Vol 4 - No 12. August 1991.

FORMAT

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NEWS ON 4

ALL FORMATS GO LOCAL

If you are fed up with always travelling hundreds of miles to visit a computer show then you will be pleased to hear that you wont have so far to go in future.

Having proved the successful formula with the London and Birmingham the organizers are now adding Leeds, Glasgow and Bristol to the list.

All locations have been chosen for their excellent road and rail links (the Bristol show is right next to Bristol Temple Meads station. As you will see from their advert in this issue the All Formats Show Calendar for this Autumn is going to mean a busy time for exhibitors - and show goers.

ADVENTURE GET TOGETHER

The 1991 Adventure Probe Convention will be taking place on Saturday 26th October 1991 at the Royal Angus Thistle Hotel, Birmingham from 10am to 5pm. This is the 2nd convention organized by the Adventure Probe magazine, a fanzine devoted to adventure players and now in its fifth year.

Most popular home computers will be represented at the convention but the Spectrum will probably dominate as about two-thirds of Probe's readers are Spectrum users.

Tickets cost £5 and are available in advance from Adventure Probe, 67 Lloyd Street, Landudno, Gwynedd, LL30 2YP. For further details contact Mandy Rodrigues on 0492-877305.

ANOTHER BLOW FOR AMSTRAD

Dixons, Britain's largest electrical retail chain, has announced that it is dropping the Amstrad GX4000 games console. Blaming very poor sales Dixons have decided to sell their remaining stocks of the machine at 19.99, less than a quarter of the original price.

Total sales of the console in the UK are reported to be as low as 15-20 thousand, and with less than 20 cartridges available it may not be long before Amstrad is forced to drop the product altogether.

SAM T.V.

No, SAMCO have not jumped on the television bandwagon, but Epson have.

Epson, famous for their printers and PCs have now moved into the pocket television market with two LCD colour tellies. At 2.6" and 3.3" the TVs have SAM (super active matrix) screens.

At £199.99 for the 2.6 inch and 299.99 for the 3.3 inch model they are not cheap, but both models have video and audio inputs so they may well prove interesting to computer users who want to keep their equipment as portable as possible.

For further details contact Epson UK on 0442-61144.

JAIL FOR SOFTWARE PIRATE

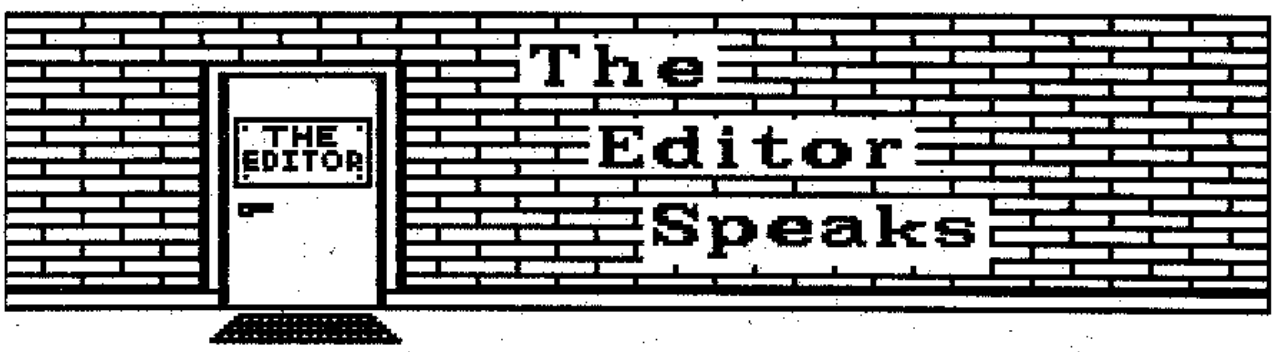
FAST (the Federation Against Software Theft) has won a major court victory against Andrew Jayes of Nottingham based A & J Software.

The case, brought under the 1988 Copyright, Design and Patents Act, cited five offences involving the illegal copying of software. It resulted in Mr Jayes being sentenced to three months in jail. This is the first time anyone has been jailed as a result of the Act and marks a real step forward for FAST.

Fines imposed on recent offenders have been high, but FAST is pleased that courts are now prepared to consider a real deterent.

News Credits: Bob Bates, Adrian Morris, Mike Adams.

URGENT we need your news. Anything you think other people should know about. Items printed earn contributor 3 month extra subscription



Several letters and phone calls have asked the question "What is this SAM DEMO DISC you keep mentioning?". Well, when SAM was first launched I had a leaflet produced and included with every SAM dispatched. The leaflet advertised the benefits to SAM users of reading FORMAT. As an incentive people who became new members using the special offer slip were promised a free demo tape. This offer continued until SAMCO took over from MGT last September.

Now we all know how bad cassette loading can be with SAM. It is not as tolerant as the Spectrum to signal strength or frequency. So it soon became obvious that, even when we had the final version of the ROM in most peoples hands, producing the tape was going to cause problems. So a few months ago we offered eligible readers a disc instead of the tape, all we asked for was an SAE to help towards the extra costs. Several hundred have already been sent out and the general reaction has been very good.

The disc contains a mix of programs, each selected to show off features of the SAM Coupé. Quite deliberately NONE of the programs use machine code, they are all in Basic. Why? Because that way they do not just show off the Coupé, as much of the PD software does, but allows you to discover how to do things for yourself. We have always been the best source of knowledge for SAM users and the demo disc is another example of this. The programs will often provide you with a starting point in attempts to develop your own ideas. Most of the free space on the disc has then been filled with some of the best examples of screen art on SAM, many exclusive to FORMAT.

For those of you who are not eligible the disc is available through the FRS page at only £1.50 inclusive.

Over the last few months there have been a lot of changes going on in FORMAT's offices. A new telephone system now makes it a little easier as a second line is used for outgoing calls, keeping 412572 free for you to ring us. There is also a new FAX line on 0452-380890 which give you another way to contact us if you need to.

This months issue is a milestone, it is the 50th issue I have put together (48 real issues plus 2 introductory issues). Still I will leave the celebrations for next months massive 4th Birthday issue - don't miss it.

Many of you have been asking for more games coverage in FORMAT and it has been suggested that we could have a games supplement. What do you think? Would you read it? More important is there anyone who could write or edit such a mag? Let me know, if there is enough interest then you never know what Santa may bring. Don't worry readers, FORMAT itself will stay the ONLY serious printed magazine dedicated to Spectrum & SAM users.

Finally, I'm sorry to say a couple of articles that should have been in this issue are still stuck on my Epson PC due to a faulty connector, its fixed now but too late for me to edit things for this issue. We also did not receive a SAMCO Mouse and interface in time for a review in this issue. I hope it will appear soon, so keep reading. Meanwhile there is a review of the Messenger Interface in this issue.

Bob Brenchley. Editor.

UNI-DOS

UNIDOS The incredible new DOS from Steve Warr for the PLUS D and DISCIPLE. Same DOS file for both systems. Random files. Sub directories. Hundreds of files on one disc. Hidden files. Protected files. Copy any file of any length without resetting. Incredibly versatile screen dump routines. Error trapping. Many more features. State if ROM for PLUS D or DISCIPLE, disk size and number of tracks required when ordering. (PLUS D, 3.5 inch 80T will be sent otherwise)

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SHORT • SPOT

By:- John Wase.

