface of the DISCiPLE or PLUS D is enabled. In this case, the PLUS D overwrites the channels area many times a second. If you load Beta Basic now, it initialises itself by the RANDOMIZE USR 58419 command of line 2 of its loader program. During initialisation, Beta Basic tries to overwrite the channels area, so as to take printing control: indeed, it succeeds; but for only a fraction of a second: the PLUS D overwrites the area immediately after! POKEing @11,1 now doesn't help as it just stops PLUS D's overwriting. You have to re-initialise Beta Basic in order to overwrite the area permanently with its own data.

Of course, once you've done this, printing is now controlled by Beta Basic, and you can now POKE @5, @6, @7, @8, @9 and @10 until you're blue in the face, with absolutely no effect at all! "But how can I send control codes to the printer," you might well ask. Well, George tells me that he thinks Beta Basic is quite clever in this respect. It lets you send text, most control codes (see below, about address 60921) and listings to the printer without POKEing anything. There is no problem, like having to POKE @6 with a PLUS D; you simply:-

```
LPRINT "Hello": LPRINT CHR$ 27;  
CHR$108; CHR$ 8: LLIST
```

and everything is handled perfectly by Beta Basic. Thus the line above will send control codes to give a left margin of 8 characters (like POKE @9,8 when using the PLUS D interface). George expresses surprise about this, but when Andy Wright wrote Beta Basic, long ago, he had a Discovery drive interface and this was the way it was handled by that even

longer ago: it depended whether you'd opened a stream to the one channel (when data was *interpreted* into tokens), or to the other (when what you sent was what the printer got)! I suspect Andy thought it was neatly handled: certainly I did. It avoided all this messing about. George also mentioned another useful tip which I had long since forgotten: you can change the characters per line output (like POKE @5) merely by POKEing address 57500 with the desired value. The first line may now be the wrong length unless you also POKE 57545, line length + 1. This is the column position variable. You can find further interesting addresses to POKE in the last pages of the excellent Beta Basic manuals, and in Beta Basic newsletters (RIP). For example, about address 60921: "Beta Basic as supplied handles most control codes itself - for example, TAB is turned into a string of spaces before being sent to the printer. However, this could prove inconvenient at times, so a 'switch' is provided. The address 60921 controls what happens: if it is 1, control codes are sent to the printer; if it is 0, most control codes are handled by Beta Basic". George finds that leaving it routinely at 0 is fine, as it can handle well the CHR\$ 27 control code sequence, and most others for that matter. You need alter it to 1 only on rare, special occasions, unlike POKE @6, the nearest PLUS D equivalent. In the last pages of the Beta Basic 4.0 manual, some POKEs are described to make the program more compatible with some disc interfaces, including DISCiPLE. These were written for the normal tape/microdrive version of the program. So if you already have the DISCiPLE/PLUS D version supplied by **FORMAT**, don't POKE hoping for further compatibility - it just won't happen. Indeed, don't do *any*

POKEs described there - they'll give you trouble.

The very last tip mentioned by George has already been given in **FORMAT** - albeit some years ago. However, as it is related to the information already given above, and as it is very relevant, we'll include it. Now, the most common problem with games and their compatibility arises because they use the *whole* area of memory - even the channels area. POKE @11,0 before loading the game from tape. Now it will not be overwritten by the DISCiPLE immediately after loading (see the previous sections). **Now you can snapshot an unaffected game!** Of course, you will also have to POKE @11,1 before you load it from disc later, as well. If you are going to use this tip often, it's perhaps a good idea to have, as well, a modified system file where @11 already contains the value zero. Consequently, after booting, the printer port is *enabled*. Boot, and then either POKE @11,1 or insert a POKE @11,1 command at the start of your autoload program. Provided you go about things this way, not only does the PLUS D not overwrite the channels area, but the snapshot 1 or 2 method still gives you the capability of dumping a screen to the printer. Pretty good! George cannot remember why the snapshot method works in spite of the fact we have POKED @11,1, but think's that it's because the specific printing routines are in the PLUS D's ROM, which mean's the address is permanent. So in this case, the machine doesn't bother to look for the address of the printing routine in the channels area information; it just goes for it direct. It therefore merely needs the initial enabling of the printer port.

