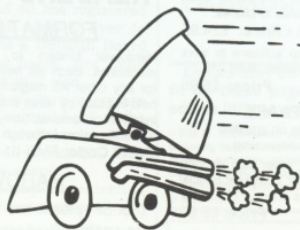


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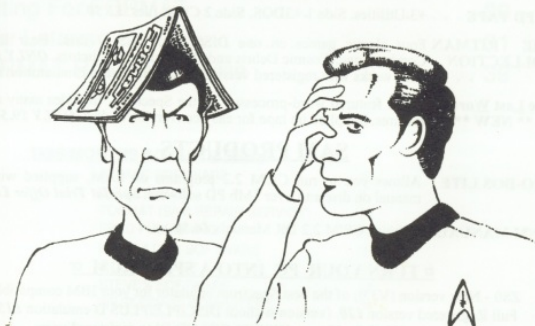
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FORMAT

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NEWS ON 4

MAKE A DATE WITH TIME

West Coast Computers have now come clean and announced their next product, well two in fact.

At long last SAM owners are to get a replacement for the clock/calendar system which formed part of the now defunct SAMBUS. The new interface will plug into SAM and will have a built-in through-port to allow other interfaces to be attached behind it. It is fully compatible with the MasterDOS TIME and DATE routines so you can date-stamp your files etc.

The second interface is a similar Clock and Calendar system for the Spectrum, WCC's first venture into the Spectrum market and, as far as we know, the first clock/calendar board ever for the machine.

Launch dates and prices are still to be announced but we understand now that the only delay will be in having the boards made. More news soon.

ONE LESS

Emap are to close their long running Amiga title 'The One' after the August issue. Emap blame falling revenue from advertising and the lack of new software releases for the closure.

'The One' has been published for eight years and targeted the younger games playing user. This was exactly the same excuse used by Emap for closing Sinclair User two years ago.

Emap do say that if the market improves they may bring the magazine back next year. However, industry speculation is that the closure of 'The One' is just the first loss for the Amiga scene.

LASER PRICES DROPPING

The prediction is that impact dot matrix printers could soon become museum pieces due to the falling cost of laser printers. Already there are lasers advertised at under £300 by the box shifters, and the first sub £200 is just around the corner.

This constant fall in price for the laser market is forcing down Ink-Jet prices which in turn forces down the price of the typical 9 and 24 pin dot-matrix printers that have been the mainstay of the industry for so long. In the long run this will lead to impact dot-matrix printers being side-lined for specialist uses like multi-part invoices and the like. The improved speed and quality of lasers and ink-jets looks set to dominate the market over the next few years.

VOYAGER ON VIDEO

Star Trek fans can now start watching its latest incarnation as the first episodes of *Voyager* are launched in the UK on video.

The new series, already receiving good reviews as it airs on network TV in the States, see a female captain and some stunning special effects.

The first tape called *Caretaker*, the feature length pilot for the series, is out now and is available at most video retailers. Future tapes will be issued at the rate of two per month.

I can highly recommend the series to all Star Trek fans.

Credits: John Marks.

URGENT We need your news. Anything you think other people should know about. Each item printed earns the contributor 3 months extra subscription (please claim when next renewing).

The Editor Speaks

Summer is here at last. Well, there was this bright shiny thing in the sky this morning and it did stay there for a few hours, so I suppose that counts as summer.

And as it is July already (this year is going so fast) it is already time to start thinking about our birthday issue in September. As always, I like to pull out a few stops for the birthday issue and make it a bit different, and this year I would like to have a special selection of letters from our wonderful readers. What I would like is your memories of how you got started with computers, not just the Spectrum or the SAM but perhaps your first encounter with a main-frame at work or one of the earlier home/hobby computers. What led you to the hobby you now hold so dear? Just a few lines, I'm sure many will want to compare notes with you. Please send your letter quickly, so that we can get as many edited and into the magazine as we can. Oh, and don't forget, Christmas is just round the corner as well. Any seasonal items would be very welcome.

We are putting together plans for a Computer Club to meet here in Gloucester on a regular monthly or fortnightly basis. Covering all computers, although with an obvious emphasis on the Spectrum and SAM, the club will be independent from Format Publications although to start with we will subsidise it to get things going. Until we know how many people would be interested we cannot give a location so we would like to hear from people who would like a regular get-together. Many years ago I helped with a similar club which was run in a local Community

Centre, so it was open to all ages. Any ideas, comments etc, are most welcome. One of the intentions is that the dates of each meeting will be published in **FORMAT** so that anyone in the area on holiday or business will be able to drop in. Once the Gloucester one is up and running I will try to encourage people to start similar clubs in other areas.

I'm still looking for a programmer to convert Music Maestro from +3 to DISCiPLE/PLUS D, please - someone help...

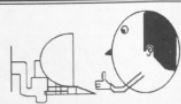
John Wase is off on a trip to the USA this month so there is no Short Spot. But I'm glad to say he should be back, refreshed and full of Americanisms, for the August issue.

We have been having a little trouble with Parcel Force since just before Christmas. Several machines that have been sent back for repair have either been lost or damaged in their hands. Please make sure you use the Compensation Fee Service when you send anything of value back to us, the extra payment will save you much misery if your machine is unlucky enough to suffer poor handling or mis-delivery. Another choice is that we can arrange collection by Amtrak.

By the way, sorry if you had trouble getting through on the Hot-Line during the last week in June. Jenny took a snap holiday, and as it was the hottest week for a couple of years all I did was *die*. I do not get on with the heat at the best of times, and with no Jenny to bully me it was even worse, but I did manage to get **FORMAT** done before passing out.

Until next month.

Bob Brenchley, Editor.



Quality Serious Software For Spectrum & SAM

PC-SUITE

From the same author as SPECMAKER. Now you can transfer your IBM data files by reading and writing IBM discs (720K format) on your SAM. PC-SUITE will even let you format IBM discs on your SAM. Write and edit SAM Basic programs on your PC. Use PC-SUITE to copy SAM data files to PC so you can print them on that laser printer at work... Supplied on 31" disc.

nb. This is not a PC emulator.
As used by Format Publications to transfer articles and programs for this mag.

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File Converter	£5.30	£4.50	✓	✓	✓	✓	✓			✓

Please add £2.00 to price for each 3" disc required.

Please add £0.50 postage for each order (£1.20 outside UK).

* Using SpecMaker Spectrum emulator

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

STICKING WITH MY SAM

Or Good Reasons For Not Joining The PC Rat-Race

By:- Rev. Tony Kinch.

My original Sam Coupé sits in the outer office of my Church Centre. One thing about town centre churches is that they are busy - as well as running all the normal churchy things we have a busy community centre. All this means a lot of work in the background. Rooms have to be allocated and invoiced: a car park has to be administered. Money comes in from all directions (and has to be spent in all directions as well!) and has to be allocated accurately. All sorts of databases are needed. And on top of all this letters have to be written and sent out.

In the old days all of this was done by hand. A nice elderly gentleman used to come in for three mornings each week and write notes in pencil in a scribbling diary and on masses of sheets of paper. Once a year he would sit down and write invoices in longhand to lots of people to get money from them for the use of rooms and the car park. The money was stored in pots and envelopes in a large safe until he was ready to go to the bank. This was fine as long as the Church had a healthy surplus in the bank, but a few years ago, the church buildings had to undergo major refurbishment (grade 2 listed building for those who know what that means!) costing over a quarter of a million pounds. This left the church with an overdraft of £20,000. Suddenly, the relaxed old methods would not do. Cash flow started to matter. The church required systems.

At about the same time as this happened my kids persuaded me that they were a deprived family without a

computer. So I went out and bought a second-hand ZX81 complete with a load of back copies of *Sinclair User* for £20. Now, there is a limit to the number of times that you can play 1K chess - and even with a 16K rampack the games potential was limited. But it was cheap, and established our first principle for computerisation: **the equipment must be inexpensive and cost effective.**

I urgently needed something that would help the church keep better track of its accounts - so I looked for a program that would help. Sir Clive did publish a very simple spreadsheet for the ZX81, but it was too limited for my purposes. There was nothing for it. I must write my own. I was encouraged by an article in *Sinclair User* about a Methodist Minister who was using a ZX81 for all sorts of things. If he could do it, so could I. I wrote a very simple accounts program which allowed me to create 30 account names, to input an amount and allocate that amount both to the individual account and to the total of all accounts. It worked, and it was easy to operate.

The simplicity of operation was important, because my friendly elderly gentleman became ill and had to give up, and for several years I was only able to use trainees who were sent to me by various job-creation agencies. This established, however, another important principle: **my programs must not just be understandable by me, but must be capable of being used easily by someone else who had no knowledge**

of how a computer worked. Believe me, one of the best ways of making sure that a program is foolproof is to have it operated by an inexperienced trainee from a job creation agency!

My first program was written - and it worked, not just when it was used by me, but other people with very limited knowledge could use it as well. In fact, trainees who could not begin to understand the principle of double entry accounts in analysis books were quite capable of answering the next question which came up on the screen and getting the right answer every time. And we were using the same manuscript account sheets that we had used for the manual systems. In this way our third principle was established: **the computer must do the job we want** - we were not managing our centre round somebody else's computer programs.

So there we were. A computerised system had been established, and with it the three basic principles which have remained in force to the present day:-

The equipment must be as inexpensive as possible in order to be cost effective.

All programs must be simple to use and easily learned by inexperienced operators.

All programs must be tailored to the job on hand, and not the other way round.

Then I had a major stroke of luck. After a series of job-creation trainees, many of whom were less than satisfactory, the agency was able to place Carol with me. She was intelligent and, as she was the daughter of one of my Church Stewards, she understood a great deal of what we were about, and in particular the need to improve cash-flow to keep the day-to-day overdraft down to the minimum level.

