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FORMAT

THE HOME OF Z80 COMPUTING



Strange, But Some People
Still Don't Read **FORMAT**

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The Editor Speaks

Yes, I know, we are still behind with *FORMAT*. I never thought it would be as difficult to catch up as it has been. Each month I've promised to get the next issue out a bit quicker, each month Jenny has bullied me to get on with things (she is good at that you know) but each month something else crops up that thwarts my carefully laid plans.

This month of course it was the 10th Gloucester show which was the major time consumer - but well worth it. The turn-out was a little lower than usual but we had forgotten to check the sporting calendar when we booked the date. What with a Rugby international, two major football matches and the Grand National horse race - you can see we had stiff competition. Then of course there was the weather - just about the heaviest rain I've seen for years (Jenny reckons I didn't slip the weather bureaux enough dosh to book a sunny day). All these things combined persuaded several people I've spoken to, to stay home in front of a good fire. Still, it is only six months to the October show.

Anyway, the show went very well and included an afternoon discussion session entitled 'The Future Of Z80 Computing'.

The idea behind the discussion was to get peoples' feelings, and there was certainly a lot of those. In general there was an agreement that the Z80 still has a lot of loyal followers and that there is a future for Z80 based machines. Part of the discussion related to the future of SAM and there was a lot of talk about

the direction that possible new developments could move in.

What was most interesting to me was the input from Spectrum users. They recognize that spares for their machines are becoming scarce, and would like to see SAM made even more Spectrum compatible than it is, so that it can always be used as a life-line to users whose Spectrums turn up their diodes and go to the great computer repair shop in the sky.

I will continue to look for feedback from *FORMAT* readers on what they would like to see developed and where they see the future of Z80 based computing going. You will find a couple of letters in this months issue and I'm sure there will be more next month.

Short Spot is missing this month (but we make up for it with a bumper Letters page). John Wase is working hard to start a new business (which I'm sure he will give details on when he is ready) and so Short Spot will appear next month with a little more space than usual to make up for missing this issue. Good luck with the business venture John, I'm sure readers will be keen to hear all about it.

Finally this month, its moving time for both S.D.Software and Fred Publishing (see *News On 4*). We are doing what we can to help both moves go smoothly and if anyone need anything then please ring me and I will try and help.

Until next month.

Bob Brenchley, Editor.

NEWS ON 4

FRED IN NEW HANDS

Just over a year ago FRED Publishing moved from its original home in Dundee to Ashby de la Zouch in a deal that saw Saturn Software's boss Darren Wileman take responsibility for the veteran SAM software company and disc mag. Well now FRED is on the move again.

FRED has had a troubled year, dogged by infrequent appearance of the disc mag and the continued non-appearance of *Kaboom!* Its long established reputation for reliability somewhat dented, Colin McDonald (FRED's founder) has worked hard to secure Allen Clarkson as its new owner/manager.

Allen is a well known figure in the Spectrum and SAM world, most notable for founding the excellent *CRASHED!* magazine which he also edited for a long time. Recently he has been helping Colin Anderton with the editing of the FRED disc magazine.

At the same time FRED will also be taking over the software formally sold by Saturn Software.

More details next month.

S.D. TO GLOUCESTER

Another old friend is on the move this month, down to Gloucester again.

Spectrum and SAM software company S.D. Software is relocating to the *FORMAT* offices for a long holiday. Nev Young, SD's owner, is under intense pressure to move from his home in Barnoldswick, Lancashire, because of his main employment. This move (which may take some time) will save him many hours commuting each day which currently leaves him with little time other than that needed for sleep.

However, until Nev can find a new house and get himself settled he doesn't want S.D. Software's customers to suffer.

So, as of now, Format Publications will be handling SD's product range direct from Gloucester. There has not been time to arrange new advertising copy for this issue but anyone who wants to order something from last months advert can do so by sending the order to us.

SAM SOURCES

As the first stage in the new project to 'debug' the SAM's ROM and DOS (see last months issue) we will soon have disc copies of the Z80 source code available for people who want to help. In this first stage we are looking to people to expand the documentation of certain sections of code - improving on the comments which already exist.

A new SRAM card, which will allow a 'soft' copy of the ROM to be loaded so that changes can be made, will be available in the next couple of months. This will allow stage two to start, where alterations can be made to the existing ROM, with a target of a new ROM being released some time in 1999.

More news as the project develops.

YOUR NEWS HERE...

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

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

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MINEFIELD

A step by step guide to writing a C program using SAM C.
Part 5.

By:- John Eyre.

I will repeat the standard opening that I've used each month, just in case this is the first part you have read and therefore wonder what Minefield is all about. This series of articles is not intended as a tutorial on the SAM C language or on how to program. Rather, it is a step by step guide to the development of an example game using SAM C. It's written around the standard version of SAM C, not SAM Vision.

Last time we completed the game itself, you can play it alright but it lacks the finishing touch of a good ending, so that is what we are going to do this time - end it all....

Stage 5 End of game functions

In this he final stage we need to improve the end of game sequence so main() needs a small addition:-

```
main ()
{
  char key;
  initialise ();
  do
  {
    setup ();
    while (!finished)
      play_game ();
    end_game ();
    key= getch ();
  }
  while (key != 'q' && key !=
'Q');
}
```

The following two function definitions need to be included and their prototypes declared. The functions are very

straightforward and should need no additional explanation other than the comments provided.

```
void end_game ()
// This function called when
// finished flag is set to 1 to
// check if mine hit otherwise
// the minefield must be cleared
{
  pen (15);
  at (0,cols/2-2);
  if (bang)
  {
    paper (2);
    printf ("BANG");
    show_mines ();
    beep (1500,100);
  }
  else
  {
    paper (1);
    printf (" OK ");
    beep (500,50);
  }
  border (0);
  // make sure the border colour
  // remains black as beep
  // function appears to change it
}

void show_mines ()
// print out location of all mines
{
  int i, j;
  paper (BACKGROUND);
  for (i=0;i<rows;i++)
    for (j=0;j<cols;j++)
      if (map [i][j] % 16== 15)
  // check for mines
      if (map [i][j]>32)
```

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```

// if mine marked
    pen (15);
// use white pen
    else
        pen (0);
// if not use black pen
    at (i+1,j);
    printf ("**");
}
else
{
    if (map [i][j]>= 32)
// if not a mine but marked
{
// print "?"
    pen (0);
    at (i+1,j);
    printf ("?*");
}
}
}
}

```

The following function prototypes need to be declared:-

```

void end_game ();
void show_mines ();

```

Once the text has been saved, the code compiled and the program run to prove it all works, then its time to think about producing a binary file which can be run outside of the SAM C IDE. To do this you must select YES against the save object code option on the compile menu. The code will be saved in a file with a name ending in .bin.

If you are working with the standard SAM C configuration and have not changed the ORG address then the object code will start at address 32768 and the game can be run from Basic by loading the code file into memory, and then following it by CALL 32768. Since no attempt has been made to set palette colours within the minefield game, it could be run after a program with unsuitable colours, so it might be wise to reset the defaults.

Basic program to load and run the

game:-