We start this month with a contribution from Bjorn Nyberg of Glasgow, so stupidly simple that you wonder if it's worth typing in. Yet once you've used it, you wonder how you did without it.

As Bjorn mentions, a request for a directory resulting in snapA, snapB, snapC and so on, is not very informative. You either rename it or forget it. So his program is for renaming snapshots taken from the Spectrum on PLUS D/DISCiPLE disc.

```
 15 POKE 23658,8
 20 INPUT "SnapRename"''"Input letter
    /digit code after 'Snap': "; LINE
     a$
 30 IF LEN a$ >2 THEN GOTO 10
 40 IF LEN a$=1 THEN LET a$=" "+a$
 50 LET a$="Snap"+a$
 55 POKE 23658,2
 60 INPUT "Input new name: "; LINE b$
 70 IF LEN b$>10 THEN GOTO 60
 80 PRINT #0;"Do you want to rename '
    ";a$;"'"'"to '";b$;"'?": GOSUB 90
    00
 90 IF k$="n" THEN GOTO 10
100 ERASE d1 ""+a$ TO ""+b$
110 CAT 1
120 PAUSE 0
130 STOP
9000 PRINT #0'"Press Y or N "
9002 PAUSE 0: LET k$=INKEY$
9005 IF (k$="y" OR k$="n") THEN RETURN
9010 GOTO 9000
9998 SAVE d1"SnapRename" LINE 1
```

A couple of other points. Line 100 looks funny, but PLUS D syntax seemed to demand it. Lines 9000 to 9010 are Bjorn's "Y?N" utility, which he usually includes as standard. Finally, Bjorn has missed the review of BetaDOS - it was, in fact, included in "Format" December 1990, page 13.

Now, here's a beauty. Are you into music? Composing? Expensive, this specially ruled music stationery, isn't it. Bob Doughty of Stowmarket to the rescue, with a Specprogram which is very easily adapted to SAM.

```
  1 REM ******Music Sheets******
  2 REM **Bob Doughty 1991***
 10 REM PRINT SHEETS ON 80 COL 80 LIN
    E PRINTER
 20 DIM L$(400)
 30 FOR N=1 TO 400: LET L$(N)="_": NE
    XT N
 40 INPUT "NO OF SHEETS "; SHEETS
 49 REM SET UP YOUR PRINTER DRIVER IN
     THE NEXT LINE, LIKE OPEN #3;"T"
    FOR INT 1, DISCOVERY OR SAM, OR P
    OKE @ 6,0 FOR PLUS D
 50 COPY : REM /1: REM AUTO LINEFEED
    FOR KEMPSTON INTERFACE AND SHINWA
     CPA80, SET FOR 80 COL; 80 LINE,
    8 SKIPOVER, OR WHAT SUITS YOUR PA
    PER
 60 FOR S=1 TO SHEETS
 70 FOR N=1 TO 8
 80 LPRINT L$: LPRINT''''
 90 NEXT N: NEXT S
```

And Bob's even sent me some paper to compose a tune on...

As I mentioned in the last column, I thought it was time to give PRINT USING a rest, since it was getting (a) acrimonious, (b) boring and (c) over-subscribed. I mean, we don't really want "Short Spot" full of a dozen PRINT USING routines every month. So, either buy a SAM, with MasterBasic (which has USING$), or BetaBasic for your Spectrum (again, a PRINT USING routine is included) or use one of the published programs, adapting it to your needs. I must, before closing this completely, acknowledge Roy Burford's letter. Roy has sent me a cassette with a very full version, following an earlier letter. If you are particularly interested in having this version printed, then drop or me a line. Meanwhile, thanks for all the interest.

Now, BIGletters. I've a had several programs sent in for SAM which actually have been superseded by events, for MasterBasic includes CSIZE as a keyword to give letters up to full screen in size. However, not everyone has MasterBasic yet, so whilst you're waiting for the postman, here's one of the programs to type in....

It's a relatively short snippet from Craig Turberfield of Shottery, Stratford-upon-Avon. Craig has modified Dave Wood's Bigletter program, featured recently, to one which prints out one letter at a time. That's because each letter fills the screen, coming up as soon as you have pressed the appropriate key.

```
 10 REM *    Big Letters    *
 20 REM * For the SAM Coupé *
 30 MODE 4: CLS #: CSIZE 6,8: POKE S
    VAR 618,8: PRINT "Press a letter
    ...": BLOCKS 0: PAUSE
 40 PALETTE 9,45
 50 CLS : DO WHILE INKEY$="": LOOP
 60 LET A$=INKEY$: BOOM
 70 LET S=0
 80 PRINT PEN 8; AT 21,0;A$
 90 LET S=0
100 FOR Z=7 TO 1 STEP -1
110 FOR X=1 TO 31
120 IF POINT(X,Z)=8 THEN FOR L=0 TO
    2: PRINT AT S+L,X*4-3; PAPER 9;"
       ": NEXT L
130 NEXT X
140 LET S=S+3
150 NEXT Z
160 PRINT AT 21,0;" "
170 PAUSE : GOTO 50
```

If you like printing in differnt ways then see the special SAM CSETS article in this months issue.

Whilst we're on about superseded programs (and I'm the first to acknowledge that we can't afford all the bits and dongles), here's one, also for SAM, from Tony Jeenes. If you pay out money, you can buy MasterDoS and the SAMbus, and you've got a clock chip which you can interrogate. If you've not got the money (or got round to it yet), Tony Jeenes has a stopgap that will do until you can get the real thing... This is a digital clock program which arose through Nev Young's explanation of the interrupt routine on the SAM Coupé. It's for Mode 4, and all the machine code is in the data statements.

```
 10 REM DIGITAL CLOCK FOR SAM
 20 REM MODE 4-LINE INTERRUPT
 30 REM ** BY TONY JEENES **
 40 REM CALL 16384 TO START
       DPOKE 23266,0 TO STOP
 50 MODE 4: CSIZE 8,8
 60 LET A=16384
 70 FOR S=1 TO 17: LET N=1
 80 READ A$: LET L=LEN A$
 90 LET B=VAL ("&"+A$(N TO N+1))
100 POKE A,B: LET A=A+1
110 LET N=N+2: IF N<L THEN GOTO 90
120 NEXT S
130 DATA "01E001CD060121104022"
140 DATA "E25AC932000000E5D5C5"
150 DATA "F53A0E40216C80CD8E40"
160 DATA "000000000000003A0F40"
170 DATA "217880CD8E403A0D403D"
180 DATA "320D40201F3E32320D40"
190 DATA "3A0F403CFE3C200F3A0E"
200 DATA "403CFE3C20023E00320E"
210 DATA "403E00320F40F1C1D1E1C9"
220 DATA "E521B040473E00C61C10"
230 DATA "FC16005F19DBFB32C841"
240 DATA "3E1ED3FBD106070E047E"
250 DATA "1213230D20F9E5217C0019"
260 DATA "EBE110EE3AC841D3FBC9"
270 DATA "CDA2407AD5E5CD5B40E1"
280 DATA "23232323D17BCD5B40C9"
290 DATA "16FF14D60A30FBC60A5FC9"
300 LET P=13: PEN P
310 LET E=P,F=P*16,G=(P*16)+P
320 FOR A=16560 TO 16839 STEP 4
330 READ B,C,D: LET E=P,F=P*16,G=(P*
    16)+P
340 POKE A,0,B,C,D
350 NEXT A
360 DATA E,G,0,F,0,F,F,E,F,F,F,F,G,0
    ,F,F,0,F,E,G,0
370 DATA 0,F,0,E,F,0,0,F,0,0,F,0,0,F
    ,0,0,F,0,E,G,0
380 DATA E,G,0,F,0,F,0,0,F,0,E,0,0,F
    ,0,E,0,0,G,G,F
390 DATA E,G,0,F,0,F,0,0,F,0,G,0,0,0
    ,F,F,0,F,E,G,0
400 DATA 0,E,0,0,G,0,E,E,0,F,E,0,G,G
    ,F,0,E,0,0,E,0
410 DATA G,G,F,F,0,0,G,G,0,0,0,F,0,0
    ,F,F,0,F,E,G,0
420 DATA 0,G,0,E,0,0,F,0,0,G,G,0,F,0
    ,F,F,0,F,E,G,0
```

```
430 DATA G,G,F,0,0,F,0,E,0,0,F,0,E,0
    ,0,F,0,0,F,0,0
440 DATA E,G,0,F,0,F,F,0,F,E,G,0,F,0
    ,F,F,0,F,E,G,0
450 DATA E,G,0,F,0,F,F,0,F,E,G,F,0,0
    ,F,0,E,0,E,F,0
```