Over the next couple of years we computerised many of the office routines. Instead of annual accounts, car park

invoices were issued quarterly and room Booking invoices monthly. And all this still with the ZX81. We never bought the original rubber-keyed Spectrum because the keyboard was so bad. We did, however, put on the back a 32K Memotech rampack and buy the awful ZX printer which produced our first quarterly car park invoices on silver paper! I don't know what the people who received them thought - but we didn't care; we were getting our money quicker and more reliably, and that was all that mattered to us.

As well as the programs to deal with invoicing and accounts management, we also created our first simple database. Carol would often say to me, "Can you make the program do this?", and she would tell me what she wanted. I would burn midnight oil (to the point where my wife threatened to cite the computer as co-respondent in divorce proceedings!), and very often was able to make the thing work. So, during this period, we built up a very worthwhile base of user-friendly software.

Three matters made us say goodbye to the ZX81. The first was that the printer was proving to be very unreliable in operation and we needed something better. The second was that we had got to the point where we needed a word-processor and, frankly, we didn't think the ZX81 would support one effectively even if we could find a suitable printer. Finally, and perhaps most importantly, with the longer programs now created it was taking up to a quarter of an hour to load a 32K program - and you can't keep on making yet another cup of tea while something that you urgently want is loading.

Where were we to go from there? The Amstrad range of PCW's was taking off, and becoming almost the standard for many churches, ministers and clergy. We

looked at them - and I looked at Mallard Basic and didn't like what I saw. I wanted to be able to keep and develop the very effective software we had created. Fortunately it was at about this time that Sir Clive brought out the Spectrum+ and microdrives, and we settled for these, originally with a Brother HR5 printer.

We also discovered one of Sir Clive's many mistakes. There was no converter software to take the ZX81 programs into Spectrum, and I can understand why lots of people deserted the Sinclair ship at this time. We had the best part of a year where we were having to keep the increasingly unsatisfactory ZX81 system going whilst all the programs were re-keyed into Spectrum and all the data re-entered.

Another of Sir Clive's mistakes was the microdrive, although it is easier to say this with the benefit of hindsight than it was at the time: at the time, both loading times and storage compared favourably with what alternatives were readily available. In fact I reckoned that the microdrive loaded 32k of data faster than the Commodore disc drive. Whilst the microdrive had on the whole a bad press I found it to be generally reliable; there were occasional problems with the edge connector to Interface 1, but since we had an office policy of taking back-up copies of everything - and all my home-made software had (and still has) an automatic back-up facility - we had very few problems. We were using microdrives as standard data storage for about five years and I cannot think of any data losses during that time.

So we settled down very happily with a standard office set-up of Spectrum+ with Interface 1 and two microdrives connected to a portable black & white television and a series of Brother printers. The HR5 didn't last long

because of the unreliability of the thermal paper, and was replaced by a 1009 and later an 1109. The Brother printer was chosen because it was the only one readily available with a serial interface as standard. This equipment was also cheap enough for us to be able to have additional sets. At one time Carol had a set on her desk, I had one on mine and a third set, with a cascaded down 1009, was in the office of my Community Worker in another Church. Software development was, of course, continuing all the time to the point where we required extra memory.

And so to what I consider to be Sir Clive's biggest mistake. He brought out a 128k machine - the QL. But it wasn't compatible with the Spectrum. It didn't even have the same operating chip as the Spectrum. I looked at it in the shops, but came to the conclusion that I could not spend another year re-writing programs and re-entering data. In fact, at this time I advised a couple of people including my wife to opt for Amstrad PCW's as the machines within their price range most suited to their needs. I even considered the change myself: I had re-written a couple of my programs into Mallard Basic and reckoned I could learn to live with it.

Then fate intervened in the form of a break-in to Carol's office one Sunday during evening worship. Our beloved Spectrum was stolen, and it looked as though the burglar had put the microdrive cartridges ready for collection on a second trip; we think the caretaker probably disturbed him. Some of my Church members had believed that I was playing with a children's toy which was not really suitable for doing 'proper jobs', and it was about time I bought a PC, which was just beginning to establish itself as a standard. They believed that the theft of the equipment provided the

ideal opportunity to upgrade.

One of these members arranged for me to discuss my computer needs with the head of computer studies at Wolverhampton Polytechnic (now the University of Wolverhampton). She was sure he would tell me to "get a proper computer". I went into his office. His first question to me was, "Did they steal your software?" When I told him that the software was all there, he simply said, "Go and get yourself another Spectrum. Your investment in software is far more important than the hardware you use. Too many people get hung up on fancy hardware. The Spectrum is a perfectly good computer, and we use them ourselves for a number of applications."

This confirmed my own feelings, so I bought another Spectrum - this time the new 128+ at less than I had paid for the original Spectrum+. Unfortunately, the 128+ did not solve the memory problem. The second 64k was not easily accessible from Basic, and very few serious commercial programs were ever written for the 128+. The only answer within the memory limitation of the Spectrum was to expand the external memory capacity and to call the data in manageable chunks. The room booking/invoicing program was expanded to the point where it required three microdrives to operate, and the data-access times were becoming too long. The accounts program also required expansion to a point where it required more storage capacity than even three microdrives could manage.

Although the Spectrum could take up to 8 microdrives, the available desk space could not. I was seriously considering an external disc drive DISCiPLE, PLUS D, or the like, when I saw the first advance publicity for something quite new, with Spectrum compatibility, which looked as though it

might be the answer to my needs.

The SAM had arrived.

Well, actually, it hadn't. When it first arrived in my office it didn't work with the disc drives. It appeared to be OK with tape and so I was able to start to transfer programs and data from Spectrum to SAM via the tape interface, although even here it appeared that the ROM contained bugs. Meanwhile the trusty Spectrum continued to be the office workhorse for several months until a new ROM chip arrived to sort things out. During those several months there were long faces from members of the Church Council who were muttering things like "Waste of money" and "Ought to get a reliable PC and be done with it."

But finally it started to work properly. MasterDos speeded matters up and gave some very useful additional disc commands, and at last it became possible to expand programs to where they needed to be. Carol left to have her family and was replaced by Margaret who works as my personal assistant and deals with the administration of the Centre and financial matters, and Pat who comes in two mornings each week to deal with correspondence and database management.

Just over a year ago we decided that we were queuing for keyboard time and bought a second SAM which sits in my inner office and has considerably expanded our ability to cope.

Margaret reckons that at times we operate a drop-in centre for ministers and clergy from the area (it comes of the fact that she makes very good coffee). They come into her outer office, and one of the first things they see is her SAM. The conversation goes something like this:

"What on earth's that?" looking with supercilious disapproval at the SAM.

"It's a SAM," I say. "A what?" comes

the reply.

I explain that it's a computer which is compatible with the Spectrum software I have created over the years. At this point the response falls into one of three categories.

One group of ministers does know something about computers and enters into a serious conversation about the pros and cons of having a computer which is not compatible with certain programs published by the national Church body, but knows enough about the issues to recognise that there is still no effective national standard for all PC's, and that to go to the level of the market where the PC's will run most software is incredibly expensive, and in our case almost certainly not cost effective. I can cope with these, and end up having a worthwhile conversation. It has to be said, though, that the numbers of people who come into this category are very small!

A second group, somewhat larger than the first, thinks it knows a lot about computers. I am constantly amazed by the numbers of ministers and clergy of all denominations who have had expensive theological educations and in consequence look with proper critical doubt at about half the New Testament and two thirds of the Old, and yet accept with fundamentalist fervour the marketing blurb which tells them that they cannot do proper computer work unless they have an expensive PC - which most of them seem to use for a bit of word processing and nothing more. These are very difficult to talk to, because they make it very clear that they have got it right and I have got it all wrong. Still, we try to demonstrate to these what the SAM can do.

The third, and by far the largest, group recognises that it doesn't know the first thing about computers and doesn't want

to. All it wants to do is to switch the computer on and do a job quickly and easily. It recognises that it has difficulty in understanding its PC, and wishes that it hadn't spent over a thousand pounds on something which it knows it is hardly using. When I demonstrate the SAM to the people in this group the normal response is "Why can't I do that with my computer?" "Why is your machine so easy to use while mine is so complicated?" "Can I get that software for my computer?" (The answer is that I have translated some of my programs into a Basic which will run on some PC's, but PC's are not really designed for that style of working.)

So I shall stick to my SAM - or rather my SAMs - because even though I might be able to afford one good PC (and a cheap PC is in my opinion not worth the plastic it's encased in), I most certainly could not afford a second. I have to accept that the ability to print word processor texts on a good laser printer is something that I find useful from time to time. But the cost-effective criterion would certainly never allow me to buy a PC set-up just for that. (The PC & printer which I use when I need that quality of print cost over £3600 which is way beyond my range - and anything less than that does not significantly improve on what I can get from my £450 worth of equipment.) S D Software do a very good converter program in their *PC-Suite* which allows me to transfer files, created on *The Secretary*, very easily and quickly into PC compatible format.

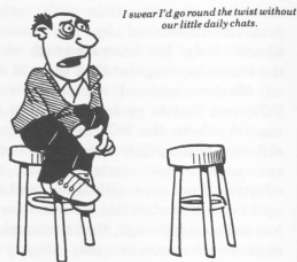
Most important is the ease of operation. I can teach a beginner to use my programs in half an hour, and I reckon that a new worker is adequately conversant with the way in which they work in less than a week. When I see the person whose PC I borrow when I want to produce top quality print struggling to

cope with what she is doing on a machine she barely understands I know that the simplicity of operation that my workers and I get from SAM is something to be valued very highly.

Finally, but equally importantly, my programs develop as the needs of my work develop. I am not stuck with what someone else has written. No, I do not consider myself to be a computer programmer - rather someone who uses Basic as a tool in the management of my job - and this is why I have never even attempted to put any of my programs on the market, although, subject to availability of time, I would be only too happy to help anyone with the development of suitable programs to meet their own needs. My use of Basic is, however, pretty basic (but effective)!

SAM provides me with what I need in terms of cost, ease of use and flexibility of programming. I can say without any hesitation that its Basic is the best I

have worked with - and I've worked with quite a few - and I'm still using the Basic as supplied in the ROM although I believe that MasterBasic is even better. For my needs, the needs of most churches and, I guess, for many small businesses SAM is the ideal computer.