```

10 PALETTE
20 LOAD "mines .bin" code
30 CALL 32768
40 STOP
50 SAVE "mines" LINE 10

```

And so, we reach the end, the final bit, the last instruction. I hope that this example has helped in some way. C is not the easiest of programming languages to pick up and if you are finding it hard going, don't worry, you won't be the only one. Remember, as with most things, the best way to learn C is to get stuck in and use it as much as you can.

SPECIAL OFFER

If you do not already own a copy of SAM C from Fred Publishing then you will not have been able to follow this series of articles to the full. Well if you have skipped them before, now is the time to stop skipping and start 'C'ing.

In conjunction with Fred Publishing we are making an extra special offer to **FORMAT** readers which allows you to order a copy of SAM C direct from us at

HALF PRICE!!!

Just send a cheque for £10 (overseas customers £12) to us at Format Publications and we will send you the full version of SAM C complete with manual, so you can start learning this powerful language.

And to top it all, there will be another special offer in the package to save you even more money.

Do not send your orders to FRED, this offer is only available from us by mail-order.

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Converting To SAM

First Steps In Converting Spectrum Basic To SAM Basic.

By:- Tony Mugford.

Many SAM users, I would say it could even be true to say most, have come to the machine by upgrading from the Spectrum. There are therefore lots of people who have collections of Spectrum software, both commercial and home-grown, that they would like to get to run on their SAM. This article is a collection of answers to minor problems met by one Spectrum user when converting his own Basic programs to a SAM Coupé. Unfortunately many of the answers were tricky to find owing to gaps in the index of the SAM User's Guide.

If this is your first use of discs then be sure to make a back up copy of your files because, otherwise, fate says you will certainly lose some of them. Never, ever, place a disc on top of your cassette recorder or the speaker magnet may destroy the files.

Make a habit of removing your disc from SAM before switching anything attached to it on/off. I've managed to crash my SAM on a couple of occasions when I've switched my printer (very big and old) off.

To EMULATE or TRANSLATE

You will be offered several programs to emulate the Spectrum but I would not recommend them except to run Spectrum games which you have purchased. The Emulating software may be very clever and interesting, but while you are running it your SAM will then function exactly like a Spectrum (with KEYWORDS operating from unmarked

keys) and under most emulators you will not have access to a large slice of SAM's working memory.

When SAM first came along there was little software so people had to use Spectrum programs. That is no longer true, so unless you have some *very* special program you need to run (and you don't have your old Speccy handy) I would go for SAM *native* software every day.

The SAMDOS disc supplied with your SAM contains two translators, one for tape and the other (hidden in a section named Dr Wright's Demos) which loads from DISCIPLE/PLUS D disc. Both will load your Basic program and convert it - with the Keywords translated to make them acceptable to SAM. They do nothing else, so you should regard them as an alternative to typing the program in again. You will still, in the vast majority of cases, find you have a little extra work to do in making slight adaptations to SAM's version of Basic.

This is a good point at which to make a file copy of the translated program for which you use a formatted disc with, of course DOS, and may have to instruct SAM to use discs with the command DEVICE D (because the tape version of the Basic Translator sets SAM to read tape).

On listing the program, you will find your DIM instructions but there will be no trace of the arrays in SAM's working memory until you RUN the program and

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then the arrays will be without data. In many programs the DATA is only entered in when the program is used so there is no worry. However, there is a straight forward procedure for taking data from a Spectrum file to SAM but more of that later.

SAM opens up in MODE 4 and most Spectrum programs will need to be run in MODE 1. You simply enter the line 'Mode 1' and you should make this instruction the first in the SAM version of your program, this also sets the CSIZE to 8,8 which means you get the full 24 lines of 32 characters on the screen.

The Translator will have made a literal copy of any instruction such as 'LPRINT CHR\$ 27; . . .etc' but the printer will not understand it because SAM does not use a binary stream for LPRINT. If your program requires you to issue Printer Control Codes you need to open a channel for binary as follows:-

```
CLOSE #4: OPEN #4:"B"
An instruction PRINT #4 (note - not LPRINT) will then send any control codes that follow to the printer.
```

For instance most printers will change to 'emphasised' mode on the instruction PRINT #4;CHR\$ 27;"E". If you have a program in which you wish to issue printer instructions, you can set up the channel for binary as an instruction right at the beginning, and thereafter forget about it.

If you have a long program, you may find that the computer stops with the error message 'out of memory' even although the program was acceptable to the Spectrum which has less memory than SAM. This is because a large part of SAM's memory is allocated to other purposes than Basic but you can take part of this for the Basic program as

described in the User's Guide under 'OPEN n'. Try for instance:-

```
OPEN 2: CLEAR 114500
```

When you are editing a program and wish to run the printer, either in testing the program or in LLISTing, it is a good idea to SAVE the program in case, as occasionally may happen, the printer does not answer the computer and this is another way in which you may lose the work you have been doing on your program. It may only happen once in a blue moon, but you can bet it will happen the one time you have typed in hundreds of lines and not saved your work.

Transferring DATA from Spectrum Arrays to SAM

Numeric Arrays are the easiest. You use your Spectrum to set up a Code file in a section of the computer RAM which is free in both Spectrum and SAM. Write into your Spectrum program a short sequence taking the data from the arrays in its program. e.g. for an array D(60) the following would work where the data are positive integers not greater than 256.

```
8000 FOR N = 1 TO 60
8010 POKE (49999 + N),D(N)
8020 NEXT N
```

Save the file as CODE on the Spectrum with:-

```
SAVE "NAME" CODE 50000,60
```

Now write a program in SAM corresponding to the one you used to transfer the data from the Spectrum, but of course using PEEK. Remember to set DEVICE "t" if you are using tape and also you must set the load address, don't just use LOAD "NAME" CODE or things may go wrong. You then have your new array in SAM's RAM which can be saved on disc and used in your Translation of the Spectrum program.

For larger numbers it would be better

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For larger numbers it would be better

to convert them into strings using the STR\$ function like this:-

```
8000 LET A$=""
8010 FOR I=1 TO 60
8020 LET A$=A$+ STR$(D(I))
8040 LET A$=A$+" "
8050 NEXT I
8060 FOR I=1 TO LEN A$
8070 POKE 49999+I,CODE A$(I)
8080 NEXT I
```

And then save it with:-

```
SAVE "NAME" CODE 50000,LEN A$
```

Which brings us nicely around to Character Arrays, these are a little more complicated but we have made a start with the last routine. Here is how you could load that data back into SAM:-