Many thanks, George; brilliant.

One more comment; this time from me. George has taken the trouble to convert the material to IBM-PC format, using his

IBM READ. In point of fact, I split this into two pieces, so I'd already sent the first bits off to Bob for last month's issue before I spotted this - poor old Bob; it thoroughly messed up his conversion routines. So apologies all round; to George for not noticing all his hard work earlier, and to Bob, for giving him loads of hassle.

Smack legs: I'll try harder next time. And now the usual appeal. While all of you have been in sunny climes, snoozing on the beaches, surrounded by empty wine bottles/lager cans and gorgeous men/women (choose appropriately **NO; DON'T CHOOSE FOR HIM/HER**), I've been working away, trying to put a Short Spot together (some in Welsh Wales, and *if you don't behave yourselves, next time it'll all be in Welsh!!!*) and Bob's been putting the rest together, and Nicole's been patting me on the shoulder, and telling me I work too hard, and I'm starting to run out of contributions, since you never took your Spectrums or SAMs with you on holiday and I don't think you even intended to take them, just **FORMAT** and Phewwww..... So once again, I'm beginning to get short of material, though in fairness, I do have a little. The danger mark is getting uncomfortably nearer and nearer, though.

So look in your drawers; send me your bits and pieces! (Behave yourself, Nicole!!!). Please keep all your snippets coming to me; without them I can't put a column together.

Please send them to:-

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

Thank you. See you all next month.



The INDEPENDENT User Group

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Bob Brenchley and **Jenny** Bundock.

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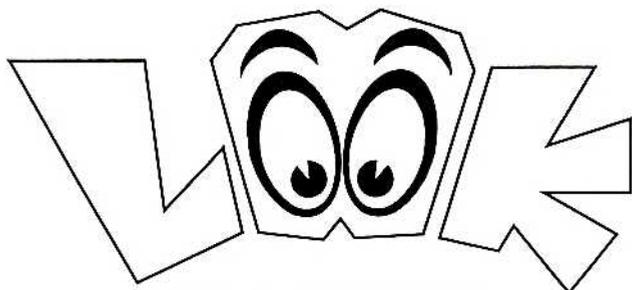
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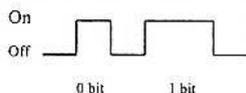
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Inside Spectrum's Tape System

By:- Ken Elston.

Last time we looked at some of the theory behind the operation of the Spectrum's tape system. This time I want finish off the theory side and then start a step-by-step guide to the actual ROM routines.

Now, in theory, the signal SAVED to, or LOADED from, tape on the Spectrum is a *Square Wave*. By that we mean that the signal jumps from off to on and back to off again without noticeable time lags between the off/on on/off states. Something like this:-



As you see, a set bit (1) is roughly twice as long a pulse as a reset bit (0).

Now in the real world the signal recorded on tape is far away from being a square wave. Even if the ULA's output was a square wave, in otherwords if it switched from one state to another fast enough, the resulting waveform on tape is much nearer a *Sine Wave*. This is due to the physical and mechanical characteristics of the tape recorder including things like wow and flutter (caused by the tape not having a precise speed but rather one that fluctuates over small periods of time) and the signal is also affected by the tone controls and even more so by the volume control.

The Spectrum loader routine starts from address 1377 (0556hex) in the ROM and here's a completely commented

disassembled which I have lifted from the irrefutable 'The Complete Spectrum ROM Disassembly' Dr Ian Logan & Dr Franklin O'Hara (Melbourne House, 1983, ISBN 0 86759 117 X), a very valuable book for any Spectrum owner.