Many thanks, Tony.

Next; a mild telling off from W.Ettrick Thomson of Aldeburgh, Suffolk, who spotted Simon Goodwin's contribution after his had been printed, and complains that no reference was made to his submission. The problem arises because I am doing the next "Short Spot" before the previous one is distributed. Bob usually has the previous issue just coming back from the printers when he is deep in the problem of putting the following issue together. I always submit a fairly long column, so that Bob has sufficient material: he often has to chop bits out to get it to fit the space available. So I'm forever returning bits of previous "Short Spots" which Bob is often cutting out again. As these come back after the issue has been printed, and after I've sent a further column, you can see that there is a superb recipe for confusion. Actually, we manage fairly well. But please do excuse the occasional out-of-order bit.....

Ettrick writes as follows. "I find that the Shell delayed-exchange sort ("Short Spot", May 91) is faster than the Shell shuttle sort used by Simon Goodwin ("Short Spot" June 91). I extended his program to make two identical tables, sorting the first by SORT_UP and the second by an added PROC using Shell delayed-exchange; times for both were found by PROC clock and the ratio calculated. For 20 runs, the times were equal in just one case; for the remainder, the shuttle-sort times were greater by amounts ranging from 8% to 39%; average (including the equality result) 22%. Andrew Featherstone ("Practical Computing", April 1983 pp136-138) compares several methods, each with and without Donald Shell's refinement, and comes out in favour of the Shell delayed-exchange sort."

In recompense, here's an interesing little tip for SAM from Simon Goodwin, which is particularly topical at the moment as I am comparing the various word-processors available for "Micro Computer Mart", and was looking at the modified "Tasword 2 for SAM" only last night.

Sam's keys are tetchy to say the least. In an attempt to ensure that a keystroke is picked up, many programmers have reduced the time taken before the keypress starts repeating. This is the wrong approach, and leads to the sort of problem seen in Tasword 2, where you only have to touch the keys for them to give you the same letter twice. It's much better to use Simon's approach as shown in his TYPE-AHEAD program, because this reads the type-ahead buffer rather than just scanning the keys when called: it's therefore far better than using GET or INKEY$. In fact, you should be able to type at full speed whilst the graphics are generated, without losing characters. Replace PRINT key$ with PRINT INKEY$ and see how few characters get through, if the buffer is not used. Simon worked out this routine to speed up Dave Tonks' "SAMSCRATCH" word processor, which those of us who receive the SDC discs know so well.

```
100 REM SAM Keyboard queue polling
110 REM Simon N Goodwin 20.2.91
120 REM Revised for John Wase, 19/4/
    91
125 REM Shows how you can read the S
    AM keyboard without losing chara
    cters
127 REM while BASIC is busy with oth
    er things. PROC GETKEY reads the
     type-ahead queue.
130 MODE 4: CLS # : PLOT 128,100: PR
    INT AT 15,4;"Type anything now..
    ."
140 DO
150 GETKEY: PRINT #0;Key$;
160 PEN 1+RND(14): FOR p=1 TO 12: DR
    AW TO RND(255),70+RND(100): NEXT
     p
170 LOOP :
180 DEF PROC GETKEY
190 REM Is there a key-code waiting?
200 IF PEEK SVAR 520
```

```
210 LET key$=CHR$ PEEK SVAR 520
220 POKE SVAR 520,0
230 POKE SVAR 571,BIN 11011111 BAND
    PEEK SVAR 571
240 REM Let the next code out of the
     buffer
250 ELSE
260 LET key$=""
270 END IF
280 END PROC :
```

Many thanks, Simon. Terrific.

And that's all for this month. My grateful thanks for all your contributions from which I try to put a balanced column together. Please keep them coming to:-

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

See you all next month.

MODEMS

WHAT ARE THEY? HOW DO THEY WORK?

By:- Brian Gaff.

I have noticed several letters in FORMAT recently, asking about modems - or should I say, what ARE modems? Well hopefully, this article will explain them, and their uses.

The word "MODEM", is an acronym for MODulator/DEModulator, which makes it sound horribly complicated! In fact, the principle behind the name is very simple. The telephone lines that we all use every day, are not exactly Hi-Fi quality. The modem was devised to enable data to be sent over them at a reasonable rate. The simplest modems use a system not unlike the Spectrum Tape Save system, employing two different tones to encode the bytes.

On the reception side, the modem turns the tones back into bytes. The complications start to creep in when you want to start sending and receiving simultaneously! You also have the problem of noise on the phone lines to contend with. This corrupts the data.

As this article aims to keep things simple, I am not going to go into the complexities of this, but basically, a modem which can talk and receive at the same time is called a Full Duplex device, and most of those available are like this. The cheapest of these (like the VTX5000 for the Spectrum), achieve full duplex by having the receive side running at one speed, and the transmit side at another.

You are probably familiar with the term "baud rate", from using serial printers. Modems too, use this term to give an indication of their speed. However, there are standards for modems that use numbers beginning with "V", to describe their speed. Here are a few of them.

V21 is one of the oldest standards, which equates to 300 baud in both directions. This is horribly slow, in fact about the same speed as a ZX81 SAVE!

V23 is the most often encountered speed on cheap gear. The VTX5000 runs to this spec, which is 1200 baud receive, and 75 baud transmit. It is the speed that Prestel, BT's Viewdata service, started out at, way back in the 70's! It is quite respectable on receive, but a non starter for sending large amounts of data the other way.

V22 manages 1200 baud in both directions.

V22bis is a development of V22, which manages to get 2400 baud through both ways. The prices start to hurtle upwards around here!