```
8000 LOAD "NAME" CODE 100000
8010 INPUT "File Length ";FL
8020 INPUT "Number Of Elements
In Array ";N
8030 DIM A(N)
8040 LET PNT=100000
8040 FOR I=1 TO N
8050 LET TMP$=""
8050 LET X= PEEK PNT: LET PNT=P
NT+1: IF PNT>FL+100000 THE
N PRINT "
8060 IF X=CODE " ," THEN LET A(N
)=VAL TMP$:GOTO 8090
8070 LET TMP$=TMP$+CHR$ X
8080 GOTO 8050
8090 NEXT I
```

What we have done here is to step through* memory searching for the commas that we used to delimit the numbers as we stored them in the string on the Spectrum. Doing it this way it does not matter how many digits there are in a number and it will also cope with the decimal point if there is one.

The same approach can be taken with non-numeric arrays, but you may have to use some other character as a delimiter because a string may contain commas.

I hope readers will be able to make use of some of the ideas contained in this

article, and that it will encourage one or two of you to have a go at translating some Spectrum Software to SAM.

[Editor's Note: I have had to edit this article quite heavily so I hope I have not introduced any errors into Tony's work.

The editing was necessary because I felt that, in some ways, Tony had gone off on a bit of a tangent. He particularly seemed to have problems with his printer causing his SAM to crash at times and so in the original text he went to great lengths to get round some problems which I felt would never affect other users.

However, at least Tony has taken the time and effort to put things in writing for other readers - I hope many more will follow his example, it really isn't too difficult to write for **FORMAT** is you want to give it a try - we are always here to help those who want to have a go.]

FORMAT

SAM REPAIR SERVICE

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

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

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

Send your machine to:-

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

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£9-95 (£8-95 to INDUG members)

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

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

DRIVER works with the SAM Mouse (no mouse should be without one) or Keyboard. It provides a full WIMP (Windows, Icons, Menus, Pointers) system that puts you in full control of your SAM.

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

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Getting The Most From *The Secretary*

Part 1 Of An Occasional Series - Choosing A Printer. By:- Rev. Tony Kinch.

Many users of the SAM computer have been round long enough to remember the very earliest printer attachments available for computers like the ZX81 and Spectrum. To say the least, they were crude. The Sinclair ZX printer simply burnt off the silver coloured coating on narrow rolls of paper to form letters. The Alphacom printer was slightly better in quality, but still used the narrow rolls of paper. In those far-off days (less than 20 years ago actually) the bewildering range of printers available today at between £100 and £200 seemed beyond the dreams of the home computer user.

Along with the range of printers, the quality has similarly improved, and a printer costing less than £150 today is capable of producing a print quality which as little as ten years ago was only possible with printers costing £1000+. Some *FORMAT* readers who have attended Gloucester's twice yearly shows have seen the quality of work which I am producing, using *THE SECRETARY* as the workhorse word-processor. (I also use Steve's Software's *Word_Pro* for some special layout work). The question which I have been asked so many times is "how do you get that quality of print from *THE SECRETARY*?"

The answer is two-fold. Firstly from the modifications I have made to *THE SECRETARY* operating program and printer code files. These were published in *FORMAT* in four parts from July to

October 1996. I know that a number of readers have successfully added these modifications to their own working copies of *THE SECRETARY*.

The second answer is in the choice of a printer.

We have moved from the crude and nasty printers of 20 years ago through full width thermal printers. Do you remember the Brother HIR5? It was my first full width printer and produced very crisp, black copy; but it faded quickly and the paper was very thin. It was, however, the first satisfactory printer within my price range. The next step up was the introduction of the nine-pin dot matrix printers. The Brother M1009/1109/1209 were produced in a variety of forms - some badged to go with specific computers. Many Spectrum users purchased them because they were the only readily available printers with a serial interface, necessary for use with Interface 1, as standard. The earliest dot matrix printers were still quite crude: some could not cope with the tails of lower case letters, giving some strange results for g, j, p, q or y. The improvement in the nine-pin printer was, however, rapid and later versions included 'NLQ' printing which, by making multiple passes of the print head - as many as four with the Citizen 120D - could produce print which was nearly up to typewriter standards.

Because nine-pin printers could never quite match the typewriter for quality,

daisy-wheel printers, which were really a sort of typewriter made compatible with a computer, had a few years of life. They were incredibly noisy and inflexible, and, by comparison with printers specially designed for computers, slow.

It was during the period when nine-pin dot matrix printers were state of the art that the SAM was introduced. Almost all the programs which were written for it assumed that sort of printer. Nine pin printers have one great advantage: they are all more or less compatible with one another because virtually all of them were controlled by 'Epson Standard Codes' - normally abbreviated to ESC. There may be some differences outside the normal range of facilities (e.g. bold print, double strike, italics, etc). The biggest difference was in the graphics capabilities, and many printers were capable of switching between Epson graphics and IBM graphics which was the most serious rival. Most other IBM codes were, however, compatible with ESC codes.

THE SECRETARY assumed ESC codes with IBM graphics in its standard form and allowed for 'Courier' (i.e. NLQ typewriter style), 'SanSerif' (i.e. block letters) as well as a draft print produced by a single pass of the print head. It also had facilities for 'Orator Capitals' and 'Orator Lower Case', although I've come across few printers with this facility.

It must be emphasised that *THE SECRETARY* works perfectly well in this form. If what you are looking for is presentable typewriter or block print for correspondence, reports and the like then a nine pin dot matrix printer is entirely satisfactory provided that the ribbon is regularly renewed. There are still plenty available. I have catalogues which show nine-pin dot matrix printers by Epson

(LX300), or Panasonic (KX-P1150) both with starting prices of under £100. It may not, however, be possible to walk into a high street store and purchase one. It may be necessary to go to the mail-order market.

The next step up from the nine-pin dot matrix printer is the 24 pin. These work in exactly the same way: a series of pins strikes a ribbon on to the paper. The increased number of pins does, however, mean that the detail of the print is finer, and therefore it can claim to be 'Letter Quality' rather than the 'Near Letter Quality' of the nine-pin. Since most 24 pin printers use ESC/IBM control codes there is not normally any problem of compatibility with *THE SECRETARY*. In fact some 24 pin printers have a wide range of fonts available. The Panasonic KX-P2023 has a starting price of about £120, although Epson 24 pin printers are more expensive (£200+). Once again these printers may not be readily available on the High Street.

At about the same time as the more advanced dot matrix printers were marketed, a new industry standard was being developed in the form of the laser printer. These are very fast, and in their early days, extremely expensive. They work in a very different way from the dot matrix printers, and in consequence used a different control system. Hewlett Packard were the market leader and developed the HP PCL control language. It has a number of common features with the earlier ESC system - just about enough, in fact, to make draft printing possible. Beyond that, it works in a quite different way.

Allied to the laser printer was the ink (or bubble) jet printer. These produce a print quality comparable to laser printers, but are slower in operation.

They work in a similar way to dot matrix printers, but instead of pins striking a printer ribbon, ink is forced through a series of very tiny holes to form the letters: some of the latest Epson printers have 1440 x 720 dots per inch which makes for very fine print quality indeed. They are available in both ESC and HP PCL forms.

Hewlett Packard make many of the ones readily available on the High Street. They use the HP PCL programming language, and are *NOT* compatible with any standard SAM software. I have written a version of *THE SECRETARY* code files and made certain modifications to the operating program and have succeeded in getting *THE SECRETARY* to work in monochrome only with a printer with HP PCL level 3 language. I have not done any work at the higher levels (level 5e seems to be the latest), so I am unable to say whether they could be made to work with *THE SECRETARY*. Broadly speaking, printers which use the HP PCL language are best avoided by SAM users, as a considerable amount of quite complex re-programming would be required, even assuming it could be done in Basic. Where a program has embedded printer control codes in machine code it would, to say the least, be a job for a professional programmer!

Fortunately there are other ink or bubble jet printers which are compatible. Epson do a range with a starting price of just over £100, as do Cannon. My modifications to *THE SECRETARY* use the 'ESC P2' language, although the standard *THE SECRETARY* program will operate such printers quite satisfactorily. Without the modifications the enhanced features of these printers cannot be accessed.

There is, however, a snag - and a VERY

serious one for SAM users.

Many ink or bubble jet printers are now produced to run only with Windows and do not have inbuilt facilities which allow them to be accessed from SAM. Quite recently a reader wrote to me telling me that he had purchased an Epson Color Stylus 400 ink jet printer, and could only get draft print from it. On investigation I discovered that the ESC language and resident fonts had been removed and the printer could only be operated with external software - not compatible with SAM, or through Windows. This is also true of some of the cheaper Cannon bubble jets.

One cannot blame the printer manufacturers for this. Almost all the home computer market is now Windows driven, and in order to keep printer prices down, manufacturers are not going to put in comparatively expensive facilities which hardly anyone will use. Ironically, Epson's cheapest ink jet printer, the Stylus 200, has - or at least had in the Summer of 1997! - full compatibility with SAM, and I have used it both in colour and monochrome. I have not seen it advertised in the High Street shops, however, at Christmas. It is well worth tracking down.

Epson have recently advised me that their latest printers in the 'Color Stylus' range, the 600 and the 800, both have full ESC/P2 compatibility. These have a starting price of around £200, so are not the cheapest on the market. But BEWARE! The Color Stylus 300 and 400 are NOT compatible.

EVEN MORE BEWARE! I asked a local branch of a major High Street retailer recently which of their Epson Stylus printers had ESC/P2 control codes and was told that all their prints were designed to work with Windows'95 and

would not work with anything else! (Even though they had both Color Stylus 600 and 800 on their displays). So much for staff having 'good product knowledge'.

Some 24 pin dot matrix printers also use the ESC P2 language, and have enhanced facilities which should be accessible through my modifications to *THE SECRETARY*. I have never used a 24 pin printer with my modified program, but I should be very interested to hear from any reader who has.

In conclusion, the choice of printer depends very much on the quality of finished product which you require. If all you require is a workhorse for correspondence, reports and the like, a simple and fairly cheap 9 or 24 pin dot matrix printer will suffice. If, on the other hand, you need a higher quality copy then an ink or bubble jet printer is the likely choice. Do not rule out a refurbished second-hand model, especially where you have a good relationship with a local, independent computer shop.

Whatever you buy, the following items need checking:-

- Does the printer have inbuilt fonts? If not, it is almost certainly only capable of being used with Windows and is not for the SAM user.
- Does it have Epson emulation?
- If it has ESC, ESC/P or ESC/P1, programming language it will almost certainly be compatible with *THE SECRETARY* in its standard form.
- If it has ESC/P2 programming language, it will almost certainly be compatible with *THE SECRETARY* in its standard form, but in order to access the more advanced features of the printer will require enhancements to the program similar to those which I have published.
- Broadly speaking, printers using HP PCL programming language and virtually all laser printers are not readily compatible with SAM or *THE SECRETARY*.

And that is it for this time, I will be back soon with some more on 'Getting the BEST out of *THE SECRETARY*'.

AUTHOR'S NOTE: Whilst I have been demonstrating at the Gloucester shows, a number of people have asked me if my modified program for *THE SECRETARY* is available on disc. My position is that I have developed *THE SECRETARY* modifications, and certain other Basic programs for use in my own Church Office. Although I am quite happy for anyone else to have the benefit of work which I have done, I am not a software house. I could not justify the time it would take me to prepare programs for commercial distribution. My work on *THE SECRETARY* uses material which is in someone else's copyright, and as such is not able to be placed in a public domain library.

For those who find the task of entering the modifications which I have already published in *FORMAT* too daunting, I am prepared to offer the following: If I receive your ORIGINAL (NOT working copy) of your *THE SECRETARY* disc, together with a cheque for £5.00 made payable as a donation to 'Darlington Street Methodist Church', I would be willing to add the modifications, together with your original program, to a new disc and return the new disc and your original to you, together with a new manual giving details of how to use the modified program. My liability would be limited to returning your donation should you be unable to use the new disc.

Your disc, cheque and stamped, addressed envelope for return should be sent to:-

Secretary Modifications,
The Methodist Centre,
24 School Street,
Wolverhampton,
WV1 4LF.

SHADOWIZER

Text By:- Steven Grant. Program By:- Graham Burtenshaw.

This program first appeared on *Enceladus* Issue 10. If you have a SAM, and have never seen any of the *Enceladus* discs, you are missing a lot. They are now available from FRED Publishing, so get on to them for prices.

Now then, what do we have here? This is a program (mixed machine code and Basic) which produces what are called 'drop shadows' on screen lettering (or shapes). You can control the direction of the shadow, its depth and its colour. I'll not bore you with all the details as Graham has written the instructions into the program.

Now it is a big program, but there again it seems *FORMAT* readers like a challenge and this one is really worth the effort I promise you. First you need to create the machine code routine that the main Basic program calls. Type in this first listing, save it to disc, then run it. If all is well it will save a small block of code to disc.