I'm looking at the load routine to start with because I think that this is a very good place to start. On entry to the routine the Z80 registers are set as follows.

IX=start address (where to place the block).

DE=block length.

A=expected marker (0 or 255 - see last months article)

Carry Flag=SET (1) for loading, RESET (0 for verifying.

On exit the registers will be set as follows:-

IX=address of the last loaded byte plus 1.
DE=remaining bytes to load (0 if all the block has been loaded)

Carry Flag=SET if load/verify was OK, RESET otherwise.

Right, here is the routine:-

```
1366 D-BYTES INC D
```

The routine starts adding 1 to D: this increases the block length by 256 bytes, but also resets the Z flag; this will be useful later for handling the first byte loaded (the marker). Note that if D holds 255 at the start, this would reset the C Flag and set the Z flag causing an error later in the routine, this means that we

can't load blocks larger than 65279 bytes.

```
EX AF,AF'
```

Save the accumulator and flags for later use.

```
DEC D
```

Restore the original length

```
DI
```

Disable interrupts. If interrupts were left enabled the routine would be halted every 50th of a second to execute the interrupt routine and timings would be lost.

```
LD A,15  
OUT (254),A
```

Turn the screen border white, and turn the Mic signal off.

```
LD HL,1343  
PUSH HL
```

This puts the address of a subroutine called SA/LD-RET (see later) on to the stack for later use.

```
IN A,(254)
```

Sample the EAR port, its status is held in bit 6 of the A register after the IN instruction.

```
RRA
```

Rotate the byte, so now the EAR port status is in bit 5 of the A register.

```
AND %00100000
```

Keep only bit 5.

```
OR %00000010
```

As this is the byte that will be OUTput to the MIC port later, this 'OR' operation turns the screen border RED by setting bit 1 (in effect adding 2 which is of course the number for RED).

```
LD C,A
```

Now store the byte in the C register. C will hold the byte to be OUTed to MIC port (i.e. the current EAR status in bit 5 and the border colour in the bottom 3 bits) for the duration of the routine.

```
CP A
```

Reset the Z flag.

```
387 LD-BREAK RET NZ
```

Stop loading if Z flag is reset; this may happen if the BREAK key has been pressed (see later).

```
388 LD-START CALL 1511
```

Find the opposite edge of the one held in C.

```
JC NC,LD-BREAK
```

Jump back if an error has occurred (i.e. BREAK pressed or no edge found)

```
LD HL,1045  
1396 LD-WAIT DJNZ LD-WAIT  
DEC HL  
LD A,H  
OR L  
JR NZ,LD-WAIT
```

This loop causes a pause of about 1 second. At the end H holds zero.

```
CALL LD-EDGE-2
```

Next, search for 2 edges. The routine has 31475 T states to do this in, so a wave of at least of 220 Hz is needed to trigger.

```
JR NC,LD-BREAK
```

Jump back if the edges haven't been found.

```
1408 LD-LEADER LD B,156
```

Load B with the timing constant.

```
CALL LD-EDGE-2
```

Go look for 2 edges.

```
JR NC,LD-BREAK
```

Jump back if the leader is not continuous.

```
LD A,198  
CP B  
JR NC,LD-START
```

Now check to see how long the wave is: the 2 edges must have been found in

between 6341 and 13185 T states, so the wave frequency must be between 530 and 1100 Hz.

In fact the leader is about 810 Hz, so it is roughly in the middle of the search range.

```
INC H
JR NZ,LD-LEADER
```

Increase H and check for it to be 0; this will repeat the above process 256 times as H holds zero on entry.