FASTFILE Sorting & Printing

Part 1.

New Routines for FASTFILE By:- Cliff Jackson.

Those who have issue 8 of volume 2 (a long way back I know, but we all get the back-issues don't we?) will know that *Fastfile* by Clyde Bish is a flexible data storage program, for the Spectrum, with a very fast search routine giving a screen or printer output. By allowing individual entries to be of varying length and storing only the bytes entered plus one byte as a separator, it is extremely thrifty with memory, using almost every available byte. The basic routine is also very compact.

I had been considering how to index my music collection and saw *Fastfile* as the answer. By the time I had entered almost 900 titles using 22000+ bytes I realised that I needed a print-out which, to be of any use, must be alphabetical.

The structure of *Fastfile* prohibits the use of any of the familiar string-sort routines so something special was needed. At first the differing lengths of the entries seemed to make sorting impossible but eventually I realised that any two consecutive entries occupy the same number of bytes if their order was reversed. After several attempts in Basic which took longer to run than they did to write, I came to the conclusion that it could only be done satisfactorily in machine code.

Although I have 'fiddled about' with assembler I had not previously written anything significant, but decided that my limited knowledge would have to suffice or be extended as I went along. Necessity

is the mother of invention it is said.

Whilst my 'vocabulary' of machine code instructions is still limited I have learned a lot along the way. Experienced assembler users may find my methods quaint (I sometimes look back at my own early efforts in basic in the same way) but the routine works and is reasonably quick considering the work it does.

In this month's article I give the assembly listing which I have documented rather fully in the hope that it will be understandable even to anyone who is not yet familiar with assembly language. I would strongly urge those who do not have an Assembler to buy one without delay. I can recommend Lerm Software's Z80 TOOLKIT, an excellent package - usual disclaimers.

```

ORG 20000
;code start - in screen memory
;NOTE:1 entry between 2 "STOPS"
;will be referred to as a
;"word" or "w1", "w2" etc.
;
D0 EQU 19900
;stores for holding addresses
;of words being worked on
D1 EQU 19902 ;w1
D2 EQU 19904 ;w2
D3 EQU 19906 ;w3
L1 EQU 19908 ;length w1
FL2 EQU 19909 ;w2
PL3 EQU 19910 ;w3
ZFLAG EQU 19911
;ZFLAG holds 0 at start and if
;last pass found nothing to
;sort but 1 if switch was made
STORE EQU 19920
;holds a word whilst switching
;
START LD A, 0

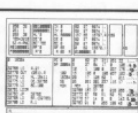
```

If you are new to the fascinating world of machinecode, SC_ASSEMBLER is the ideal program to help you, all thanks to the unique automatic autotab editor designed to help the absolute beginner.



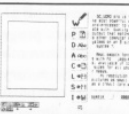
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```

LD (FLAG),A
LD A,(23627)
;get (VARS) finding start of b$
LD L,A
LD A,(23628)
LD H,A
LD A,6
;offset into variable area
ADD A,L
LD L,A
LD A,H
ADC A,0
LD H,A
LD (D0),HL
;HL=address of 1st char (STOP)
;as starting point for
;subsequent passes
LD (D1),HL
LD BC,0 ;clear BC
FIND1 INC HL
;step to 1st data byte
INC B ;start count
LD A,(HL) ;look at it
CP 226 ;is it "STOP"?
JR NZ,FIND1;if not loop
;again to find end, counting
LD (D2),HL
;end found so store address
;to be used as start address of
;next word
LD A,B ;B=length
LD (L1),A;store it
PUSH HL
LD HL,(D1)
;point HL to start w1 again
POP DE
;DE now=start w2
FIND2 INC DE
;=first data byte of w2
INC HL
;step to first byte of w1
INC C
;step forward, counting
LD A,(DE)
;look at "current" char of w2
CP "*"
;is it the End Of File marker?
JRZ,LAST
;if yes, jump to check if
;another pass needed
JR CP2
;not last so jump to "compare"
BCP1 INC HL
;step forward, counting
INC DE
INC C
LD A,(DE)
CP 226 ;check for end w2
JR Z,NWORD
;found so jump to next word
LD A,(DE)
;compare chars pointed to by
;DE and HL (w1 and w2)
CP (HL)
JR Z,CP1
;chars are identical - so
;sort unnecessary, loop back
LD A,(HL);now look at w1
CP 226 ;is it "STOP"?
JR Z,NEXTCH
;yes but w2 is longer so jump
;forward
LD A,(DE)
CP (HL)
;this time see if this char in
;w1 has higher ASCII code than
;same char in w2
JR C,SORT
;yes - so jump forward
NEXTCH INC HL
;step forward through w2 to
;find end
INC DE
INC C ;counting
LD A,(DE)
CP 226
;check for end of word
JR NZ,NEXTCH
;not found so loop to look at
;next char in w2
NWORD LD A,C ;end w2 reached
LD (L1),A
;store length of w1 in store
;for w2 as w2 now becomes w1
;as search continues
LD HL,(D2)
;now point HL to start of new w2
LD (D1),HL ;and store it
LD (D2),DE
;end of w2 becomes start of w3
LD BC,0 ;clear BC reg.
JR FIND2
;we know start and LEN of old w2
;now to be w1 as we step
;forward to next word) so loop
;back to compare w1 (was w2)
;with w2 (was w3)
LAST LD A,(FLAG);look at FLAG
CP 1;is it 1?
JR Z,RERUN
;yes! go round again
END RET
;no so RETURN to Basic
RERUN LD A,0
LD (FLAG),A ;reset FLAG
LD BC,0 ;reset BC
LD HL,(D0)
;set HL pointer to start of b$

```

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```

LD (D1),HL ;store in w1
JR FIND1
;jump back to search w1 again
RSORT INC DE
;sort needed but first step
;through w2
INC C ;counting and
LD A,(DE)
CP 226 ;looking for end
JR NZ,SORT
;not found - loop again
LD HL,(D1)
;end found so store addresses
EX DE,HL
LD (D3),HL
;store start w3 (also end w2)
LD HL,(D2)
EX DE,HL
INC DE;=1st char w2
INC HL;=1st char w1
LD A,C
LD (L2),A ;store LEN w2
SWITCH LD A,1
;indicate sort being done this
;pass
LD (FLAG),A
PUSH DE ;save temp.
LD DE,STORE
;point DE to blank part of
;screen
LD A,(L1)
LD B,0 ;reset B
LD C,A ;C=LEN w1
PUSH HL ;save HL temp.
LDIR ;copy w1 to screen
POP DE
;retrieve former contents of HL
POP HL
;and DE (contents reversed)
LD B,0
LD A,(L2) ;LEN w2
LD C,A ;into C
PUSH DE ;save DE
PUSH HL ;and HL
LDIR
;overwrite w1 with w2
;- start of w2 may be corrupted
;(depending on respective
;lengths) but only AFTER that
;part has been copied
POP DE
;recover:DE=address w2
POP HL ;HL=address w1
LD D,0
LD A,(L2)
LD E,A
;E now holds LEN w2
ADD HL,DE
;HL now holds start address
;for new w2
EX DE,HL
;DE now = "destination"
LD HL,STORE
;HL holds "source" address
LD B,0
LD A,(L1)
LD C,A
;C now holds LEN of old w1
PUSH DE
LDIR
;copy old w1 to old w2 position
POP DE
;recover address of old w2
;(soon to be w1)
LD HL,(D3)
;recover start of w3
LD (D2),HL
;and place in w2 add. store
EX DE,HL
;regs. now hold correct values
;except HL points to first data
;byte, not the "STOP" token
DEC HL ;so reduce by 1
LD (D1),HL ;and store
LD (D3),HL
LD BC,0 ;reset
JP FIND2 ;cont search
FINISH NOP
LENGTH EQU FINISH-START

```

In case you still refuse to be persuaded I have included a basic loader as Fig.2. A later issue will contain basic routines for printing *Fastfile* and handling data.

```

10 REM basic loader for "b$sortC" code
20 CLEAR 49999: LET c=0: RESTORE 100
30 FOR a=50000 TO 50227: READ b: LET c=c+b: POKE a,b: POKE 23692,8: PRINT a,b: NEXT a
40 IF c<>23146 THEN PRINT "Error in Data": STOP
50 SAVE "b$sortC"CODE 50000,228
60 STOP
100 DATA 62,0,50,199,77,58,75,92,111,58
101 DATA 76,92,103,62,49,133,111,124,206,0
102 DATA 103,34,188,77,34,190,77,1,0,0
103 DATA 35,4,126,254,226,32,249,34,192,77
104 DATA 120,50,196,77,229,42,1

```

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90, 77, 209, 19
 105 DATA 35, 12, 26, 254, 42, 40, 50,
 24, 3, 35
 106 DATA 19, 12, 26, 254, 226, 40, 21
 , 26, 190, 40
 107 DATA 244, 126, 254, 226, 40, 4, 2
 6, 190, 56, 51
 108 DATA 35, 19, 12, 26, 254, 226, 32
 , 248, 121, 50
 109 DATA 196, 77, 42, 192, 77, 34, 19
 0, 77, 237, 83
 110 DATA 192, 77, 1, 0, 0, 24, 198, 58
 , 199, 77
 111 DATA 254, 1, 40, 1, 201, 62, 0, 50
 , 199, 77
 112 DATA 1, 0, 0, 42, 188, 77, 34, 190
 , 77, 24
 113 DATA 155, 19, 12, 26, 254, 226, 3
 2, 249, 42, 190
 114 DATA 77, 235, 34, 194, 77, 42, 19
 2, 77, 235, 19
 115 DATA 35, 121, 50, 197, 77, 62, 1,
 50, 199, 77
 116 DATA 213, 17, 208, 77, 58, 196, 7
 7, 6, 0, 79
 117 DATA 229, 237, 176, 209, 225, 6,
 0, 58, 197, 77
 118 DATA 79, 213, 229, 237, 176, 209
 , 225, 22, 0, 58
 119 DATA 197, 77, 95, 25, 235, 33, 20
 8, 77, 6, 0
 120 DATA 58, 196, 77, 79, 213, 237, 1
 76, 209, 42, 194
 121 DATA 77, 34, 192, 77, 235, 43, 34
 , 190, 77, 34
 122 DATA 194, 77, 1, 0, 0, 195, 81, 78
 , 0, 0

Next month we will do the sort, and look at ways of overcoming any problems you may have encountered.