```

10 LET TOT=0
20 FOR I=0 TO 239
30 READ N: POKE 16384+I,N
40 LET TOT=TOT+N
50 NEXT I
60 READ CHECKSUM
70 IF TOT <>CHECKSUM THEN PRINT "ERROR IN DATA": STOP
80 SAVE "SHADOW_C"CODE 16384,240
100 DATA 219,252,230,31,211,251,38,170,46,240
110 DATA 205,180,64,71,17,142,64,26,254,99
120 DATA 40,6,184,40,18,19,24,245,45,125

```

```

130 DATA 254,0,32,232,46,240,37,124,254,0
140 DATA 32,224,201,229,58,135,64,133,111,58
150 DATA 136,64,132,103,205,180,64,71,17,161
160 DATA 64,26,254,99,40,6,184,40,6,19
170 DATA 24,245,225,24,209,225,229,58,137,64
180 DATA 133,111,58,138,64,132,103,58,141,64
190 DATA 79,205,180,64,71,17,142,64,26,254
200 DATA 99,40,13,184,40,3,19,24,245,58
210 DATA 179,64,87,205,217,64,13,40,12,58
220 DATA 139,64,133,111,58,140,64,132,103,24
230 DATA 216,225,24,150,71,255,255,0,0,1
240 DATA 1,3,34,0,99,0,0,0,0,0
250 DATA 0,0,0,0,0,0,0,0,99,0
260 DATA 0,255,17,99,0,0,0,0,0,0
270 DATA 0,0,0,0,0,0,0,0,99,102
280 DATA 55,203,28,203,29,126,56,14,230,240
290 DATA 95,203,31,203,31,203,31,203,31,179
300 DATA 41,201,230,15,95,203,23,203,23,203
310 DATA 23,203,23,179,41,44,201,55,203,28
320 DATA 203,29,126,56,7,170,230,15,170,119
330 DATA 41,201,170,230,240,170,119,41,44,201
340 DATA 23285

```

Ok? Done that? All working I hope. Right my readers, that was the easy bit. Now you have to really work. Here is the listing for the main program. You will

note that it contains its own instructions, these are reached when the program is run by pressing '1' at the main menu. The lines from 1190 to the end of the program could, if you are feeling lazy, be left out - but you will need to read them of course in order to understand how SHADOW MAKER works.

```

10 REM SHADOW MAKER.
20 DEF PROC shadow DATA
21 IF PEEK 16398<>17 OR PEEK
16444<>64 OR PEEK 16584<>4
1 THEN LOAD "shadow_c"CODE
16384,240
30 LET ad=16545: DO
40 READ a
50 POKE ad,a+a*(16*(a<>99)):
LET ad=ad+1
60 LOOP UNTIL a=99
70 READ a: POKE 16563,a+a*16
80 LET ad=16526
90 DO
100 READ a
110 POKE ad,a+a*(16*(a<>99)):
LET ad=ad+1
120 LOOP UNTIL a=99
130 IF NOT ITEM THEN LET x=0:
ELSE READ x
140 IF NOT ITEM THEN LET y=175
: ELSE READ y
150 IF NOT ITEM THEN LET le=25
0: ELSE READ le
160 IF NOT ITEM THEN LET hei=1
92: ELSE READ hei
170 IF NOT ITEM THEN LET dep=2
: ELSE READ dep
180 IF NOT ITEM THEN LET xd=1:
ELSE READ xd
190 IF NOT ITEM THEN LET yd=-1
: ELSE READ yd
200 IF NOT ITEM THEN LET xdi=0
: ELSE READ xdi
210 IF NOT ITEM THEN LET ydi=0
: ELSE READ ydi
220 IF NOT ITEM THEN LET xm=xd
: ELSE READ xm
230 IF NOT ITEM THEN LET ym=yd
: ELSE READ ym
240 POKE 16525,dep
250 POKE 16523,xm: POKE 16524,
-ym
260 POKE 16519,-xd: POKE 16520
,yd
270 POKE 16521,xdi: POKE 16522

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,-ydi
280 POKE 16393,le+x: POKE 1641
5,x: POKE 16419,le+x
290 IF ym<0 THEN POKE 16420,37
: POKE 16391,175-(y-hei):
POKE 16423,175-y: ELSE POK
E 16420,36: POKE 16391,175
-y: POKE 16423,175-(y-hei)
300 CALL 16384
310 END PROC
320
330 MODE 4: CLS #: CSIZE 8,16
333 LET xrg=256
340 PRINT "T H E S H A D O W
M A K E R "; AT 2,4; PE
N 6;"THE AMAZING SHADOW MA
KER": CSIZE 8,8
350 PALETTE 1,19: PALETTE 6,98
: PALETTE 5,34: PALETTE 4,
32: PALETTE 3,2
360 shadow 7,99,1,0,99,0,175,2
55,17,5,1,-1
370 shadow 6,99,5,0,99,0,150,2
55,20,4,1,1
380 shadow 5,99,4,0,99,0,150,2
55,20,4,1,1
390 shadow 4,99,3,0,99,0,150,2
55,20,4,1,1
400 PEN 8: PALETTE 8,68: PALET
TE 9,64
410 PRINT AT 9,10;"1) Informat
ion"; AT 11,10;"2) Demo";
AT 13,10;"3) Shadow screen
"; AT 15,10;"4) Exit"
420 shadow 8,99,9,0,99,75,105,
140,60,1,1,-1,1,-1
430 GET a
440 IF a=4 THEN BOOT
450 IF a=1 THEN GOTO help
460 IF a=2 THEN GOTO demo
470 IF a=3 THEN GOTO shad
480 GOTO 430
490
500 LABEL demo: CLS #: CSIZE 8
,8
510 LET A$="EXAMPLE LINE OF TE
XT"
520 PALETTE 5,29: PEN 5
530 PALETTE 6,25: PALETTE 7,11
3
540 PRINT ""1,1 ";A$""1,-1
";A$""-1,1 ";A$""-1,-
1 ";A$""0,1 ";A$""0,-1
";A$""1,0 ";A$""-1,0
";A$
550 shadow 7,99,6,0,99,0,160,2

```

```

55,8,2,1,1
560 shadow 7,99,6,0,99,0,144,2
55,8,2,1,-1
570 shadow 7,99,6,0,99,0,128,2
55,8,2,-1,1
580 shadow 7,99,6,0,99,0,112,2
55,8,2,-1,-1
590 shadow 7,99,6,0,99,0,96,25
5,8,2,0,1
600 shadow 7,99,6,0,99,0,80,25
5,8,2,0,-1
610 shadow 7,99,6,0,99,0,64,25
5,8,2,1,0
620 shadow 7,99,6,0,99,0,48,2
55,8,2,-1,0
630 PAUSE : CLS : PEN 7
640 FOR n=0 TO 5: PRINT " TAB
5;A$: NEXT n
650 shadow 7,99,6,0,99,0,160,2
55,8,1
660 shadow 7,99,6,0,99,0,136,2
55,8,1,1,-1,1,-1
670 shadow 7,99,6,0,99,0,112,2
55,8,2
680 shadow 7,99,6,0,99,0,88,25
5,8,3
690 shadow 7,99,6,0,99,0,64,25
5,8,6
700 shadow 7,99,6,0,99,0,40,25
5,8,12
710 PAUSE
720 PAPER 1: CLS : PALETTE 1,1
9
730 FOR n=0 TO 50: CIRCLE PEN
RND(14);RND(230),RND(170),
RND(30): NEXT n
740 PALETTE 15,0
750 shadow 0,2,3,4,5,6,7,8,9,1
0,11,12,13,14,99,15,1,99,0
,175,255,175,5
760 PAUSE 50: CLS #
770 FOR n=0 TO 4: LET x=RND(25
0),y=RND(170),z=RND(80): C
IRCLE x,y,z: CIRCLE x+1,y,
z: NEXT n
780 PALETTE 3,7
790 shadow 7,99,3,0,99,0,175,2
39,191,15,1,1,2,2
800 GOTO 10
810
820 LABEL shad
830 CLS #: CSIZE 8,8: LET xrg=
256
840 INPUT "Filename of screen?
(RET=DIR) ", LINE F$
850 LET x1=80,y1=80,xx=50,yy=5