To leave the loop, the leader must have a minimum length of about 0.3 seconds.

```
1423 LD-SYNC LD B,201
CALL LD-EDGE-1
```

Now it's time to look for the sync pulse. Load B with the timing constant and look for only 1 edge.

```
JR NC,LD-BREAK
```

The edge hadn't been found - this could be due to tape noise.

```
LD A, B
CP 212
JR NC,LD-SYNC
```

Check to see how far the new edge is from the previous one. They must be found in a maximum of 7757 T states, but only the ones found in less than 2565 T states are good to leave the loop: this means that the frequency should be more than 1364 Hz, otherwise the edges we are considering are still the ones of the tone leader.

```
CALL LD-EDGE-1
```

If the first halfwave of the sync pulse has been found, then look for the other one. The available time to look for the second halfwave depends on the time spent for the search of the previous halfwave.

```
RET NC
```

If it gets to this instruction then it wants to stop loading, as the search for a sync pulse search was not successful.

```
LD A, C
XOR %00000011
LD C, A
```

Invert the last 3 bits of the C register. This turns the border from CYAN to ELLOW or from RED to BLUE.

```
LD H, 0
```

Initialize H with zero. This is the register holding the checksum.

```
LD B, 176
```

Load B with the timing constant.

```
JR LD-MARKER
```

Jump forward to load the marker byte.

```
1449 LD-LOOP EX AF,AF'
```

Restore the register holding the expected marker.

```
JR NZ,LD-FLAG
```

Jump forward if considering the first byte loaded.

```
JR NC,LD-VERIFY
```

Jump forward if we are verifying.

Note: If D was holding 255 at the beginning, the Z flag would be set and the Cy flag reset: this causes an error, as the marker would be loaded into memory and not compared with the one stored in the A register here.

```
LD (IX+0), L
```

We are loading, so put the byte loaded in memory (held in the L register).

```
JR LD-NEXT
```

Ok, that is where we will have to leave it this month as I've run out of space. All being well I'll be back next time to continue the walk through of the load routine.



YOUR LETTERS

Dear Editor,

In answer to your questionnaire on the renewal notice, I enjoy **FORMAT**, as it is, a good mix.

What would be nice is more hardware subjects, and what about the languages, Forth and Prolog for a bit of AI. I seem to remember a Forth version for the Z80 years ago. And, what about less holidays for Jenny and a ball and chain for her ankle, to keep her at her desk!

Yours sincerely, William Gain ford.

Indeed there are several versions of Forth around (for Spectrum and SAM), and I have seen one version of Prolog for the Spectrum. We have run articles before but there has not been much interest expressed in the subject in the past few years, and certainly no new articles have been forthcoming.

As to your final comments, I've scrapped Jenny down off the ceiling, but I think she is in her office at the moment with a wax effigy and some very long pins.... **Ed.**

Dear Editor,

I am making a sincere enquiry regarding the following items. Firstly the SAM Clock. In your latest magazine it is quoted that your backlog is now at six months behind delivery dates, yet my purchase was for delivery after the end of 1997. I excepted the delays after that date because of the unforeseen production problems. I hope my SAM Clock arrives at least before the end of this year.

Secondly, the hard drive interface and drive types. Because SD Software is no longer in business in producing the IDE

hard drive interface, I am aware of no one else who is manufacturing the above items. Yet from your magazines, it is quoted that you are still insisting that these are still available! How is this possible?

I have just acquired a Maplin catalogue, and have found out that I can purchase a number of hard drive types. A standard five and a quarter, three or three and a half drives, and their single, double or tower casings. But also the new read-write CD drives, the normal and the new half sized CD drive units.

A question. If you know of anyone who is still producing the IDE interfaces, is it not also possible to produce the alternative (to the IDE) interface instead, so that we SAM customers can utilise the more standard CD drive or Winchester type hard drives.

From the above it would therefore be possible for me to put all my copyable Spectrum software onto one hard drive and also utilise another for normal SAM only software. Thereby saving on the expense of buying for too many standard discs. Especially as they are prone to become faulty over time, and what seems to be happening is their possible demise.

My membership is up for renewal, therefore please could you tell me what the actual cost is for one or more years membership.

If there is hope of seeing a new SAM on the market, my ideal SAM would be: 4 8-Bit SAM processors, memory management, graphics, sound, and finally interfacing management. This would give extra speed and compatibility with PCs via an older type PC board

add-on.