Editor's Note: As volume 2 of **FORMAT** is now Out Of Print, there will be some readers who do not have access to the original FASTFILE article. Being the kind, helpful people that we are, we will reprint the article (and send it to you with your next **FORMAT**) if you send in a request with two first-class stamps (or two IRCs) to cover photocopying. Please remember to quote your membership number on your letter.

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C-ing Things

A Review By:- Carol Brooksbank.

I have been programming in Basic and machine code for longer than I care to think about, but I had never had anything to do with C. So when Fred Publishing phoned to ask me to take part in the pre-release testing of SAM C, I replied that I thought I would not be much use to them because I knew nothing of the language. They said they wanted to know how a raw beginner would get on with it, so I was recruited.

I discovered that knowing Basic was a mixed blessing. It helps to know something about programming, and some of the commands are almost the same as the corresponding Basic ones, but the syntax is very different. If you try to set up the FOR statement of a loop as you would in Basic, nothing will work. In Basic it would read **FOR X=1 TO 100** and you would leave out the STEP if it was 1. In C, the same command reads **for(x=1;x<101;x++)** Get the semicolons wrong, or leave the step off (x++ is C shorthand for x=x+1 which can be used but is less efficient), or even write 'FOR' in capitals, and all you will get is a collection of error messages when you try to compile it - though 'FOR' is rewritten as 'for' when you enter it.

The typescript draft of the manual was a bit short of examples and I spent many frustrating hours trying to master the syntax. Happily, the final version of the manual is much better, and the newcomer would not get as stuck as I did. But you could not hope to master the

language using just the handbook. I am now using a 589-page C tutor (Teach Yourself C, by Herbert Schildt. McGraw Hill. £19.95) and working my way through it, doing all the exercises. It is worth doing that, because C is a superb programming language.

It has very few keywords - only 25 in SAM C. All the rest of its work is done by libraries of functions, some of which are standard in all versions of C, others are specific to the particular version and can only be used with one machine. Functions may be written in C or in machine code, so it is very easy to add to them functions which you yourself might wish to use frequently, but which might not be present in the standard set. For instance, I wrote a 'circle' function since there was no facility for drawing circles in the original version, and this has now been added to the production version and will be on the disc you buy.

All the functions can be examined. Most are written in C source code and can be loaded into the program and inspected. The one library which is written in assembly language source code can be loaded into the *Comet Assembler* for inspection. You can learn a great deal about writing functions yourself by looking at how the ones which constitute the language are written. Because you have to know how to write functions. Even if you do not want to write library functions for future use, virtually every program will have at

least one function which is called, like a Basic procedure or subroutine, from the main program.

Many of the keys have been pre-programmed to spell out the keywords and more common functions, so you have something like the old Spectrum one-key entry. You can add others to keys which have not been used, and save them so that they are in place when you next load the program.

Below I give an example of a very small and unsophisticated C program, which has the main program - starting at main() - and a function - int getmag(). The program generates a number between 1 and 100 and then gives you 10 chances to guess what it is, telling you each time whether your guess was too big or too small. If you get the number, the program reports "RIGHT" and terminates. If you fail, it tells you before terminating what the number was. You can see a 'for' loop, some 'if-else' statements, including some nested ones, and the line 'magic=getmag();' which calls the function which generates the hidden number. The '#include' statements at the start and end tell the compiler which libraries to include. Stdio.h has to be in every program because it includes the operating system. The others are the ones which include 'cls();', 'rand();' and 'abs();'.

Program 1 - A Sample C Program

```
#include "stdio .h"
#include "graphics.h"
#include "stdlib .h"

main()
{
    int x,magic,count;
    magic=getmag();
    cls(0);
    printf("The number is between 1 and 100\n");
    printf("You have 10 guesses\n");
```

```
for (count=1;count<11;count++)
{
    printf("\a\6\0Enter guess %d: ",count);
    scanf("%d",&x);
    cls(0);
    if (x== magic)
    {
        printf("RIGHT");
        count=15;
    }
    else
    {
        if (x<magic)printf("TOO SMALL");
        if (x>magic)printf("TOO BIG");
    }
    if (count>10 =count<15){
        cls(0);
        printf("The number was %d",magic);
    }
}
int getmag()
{
    int a,b,c;
    a=rand();
    a=abs(a);
    a=a/500;
    b=rand();
    b=abs(b);
    b=b/500;
    c=a+b;
    if (c>100)c=c-100;
    return c;
}
```

```
#include "graphics.c"
#include "stdlib .c"
```

When you have written your program, it must be compiled into machine code. If you have made any errors then warning messages will appear, and if the errors are fatal ones which prevent the compilation, the program will exit the compiler. When you return to the editor you find error messages inserted in the offending places in your listing. There is also an efficient de-bugging mode for finding those places where your syntax was perfect but your logic went astray, so even though your program compiled,

it does not run as you expected.

When it has been successfully compiled, you can run the program from within C to test it. During compilation you can save an assembly language source code listing which can be loaded into the *Comet Assembler* and modified or assembled. You can also save the object code, which will run independently of the C compiler, called from its SAVE/LOAD address.

The whole purpose of C is that it allows you to write a program which will be in machine code, without using assembly language. You get all the speed and convenience of machine code, but the program is much easier to write. A C program can even be a mixture of assembly language and C language if you like, and those who know a bit about machine code will find that they will use it for odd functions where there is no C command or function which does quite what they want. But those who have never mastered assembly language will find themselves able at last to get away from Basic and write efficient, fast-running programs. Just like any other machine code program, you can call the code from within a Basic program, allowing you to retain Basic for the things it does best, like disc operations.

The beauty of C is that it is easily upgraded. The version we have now is what is termed *SMALL C*, indeed I have found that some of the commands I am supposed to use to do the exercises in my course book are not yet available. But as new functions are written they can be issued as extra library discs, or as updated versions of existing libraries which can be copied to your working disc in place of the ones you have now.

SAM C is a little limited at present, because some of the functions you find in

other versions are not yet included. In particular, it can only handle integer numbers from -32767 to 65535. So no decimals, no bigger numbers (unless, of course, you write your own functions to handle them!). Fred Publishing say that development is still going on, and new functions will be issued shortly.

In the meantime, SAM C allows you to write very sophisticated programs as it stands. Unless you are doing something which needs complicated arithmetic, and few programs do, you will hardly notice the omissions.

I would recommend SAM C to anyone who likes programming. Even if you are good at writing machine code programs, you will find you do far less debugging in C, and when you do, mistakes are easier to find. If you have only ever programmed in Basic, C will open up a whole new world to you - and it will make you become a good, logical programmer, breaking your program down into small, easily written and tested functions.

But don't expect to sit down with the handbook and start writing complicated programs in SAM C unless you are already familiar with the language. The introduction to C in the handbook is only enough to get you started. You don't expect to learn to write machine code from the technical chapter in your computer handbook. You have to learn the language and then apply what you find in the handbook. It is the same with C. You have to learn the language and use the handbook to explain the special features of SAM C. But I promise you, it is well worth learning. It is the language most professional programmers use, and I feel sure it will lead to many new and sophisticated programs being written for Sam.



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CHEQUES and PO's TO STEVEN PICK

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The HELP PAGE

Edited By:- Ray Bray.

Peter Ross of Newcross, London, has been experiencing some difficulties with version 1.5 of *The Secretary* and forwarded his master disc for checking.

He has been unable to toggle JUSTIFY with INV+J as stated in the Manual Update and although it toggles with CNTRL+J, the text fails to justify. Secondly, when he tries GLOBAL delete or insert the text is not adjusted to close up any spaces which arise, also there appears to be no difference between LOCAL and GLOBAL delete/insert. Finally when he tries to type capital letters holding the SHIFT key down, a swung dash (~) character appears before the capital letter and, when he holds down the SPACE bar, a zero is printed after the first space.

Firstly, I have checked your Secretary V1.5 disc and can confirm that it is perfectly alright, and I have not found any of the problems you mention. I suspect that all but two of the problems you encountered are due to the fact that the handbook does not adequately explain how the various functions work. I will therefore expand on the instructions given on these items.

JUSTIFY. As you correctly state, justification can only be toggled using CNTRL+J. The INV+J quoted in the Manual Update is a misprint, as is INV+T. What the Manual fails to tell you is that text can only be typed in the JUSTIFY mode if INSERT is switched OFF, although it can be reformatted and justified with INSERT ON. I find it best to keep INSERT OFF even if you don't wish to justify, as you can occasionally lose the odd letter during word-wrap

with INSERT ON.

GLOBAL & LOCAL. The Manual doesn't really explain the purpose of these two modes. They refer to adjustment to the text when inserting or deleting, either within the current page (LOCAL), or throughout the whole document (GLOBAL). For instance, if LOCAL is set and a line is deleted from page 1 of a document, then all lines within page 1 move up one line but all the other pages remain unaltered. If the same action is taken with GLOBAL set, then all lines throughout the document move up one. The same thing applies to inserting text, so if there are no spare lines on the bottom of the page in which the text is to be inserted, then make sure that GLOBAL is set - otherwise you will lose text off the bottom of that page if the text inserted is longer than the spare spaces at the bottom of the page.