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0,s=1
860 IF F$="" THEN DIR 1: GOTO
840
870 LET sc=(1+IN 252 BAND 31)*
16384
880 LOAD F$ SCREEN$
890 POKE 114688,MEM$(sc TO sc+
24576)
900 CSIZE 8,8: PALETTE 15,120
LINE 20
910 INPUT "Enter colours to ch
ange: 999 to see colour c
hart: ";c
920 IF c<>999 THEN GOTO 960
930 PALETTE 15 LINE 20
940 LET t$=STRING$(6,CHR$(143)
+STRING$(6," ")): CSIZE 8,1
0: CLS : FOR n=0 TO 15: PR
INT AT n,0; PEN n;t$; PEN
15; n: NEXT n
950 PAUSE : POKE sc,MEM$(11468
8 TO 114688+24576): GOTO 9
00
960 INPUT "Colour to change to
? ";cs
970 INPUT "Over what colour ba
ckground? (99=all) "
; b
980 INPUT "Shadow direction?
x= y="; AT 1,22;xd; AT
1,29;yd
990 INPUT "Thickness? ";t
1000 INPUT "Gap? (y/n) "; LINE
F$: IF F$="y" OR F$="Y" TH
EN LET g=1: ELSE LET g=0
1010 PRINT #0; AT 0,0;"Use keys
Q,S,I,O and SPACE to mo
ve box; press RETURN to en
d.": PAUSE : PALETTE 15 LI
NE 20
1020 POKE sc,MEM$(114688 TO 114
688+24575)
1030 PEN 15: OVER 1: PLOT x1,y1
: DRAW xx,0: DRAW 0,yy: DR
AW -xx,0: DRAW 0,-yy
1040 PLOT x1,y1: DRAW xx,0: DRA
W 0,yy: DRAW -xx,0: DRAW 0
,-yy: OVER 0
1050 LET x2=x1,y2=y1,xx1=xx,yy1
=yy
1060 IF IN 32766<>95 THEN LET x
x=xx+(IN 57342=93 AND x1+x
x+s<255)*s-(IN 57342=91 AN
D xx-s>0)*s,yy=yy+(IN 6451
0=94 AND y1+yy+s<175)*s-(I
N 65022=93 AND yy-s>0)*s:

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GOTO 1100
1070 IF INKEY$=CHR$ 13 THEN GOT
O 1120
1080 LET x1=x1+(IN 57342=93 AND
x1+xx+s<255)*s-(IN 57342=
91 AND x1*s>=0)*s
1090 LET y1=y1+(IN 64510=94 AND
y1+yy+s<175)*s-(IN 65022=
93 AND y1*s>=16)*s
1100 IF x1<>x2 OR y1<>y2 OR xx<
>xx1 OR yy<>yy1 THEN LET s=
s+1: ELSE LET s=1
1110 GOTO 1030
1120 IF g THEN LET xg=xd,yg=yd:
ELSE LET xg=0,yg=0
1130 IF b<99 THEN shadow c,99
,cs,b,99,x1,y1+yy,xx,yy,t,
xd,yd,xg,yg: ELSE shadow c
,99,cs,0,1*(c=1),2*(c=2),3
*(c=3),4*(c=4),5*(c=5),6*(
c=6),7*(c=7),8*(c=8),9*(c=
9),10*(c=10),11*(c=11),12*(
c=12),13*(c=13),14*(c=14)
,15*(c=15),99,x1,y1+yy,xx,
yy,t,xd,yd,xg,yg
1140 GRAB GS,0,0,255,16: INPUT
"OK? (y/n) "; LINE F$: IF
F$="n" OR F$="N" THEN POKE
sc,MEM$(114688 TO 114688+
24576): GOTO 900: ELSE PUT
0,0,GS: POKE 114688,MEM$(
sc TO sc+24576)
1150 INPUT "More? (y/n) "; LINE
F$: IF F$="y" OR F$="Y" T
HEN POKE sc,MEM$(114688 TO
114688+24576): GOTO 900
1160 INPUT "Save? (y/n) "; LINE
F$: IF F$="y" THEN INPUT
"Filename? "; LINE F$: POK
E sc,MEM$(114688 TO 114688
+24576): SAVE F$ SCREEN$
1170 GOTO 10
1180
1190 LABEL help
1191 DATA 0,1,16,17,19,25,27,29
1195 GRAB AS,0,175,255,20
1200 MODE 3: CLS #: CSIZE 8,8
1210 PUT 0,175,AS: PALETTE 2,25
1211 PALETTE 3,127
1220 RESTORE 1191: FOR n=0 TO 7
: READ a: PALETTE 0,a LINE
154-n: PALETTE 0,a LINE 1
40+n: NEXT n
1230 PRINT AT 5,0;"Interestingl
y, this program occurred t
o me this morning whilst I

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was lying in bed, straight
out of the blue."
1240 PRINT "It will, quite fort
unately, add shadows to bi
ts of pictures, which 1
) saves more FLASH! hours
and 2) makes it easy to be
utifytext etc (as demonstr
ated here)."
```

1245 PRINT "You can choose whic
h way the shadow should sl
ope, whether it should
be offset, what colours sh
ould be given shadows on w
hich backgrounds and so on
, and you can choose to 's
hadodize' in
windows."

1250 PRINT "From the menu you
can have a look at a quick
demo which just shows
some of the combinations,
and can use an automated
shadodizer t
o shadodize screens easily
. I included this option
because the procedure, SHA
DOW, is a little complex.
However, using the proc
edure from BASIC gives you
more power."

1255 PRINT #0; AT 1,0;"Key..."
1260 PAUSE : CLS
1270 PUT 0,175,AS\$
1275 PALETTE 1,46:
1280 PRINT PEN 1; AT 5,0;"SHAD
O W search,99,replace,backgr
ound,99,x,y,length,height,
depth, x dir,y dir,
x disp,y disp,x move,y mov
e"

1295 PRINT "The list of parame
ters looks very formidable
, but there are lotsof thi
ngs that can be changed, a
nd only the first few are
compulsory.
Here goes..."

1299 PRINT "You can shadow any
number of colours at once,
on any number of backgro
unds at once, but obviousl
y can only use one colour
to use as the shadow at
once."

1300 PRINT PEN 1;"search"; PEN

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3;" and "; PEN 1;"backgrou
nd"; PEN 3;" both represen
t up to 15 numbers, referri
ngto colours (0-16), and
the two 99's are used to t
erminate the 'lists'."
1308 PRINT "Eg, SHADOW 1,4,6,10
,15,99,"; PEN 1;"5,"; PEN
3;"0,1,2,99"
1310 PRINT "(colours just to sp
lit it up) would put a sha
dow of colour 5 around
all areas of colour 1,4,6,
10 or 15, where the shadow
would fall
on colour 0,1 or 2."
1311 PRINT "The background opti
on lets you be selective w
ith your shadowing."
1312 PAUSE : CLS : PUT 0,175,AS$
1315 PUT 0,175,AS$
1320 PRINT PEN 1; AT 5,0;"SHAD
O W search,99,replace,backgr
ound,99,x,y,length,height,
depth, x dir,y dir,
x disp,y disp,x move,y mov
e"


1325 PRINT "All other parameter
s will be chosen by SAM if
you don't specify them."



1330 PRINT PEN 1;"x,y,length,he
ight"; PEN 3;" define the
window in which to shadow,
in pixels;
the default is 0,175,255,
192. (whole screen)."



1335 PRINT PEN 1;"depth"; PEN 3
;" is the width/depth/call
it what you will of the s
hadow, default 1."



1340 PRINT PEN 1;"xdir,ydir"; P
EN 3;" specify the directi
on you want the shadow to
go in. 1,1 gives shadows
to the upper-right of obj
ects, 1,-1
- lower-right, -1,-1 - lo
wer-left, 1,0 - right, etc
."



1350 PRINT PEN 1;"xdisp,ydisp";
PEN 3;" are usually 0; th
ey represent the displacem
ent (in pixels again) fro
m the object that the shad
ow should start, and can p
rovide gaps between the ob