Graphics, as before, but with two more screens. True PC type word-processor screen and PC type hi-res screen.

Sound, as before, but probably with more sound channels (max 64). Interfacing (add-ons), as before, but also for a PC type drawing (CAD) board, a modem, TV access to teletext and or the other TV text channel. Multi-play/role cable access to other users, i.e. similar to those PC (modem) and Sega Playstation multi-tap unit access interfacing.

The memory management system for faster and or independent or joint control of RAM, ROM, Basic, MasterBasic, DOS, MasterDos, interfacing and graphic management and sound management (including MIDI).

Such a PC would in my view be a better option than purchasing a PC (with its many start-up setting-up of memory configurations, to overcome its software/hardware compatibility problems).

A new SAM would be easier to use, since there is no software or hardware incompatibility problems (the messenger is ideal to convert Spectrum software to SAM drive software format). There being no other problems, the ROM/Basic etc can be independently upgraded when and if necessary via a new hard drive disc.

And finally, given that the new SAM has four 8-Bit processors, how about an 8-Bit Commodore Vic 20/C64 or C16/+4 with ROM maps on soft disc (loadable onto SAM hard drive).

Thanks for your continued support for us SAM users.

Yours sincerely, C.Roads.

Ok, from the start, Clocks are being built but I'm still trying to catch up, I'm just not getting the time I need to sit down and assemble them. As I've said before, mistakes in the boards mean that the job is not an easy one.

SD's hard drive interface is still going to be available, although there is a new

batch of boards on order. The IDE interface works with almost any IDE hard drive (5¼", 3½" or 2½") although the 2½" will need a special cable which you would have to get from a PC supplier. In theory it would also be possible to connect a CD drive but it would need some special driver software written - and apart from things like clip-art CDs there would be little value in connecting a CD to SAM at the moment.

I'm not sure what you mean by "more standard CD drive or Winchester type hard drives". The only alternative to the IDE standard is the SCSI system, but this requires much more hardware control and as the drives are more expensive than IDE it is a non-starter.

On the subject of renewing, you will remember that we do send out renewal notices with the final two issues of your membership. **Ed.**

Dear Editor,

I want to order a new power supply for SAM Coupe. The one I have has burned parts and doesn't work anymore. So I want to know how much money I have to send you to get a new one.

Yours sincerely, S.Kempees (Netherlands).

See answer to next letter. **Ed.**

Dear Editor,

The PSU used with my SAM has failed (+12 volt supply no output).

1. Can you supply a circuit diagram or other circuit details? There is no circuit information in the SAM Technical Manual (V3.1).

2. Are you able to sell me a new or working PSU for the SAM? Please advise price including post and packing.

3. Please advise if you are prepared to repair the PSU and the approximate cost. I realise the actual cost cannot be determined until you view the PSU, but in normal circumstances this should (rarely) exceed half the cost of a new

item.

Finally, I have checked the SAM +12V rail for 'shorts' and seems to be ok. I am aware of the hazards from the 240v mains when checking the PSU with the cover removed!

Yours sincerely, Arthur Telling.

Right, I'll answer both letters about SAM PSUs in one go.

PSUs are available on an exchange basis at £24.95 including UK postage and packing (add £3 overseas). Just send the old one back with a cheque, and we will get a replacement to you as soon as possible.

The most common problem with SAM PSUs is that the 12v side goes down. Usually resulting in a blank screen on a TV, while connecting to a monitor gives a good picture. If you have a multi-meter then testing the 12v is easy enough (see the manual for pin-outs on the power plug). If you find there is no 12v output then the most likely cause is that the 12v zener diode on the main power board (I think it is marked D4 on the board) has blown. Anyone with a little soldering experience should be able to replace it.