V32 is 9600 baud both ways. £800+ is an average price for one of these little toys, prices are falling though.

Before I go into the sort of uses modems are put to, a short word about the limitations of the Spectrum. Unfortunately, Uncle Sir, and Big Al, never bothered to provide our little machines with a decent RS232 port. AHA, I hear you say, it works my printer OK! Well, it does, because you are really only sending data OUT of it. To use it on a modem, you need to be able to bring it in at the same time.

Unfortunately, the Z80 can only do one thing at a time, so proper RS232 ports generally have a chip in them called a UART, an acronym for Universal Asynchronous Receiver Transmitter. This takes charge of the port, storing characters which come in while the Z80 is busy in a buffer, and generally looking after things. When

the Z80 is free, the UART can send its data to the processor and the bytes are retrieved and sent to wherever the software decides.

On the Spectrum, the whole process is driven by the Z80, and only a single character buffer is possible. This is due to the fact that the ULA - Uncommited Logic Array - which drives the Speccy screen, has to stop the Z80 running while it updates the RAM used for the screen. During this time, characters get lost.

At present, there are no RS232 interfaces for the Spectrum which get around this problem. That is why it is not possible to simply wire a standard modem up to interface 1 or a 128K machine. Some people have done it, but the results are rather dreadful. There is little software about which can use these ports in this way either.

That is why most users have to make do with the VTX5000. This may be only capable of V23, and a rather oddball 1200 baud Half duplex mode, but it does get around the RS232 problem nicely by having a UART chip built in. There is also a lot of software available for it, and to cap it all, it includes a usable Viewdata terminal in ROM. Unfortunately, the VTX5000 is no longer made, but there are still quite a lot of them available new, and on the second hand market. Its probably the cheapest way for Spectrum owners to dip a toe in the comms waters though.

So, what about SAM? The good news is that the comms interface has got a UART, and it can drive a modem. As yet there is no software to do this, but its coming. It may also soon be possible to use the VTX5000 on the machine via an interface, which may be good news for the cost conscious. Special software would need to be written though, as the ROM could not be used.

Any "Hayes compatible" modem should work on SAM's comms interface. though the software must be written in code to be fast enough to retrieve characters from the 3 character buffer. The term "Hayes modem", refers to a standard command language used to communicate with modern modems. Hayes is the name of the company who first used it. The commands look like this:-

AT DT0716181111

This dials the number using tone dialling. All commands start with AT.

So, all very nice you may say, but why SHOULD I want to send data over the phone, what can I use it for? Well, you can join in multi user games, get programs from Bulletin Boards, read and send electronic mail - some of which is distributed world wide - , and even run your own area on someone elses system!

Costs can be as high or low as you like. If you stick to free BBs, you only pay the cost of the phone call. If you want what is effectively an on line interactive magazine with multi user games and loads of software, then you join Micronet. This is quite expensive, at 30 a quarter, though you do get access via a local call, which is something you cannot always do with BBs!

On the other hand, you may just want to ring up a mate, and swap programs via the phone. There are several pieces of software that allow this. It is for this use, that the rather odd 1200/1200 baud half duplex mode comes into its own. Half duplex simply means that the modem switches between receive and transmit.

Errors caused by noise on the line are corrected by a special code called a checksum which is calculated from the data sent in each block. This is sent to the receiver, who in turn checks it against a code worked out from the data received. If they do not match, a request is sent for that part of the data to be resent. Receiving software from BBs, Micronet, or another user, is called downloading, and although the systems and software used vary, the way they detect errors are very similar.

Most systems you will encounter, fall into one of two catagories.

Viewdata:- looks just like teletext, but has the advantage that you can send data as well as receive it. MICRONET uses this type of system.

Scrolling:- is just what the name suggests. In its simplest form, it is just a stream of textual information. Its not much to look at, but these BBs tend to have the most comprehensive features. They are not tied to a rigid page based format as is normal on Viewdata systems.

There is one other difference which is not obvious at first. Viewdata uses 7 data bits, and reserves the eighth for checking parity. This is a primitive form of error detection. It means though, that when data is being sent, only codes from 0 to 127 can be used. It makes downloading less efficient as offset bytes must be sent to tell your software the true value of the byte.

Most scrolling systems do not bother with parity, which means that standard text can be affected by line noise more than on a viewdata system. However, as most download systems do error checking, the data is able to be sent faster as all the values up to 255 can be sent. On the Spectrum, scrolling boards can look rather untidy, due to the fact that the standard scrolling display is supposed to have 80 columns, and the best you can do on a Spectrum is 64.

I often get asked if it is possible to run a BB on a Spectrum. Well it is, but as yet only the +3 has any usable software. The serial port is, as ever. the main problem. The VTX5000 is not able to answer the phone or run in what is known as HOST mode - transmitting at 1200 baud and receiving at 75 baud - so a method has to be found of connecting a standard modem before you can contemplate running a BB.

Well, that will do for now, below are a few contacts you may find useful. I hope you will forgive me for including myself in this! Comms can be a very interesting side of computing. The only real drawback it has is the cost of phone calls in this country, but maybe that is about to change.

B.G. Services, 64 Roebuck Road, Chessington Surrey. KT9 1JX. ring 081 397 0763. VTX5000s and BB lists, advice etc.

Micronet, 0800 200 700 for info packs, or 071 618 1111 and then 44444444444444 to see the demo database.

There are many BBs, and quite a lot of them cannot be accessed by a VTX5000, but here are a few taken at random that at least have Spectrum areas and software.

Image Design Viewdata is Viewdata and on 0634 869 001 (Kent)

Infotel ROS is scrolling, so you will need extra software to access it on a VTX5000. Ring 0737 766 027 (Surrey)

Fourth Dimension Online Systems is also scrolling, ring 0202 600 305 (Dorset)

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NEV'S HELP PAGE

By:- Nev Young.

Well the summer solstice has passed and the rainy season has started here in England. This may have something to do with the ritual rain dance performed at Wimbledon each year or maybe I'm just an old sceptic.

Another sceptic is Mr Simpson of Mansfield who asks where has all my memory gone on my SAM. He is trying to use an array of 1000,50 character strings and gets an out of memory condition. Further more RAMTOP is set to 81919 and PRINT FREE shows only 57542 bytes left. So he asks is there any way to access the extra memory or is it a "con".

When SAM is switched on, after the flashing border which shows the memory test is being done, the ROM program organises the memory. The two highest memory pages, each page is 16K you remember, are used for the screen. the four lowest pages are allocated for basic. The rest are left unused.

As the address of the first page of RAM is 16384 adding the 64K for 4 pages onto this gives 81920. So RAMTOP has to be below this value hence 81919. When you load the DOS this will load into the highest unused page. If you have Masterbasic this will load into the highest page below the DOS. Other utilities, such as the dump utility, will load into other unused pages. If you open another screen this will use the two highest unused pages. The free pages can soon get used up if you are not careful.

All these use the highest pages available. So you would expect to be able to tell the machine to allow more memory for BASIC by using the next lowest free page, and you can. Every time you use the command OPEN 1 one more 16K page will be opened for use by basic. But this will not move RAMTOP and so will not alter the FREE space. After opening more pages, you can open more than one at a time. You have to use the CLEAR command followed by the new value of RAMTOP.