```

```

ject and shadow. "
1355 PRINT PEN 1;"xmove,ymove";
PEN 3;" are pretty pointl
ess but can be used to giv
e varouseffects - they sp
ecify the direction that e
ach layer (when", PEN 1;"d
ePTH"; PEN 3;">1) should b
e spaced, V=are normally e
qual"; PEN 1;"xdir,ydir";
PEN 3;"."
1360 PAUSE : CLS : PUT 0,175,AS$
1370 PRINT AT 5,0;"If that's al
l confusing, but you're d
etermined, why not look at
the way the menu screen is
done. Why indeed."
1380 PRINT "'You can make all
sorts of different effects
by mucking about with th
e parameters, and can shad
ow things from several dir
ectionssuccessively."


1385 PRINT "A screenful of mode
4 text looks excellent wh
en shadowed
(doesn't work quite right
in mode 3), and the BASEL
letters (o
r any other large fonts) a
re superb."



1390 PRINT "'Also - try shadowi
ng shadows in dwindling hu
es..."



1391 PRINT "(As feebly demonstr
ated on the second line of
the menu screen)"



1395 PAUSE : GOTO 1


```

Still with me? Good. Hope you like the program as much as I did when I first saw it.

There is, by the way, a nice little demo within the program - this shows you exactly how various effects are created. Start off by playing with the values in this demo routine and you will soon get a feel for what SHADOW MAKER can do.

Program reproduced (with minor modification to aid printing) from Enceladus Issue #10 with the kind permission of FRED Publishing.

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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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INTERFACES

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

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BUG HUNTING

By:- Ken Elston.

During one of the long telephone calls I have with Bob when work is getting me down and the ideas are not flowing as they should, he asked if I could revamp an article which I originally did for **FORMAT** way back in issue 2 of volume 3 - a very long time ago. He said that as the early issues are no longer in print, and there had been several requests for a similar article, here was my chance to show off to all the newcomers and remind the old hands about something they may have forgotten.

Bugs and Errors, the bane of every programmers life. They say "There is ALWAYS ONE MORE BUG in a program" and I've never found a truer saying. So come, read on, I will try to show you how to track down those elusive bugs. This article is written with 48K Spectrum programmers in mind, but most of it applies to 128K users and in the main to SAM programmers as well.

The first error encountered by most Spectrum users is the flashing question mark which indicates a syntax error in the line you are trying to enter. Experience, and the manual, soon show that it is caused usually by typing in a keyword letter-by-letter, or by bad punctuation, for example omitting a semi-colon or left out a set of quotes ("). The marker is set to the end of the part of the line the Spectrum has understood. So normally (but not always) the error is after the flashing question mark. Look along the line, is there a mismatch of

brackets or quotes? Try moving the edit cursor along the line, does the cursor jump over each keyword? If not then you have typed out the word instead of using the single key entry system. Now I know if you are a 128K users you may be use to typing things in one letter at a time - but remember that Spectrum Basic was designed for the single key input and can go wrong if entered in 128K mode. Quite often 48K programmers use keyword names as variable names (230 INK ink is a classic). Now this will enter easily in 48K mode, INK is a single key command and the variable 'ink' is typed in one character at a time - the 48K Spectrum is not confused in any way. But if you try to type that in in 128K mode you will get an error because INK (or ink) is taken as a command and changed to a token and then the 128K interpreter stops because it thinks you have two commands in a row. Stupid, but you have to live with it.

The most frequently occurring error code you will come across is the dreaded - 2 **Variable not found**. When you create a variable - lets say by LET A=10 - then the Spectrum will know what you are talking about whenever it finds the variable 'A' in your program. Error code 2 results when the computer reaches a variable in the program that has, so far, not been given a value. After the error report on the screen are two numbers separated by a colon (ie 120:2) these give the line and statement number which produced the error. Check the line, lets

say it reads:-

```
120 LET A=10:LET B=A*T1
```

well the error is being reported in statement 2 and as 'A' has been set in the first statement it must be the variable 'T1' that can't be found. Look back through the listing, if you cannot find a statement giving 'T1' its initial value then add a line setting it to a value you think is right (you can always come back later and alter it if you need to). Also check that you haven't mistyped something, the number 1 and the letter I (or a zero and the letter O) are very easy to confuse.

Remember that the mistake may not be at a lower line number, with GOTOs and GOSUBs in a program it could be almost anywhere so follow the program through until you find it.

Although the majority of error codes are explained adequately in the manual, the report 'B-Integer out of range' can be confusing. An integer is a whole number - 1 is an integer, 1.5 and 3.75647 are not. The error occurs most frequently when you try to print something beyond the limits of the screen. `PRINT AT 0,31;"a"` is acceptable and will print a letter 'a' at the top right of the screen. `PRINT AT 0,32;"a"` would not be possible as it's off the edge of the screen. The integer 32 would be out of range, resulting in error code B. The error is more difficult to detect if variables have been used as co-ordinates and your character, or series of characters, is being printed in varying positions. If the instruction `PRINT AT 0,x;"a"` produces report code B, make sure that the value of x never increases beyond 31. Integer out of range can also be found when you are POKEing a number into memory. The biggest number which can be POKEd is 255. In

this case the error code will occur in the statement containing the POKE statement. In many cases though, the error will have occurred in a DATA statement, somewhere else in the program, which is used to hold the values you are trying to POKE into memory. Have you left out a comma? has 201,16 become the large number 20116? Negative numbers are also 'out of range' so did you put a minus sign in by mistake?

Another very frequent error code is 'E - Out of Data'. That will occur in a line containing a READ statement. The error though, will have occurred in one of the program DATA lines, which may be nowhere near the READ line. What happens is that the READ command sends the computer to a DATA line to collect the next piece of DATA contained there. This is often done within a FOR-NEXT loop, especially when graphics are being set up. The line:-

```
FOR I=1 TO 8: READ N: NEXT I
```

will send the computer to the DATA lines eight times, for eight separate pieces of information. If there are only seven pieces of DATA there it will return to the READ line and produce the OUT OF DATA error. When there are several DATA lines they will all have to be checked, because the piece of DATA you have omitted was not necessarily the last.

In some cases the computer will follow the program correctly, without producing an error code, but from the programmers point of view the program contains a BUG - it ain't doing what you want it to do. In that case RUN the program and BREAK into it at the point where it appears to go wrong. That will produce report code '9 STOP statement' and the

line/statement on which you have STOPped the program. This method makes it easy to locate the rough area of the program which may contain the problem. Now PRINT some of the variables, look for values outside the range you think they should be, print the value of the control variable in a FOR-NEXT loop so you can see how far it got before you pressed BREAK. If your program crashes before you can stop it then add STOP statements into the basic just before the point at which you think it goes wrong. Keep looking, keep PRINTing.

Programs which you copy from magazines, books or from friends can be difficult to de-bug because they may contain programming techniques which you are not familiar with, or simply because it is often difficult to follow another programmer's logic. The flashing '?' indicating a syntax error may appear frequently. In that case check carefully what you have copied. You may not have recognised words such as TO or THEN as keywords. Make sure that when the 'is not equal' sign (<>) appears in a listing you always enter it as one character and not as 'is less than' (<) followed by 'is greater than' (>). Most problems are caused by mistyping so double check each line, or better still get a friend to go through it (he may find the error you missed).

Sometimes a program listing in a book or magazine will contain what seems to be a very obvious error. If it contains key words or symbols which are not on your computer, check that it is intended for your machine, you cannot type a BBC program into the Spectrum no matter how good the program is. If a program contains the command GOTO or GOSUB to a non-existent line number then the

computer will simply go to the next numbered line after that one. That is a sign that a program has been developed and improved and is sloppy programming, but rarely a real error.

When you have errors in a program, first check the report codes listed in Appendix B of the manual. It may then be necessary to read the appropriate section of the manual.

Always type in a program exactly as it is listed, don't make changes (however good you think they may be) until after you have tested the program as the author intended. Once the program is working you can make any alterations you like and when things go wrong you can confine your search to the changes you made. This is often the best way to improve your programming skills - it is far easier to start from something that is working and develop forward, than it is to start with the blank screen.

Again - remember that the error is not necessarily on the line which produces the report code; that is simply the line where the computer meets the problem for the first time. Always check carefully every line connected with the line containing the error code and the mistake should be easy to locate.