AUTO INSERT/DELETE. When text is added using INSERT, the paragraph is not reformed (Page 2 of the Manual Update refers). However, all you need to do after typing the last word of the inserted text is to press F7 and the paragraph will be reformed. The same thing applies to deleting text using either the DELETE key alone or with INSERT set. I never use the INSERT/DELETE functions on the EDIT line for minor editing of text as it is much easier to insert lines using CNTRL+I or delete lines using CNTRL+DELETE, and similarly to insert and delete words using F1 to toggle INSERT and press F7 to re-form the paragraph. This is much quicker than having to press EDIT, make a selection from the menu and

then press EDIT twice to get back to the text!

KEYBOARD PROBLEMS: With reference to the problems you are having with the SPACE bar and with the capitals using the SHIFT key. Although you do not say whether or not these faults appear only when using *The Secretary*, I have been unable to reproduce them when using your disc. Therefore it looks as though your SAM has developed a keyboard fault. The SHIFT, 0 and SPACE bar all share a common decoding line and furthermore, the swung dash which your SAM produces when you try to print upper case letters using the SHIFT key, is keyed by SHIFT+0. This indicates that there might be a fault in the keyboard membrane or in the connector ribbon cable.

The next item concerns disc drives, a subject which doesn't arise very often in our mailbag I'm pleased to say. Martin O'Connell of Birmingham had been using an external 3½" drive on his SAM via an external interface as his only drive. He recently fitted the SAM Coupé disc drive upgrade kit and understood that the external drive could be used as Drive 2 if the jumper switch inside the external interface was changed. He built and fitted the upgrade kit and the new internal Drive 1 worked immediately but the external drive refused to work and the error message 103 "No such drive" appeared. However, when the jumper switch was returned to its original position the external drive still responded as Drive 1. Martin says that as far as he can see he has followed all the instructions fully, but he did notice that the capacitor C3 on the external interface was damaged and he wondered whether this might be causing the problem?

Well Martin, I have not had experience of fitting the upgrade kit and I have no knowledge of the external interface so I

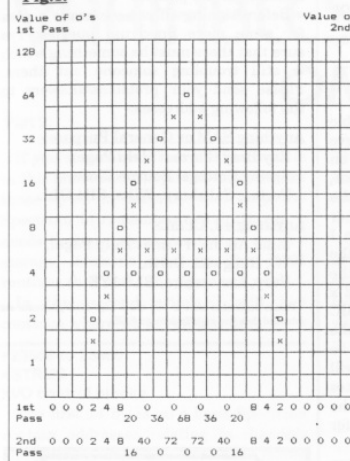
am forwarding your letter to Bob to see if he can help. However, I do have two thoughts on your problem. Firstly do a PEEK on DVAR 2 and if the value is 0 then POKE it with 208. MasterDOS should normally set DVAR 2 to this value on start up if a second disc drive is fitted, but SAMDOS does not - you have to do it manually or run the full menu program on the original SAMDOS disc. The other thing you might try (with the jumper switch in both positions), is to switch the actual drive to which the commands such as DIR1 and DIR2 refer to, by POKEing DVAR 111,2 and DVAR 112,1.

In April I started to explain the method of down-loading new characters to a printer by describing how draft characters are dealt with, this month I will give an outline of how NLQ characters are handled on a nine pin dot matrix printer. I purposely use the word outline as although a printer may be Epson compatible, individual makes of printers do vary in the method used to define NLQ characters, so you should consult the printer handbook to determine the precise method of definition used.

In essence the difference between draft and NLQ printing is that two passes of the printer head is required to form an NLQ character and, between the two passes, the paper is moved vertically half a dot thereby causing dots to overlap those above and below each other as well as those to either side. To enable this to happen two separate sets of bytes are required to define the dot data for the two passes. The grid used for defining NLQ characters therefore requires more cells than for draft characters and this can be achieved by either increasing both the number of columns and rows or, by keeping the number of columns about the same and only increasing the number of rows.

The Star 9-pin printers employ the

Fig.1



first method, using a grid 23 columns wide and 16 rows high as shown in figure 1. Forty-seven data bytes are required to define each character, one attribute byte plus the 23 data bytes for each pass of the printer head. This is illustrated at figure 1, where an NLQ version of the miniature upper case "A" defined in the April issue is shown. It can be seen that the 23 bytes for the first pass (shown at the bottom of the grid), are defined by totalling for each column the value for the o's contained in the even number rows (counting the rows from the bottom of the grid), and those for the second pass are defined by value for the x's in the odd numbered rows. The method of computing the attribute byte for NLQ characters is slightly different from that used for draft characters, the individual bits being allocated as follows:-

Bits 0-3 Right Spaces (0 to 10 cols).
Bits 4-6 Left spaces (0 to 7 cols).

Bit 7 Which pins are used (Ascender/Descender value) Top 8 pins=1 Bottom 8 pins=0

A simple way to calculate the attribute byte value is: Right Spaces + (Left Spaces x 16) + (Asc/Desc value x 128).

The value of the attribute byte for the character defined in Fig 1. is therefore 5 + (3 x 16) + (1 x 128) = 181. However, if proportional spacing is not required then the right and left spaces are not considered thus the attribute byte would be 128. The other main difference between draft and NLQ characters is that horizontally adjacent cells may be used for defining NLQ characters. The character illustrated can be down-loaded to the printer and printed using the following program:-

```
10 REM ++Download the character
  r NOTE DIP S/W 2-1 OFF++
20 CLOSE #3: OPEN #3:"B"
30 LPRINT CHR$(27);"k";"0";:
  REM Select NLQ type
40 LPRINT CHR$(27);"x";"1";:
  REM Select NLQ characters
50 LPRINT CHR$(27);":":CHR$(0)
  ;CHR$(0);CHR$(0): REM Copy standard characters from ROM to RAM
60 LPRINT CHR$(27);"&":CHR$(0)
  ;CHR$(64);CHR$(64): REM Define download character 64 (@)
70 RESTORE 200
80 FOR N=1 TO 47: READ C: LPRI
  NT CHR$(C): NEXT N
90 STOP
100 REM ++Print download character++
110 LPRINT CHR$(27);"%";"1";:
  REM Select download characters
120 LPRINT "test @@@@@@@@@@ test"
130 REM ++Reset printer++
140 LPRINT CHR$(27);"%";"0";:
```



```

REM Select ROM characters
150 CLOSE #3: OPEN #3:"P": STOP
200 DATA 128,0,0,0,2,4,8,20,0,3
    6,0,68,0,36,0,20,8,4,2,0,0,
    0,0,0
210 DATA 0,0,0,2,4,8,16,40,0,72
    ,0,72,0,40,16,8,4,2,0,0,0,0
    ,0

```

That is all the room we have available this month for this topic. I hope you have all read Carol's excellent article on bit-image graphics in the June issue, which showed in more detail how the printer deals with characters and other bit images. When we next have room I will explain the differences in the definition of NLQ characters on the Epson 9-pin printers which use the 12 x 18 grid, and also include a short BASIC routine which can be merged with the SAM UDG DESIGNER program (to be found on the SAMDOS disc), which will convert the screen character bytes produced by that program into the printer draft character bytes required for down-loading.

Finally we have received a letter from Frank Harrop of Brighton concerning the query from Malcolm Dopson (in the May issue), on printing from SAMPRINT. Frank says that providing the printer is set to the graphics mode all will be well. He also mentions in reference to Malcolm's second query (and that of B.H.Davis), that with the PCG DTP program the hash character has to be used in order to print the £ sign. I had assumed that this was known as Malcolm was able to print the £ on his 9-pin printer, and that the problem was related to using a 24-pin printer. Still it is worth reminding everyone that the hash character has to be used on the DTP.

Handy Tip (or un-Tip!). Mike Jewell found his SAM Comms Interface had the leans and was causing problems but a small piece of draft excluder stuck on the base put things on the level and now all is well. Sounds better than the usual

folded cigarette packet!

Before signing off can we make a plea for some more Spectrum queries, I'm sure that there must be something which is still troubling someone out there. Please send your problems/answers to the following addresses:-

Anything SAM or General Purpose:-

Ray Bray (Format Help Page),
Spring Cottage, Bourne Close,
Porton, Salisbury, Wilts, SP4 0LL.

Anything +3, CP/M:-

Mike Atkins (Format Help Page),
70, Rudgwick Drive,
Bury, Lancashire, BL8 1YE.

Please remember that if you want any discs/printouts etc returned then you must include an SAE.

FORMAT

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VARIABLES ON A THEME

By:- Dilwyn Jones.

Part 2.

If you remember, from the first article in this short series, system variables are those bytes in memory that help the Spectrum to remember certain things it needs to know about itself, they are the storage locations used by the ROM routines that make the Spectrum work.

In this second article I will just continue where we left off last time.

• 23568 to 23605

• STRMS

• I/O control blocks

The first 14 bytes on a basic Spectrum contain addresses relating to channels and streams. Streams - 3 to +3 are stored in two bytes each.

Streams and Channels are a complex subject in their own right and so I will not go into details here. There have been articles in the past in **FORMAT** which should answer any questions you have.

• 23606/7

• CHARS

• Pointer to character data

This system variable has as its normal values:-

23606 contains 0

23607 contains 60

which points to the start of the character set that the computer uses for printing on the screen.

The normal address printed to is 15360 which is 256 less than the address of the start of the ROM character set. Why 256 less? Because the character generator is accessed by something similar to PEEK

23606+256*PEEK 23607+CODE "A"*8 and since the first character is a space, and the code of a space is 32, you can see that 8*32 is 256.

The character table is 768 bytes long, so if you wish to set up a new character set you must set aside this number of bytes in case it is overwritten by Basic - you wouldn't get a crash, you'd just end up with gibberish.

The SCREEN\$ command also uses this system variable. In fact, you may be aware of the problem that SCREEN\$ does not recognise user-defined graphics normally, unless they happen to be similar to an existing Spectrum character. This is because SCREEN\$ works by picking up the address of the start of the character generator and looking through the table until it finds a matching character.

Now since the Spectrum screen is bit-mapped rather than memory-mapped like some computers, once anything is printed on screen it stays the same even if you change the character in memory. So we could temporarily change the pointer to the character set to point to the user defined graphics and look up here.