For example after switch on type "OPEN 4". There should now be eight pages available for basic. To move RAMTOP to the highest value type "CLEAR 147455". Now try PRINT FREE. You can also use the OPEN command to set the number of pages to a specific value by "OPEN TO 8". If you play about with different values of OPEN TO and also try OPENing extra screens it won't be long before you have used all the memory.

Now this begs the question, why isn't all the free memory assigned to basic at switch on and then you have to free some it to let you open screens etc. The simple answer is I don't know, but It was probably thought to be a good idea at the time it was done.

A sad tale from David Ashton in Plymouth. The light on his PLUS D has gone out and stopped out. What should he do? Contact Paul at PBT (see his advert somewhere in this issue). If he can't fix it then nobody can. However if the PLUS D is working apart from the little LED not coming on then there is no real need to get it repaired, after all there never was one on the DISCiPLE.

J.Juursema of Hoorn has some machine code routines of about 300 bytes in length and asks if it is possible to make these into execute files. It is clear to me from your letter that you do not understand what an execute file is. That is not too surprising as they are hardly ever used.

Within the RAM area of the DISCiPLE

and the PLUS D there is a 512 byte area that is used to buffer sectors before writing them to the disc and also after reading from the disc. The sector data is then moved to where it is really wanted in memory. (Yes I know some disc read and writes go directly to memory without this buffer). It is also used by the DOS when reading the disc directory.

However, it is possible to load one sector of data into this buffer and execute the code from there. As you will now realise the file has to be of type execute. The rules for constructing an execute file are:- The file must be less than 511 bytes long. The code must be written to execute at the disc buffer address (1A00 on the DISCiPLE and 3A00 on the PLUS D). You must not use any DOS functions that would overwrite or clear the disc buffer, obviously. The shadow ROM is paged in during execution, again obvious, so you have to call the main ROM via a RST 10 followed by the routine address. At the end of the routine, as long as you haven't altered the stack or any pointers etc, the system is returned to just after the LOAD command.

This means that you can not put anything in an execute file and expect it to stay in memory for any length of time. To add the new routines as you are trying to do you will need to extend basic as outlined in issues 2/3 and 2/4 or use the create file type available in Uni-Dos that is designed just for this.

Derek Morgan of Skelmersdale sent me an interesting little program that is well suited for the short spot. He says it don't work on SAM. The program is:-

```
10 CLOSE #3;"B": OPEN #3;"B"
20 LPRINT CHR 27;"M": REM ELITE
30 LPRINT CHR$ 27;"S0": REM SUBSCRI
   PT
40 LPRINT CHR$27;"A";CHR$ 6: REM SI
   X LINES
50 DIR #3,1 60 CLOSE #3;"B"
```

There are number of thing that stop this from working as expected. It should print a mini dir (ie in small print).

The problems are:-

1. Line 60 is not needed.
2. The CLOSE in line 10 should be CLOSE #3:
3. There should be a ; before the : on lines 20, 30 & 40.
4. Before printing the DIR the printer channel should be reset to "P" so add this line:-

```
45 CLOSE#3: OPEN#3;"P"
```

Then it should work beautifully.

As a matter of interest rather than keep closing and opening channel 3 to get control codes to the printer you can start your program with the following:-

```
10 CLOSE #3: OPEN #3;"P"
20 CLOSE #4: OPEN #4;"B"
```

Now you can print via channel 3 as normal but you can send control codes via channel 4 at any time.

C.Burn has written again to expand on his letter of last month and to raise a few more queries. He has heard of a variable called VECTOR that can be used to add new commands. Well there is no variable in the DOS by that name but I think you may be thinking of either KBSCAD or ONERR. Using the ONERR var is shown by example in the adding basic commands as mentioned above. When the spectrum fails syntax it passes control to the shadow ROM. When this routine fails syntax then, if ONERR is non zero, a call is made to that address with the shadow ROM paged out.

The other address KBSCAD is called just before the keyboard scan so is called every interrupt. This can be used for running background tasks such as a print spooler etc.

The variables can be loaded by POKE @adr,n where adr = 16 for KBSCAD and 14 for ONERR. Note that they must

hold a value > 256.

Mr Burn also asks about the extra hook codes and system variables for the DOS. I would recommend the series inside G+DOS by S Warr in issues 2/8 2/9 2/10 & 2/12 and the articles on hook codes in issues 2/3 2/4 & 2/6.

Well thats it for another month. Keep your letters coming and I will do my best to get an answer for you. Please note that I am unable to give personal replies, but I will try to answer as many letters as I can through FORMAT.

Write to:-

Nev Young (Format Help Page)
70, Rainhall Road,
Barnoldswick,
Colne,
Lancashire,
BB8 6AB.

++ ++ ++ ++ ++

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Part 1.

By:- Carol Brooksbank.

Are those machine code programs which appear in FORMAT a total mystery to you? Have you tried in the past to get to grips with machine code, and given up in despair? Well, stick with me over the next few months and we will blow away the clouds. And let me reassure you about two things. You will NOT have to learn hex arithmetic. Nor will you need to learn the binary system, because the little bit of binary you need to know I shall give you in a simple table which you can refer to whenever you want to use a binary number.

I shall be using simple, (sometimes silly!) drawings and illustrations to help you remember how things work, and short, but usually useful, routines to introduce you to the various programming instructions.

But why do we need machine code? Well, the only thing a computer can do is manipulate numbers. Everything it does, from graphics to word processing, music making to controlling a robot, is done by numbers. The only instructions it can understand is a sequence of numbers. Each number or group of numbers in the sequence triggers off a response in the computer's processor and hardware, and the computer does what the programmer wants it to do. That sequence of numbers is a machine code program.

When you program in BASIC, the first thing the processor must do with every command is translate it into a machine code routine. That takes time. If you program in machine code in the first place, you are cutting out the middle man - the BASIC translator - and the program is vastly speeded up. And there are some things you can do in machine code which are not possible in BASIC, because there are no commands. Spectrum Plus 3 owners will know that they cannot make OPEN# files on disc as Microdrive and PLUS D users can. But it can be done, even on a Plus 3, from machine code.

But don't run away with the idea that once you know machine code, you will always use it and abandon BASIC for ever. You should only use machine code when what you want to do is either impossible or unacceptably slow in BASIC.

A list of numbers in the right order may be crystal clear to a computer, but it is mind-boggling for a human to read or write as a program. We should have to learn and remember the significance of more than 650 numbers or combinations of numbers. Only the occasional genius can manage it. So it is usual to use Assembly language for program writing.

Assembly language gives every command a short name like ADD (obvious) or SUB (for subtract), which makes it possible for the average brain like mine to remember what the command does. These names are called opcodes. In the old days, having written your assembly language program, you then got a list of all the opcodes, looked up the numbers they stood for, and wrote a code poker to poke the numbers into the computer's memory in the right order. These days, fortunately, there are assembler programs which let you write in assembly language and they do the translation to numbers for you. They let you save the assembly language sequence - the source code - and/or the machine code sequence - the object code.

There are a number of good assembler programs around, and if you already have one, use it. If not, I strongly

recommend getting one because the index-and-pencil method is so frustrating and fiddly that you will give up once the routines get longer than a few commands. But I will include code pokers, at least for the first few articles, for the benefit of those who have not yet bought an assembler.