A few other points to keep in mind when writing programs:-

1. Always make regular saves while entering your program. Don't RUN the program until it has been saved just in case you get that fatal crash.
2. When saving your 'improved' version of a program DO NOT overwrite your old version - you may want to go back to it at a later date - try adding a number at the end of the name that goes up by one each time, that way you will have a copy of each stage of

development and if it goes wrong somewhere you can always go back and check an older version.

- Put lots of REM statements in. Six months later you won't understand your own coding unless you do - I know, as a full time programmer, I can't remember what last weeks code did - let alone last months. REMs will also help others to understand what is going on if you send the program to **FORMAT** (you were going to do that were you not?) or if you pass it on to a friend.
- Split your programs up into small sections and test each on their own. Much easier than testing the whole program. This will also help you to develop good programming style - working in subroutines and blocks, rather than *spaghetti* programming.

Finally, hardware problems may also cause errors in programs. Any alteration to the power supply can cause a program to CRASH. In that case the screen display may change dramatically and the keyboard will have no effect. The only solution is to unplug your computer or reset it and begin again, making sure that your power supply and interfaces are connected firmly. Clean up the edge connector with a hard (ink) rubber, don't use a chemical cleaner as you may damage the circuit board.

I hope this article will help you the next time you find the odd bug in a program. If there are any problems I can help with then please drop me a line c/o **FORMAT**. I cannot give a personal reply but I will try to help you out in a future issue.

Thank you for reading my efforts, happy programming and may your errors always be small and easy to detect.

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FOR SALE SAM Coupé + disc drive, Citizen 120D printer with interface and cable in good working condition. Also many software titles and hardware such as LERM, Messenger, Joystick etc. £100 o.n.o. Ring Peter Ross on 0181 422 0151.

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YOUR LETTERS

Dear Editor,

Before anyone starts using High Density discs in SAM in place of Double Density, be warned. Whilst they may appear to function adequately in the short term, as data on the disc is overwritten a number of times, the disc will eventually be corrupted, throwing up numerous Sector Error messages.

HD discs have a magnetic coating twice the coercivity of DD discs, and require a higher recording current, hence the additional hole in HD discs which tells the 1.44M drive to use the higher write current for HD discs, and a reduced current for DD discs.

Incidentally, blanking off the additional hole in HD discs will have no effect since the SAM interface cannot enable the higher write current, even though a 1.44M drive may be fitted.

Yours sincerely, Ken Powley.

Thanks Ken, useful point. *Ed.*

Dear Editor,

I suppose that at my age I am finding that things are getting a bit beyond me. After all, computing is a young persons thing, and I can't be expected to keep up. So, it seems to me that **FORMAT** over a period of a year or two (or more) is becoming a shade too - what? - technical? erudite? advanced? for me to absorb very much from it. Now, I'm not a complainer, and I am not complaining now, and I still enjoy and look forward to seeing the monthly number, so please do not regard this moan in that light - it is my problem, not yours!

You may have gathered from this letter

that I am probably nearing the end of my capabilities in the fascinating field of programming, so that like many before, I may have to decide to go into the PC world - with very great regret. Would you therefore please ask Jenny to send me the next issue of your PC mag? just to see what it is like. Thanks. Cheque for £2 enclosed.

Best regards to all.

Yours sincerely, John Saunders.

I don't quite see why 'nearing the end of your capabilities in programming' should lead you to move into the PC world. True, PC's have their uses (without them **FORMAT** would not be produced in the way it is) but both the Spectrum and SAM are infinitely more *programmable* by the average person than any PC. I've made my living (if you can call it that) from computers since 1976, a lot of that time in programming. But if I want to do any programming today it would be on the Spectrum or SAM. In fact my preferred machine would be a 48K rubber keyed Speccy because I can program on that faster than on anything else.

So by all means look into the world of the PC for things that the PC does well, but keep your existing machine for programming. *Ed.*

Dear Editor,

I am most grateful to you for identifying on the phone the fault with my SAM and sending, so promptly, the replacement for the offending ASIC chip. In less than 24 hours from the fault occurred, the SAM was working again.

I enclose a cheque for £15.26 - the odd 26p to cover the cost of 1st class post.

Yours sincerely, Ivan R.Betts.

Glad to be of help Ivan, the £15 cost of the ASIC actually included postage but the extra 26p will allow me to give Jenny a much deserved rise (I'll put it under the legs of her chair as soon as I can). *Ed.*

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For anyone who found my SNA loader useful (if anyone managed to get it to work), I have also written a larger program which loads and saves both SNAs and TAPs. It is called 'Spectre', and has recently been made available for download from the internet at:-

<ftp://ftp.nvg.unit.no/pub/sam-coupe/temp/SPECTRE.ZIP>

I expect it will be moved to a more suitable directory at some stage, so you may have to look around for it, but it shouldn't be too hard to find. After down-loading it to a PC, you'll have to unzip the file with a program like PKZip, InfoZip, etc. Then you'll have to copy SPECTR.PAK to SAM disc, and extract the files by typing:-

CLEAR 31999

LOAD *SPECTR.PAK* CODE 32000,327
68,32000

CLEAR 81919

Then you'll have to get a copy of the Spectrum ROM, and name it "rom.bin" (but you've already done that for my other program).

Yours sincerely, James Gasson.

Dear Editor,

Please could you send me another keyboard for my SAM. I'm having trouble with keyboard membranes, they get damaged easily. It seems to be at the end that's covered in plastic, just above that the copper lines break and I lose all keyboard functions.

Is there any way of lengthening the membranes so I don't keep breaking them. Please send the keyboard as soon as possible.

Yours sincerely, (and sick of keyboards) P.Carr.

The only way to lengthen the tails would be to remove the connectors from the main board and solder them to the end of a short length of ribbon cable. However, I wouldn't recommend it unless you are really into soldering - and anyway, unless you are taking the keyboard off quite frequently I don't see the need for any modification. For testing purposes I have a keyboard here which has probably been plugged in and out several hundred times and it is still going strong (I suppose I'm tempting fate saying that). *Ed.*

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You may recall that one device could be plugged into the expansion port of the machine, and the other device was designed to be fitted (soldered into position) internally.

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Yours sincerely, C.A.Walford.

We have asked several times for a

review example of the PRO-FACE as it is called but as yet we have not received one. However, if a review from an existing reader was forthcoming then I'm sure I could find room for it in an up-coming issue of *FORMAT*. *Ed.*

Dear Editor,

I wish to take the opportunity of your offer to purchase a copy of SAM C as advertised in the February issue of *FORMAT*.

I thank you for your help in purchasing DS/DD discs for my SAM. I have managed to obtain some from both Screen-Scene and Tandy in Cheltenham. Those from Tandy were called Radio-Shack and cost only £3.99 for 10, and have reason to doubt their quality. Those bought from Screen-Scene cost me £6.99 for 10. This was quite a large price difference. I can only tell you more about them when I have used them.

Thank you for the continued publication of *FORMAT* even if it is now arriving a month late.

Yours sincerely John E.Thornborrow.

Ooo you know how to hurt! I am trying to catch up John, really I am. Jenny says I can't have a holiday this year until I'm back on track.

Glad you found some suitable discs, the Tandy ones sound a bit expensive to me but then Tandy never have been the cheapest of places for that sort of thing. *Ed.*

Dear Editor,

Like Simon Turk, I used to have problems with the Spectrum edge connector, but the symptoms totally disappeared after I fitted a gold-plated one. It simply solders onto the existing edge connector, after cutting off the excess length with a hacksaw. These devices are a bit expensive (around £12), but in my experience, well worth the cost in terms of their complete effectiveness. They are available from Electromail,

P.O.Box 99, Corby, Northants NN17 9RS. Tel: 01536 20455, quoting part N° 468-709.

Regarding a snapshot hacking program, the one I use, and would recommend if still for sale, is Hackers' Workbench from S.D. Software.

Hope this information is of help.

P.S. I managed to track down a possible source of A5 binders. The only information I have at the moment is the company name, Viking Direct, but it may be worth making enquiries.

Yours sincerely, Miles Kinloch.

I've heard of the gold-plated edge connector before but I have never tried it myself. Still, if someone is up to removing the circuit board from their Spectrum and doing a little bit of soldering it certainly would make a good improvement to do.

And I agree on the Hackers' Workbench. It has the advantage that it works on the disc copy of a program so you are not constrained by the amount of memory as many other hacking tools are. I've always wished S.D. had pushed it a bit more as it deserves the praise it gets.

Will look through the Viking catalogue when I have a few hours to spare (it is that thick) and see if I can see anything. There was nothing when we looked a couple of years ago but they may have sneaked something in. Thanks for the hint. *Ed.*

Dear Editor,

I am a widowed pensioner in rather indifferent health! If interested, I am a Cheltonian, born and bred.