One snag is that although there is a system variable that tells us where the user-defined graphics start we must subtract 256. This conveniently means we subtract one from the high byte. This program should demonstrate:-

```
10 FOR X=144 TO 164
```

```

20 PRINT AT 0,0;CHR$ X
30 POKE 23606,PEEK 23675
40 POKE 23607,PEEK 23676-1
50 PRINT AT 20,0;SCREEN$ (0,0)
60 PAUSE 40
70 POKE 23606,0
80 POKE 23607,60
90 NEXT X

```

What we did was make the computer think the user-defined graphics are the normal character set. SCREEN\$ will still produce characters with codes of 32-127, although this is easily overcome with a bit of fiddling. Since SCREEN\$ starts off with CHR\$ 32 and the UDGs start off at 144, we would need to add 112 to return characters in the range of the user-defined graphics.

Here is one way to do this. X is the x co-ordinate across the screen and Y and y co-ordinate down the screen of the location SCREEN\$ is to examine. A check is first of all made that SCREEN\$ does not find one of the normal characters there, then returns if one is found. The character at Y,X is returned in A\$. Line 8025 is needed only if you are using a character set other than the ROM one.

```

8000 REM SCREEN$ FOR UDG'S
8010 LET A$=SCREEN$ (Y,X)
8020 IF A$="" THEN RETURN
8025 LET A=PEEK 23606: LET B=PEEK 23607
8030 POKE 23606,PEEK 23675
8040 POKE 23607,PEEK 23676-1
8050 LET A$=SCREEN$ (Y,X)
8060 IF A$<>"" THEN LET A$=CHR$(CODE A$+112)
8070 POKE 23606,A
8080 POKE 23607,B
8090 RETURN

```

If you are using the ROM character set, then delete line 8025 and replace lines 8070 and 8080 with the alternative versions that follow.

```

8070 POKE 23606,0
8080 POKE 23607,60

```

The story does not finish there. There

are only 21 user-defined graphics - if SCREEN\$ does not find a match, it will continue looking up past the user-defined graphics until it has finished looking for the 32 to 127 range it thinks it's looking for. This could be embarrassing if there just happen to be some data stored above the UDGs for any reason which resembled any character. To help prevent this happening, although the UDGs are normally at the top of RAM anyway, this line could be added:-

```
6065 IF A$>CHR$164 THEN LET A$=""
```

Incidentally, you should ensure that 23606/7 always points to the right character set when PRINTing, LISTing, etc, is done.

• 23608

• RASP

• Buzz length

Controls the duration of the buzz that sounds to warn you that you are running out of memory. At switch-on, this has a value of 64. This can be altered, but there seems little point. POKE 23608,0 gives a very short click rather than a buzz - useful if you hate the buzz that satirically mocks you when you run out of memory. Alternatively, POKE 23608,255 gives a very long buzz which immobilises the keyboard, preventing you typing any further than when the buzz sounded.

• 23609

• PIP

• Click length

Controls the length of the click that is emitted when a key is pressed in command mode or during an INPUT. It starts off at zero but may be changed. Any value between 30 and about 130 gives a pleasant, more audible bleep

rather than the quieter click normally given. Values higher than 130 tend to noticeably slow down the keyboard response (since computing stops as the bleep is sounded). Usually, the one to use is POKE 23609,100.

• 23610

• ERR NE

• Error report number

Controls error report number and normally has a value of 255 unless an error arises, when it contains one less than the error report codes printed, eg, for error 4 (out of memory) it would contain a 3. The message printed out is contained in ROM starting at address 5010. The end of the message is signified by the last character in the message having bit 7 set to a one. After the error message comes the © 1982 Sinclair Research Ltd.' message that you see after switch-on or NEW.

You can POKE 23610 to generate an error to stop the program, but since the message printed is fixed and in ROM, you may end up with garbage.

If you wanted to simulate an 'out of memory' error you would end a program with POKE 23610,3. This would not work as any program line; you'd have to ensure that it was the last line, as once a condition arises to end a program, only then is 23610 looked at to determine what is printed.

• 23611

• FLAGS

This system variable contains various flags controlling the Basic system and generally should not be POKEd. However, some of the flags can be usefully PEEKed.

Bit 0: Being a one indicates no space to be printed before the next key word.

Bit 1: This bit being set to a one

indicates that the print output is to be sent to the printer. A zero would mean it is to be sent to the TV screen.

Bit 5: Any newly pressed key is indicated by its code being stored in 23560 (the LASTK system variable) and bit 5 of 23611 (FLAGS) is set to indicate that a new key has been pressed.

Bit 7: Syntax flag.

These will be of more use when using ROM routines in a machine code program.

• 23613/4

• ERR-SP

Keeps track of the address on the machine stack where the appropriate return data lies. Try calling a few GOSUBs with no matching RETURNS and watch this point move down the memory. Now you can see what happens and why this occurs when you run out of memory in a situation like this. Also, try PEEKing the contents of the three addresses (the base of which is pointed to by 23613/4) to see what return data actually consists of.

```

10 LET A=PEEK 23613+256*PEEK 23614
20 PRINT PEEK A;TAB 10;PEEK (A+1);TAB 20;PEEK (A+2)

```

Oh dear! No more space this month, you would think that the Editor (hiss boo) would give more space to such well written articles.

Still, next time I will continue this look at the Spectrum's system variables from the point I am now forced to desert you at. Don't worry loyal readers, there is plenty more still to come.

Until we meet again....

[This article is extracted from Dilwyn Jones' book, Delving Deeper into your Spectrum ROM - first published in the UK by Interface Publications. Although it is now out of print you should be able to obtain a copy through your local library.]

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REFing

PROCs

By:- Ettrick Thomson.

This article may be looked on as a sequel to 'DEF PROCing' by Darren Talbot, **FORMAT** April 1995, which gave many examples of useful procedures, but did not include anywhere the parameters were passed by reference. Programmers who have advanced from BetaBasic on the Spectrum will already know about them, but those with only the SAM Manual to go by will not.

Here is a simple, somewhat artificial, example of such a procedure and a program that makes use of it:-

```
10 LET v=0,m=0
20 FOR i=1 TO 10 STEP 2
30 running_average v,m,i*i
40 PRINT m;" ";v
50 NEXT i
60 DEF PROC running_average R
EF a,REF n,z
70 LET a=a*n,n=n+1,a=(a+z)/n
80 END PROC
```

A series of values, z, is passed to the PROC which calculates the average of the series so far. In the call (Line 30), v is the average, m the number of values, and, in this case, z=i*i. Within the PROC the sum so far is calculated, the number of entries is incremented, and the new sum and new average is calculated. Because the parameters a and n are marked as REF, their values at the END PROC are passed back to give new values of v and m, printed at Line 40, and available when Line 30 is executed again. The z of the procedure is not passed back.

When this idea was first used, in ALGOL, REF parameters were said to be 'called by name', other parameters 'called by value'. This is a useful approach, for

every variable has a name and every variable has a value: not necessarily a numerical value; d\$ might be the name of a variable representing a day of the week; its value might be 'Tuesday'. Consider the statement 'LET x=x+1'. The x on the left of the equals is the name of the variable to which a new value is to be assigned; the expression on the right gives that value, which in this case depends on the old value of x. A procedure with REF parameters can be looked on as a glorified LET statement: each parameter called by name (eg v and m in Line 30) is a variable to which a new value is given by the procedure; the parameter called by value (eg i*i in Line 30) is a constant used by the procedure. Consider 'LET x=10': this may be the first mention of x in the program; the statement 'creates' x and gives it a value; if x has been mentioned, its old value is discarded. The same with procedures with REF parameters: a variable called by name can be created by the procedure. In a call of a procedure with REF parameters, such parameters must be the names of variables: not constants, not expressions.

This identification of a procedure with REF parameters as equivalent to one or more LET statements is not the whole story. You can have 'LET c(i)=...' but SAM does not allow 'c(i)' to appear in a call as a variable called by name; it could, however, appear as called by value. SAM allows arrays as a whole to appear as parameters of procedures. Here is an outline of a procedure to

create an array that is a copy of an existing array:-

```
DEF PROC cpy REF x(),REF y()
LOCAL q
LET q=LENGTH(1,y())
DIM x(q)
```

[copy each element of y into the corresponding element of x]
END PROC

All arrays used as parameters in a procedure must be REF parameters, even though, like y() in this procedure, they are really called by value.

This ability to create a variable can be used to replace a function where more than one statement is needed to calculate the function, which you can't have in the DEF FN arrangement. The greatest common factor of two integers p,q can be found by:-

```
DEF PROC gcf REF g,p,q
LOCAL z
DO: LET z=p MOD q,p=q,q=z
LOOP UNTIL z=0: LET g=q
END PROC
```

A call "gcf n,15,18" will give n the value 3. But, unlike FN, we cannot use "gcf n,15,18" as part of an expression; it must be a separate statement; then n can be used in an expression.

Sometimes two related functions are conveniently produced by one procedure. The position of one point relative to another can be given by the range and (compass) bearing, or by the East-West and North-South displacements. This procedure calculates the displacements given range and bearing (in degrees measured clockwise from North): -

```
DEF PROC position REF EW,REF
NS,bearing,range
LET bearing=bearing*PI/180
LET EW=range*SIN bearing,NS=
range*COS bearing
END PROC
```

This brief introduction will, I hope, help newcomers to SAM basic to make use of procedures with REF parameters.

Writing for **FORMAT**

Hey you! Yes, you - the person reading this. Now don't go away, I want a little chat with you. Are you sitting comfortably? Then I will begin.

We hope that you find **FORMAT** interesting each month, we certainly try our best to get a good mix of articles together for each issue - but we always need more. Filling these pages is not easy, we start with a pool of around thirty articles and try to pull out a reasonable mix of Spectrum, SAM, and general purpose articles that we believe will appeal to the wide spread interests of our readers and to judge from your comments we normally succeed.