I'm sorry to say that I've never seen a proper circuit diagram for the power supply - anyone fancy drawing one up for publication? ***Ed.***

Dear Editor,

I have been reading the letters about a modem for the SAM with interest, as for years I have had a Maplin kit for a Spectrum modem lying around. I'm afraid that some of the parts are missing, but all the IC's are there. I think that the only things missing are the edge connector and the resistors. It comes with full instructions and part list, and runs at 2400 baud. Do you think it could be converted to the SAM? Does the SAM have a 8 bit ASCII like character system (I don't have a SAM so I can't try anything). I will try and email you the instructions and part list if you want

them, and if that doesn't work I will try snail mail (if you want them).

Yours sincerely, Peter Allen.

I have seen the Maplin modem running, but by today's standards its very slow. The problem, as always, is software. You would need to write your own control software. Ok, this would really mean altering the Spectrum version to allow for changed addresses and ports, but it could be a bit of a job.

Ed.

Dear Editor,

After nearly 18 months in the process we have finally sold up and moved house! The new address is above for future issues (lots of them please)! I've not been able to spend much time on SAM over the past year with all the trouble, but that should change now.

I finally managed to get to a Gloucester Show last time, although I didn't get there 'till about one (a bit of a last minute decision). I found the discussion very interesting, and the update in the latest **FORMAT**. I am a machine code programmer and I would be willing to help in the debugging/redevelopment of the SAM ROM and DOS (and HDOS?) Please let me have more details of what needs to be done.

Did I read that you were temporarily taking over the running of FRED Publishing? After issue 80 I subscribed for a further 12 months and at the same time took advantage of a special offer to order 4 or 5 games. I haven't received any of the games nor any issues of FRED past 80. With all the problems of the move I never got round to doing anything about it, but it's about time I did! Looking back at bank statements I can confirm that the cheque was cashed.

Anyway, I look forward to hearing more about the project.

Yours sincerely David Laundon. W

ould love to have you on the

ROM/DOS team David. I will give you a ring one evening soon, so we can have a chat.

No, we have not taken on FRED, but there continues to be a delay in getting things settled with those that are going to run things. Hopefully there will be more news soon. In the meantime write to Darren Wileman as, for the moment, he is still responsible. **Ed.**

Dear Editor,

I have just received my copy of **FORMAT** and am sending you my renewal notice for a 2 year period. As usual when I receive my copy, I'm very happy to see what is inside. (and do find food for my Spectrum!).

I first got my Spectrum (48K+) in 1983, and always use it. I love it because it is a 'real' computer, that is easy to understand and does just what is necessary, no more. But the Spectrum can do many things!

Other advantages are, very low electric use and, also, the Spectrum is small, light and beautiful: my dream must be a portable Spectrum with colour LCD screen: If this comes one day, sure, I will buy it!! (not a PC with emulator though, the spirit is not the same).

Something else now. I would like to know why I received my copy of **FORMAT** from Copenhagen (yes!!) with a delay of 2 months later? It is now July and the last **FORMAT** I received was the May issue! I think that there is a big bug here! I will be glad to receive my copy at the time! (I always ask on my renewal for the airmail service). You will soon receive my subscription fee via the Post Office.

What I would like to see covered in a future issue of **FORMAT** is an article speaking clearly of sectors and tracks, and how to create, load and modify data on track/sector of my choice. I don't know exactly how to use the drive and the PLUS D to load and save data, except with using arrays.

All my congratulations to everybody working at the magazine! See you soon!

Yours sincerely, Dominique Charbonnner, (France).

Nice to hear your thoughts on the Spectrum Dominique, I'm sure they are shared by many of our readers.

As you will know from my editorials, we are behind with issues at the moment, so your last issue was not stuck in the post for two months. For overseas mail we now use a mailing company that posts some items from main-land Europe. Belgium and Denmark seem to be their favoured countries, but other post gets sent from within the country it is destined for. We use this service because it is both cheaper than Royal Mail International, and so far it is proving faster. But we will keep it under close review.