Spectrum and Sam both use the Z80 processor chip, so most of our routines will run on either. Where there are differences, I will tell you and give two routines.

So, down to business. At this point, I want you to forget all you know about BASIC programming. Machine code and BASIC are two entirely different methods of programming, and if you keep trying to compare the two you will only get confused, and eventually discouraged.

When I give you a new machine code command, I will give the opcode and the number or numbers it represents, like this:- RET - 201

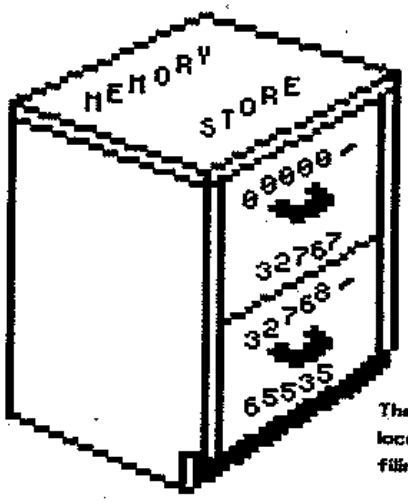
If you are using an assembler you will not need to worry about the numbers, but it will help you see how the machine code program builds up.

RET is, in fact, the most important command of the lot. RET means RETurn. Every program must end with it, because without it control is not handed back to BASIC, and the processor either wanders aimlessly round and round in an endless loop, or resets the computer as though you had pressed the reset button or switched it off and on. Aimless wandering is called a crash. Sometimes it results in pretty patterns on screen, sometimes everything freezes, sometimes the disc drive goes berserk. Either way, there is no response to the keyboard and the only way out is to reset the computer. A crash will not harm the machine, but everything you had in memory will be lost and a disc in the drive may be corrupted. Moral, ALWAYS SAVE MACHINE CODE PROGRAMS AND TAKE THE DISC OUT OF THE DRIVE BEFORE YOU TRY THEM OUT, because any faulty programming can cause a crash. In BASIC an error will give you an error message and a chance to sort things out, or the BREAK or ESC keys will give you a way out of an endless loop. In machine code, you will get a crash and lose everything - hours of work wasted unless you SAVE before running.

There are one or two variations of RET which you will meet later on, but for now the golden rule is, always end with RET.

As the processor can only use numbers, it must have places to store and manipulate them. Today we will look at two of those places.

1) MEMORY LOCATIONS.



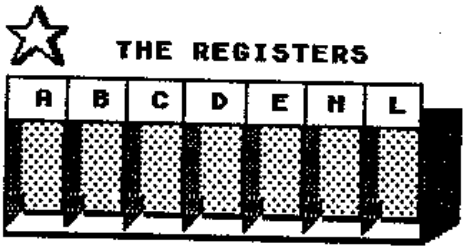
The computer's memory locations are like the filing cabinet

The Z80 chip can look at 65536 (0-65535) memory locations at a time, each of which can store one byte - a number between 0 and 255. If the computer has more than 65536 bytes of memory, the rest are held in reserve and chunks of memory can be swapped with the ones in use, by a system called paging, when you want to get at them. We shall not worry about paging for now - 65536 bytes is quite enough to go on with.

2) REGISTERS.

If you are working in an office, you might have a filing cabinet in which you store papers long term, but it is handy to have a set of pigeon holes on the desk where you can sort and store things while you are working on them.

To the Z80, memory locations are a bit like the filing cabinet. Registers are the desk top pigeon holes, but the Z80 puts numbers in them, not papers.



A IS THE "STAR" REGISTER, WHICH CAN MANIPULATE NUMBERS. THE OTHERS CAN ONLY STORE THEM

The registers are the desktop pigeonholes where the numbers being worked on are stored.

The most important register is A - the Accumulator. Numbers up to 255 can be put into it, other numbers added or subtracted. You can compare a number with the one in A and work out whether they are the same, higher or lower. It is a very powerful and useful register.

There are other registers, B,C,D,E,H and L but they can only store numbers. If you want to manipulate them, you have to transfer them to A.

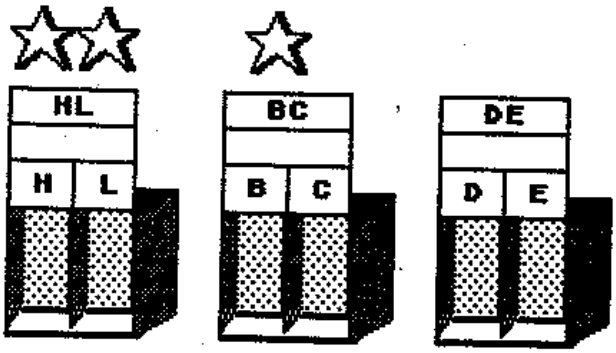
But what if you want to do something with a number bigger than 255? Then some of the registers can pair up to become double registers. The most important double register is HL (High-Low). Like the accumulator, numbers held in it can be manipulated - added to, subtracted from. HL is, in fact the two single registers H and L put together. B and C can live together to make BC, and D and E to make DE, but they can only hold numbers, not play around with them.

So, how do we use double registers? Let us suppose we want to put the number 12345 in HL.

Your number is first divided by 256. The number of times 256 will go into it is called the Most Significant Byte - MSB or High byte - and that goes into H. The leftovers, the remainder less than 256, is called the Least Significant Byte - LSB or Low byte - and it goes into L. 12345=48*256+57, so the MSB is 48 and the LSB is 57. By using two registers together, the MSB in one register and the LSB in the other, any number up to 65535 can be stored. We won't worry for the time being about even bigger numbers.

REGISTERS ACTING TOGETHER AS DOUBLE REGISTERS.

Some of the registers are like married couples. They retain their individuality and can still act alone, but they also act together as pairs. They are faithful to their partners and do not associate with other registers.



HL IS THE "STAR" DOUBLE REGISTER BECAUSE IT CAN MANIPULATE NUMBERS WHILE THE OTHERS CAN ONLY STORE THEM. BUT BC GETS ONE STAR BECAUSE IT CAN CARRY NUMBERS OUT TO BASIC.

To put a number in a register you LoaD it, so you get commands like:-

LD A,35 (Load A with 35 - put 35 in the A pigeonhole) which gives us 2 bytes of object code:-

62 (Load A with a number)
35 (the number we want to put in)

So, here is the source code and object code for that command:-

LD A,35 - 62,35

You can move a copy of a number in one register to another - LD A,B (load A with B, object code 120). That would leave A and B holding the same number, because the number is copied, not moved altogether.

You could add two numbers:-

```
LD A,5 - 62,5
LD B,7 - 6,7
ADD A,B - 128
```

would leave A holding 12 and B holding 7, because you can add to A, but B can only look after a number.

```
LD A,5 - 62,5
ADD A,7 - 198,7
```

will give the same result in one less byte. The diagrams show you all this in action.