However, we need your help, and we need it now. Sending us £50 notes would be nice, but seriously we do need your help. We need more material to fill these pages. Even some small items for Short-Spot and the Letters Page are better than nothing - and there can't be anyone out there who does not have something they want to say.

Larger contributions, from 1 page to a regular column, are also needed - urgently. Articles on computer languages, how to program, useful routines, listings, games hacking, hardware, experiences with printers.... There are just so many things that other readers will find interesting that you could write about.

FORMAT is your magazine, it keeps a very dedicated bunch of enthusiasts together and helps to keep their hobby alive. The Spectrum and SAM (and other Z80 machines) need **FORMAT**, and we need your contributions to help keep **FORMAT** out there in front - as the most widely read magazine of its type on the market. Please help, we need you.



YOUR LETTERS

Dear Editor,

I've just read the letters page of **FORMAT** Vol.8 N°9 and noted the letter from Stephen McGreal regarding a good Spectrum emulator for the SAM so that he can get Chaos up and running.

I managed to get the game running on my SAM and save to disc by using SamTape 4 from Lerm, I believe their address is 11 Beaconsfield Close, Whitley Bay, Tyne and Wear, NE25 9UW.

Could you please pass this information on to him.

PS. Is the location for your Computer Fairs accessible to wheelchairs? If it is then I might see you in Oct/Nov.

Yours Sincerely, Bob Chowdhury.

Thanks for the info Bob, and yes there is no problem with wheelchairs except for access to the three or four stands on the stage area. **Ed.**

Dear Editor,

As I write a cheque for the restoration of my SAM Coupé (damaged membranes and new Keyboard). I feel I must thank the SAM Repair Service you have down there in Gloucester. When I phoned Bob about sending my SAM via Parcel Force, some good advice he gave me was to ask for a Compensation Fee Form just in case SAM got lost or damaged. I was feeling that I would be lucky if I saw my computer again by the end of May after Bob told me it could take about 10 days once **FORMAT** have received my machine. It still has not sunk in yet, but although I posted my Coupé last Thursday afternoon (11/5), I had an Amtrak delivery man at my front door with my Coupé under his arm the following Tuesday. **FOUR DAYS!!**

UNBELIEVABLE!!!

All I can say is keep up the good work at **FORMAT** and I can assure other readers that you are leaving your Coupé/Elite in safe hands when you need your computer repairing.

Yours Sincerely, Paul Featherstone.

It was luck Paul, your machine arrived here just as one of our repair guys was bringing back another machine. As he had to come back later in the day he took yours and did it before he came back, just in time for the Amtrak van to pick your's and a few others up.

Normally, unless it is one of those real problem machines, repairs should only take a week but it all depends on workload in the end. **Ed.**

Dear Editor,

Firstly, I must say thankyou for the Gloucester show - it was great to see so many people who are obviously so enthusiastic about the SAM and the Spectrum.

One thing I was slightly concerned about at the show was that there were two people with SAM hard drives in development, neither of which there had been any kind of publicity about before the show. If you had known more than you were letting on about either Nev or Cookie's projects, then why didn't you pass on the news? Had they known about each other, then maybe they'd have been able to work together, and got something to the stage at which it can be produced so much sooner.... still, it's good to see something appearing at last.

A few ideas for the future development of the SAM: more internal ports, please. In particular, the mouse, external drive

and RS232 interfaces could be incorporated into the machine in the same way as the printer port. A second joystick unavailable for some years now. Also, would it be possible to incorporate the full 512K memory on to the main circuit board? That way, it could be possible to make a 1 meg expansion card to be added in the same way as the old 256K one. I realise that all these things cost money, but in my opinion the only way forward is to develop the hardware to its full potential.

Finally, I must apologise for clogging up the letters page recently with my nitpicking over your spelling. It all got ridiculously out of hand, and it'll never happen again, I promise!

Yours Sincerely, Mark Sturdy.

Glad you liked the show Mark. Yes, there are often things that I know about that for one reason or another I think it better not to print. On the hard disc front, I would not mention it in **FORMAT** until I saw a working prototype. I also think it unwise to encourage people to join forces because, ultimately, that could lead to both projects failing. At the moment it looks like S.D. Software's system stands the most chance of reaching the market place - However, I feel it best to hold back even on that project until a little nearer a launch date.

The joystick splitter should be easy to wire up, I'll look into getting an article done for that sometime. *Ed.*

Dear Editor,

Regarding E. Butterfield's problem with the continuous form feed in Wordmaster, I think I may be able to offer a solution.

The symptom rings a familiar bell, in fact, I once helped another **FORMAT** reader with exactly the same trouble. The cause in his case did indeed turn out to be a code which the printer, not being fully Epson-compatible, didn't recognise.

This was the ESC sequence 27,65,12 for setting 1/6 inch line feed: if the

printer lacks this feature, the 12 will just be interpreted on its own as a form feed - hence the effect. As these codes are sent automatically at the start of printing a document, the only way round it is by using a POKE. If anyone experiencing these difficulties therefore adds POKE 57151,201 to the Wordmaster BASIC (line 100), this will solve the problem by disabling the routine responsible for sending the sequence.

Hope this will be of help.

Yours Sincerely, Miles Kinloch.

Many thanks Miles. *Ed.*

Dear Editor,

Having just filled out my subscription renewal in eager preparation for another year of **FORMAT**, I thought I had better put pen to paper and put a face to an otherwise meaningless membership number.

I have been a keen reader of **FORMAT** for some time now, and began to subscribe when the SAM Coupé was first launched. I began tinkering with computers at school, being the proud owner of a Sinclair ZX81 with a massive 16K of RAM. This was soon replaced by a 48K Spectrum, a Spectrum 128 and eventually a SAM Coupé, which holds its head up high next to an Amiga (Booh! Hiss!).

At the moment I am studying for a degree in Software Engineering, and am about to enter my final year (exam results permitting, he says in baited breath as that dreaded time of year looms ever nearer).

A couple of letters in last month's issue caught my attention in particular. The first was a letter from Mr E. Butterfield experiencing trouble with a Tandy DMP110 printer. At one time, I used to own such a printer and ran it from a Spectrum 128. The only way I was able to produce a screen dump was to write my own routine. The final routine only printed in pure black and white (no grey scale), but satisfied my needs at the time.

I have tried to find the program in question but cannot seem to place it (it was nine years ago), but if he would like to get in touch and supply me with a photocopy of the relevant pages of the printer manual, I am sure I could have another go at writing the routine for him. I can't promise anything too soon because of the imminence of my exams, but if he can last out another couple of months, I will give it a go (unless someone else can come up with the goods in the mean time).

The other letter, from Dominique, asked about a series of articles on programming in Pascal. Once again, in a couple of months time, I would be interested in writing such an article. I have had ten years experience in Pascal programming (on and off) and bought the 1984 edition of Hisoft's Pascal compiler for the Spectrum. My Pascal experience is primarily with Turbo Pascal for the IBM PC and compatibles (Booh! Hiss! again), but this should not be a problem.

Before I finish, may I just thank all of you at **FORMAT** for the many hours of pleasure you have given me and I look forward to reading another year's worth of your wonderful publication.

Yours Sincerely, Alan Bell.

I look forward to anything you would like to contribute to **FORMAT** Alan, and good luck with the exams. *Ed.*

Dear Editor,

With this letter is a cheque for the repairs to my SAM. I would like to thank you for finding my SAM Coupé with Blue Alpha, the new keyboard looks great. Keep up the good work!

Now to networking. After speaking to you on the phone I had a look through my cables and found a seven pin din lead which I must have received when I bought my SAM.

I checked the way it is wired up and it is the same as in the user guide. Pins 6 and 1, 7 and 3 are looped on both din plugs and are joined by 2 core cable.

For ease I'll name the main station

SAM1 and the other SAM2.

Plug one din plug into SAM1's midi out socket.

The other plugs into SAM2's midi in socket.

Note:- SAM1 is the main station and is named 'N0', the network lead must be plugged into the midi out socket.

To use the network type **DEVICE N0** on SAM1, and type **DEVICE N1** on SAM2.

Sending information over the network or receiving information is the same as using disc drives. e.g. To send a program over the network use: **SAVE "NAME"**

To receive a program over the network use: **LOAD"**

By changing what you type after device you can use disc drives or the network. I have done this and it works very fast.

I've used the Spectrum network through the interface 1's which is fun. There is a program on the microdrive intro cartridge which I hope to convert for the SAM, it's nothing fancy, just a number guessing game but I had a lot of fun.

Maybe if you were to ask your readers about networking, a big enough response could lead to a network page, or maybe not, but it's worth a try, someone may have a network program of their own.

Thanks again for my SAM.

Yours Sincerely, Colin Urwin.

Anyone interested in networking? Drop us a line and let us know what you are up to. *Ed.*

Dear Editor,

I have subscribed to **FORMAT** for nearly a year, I like the format of **FORMAT**. I would like to know how you pick your advertisers, further to this I would like to make a suggestion, that you might well consider inviting Messrs J & P Electronics Ltd., Unit 45, Meadowmill Est, Dixon Street, Kidderminster, DY10 1HH to partake in some advertising space, I feel that addition of same would totally transform our magazine. For this reason I must agree with the comments that I read

Below you will find details of the full range of SAM hardware now available.

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W1104	1 MegaByte External Memory Pack. (Needs MasterDOS to run from Basic).	PHONE
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W1108	Internal 256K Upgrade (for older SAMs with only 256K of memory)	£34.95
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every month in our magazine - not enough for the Spectrum reader. This firm would provide myself and many others with products that are needed in the Spectrum World.

Yours Sincerely, G.E.Rogers.

J&P have received many mentions in the past within these pages. They are a long established and much respected company. However, so far, they have not taken up our offers on advertising space.

As for there not being enough for the Spectrum reader, as I've said before, we try to keep the balance but we can only print what we get from writers. **Ed.**

Dear Editor,

I am writing to say that I will not be renewing my membership. I find that the magazine has nothing for the +3 user. The SAM in the spot light more than the +3 which I use all the time. Most of your readers must be SAM users this is why the +3 gets a back seat.