By the way, it is not a good idea to use the giro system at the post office to send us money. Because the cheque arrives in a different envelope it often causes delays as we try to match up the payment with your renewal. From France it would be easier for you to use the **Foreign Currency Payment Scheme**, details of which we send out about twice a year. **Ed.**

Dear Editor,

I have usually found the content of **FORMAT** to be interesting and instructive so as I am expecting delivery of a new PC very shortly I would like to transfer my subscription to **FORMAT** PC.

I have enjoyed my SAM, and before that a Spectrum for many years, especially writing my own programs, but recently have been using the machine less and less. I shan't be doing away with old Sammy though, oh no! He will be stored, carefully, ready to come out to do service whenever the programming muse strikes, or when I get bored with Windows and Net surfing.

P.S. I just realised there is a SAM

emulator available now for the PC - is this on the Internet?

Yours sincerely, John McCabe.

Allan Skillman's excellent SIMCoupe can be downloaded from the web using the following address:-

http://www.hep.ucl.ac.uk/--ajs/simcoupe/simcoupe_dos.html

If anyone wants a copy and does not have internet access then send me a formatted disc and a stamped addressed envelope and I'll send you a copy.

Allan values any feedback on things that work/do not work so that he can carry development forward. ***Ed.***

Dear Editor,

I am enclosing my payment for another years subscription. I thought I would take this opportunity to add my thoughts to the development of the SAM computer. I have listed the items I should like to see become available or added to the system. They are not in any particular order of preference.

Improved graphics with dedicated graphic memory Scan doubler to allow the use of a VGA/SVAG monitor - Interface/Dos to allow the use of HD (1.44 meg) floppy - A hard drive system which works reliably - An improved user manual - Modem - A redesigned case to allow the extra interfaces to be contained internally, preferably with; an external keyboard.

If I can be of any help to you on any of these, or other projects please contact me. I have had a SAM since they were first available and have used Spectrum's since 1984. I have also worked in an electronic environment for around 30 years now and could possibly help you there also.

Yours sincerely, Geoff Bridges.

Thank you very much for your input Geoff, I would love to talk to you about any help with electronics you feel may be able to give. ***Ed.***

Dear Editor,

As you know, the date for the NSSS has changed (again!!) to November 28th.

I have been told this is to avoid it being too close to the All Formats Fair. Is this true and when is your show?

Also, how do you feel having just printed details of 'September' show in *FORMAT* and now being left looking stupid through no fault of your own? Do you feel this is down to bad organization? Do you think Spectrum and SAM fans will eventually get so fed up of this chopping and changing that they might abandon the show? Will the Bolton location make a difference to attendance?

Also, what is your website address (so I can add a link from my site).

Yours sincerely J.A. Waddington.

To be honest I don't know what is happening on the NSSS front. Our show is still set for the 17th October and we hope to see lots of people in Gloucester for that.

As yet we have not set up a web site, it will happen one day, but I just don't have the time for now. ***Ed.***

Dear Editor,

Is there going to be another issue of the Spectrum & Sam Resource Directory this year. If so could you make sure that there are a few repair companies in it that will handle Spectrum repairs.

Yours sincerely, Martin Hall.

If we can find some, certainly. A new directory will be done soon, but we can't commit to exact dates yet. If anyone knows someone who should be included then let us know as soon as possible. ***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 fax them to us on 01452 380890.

Z80 One Man's Experience

V3.05

By:- P.A.Basheer.

For the PC, the latest Spectrum emulator (Z80 version 3.05) is better than ever, finally we have a Spectrum that is better than the Spectrum!

Now we can have a Spectrum with a huge hard drive, monitor quality display, good quality keyboard, DISCiPLE/PLUS D, Multiface 128, variable speeds for programs (so that you can speed up slow graphic programs or slow down games that are too fast to play), mouse and joy-stick, fantastic!