Similarly, with the double registers - LD HL,nn (33,LSB,MSB) gives the same result as - LD H,MSB (38,MSB) followed by - LD L,LSB (46,LSB)

And no, I didn't make a mistake in the order of LSB and MSB after 33. In the sequence of numbers in a machine code program, the MSB and LSB of a longer number are reversed like that. If you use an assembler, the program will take care of it for you, but if you are writing your program by hand you must always put the LSB first. So:-

```
LD HL,12345 - 33,57,48
LD DE,24000  - 17,192,93
ADD HL,DE - 25
```

would leave HL holding 36345 and DE 24000. The individual registers would now hold:-

```
H - 141 (MSB of 36345)
L - 249 (LSB of 36345)
D - 93  (MSB of 24000)
E - 192 (LSB of 24000)
```

The double register BC has a special function, in that a number it holds can be carried back to BASIC after the RETurn. So we could transfer the number in HL to BC like this, and then retrieve the answer from BASIC.

```
LD B,H - 68
LD C,L - 77
RET - 201
```

If you wanted to return a smaller number than 256 to BASIC, a number stored in A perhaps, the MSB would be 0, so you would

```
LD B,0 - 6,0
LD C,A - 79
```

Finally, for this month, we will write a couple of short machine code programs which demonstrate that these commands really work. You can try them on your Spectrum or Sam - they are the same for both machines.

Machine code programs have to be POKEd into memory and then called. We don't want them accidentally overwritten by BASIC, so we use the BASIC command CLEAR to lower RAMTOP. RAMTOP is the highest byte that can be used by BASIC, and if you tried to write a program so long that it went above RAMTOP, there would be an 'Out of memory' message. So, by using CLEAR, we restrict the amount of space available for BASIC, but we make a safe place for the machine code program. Even NEW will not rub it out. Only a complete reset will get rid of it.

These are only little programs, so use CLEAR 49999. That means we can put each program at 50000. In assembly language we start the program with ORG (ORiGin). It has no code number, because it is not a machine code opcode, but an instruction to the assembler to store the code from that address. Instructions to the assembler are called pseudo-opcodes. The code pokers poke the code into memory starting at that address.

Because we want to see on screen the contents of the BC register at the end of the program, the command we use to run the machine code programs is:-

```
PRINT USR 50000
```

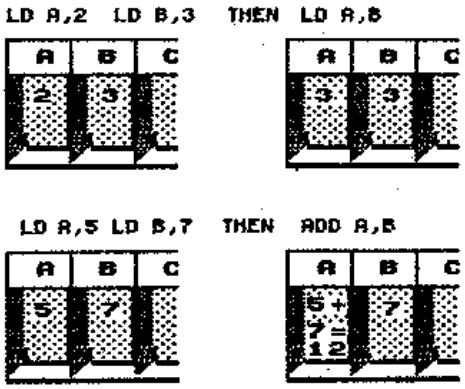
On Spectrum, the command RANDOMIZE USR 50000 and on Sam, the command CALL 50000 will run the programs without printing the answer.

So, use your assembler to enter these two programs, following the

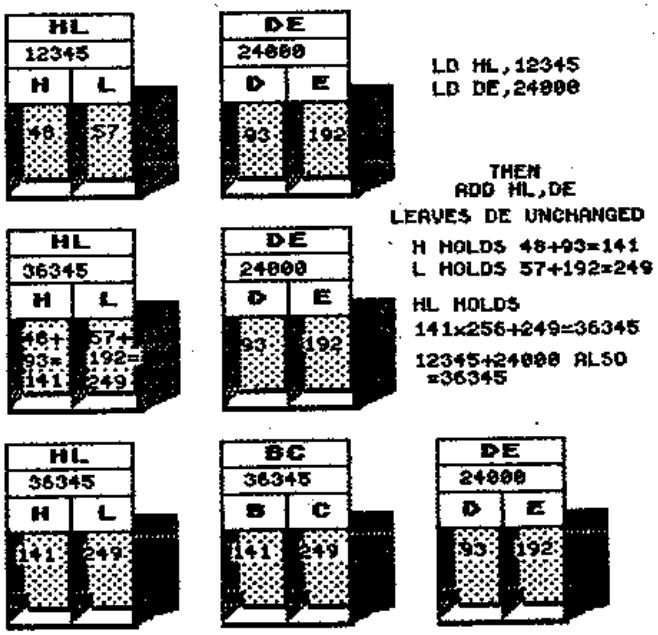
assembler instructions about saving the machine code and loading it to memory. If you use the code pokers, type one in and RUN it. Then, PRINT USR 50000 will run the program and print the answer. Repeat the process with the second one.

This sequence illustrates the processes used in the examples:-

Program 1.



Program 2.



I know that you are thinking that you could get the same result in half the time with a calculator, but these are just to show you that machine code programs do work, and to introduce you to the fundamental LD and ADD instructions. From next month we will try to write programs which are actually useful. See you then.

Program 1.

```
        ORG 50000 ;tell assembler to write code to run
                  ;from address 50000
START   LD A,5 ;load accumulator - A register - with 5
        LD B,7 ;load B register with 7
        ADD A,B ;add number in B to the one in A,
                ;leaving answer in A and B unchanged
        LD B,0 ;transfer answer to BC register so that
               ;PRINT USR command can retrieve it from
               ;BASIC. It is <255, so the MSB (held in
               ;the B register) will be 0
        LD C,A ;load C with the number in A, leaving A
               ;unchanged
        RET ;return to BASIC
END     EQU $
LENGTH  EQU END-START
; the label LENGTH, after assembly, will tell us the
; number of bytes in the machine code program
```

NOTE: In source listings, lines starting with ; or words after ; are notes and not part of the program.

Code Poker 1.

```
  5 CLEAR 49999: LET firstbyte=50000:
    LET lastbyte=50008
 10 LET Q=130
 20 FOR N=firstbyte TO lastbyte STEP 3
 30 LET check=0
 40 FOR B=0 TO 2
 50 READ A
 60 POKE (N+B),A
 70 LET check=check+a
 80 NEXT B
 90 READ A
100 IF check <>A THEN PRINT "ERROR IN
    LINE ";Q: STOP
110 LET Q=Q+10
120 NEXT N
130 DATA 62,5,6,73
140 DATA 7,128,6,141
150 DATA 0,79,201,280
```

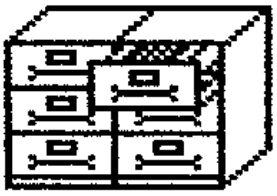
Program 2.

```
        ORG 50000
START   LD HL,12345 ;load the double register HL with
                    ; 12345
        LD DE,24000 ;load DE with 24000
        ADD HL,DE ;add them together, leaving the
                  ;answer in HL. DE is unchanged
        LD B,H ;transfer the answer to BC so that it
        LD C,L ;can be returned to BASIC
        RET
END     EQU $
LENGTH  EQU END-START
```

Turn to page 28.

Software for the SAM COUPÉ

SC_FILER



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£12.50 DISC ONLY

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Data is compressed to allow maximum record storage.

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Screen mode 3 used to display records. You define fields on screen wherever you want them, using windows. Line drawing and colours available to enhance the display. Choose from a range of different character sets. You decide which field is to be used for sorting, and the records are automatically filed in order as you add them. Add, edit, amend, make printed copies.

There is a buffer search facility to help you find the records you want to display.