Yours Sincerely, C.N.Cranston.

It is true that the majority of **FORMAT** readers now own SAMs but most of them still own Spectrums as well (and still use them). The +3 was never a very popular machine but it does have a loyal following. BUT, and it is a big but, our +3 readers never seem to write articles for us. Why? I don't know Mr Cranston. Have you ever thought of encouraging interest in the +3 by writing something (however small) for **FORMAT**? Given the shortage of +3 material I can promise that any article would receive our most urgent attention. So come on Mr Cranston (and other +3 readers) stop bemoaning the lack of +3 material and start writing some for all of us to share. **Ed.**

Dear Editor,

I have managed to convert a 'C' program from 'New Scientist' to run on the SAM. It draws an 'autostereogram'. I am sure **FORMAT** readers would be interested, though of course there would be copyright considerations, if it

was intended to reproduce the program - please contact me if you require further details.

Yours Sincerely, Nick Carthey.

I'm also sure others would be interested Nick, and as long as you credit the original author of the article/program and where it first appeared there will be no problem in running it as an article in a future issue of **FORMAT. Ed.**

Dear Editor,

I have just bought SAM C, and was astonished to find that only integer variables, not floating-point, are supported.

Neither FRED's advertisement, nor the various admiring references to SAM C in **FORMAT**, mention this omission. This may be mere carelessness, but I'm inclined to regard it as sharp practice. I have no evidence, but I cannot imagine that the ZX80 was advertised without saying it handled integers only.

Yours Sincerely, Ettrick Thomson.

It is far from being sharp practice Ettrick, I would have been surprised to have found floats (as I think they are called in C circles) in a standard C compiler of this size. I've spoken to my expert advisor (Nev Young) and he tells me that he has only resorted to floats on a handful of occasions during his C programming life (over 5 years I believe). I would think that floating point routines will be on one of the early library routine discs that FRED plan to do. **Ed.**

Dear Editor,

I write to express my views and needs of **FORMAT**. I find that the in depth articles extremely useful. The June edition's article on printer graphics by Carol Brooksbank is a good example, also the Help Page article on Ramtop etc.,

I am a SAM owner and I find that the SAM has sufficient power for my computing needs. The advent of SAM C has added to this, and should help to boost sales.

To me, computing is a hobby, and I think this applies to many SAM & Spectrum owners. Reading your letter pages I find a range of people, male, female, young, and old codgers like me. We all produce programs for our own usage. Mine range from fortune telling for a school fete, the rule of Mah Jong, to adventure games for my grandchildren.

I admire the professional programmers and thank them because without them I would not have this hobby. I do not expect them to part with secrets freely, they must earn their living.

However, this need not apply to us amateurs, and we could feed help and information through **FORMAT** articles, as is done to a great degree in Short Spot.

I would like to see a column called 'FOR STARTERS'. This would help newcomers to computing, by expanding the understanding of SAM Basic and SAM C. The *Basically Speaking* articles were very useful.

Hints and tips from readers should be encouraged. This need not be financial reward, just to see their name in print is a boost to the ego, well it is for me.

I give an example. I was writing a SAM C program, when I found that I needed modulo arithmetic which SAM C did not supply. I invented (or re-invented) the following formula:-

MODULO ARITHMETIC

Example $13 \bmod 3 = 1$

$A / B = C \quad 13 / 3 = 4$
 $C * B = D \quad 4 * 3 = 12$
 $A - C = E \quad 13 - 12 = 1$

This is not earth shaking, but it may solve someone's problem.

I would also like to see skeleton programs e.g. Hunting the Wumpus, their value is twofold.

1) A beginner can analyse them and say "That's how it is done", and start on a masterpiece.

2) They can be fleshed out with graphics, sound, and freely adapted.

Surely such programs can be culled

from back issues of **FORMAT**?

Yours Sincerely, Frank Evans.

Thanks for your comments Frank, but don't class yourself as an old codger - if you are mentally active enough to have computing as your hobby then you are far from being an old codger.

As to programs, we love them. They are the life-blood of **FORMAT**. From Short Spot items to multi part series. And I have always thought that adding to an existing program is the best way to learn Basic or many other languages.

By the way, I think you will find that SAM C does have a MOD function, but thank you for your routine which I'm sure some readers will find useful. **Ed.**

Dear Editor,

I have telephoned your number about a dozen times this last week to find the line occupied by a fax machine. I have also phoned Fred Publishing of Dundee, and told by an answering machine to ring again. Has business gone back to paper and pen. (I feel better now).

I have a SAM Coupe 512K with an internal drive and a drive/printer interface and disc drive fitted with a 2.1 ROM, also a Spectrum with a PLUS D and disc drive.

Could you please answer the following questions?

1. Is it possible to run 'SAM Paint' with a 2.1 ROM?
2. What is the price of a new ROM?
3. DUC lead for the Plus D. To me your advertisement is a little ambiguous "without the need for opening one drive". Does this mean you have to open the second drive?
4. Has the afternoon HOTLINE been discontinued?

Yours Sincerely, K.Todd.

You must have been using the wrong number Mr Todd, our fax machine is always on 01452-380890.

Anyway, your answers. 1) No. 2) The latest SAM ROM can be ordered from us at £12.95 including UK p&p. 3) It means: if you connect two drives with a straight

cable you need to open one to change its ID to drive 2, with our DUC lead you don't need to because the drive signal is swapped by a twist in the lead. 4) No, in fact that is the best time to get through these days. **Ed.**

Dear Editor,

Regarding E.Butterfield's PCG's DTP Workmaster/Tandy DMP 110 printer form feed problems on p28 of May's **FORMAT**. I had a similar type of experience with my Spectrum ZX+ 128K RS 232/Serial 8056 printer set-up and Wordmaster. Miles Kinloch sorted this out for me quite readily.

Briefly, E.Butterfield should try executing POKE 57151,201 into WORDMASTER. This disables the n/72 line feed capability. My printer appears to recognise CHR\$ 27;CHR\$ 65;CHR\$ 12 for 1/6 line feed as CHR\$ 12, a form feed; his, maybe, does the same. My printer, however, did print the text after a form feed - a great paper waster! If this works, he should, if he has not done so already, make a copy of his master disc and save the patched WORDMASTER to this.

Yours Sincerely, Roy Burford.

Many thanks Roy. With all the different solutions to Mr Butterfield's problem one is sure to work. **Ed.**

Dear Editor,

Thank you for backdating my subscription. Although having missed just 5 issues it is surprising to see the advancement in such a short time The long awaited hard disc well on its way, and the development of the SAM C language should do a lot to boost the SAM's status. Hopefully these new products will sell well and so encourage the manufacturers to expand their range.

I bought my 215K tape only SAM about one week before SAMCo's collapse, and was hoping to be able to save up and buy such peripherals as the Video Digitizer and Hardware Developer. Sad to say these never really came back onto the market, and I must confess I had to

wait a good year before deciding to spend more money on the computer, then, she was really only a games machine without the disc drive. Then having finally managed to get hold of a disc drive and mouse my SAM started to take form.

I had previously used a 48K Spectrum and an old Japanese printer as a word processor, and also used it to print various bills when I ran a part time business in England. I thought that was pretty good. But having purchased *The Secretary* and replacing the printer with a Starjet bubblejet printer, even those with IBM types were surprised at the quality and capabilities of my 8-bit.

Since then I have dabbled with programming in Basic and have worked up a massive Database using about 20 discs, and expanding, so the Hard drive interface will come in useful.

Having seen a program running on a friend's IBM compatible got thinking. He had what was called 'intelligent icons', which could be re-arranged on screen to suit his particular needs. Could I create such a program??

If anyone is interested, I've written a program that does just this. It allows one to create various menus using icons, placing them anywhere on screen, and gives the ability to swap them around as needed. I've used icons created with Icon Master within DRIVER and converted their format using a simple program. If interested I could send the program as a couple of articles for the benefit of others. I use it when writing menu driven programs and it enables me to make extensive use of the Mouse.

Once again thank you for a high quality publication. It really is my only link with the world of SAM and look forward to it arriving every month, even though it doesn't get here until around the 15th.

*Yours Sincerely, I.W.Canfield.
(Germany).*

I'm sure there would be interest in your articles and I look forward to seeing them. **Ed.**

Dear Editor,

Regarding the expansion of **FORMAT** readership, in particular contacting the Z80 Spectrum emulator users.

Why not contact Mr G.Lunter and Brian Gaff of (B.G. Services) who probably have a list of all the registered users. You could then mail a flyer to them all. Also there is a Bulletin Board System for registered users, you could probably get an advert on it also.

The unregistered shareware users are more of a problem. You could ask if the above would let you advertise on their shareware Z80 disc, via a text file. This would take care of new users.

I cannot think of a way of contacting existing users of the shareware version.

Yours Sincerely, Phil Bartle.

Phil's was the first letter to mention emulator users. I have been in contact with Brian Gaff in the past and he has offered to do what he can to help. My only problem is that we really need to have a regular column covering the Z80 emulator (and others) in **FORMAT** - it is the old chicken and the egg problem. I have asked before for someone to write or sub-edit such a column but so far to no avail. Anyone interested? **Ed.**

Dear Editor,

I always find it difficult to choose three articles which I have enjoyed more than others as I usually read the magazine from cover to cover.

As I started with a Spectrum 48K and now have a SAM 512K with one disc drive which has been upgraded from a 128K using tape, I find that nearly all the articles are of some interest.

The only articles that do not interest me are about the PLUS D or DISCiPLE as I have never owned one so I do not understand them.

I was pleased to see the return of John Wase's Short Spot as **FORMAT** was not the same without it.

The Help Page always holds something of interest and without wishing to repeat myself, anything by the amazing Carol

Brooksbank is always absorbing.

I have been a subscriber to your magazine since I first purchased my SAM in 1989 just before the demise of MGT and I think the standard has always been high.

Carry on the good work!

Yours Sincerely, Colin Rout.

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 0452 380890.



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