Try getting all these with a regular Spectrum. In my opinion the TV display from a 48K Spectrum was terrible, what with the 'dot-crawl' and the wondering tuning. Remember the relief we felt when the 128 appeared with a much better display? Well, the Cub monitor had a much better display even at that time. I bet quite a lot of user's eye sight were ruined by these TV displays—mine was anyway.

The latest version of Z80 has removed one bug which had plagued version 3.04, which refused to load in DOS mode on my Pentium 166 MMX, even though the emulator was working fine under Windows 95. This was not good enough since the program does not support tape handling under Windows, and also DISCiPLE emulation is quite unsatisfactory – formatting the disc is not possible, for example. The strange matter was that 3.04 did run fine under DOS on another Pentium 60 without MMX. (So the culprit was probably the

MMX).

Version 3.04 had another serious bug when it came to DISCiPLE or PLUS D emulation. Snapshots made by DISCiPLE emulator to the 3.5 floppy would appear to save normally. So after 15 or 16 snaps, the disc would be full. Suppose you have made 10 snapshots on to the disc. If you try to load a snap from the floppy disc, only the latest snapshot would load and work. All the other snapshots (1-9) would appear to load, and then crash. This was due to a bug which caused the earlier snapshots to be trashed while the latest snapshot was being written to the disc. This bug has now been eliminated and all the snapshots on a floppy reload and run normally. The DISCiPLE/PLUS D emulation still remains the weakest part of the emulator. It still takes ages to format a floppy disc, or to save and load files and snapshots to it. However, the overall impression regarding the emulator is very good, since the author has made a lot of small modifications to the previous version, mostly cosmetic but some very useful. These modifications are too numerous to mention here.

Is this the last version of the emulator? I believe that they are still working on a new version which would add more bells and whistles. In that case, I wish that Mr Gerton Lunter (the Dutch author of the program) would consider adding emulation for UniDos to the list. Also, a compiler program to produce stand alone

exe files for the PC would be terrific. This would mean that you can program in Spectrum or Beta Basic, and then compile it and use it as an MS-DOS program! Who would need other languages then!

I have come across such a program, by the way. It is part of another Spectrum emulator for the PC, called Warajevo Simulator, produced by a couple of kids from Bosnia. The emulator is no match to Lunter's Z80, but is compatible with the .z80 files of Z80 (version 2.x) and would produce stand alone .exe files from the Spectrum programs. This means that the emulator is not required to run the compiled programs.

Now all Gerton Lunter has to do is either come up with a similar program or buy out these guys!

This program is Shareware and is registered in UK by Brian Gaff of

B.G.Services. Give him a call or send him an SAE for details. Since Brian's eye-sight is sufficiently bad that he is a registered blind person, please write or print legibly in large block letters. Write to:-

**Brian Gaff (B.G.Services),
64 Roebuck Road,
Chessington,
Surrey,
KT9 1JX.
Tel: 081-297-4180.**

I rate this software 9/10.

SMALL ADS

For Sale Spectrum hardware and software. I also buy and sell computer magazines, old and new. Write for more information to Jonathan Marsh, 20, Camp Mount, Pontefract, West Yorkshire, WF8 4BY.

For Sale Spectrum software, all originals. Games and serious software - Jet Set Willy, Manic Miner, Apocalypse, Hulk, Thunderbirds, Colossal Adventure, Man Utd, Europe and lots more. Also +3 Disc software, books, magazines. Send SAE for huge list. Alan Cresswell, 18 West Street, Geddington, Northants, NN14 1BD.

For Sale Sound FX Classic 3000 Wave-Table 16-bit Sound Card, SB-compatible, 24-note polyphonic General MIDI module plus Roland MT32 & Ad Lib, CD and full 16-bit 'wav' audio. Boxed with all leads, manual, drivers & some software. Requires 386 or above, at least 4MB RAM, Windows 3.1 only. £30.00 ono + p&p. All enquiries, please contact Matthew Compton - Tel/Fax. 0161-9763628; E-mail: Matthew.compton@which.net

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

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