But, in answer to your little questionnaire at the bottom of the renewal notice, I cannot pick out any one article to which I enjoy because I enjoy the whole magazine. I like to try to keep up with developments and even though I am geriatric now I am still interested in the technology.

I find little use for the Speccy these days - except as a household reference device. What on earth do people use them for? I stopped playing games years ago!

As for what I would most like to see covered in a future issue, my answer is - uses for the PC and NOT as a games machine!

Yours sincerely, John Corbett.

Rubbish John, you are not geriatric if you have enough interest in life that you still read *FORMAT*. But I am sorry that you have stopped playing games. You know, this is something that many people turn to me and say, "I don't use my computer for games! Only for serious things." They say, "Which to me is like saying "I only use my car for 'serious' things" or "my television is only for education, not for entertainment".

Ok, I know the zapp'em-up games are (in the main) of more interest to the younger generation - but there are a whole wealth of entertaining games for computers that do not fall into that category. I remember introducing the grey-haired mother of a friend of mine to adventure games on his BBC a few years back. I can't remember what game it was off hand, but she soon became hooked.

Games are a good way to unwind, but they are also a good way to keep the old brain cells ticking over.

As to the uses of a PC, well they are a good drain on your bank balance.... *Ed.*

Dear Editor,

I am returning my SCADS disc as I am receiving sector errors upon loading the main program. All I can load successfully is the READ ME File by holding down the F9 key. I would appreciate it if you could test the disc and issue me with a replacement if necessary. I am very much looking forward to programming with SCADS and wish to take this opportunity to thank you and *FORMAT* for the help and good service you provide.

Also, I don't know if you know about

'Retrogames' which is a fanzine about old and classic games and systems. The reason I feel this may interest readers is because at the back of every issue they have a list of games for old machines, including games for the Spectrum. While these games are second hand they also point out whether the instructions are missing and so on and most games cost from around £2.00 to £5.00 which is not too much strain on the wallet. They even have some Spectrum machines in stock for anyone who would like a Spectrum or wants to replace a broken one. Each issue of Retrogames costs £2.50.

Retrogames can be contacted by writing to Retrogames, c/o Jason Moore, 61, Baccara Grove, Bletchley, Milton Keynes, MK2 3AS. Tel: 0181 203 8868.

Hope this is useful.

Yours sincerely, Simon Turk.

Thanks Simon. We could not find a problem on the disc you sent back but have sent you one recorded on another drive - just in case it was a simple misalignment of heads problem. *Ed.*

Dear Editor,

Following the piece in *FORMAT* on the future of the SAM, these are my thoughts on a new version of the machine.

Why not launch an enhanced SAM using some of the hardware add-ons that are already available? I don't see why it's not possible to add the following modifications to the current SAM:

*Internal hard drive - as I'm sure you know, there is a new system called the Atom, which allows a hard drive to be added in the place of the second disc drive. From what I've seen, it works brilliantly, and the DOS allows you to use existing Basic commands, making it straightforward to use, but at the same time extremely powerful.

*Replace the mouse port with an RS232 serial port - the machine would then be compatible with any PC serial mouse, as detailed in Ian Spencer's

article in issue 53 of SAM supplement.

*Second serial port - for use as a modem interface. There is a program in existence called Commix, which allows the SAM to be used with a modem, giving access to email and bulletin boards.

*Internal printer interface - self-explanatory.

*A modified version of Steve Nutting's SC_Autoboot chip, adapted so that if there's no disc in the floppy drive, it boots the hard drive on power-up.

*Steve's SC_Disc Protector included as standard.

*A new version of DRiVER, installed on, and patched to read, the hard drive.

A SAM bundled with an internal hard drive, a mouse and a fully-working GUI (and the capability to add a modem) would, I'm sure, go down well with existing 8-bit hobbyists - with financial backing, it could even be marketed along the same lines as Amstrad's recent 8-bit PC.

Yours sincerely, Mark Sturdy.

Phew! Lots there Mark. Comments please readers. *Ed.*

Dear Editor,

Thank you for the Feb edition of *FORMAT*. Some years ago when Spectrum and accessories were dropped I made sure I had at least two of everything so am still operative. I do have a fault in one of the DISCiPLEs or Interface One, as the printer will not operate properly. When I switch on it starts to run and I cannot stop it unless I switch off.

However I write in reply to two letters in the Feb '98 issue. The first is the demagnetisation of cassettes and tapes including video. I use a mag mount which holds an aerial and clamps on to the roof of a car.

The second is for Simon Turk. Fit the Spectrum (I have a plus 3+ grey) into a homemade wooden case and cut channels for leads, reset button etc.

If you cut it at an angle it also raises the keyboard making it easier to type.

Yours sincerely, F.R.Hamilton.

Is the Mag-Mount electrical Mr Hamilton? Because if it is not an alternating magnetic field it would not de-gauss the tapes/discs. Perhaps you could write again and explain.

As to your printer problem, sounds like something is shorted to me, but where in your system the short could be will require an expert to find. *Ed.*

Dear Editor,

I have a question about my SAM. I gave my SAM to my daughter and she said "Grandfather my SAM is damaged, can you repair it?". I can't you know, but in the past I went to a repair shop in the middle of no-where in your country and met a fine man who repaired my SAM in a jiffy. I know he died but I suppose there will be someone who took over his place in your neighbourhood. I will try to repair it here somewhere in Holland but if I can't find such a guy I have the intention to go to your repair shop. I should be obliged if you can give me the address. Thank you in forehand. I sign with hearty greetings.

Yours sincerely S.M.S.Kempes.

Now the big question Mr Kempes, is what is wrong with the machine. Quite a few things are fixable provided you know how to use a screwdriver and just possibly do a little bit of soldering. Failing that the machine would have to come back to us in Gloucester for fixing.

If you would like to write to me, giving more details of the fault, then if it is something simple we can sell you the parts. If on the other hand it looks more difficult then maybe it only needs the main circuit board repairing - in which case would be cheaper to get you to send only the board over to England. If you give me more details I'm sure that between us we can get your

grand-daughter up and running again very soon. **Ed.**

Dear Editor,

Can anyone tell me if there are any cheats or pokes for *Prince of Persia*. I have had a couple of people ask me in the last couple of months if you can jump a level and go on to another.

Yours sincerely, Jenny Bundock.

Funny, I've got a secretary with exactly the same name as you Jenny. Do you think you may be related?

Can any reader help? **Ed.**

Dear Editor,

Well this is in good old fashioned long hand because I've been trying to move for a month, and still don't know when it's going to happen.

Firstly, my subscription ran out in January and I did not get that issue but did get February's. So can you send me a renewal form.

With regard to the future of SAM - great - I hope you get the response you need, because, of course by default, a poor response would put the end of the line in sight. Even then it is easy to talk a good future and I do wonder how many of the promises you made will actually be kept. As for myself I was always more a user than an expert, and what I know is rusty. As for cash, well, I've got to keep most of it for this damn move and, in the future I'd have to be *VERY* convinced before finding any more.

Fundamentally, apart from the emotional appeal, is there a vote for SAM/SAMson now? On the assumption that the Z80 family is still in production then there must still be a demand - if so where and what for?

Can SAM be led into this? Is there some other niche market it can happily occupy - or some new market place - eastern Europe or Africa for example that a good cheap home computer can move into?

From what I can see, perhaps the future of SAM depends on whether it can be used on the internet and I would suggest this may well become another priority - sorry to add to your list - but if an improving SAM can access the web then I think it will have a real chance, especially in as yet untapped market places where a cheap web access could be a real selling point.

I certainly wish you good luck with your efforts and if I can come up with anything positive I'll let you know.

Yours sincerely, Ian Beardsmore.

Thanks Ian, a letter full of things to comment on - but I will save that for now. What I'm after is as many letters like your's. The more comments we get the better the 'feel' for things.

One thing though, we are not looking for any 'investment' at the moment. If the right developments are made then the whole project should pay for itself from sales. If, at some time in the future, everything can be put together into a new computer then that is the time that backers would have to be found.

Come on readers, keep them coming. And not just you SAM users - I want to hear more from the Spectrum fraternity as well, it is in your interests to see a Z80 based computer continue in production so I need your input as well. What would you like to see added to SAM to make the machine more appealing to you? What do you like about the Spectrum that you feel the SAM misses out on?

Come on readers, get writing. This is your chance to influence the future of the Z80 based machines. **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.

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