Includes routines to allow you to convert files from Lerm Address Manager and GM Base for use with SC_FILER.

Comes with a demonstration database which records all the Z80 machine code instructions, their operation, effect on flags, etc.

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THOUGHT SPOT.

By:- Jeremy Cook.

Friends, ROMs and computerpersons, I bring you Thought Spot, undoubtedly the best puzzle page in FORMAT. Lined up below are a few problems of varying type and difficulty (I hope), which should occupy you pleasurably for a minute or three.

Also below is the prize puzzle, which some of you will notice is a repeat of puzzle no.4, the reasons for this, however, I decline to repeat. You will of course recall that the winner is awarded **ONE YEARS FREE SUBSCRIPTION to FORMAT!**

Some more of you will no doubt wonder about previous puzzles, their solutions and winners. I hope to give you details next month. For now have a go at this puzzle. I have tried to give a few ideas underneath.

PRIZE PUZZLE NO.10 - DOMINOES AGAIN

The diagram shows a set of dominoes laid out for your inspection, with numbers instead of dots for clarity. Unfortunately the lines which separate individual dominoes have been left out. All you have to do is write a program to identify the position of each domino.

```
46566033
14554150
20116001
42262336
40554523
16232516
43403120
```

Before you can write a program for any of these puzzles, you have to have a strategy for solving it. Perhaps the easiest way is to think how you would do it by hand, but this is not necessarily the best way. To do this puzzle by hand I would start by finding the dominoes that only appeared once in the diagram, and then mark those in. Having thus reduced the repetitions of other dominoes, I would search again for the dominoes that only appear once, and so on.

Inevitably there will be a time when all dominoes that remain to be found occur twice or more in the diagram, so a way round this has to be found. For example you might choose the first domino that appears twice (or more depending on the situation), mark that and then continue searching for dominoes appearing once. If this leads to a dead end (ie. all dominoes cannot be placed) then you have to be able to backtrack to try the second position of the domino, and so on.

This is just one way of looking at the problem, and most of the details are quite simple to program. All I'm trying to say is that with a bit of thought, the task can be reduced to several smaller tasks that can be fitted together to produce the desired results, and that these tasks will vary depending on which method you choose. And when you write a program it is always a good idea to find different ways to do things. Invariably the first attempts give you an understanding of the problem, and subsequent attempts improve the program considerably, because of the better understanding.

Send your program in by 1st October 1991 to:- Jeremy Cook (Thought Spot), 6, Burgoyne Road, Sunbury-on-Thames, Middlesex, TW16 7PW. (Please Note that discs and cassettes will only be returned if an SAE is enclosed).

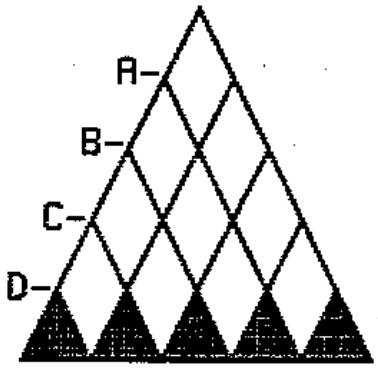
Even if you can't do all of the puzzle, I am still interested in what you have done and what ideas you have.

And now, what some of you have all been waiting for, the puzzles that stretch the mind and twist the cerebral cortex...

DIAMOUND

If the ten digits are placed into the ten diamonds below so that each digit is used once and each diamond contains one digit then there will be four numbers reading across: A, B, C and D. One such set of these numbers has been added in groups of three. Can you put the correct digit into each diamond?

A+B+C = 841 A+B+D = 2353
A+C+D = 3119 B+C+D = 3154



ALL SPORTS

Chuck and two of his friends have found that each is best in one, second in one and worst in one of the three sports in which they compete frequently.

1. Al is not the best swimmer.
2. Brad is better than Mr Dillon at golf.
3. Mr Enfield is better than Al at tennis.

Can you now identify each athlete and give his relative rank in each sport? Mrs Farley, in particular would like to know how her husband is getting on, as he is definitely last in house repairing, washing up ...

BALTIMORE TRANSDELETION

This strange title (whence it came I know not) refers to taking a word and removing each of its letters in turn, each time shuffling the remaining letters to form another word. To illustrate, consider the word GIANTS:

GIANTS-G = SATIN
GIANTS-I = GNATS
GIANTS-A = STING
GIANTS-N = GAITS
GIANTS-T = GAINS
GIANTS-S = GIANT

Now you try with the word ASTRINGE, with the added contraint of making two words at each deletion (eg. for -G above, would have SATIN and STAIN).

That concludes this thrilling episode of Thought Spot, the thinking beings' puzzle page. Turn in next month for the eleventh inciting exstallment! My thanks to those who have been sending in their solutions, there seem to be a few more than usual. Once again, please, I mean PLEASE try the prize puzzles and send in your solutions, because I get very despondent and disheartened when nothing arrives. If you have anything to say I am always happy to read your comments, so drop me a line.

- - - - - - - - - -

SOLUTIONS TO JULY'S PUZZLES

Front and Back:- ENTertainmENT, REDiscoveRED, INGrainING, TORmenTOR, REStoRES.

Quickies:-
1. Thirty pence. The objects are house numbers.
2. 2,001,000
3. Incorrectly
4. Four seconds
5. 8 feet by 15 feet

Roll Reversal:-
E gets B and pushes into siding.
E goes under bridge and pushes A into siding.
A,B coupled and E takes them to right hand side of track.
A,B uncoupled and E takes A back to siding.
E pulls B to left hand side of track and then leaving B goes under the bridge, back to the siding.
E takes A to right hand side of track, leaves it there and returns to siding.
Thus A and B are reversed.

THE MESSENGER

LINKING SPECTRUM & SAM

Reviewed By:- Adrian Russell.

The messenger is the latest piece of hardware from the ever creative mind of Bruce Gordon. The Messenger comprises of several pieces. Firstly there is the Messenger itself. This is housed in a Kempston joystick interface box with a Samco sticker on the top. There is also a small uncased circuit board and a program disc. Oh yes and a manual.

Now I am told that the casing and manual were not finalised when I got mine so I expect these will be improved. The Messenger itself is constructed on a circuit boad just under 4 x 2.5 inches. It contains an 8K EPROM, an 8K RAM, a PAL and 3 other ICs. The Spectrum edge connecter is designed to allow it to be connected to any Spectrum including the +3 and +2A although there is an undocumented jumper inside labeled PLUS 3.(To use the Messenger first you have to connect all the bits. The Messenger goes on the Spectrum edge connector and a small PCB goes into the Sam expansion port (there seems to be a lot of holes on this board for extra components but no hint as to what they do or why they are missing). There is also a flying lead from the side of the Messenger that connects to the MIDI OUT socket of the Sam. Now for the first problem on mine the case was a little oversize and I couldn't get the power lead into the Spectrum with the Messenger plugged in (I was using a +2) so I had to use the Messenger unboxed. As I said earlier the case is supposed to be getting changed but I would check with Samco before ordering.

Now for the second problem you are using two computers so you need both on your desk and powered up at once, so you need at least one extra power socket and if you are using two TVs then more. You can, of course, use just one TV if you are prepared to either keep swapping the aerial lead or can use a signal splitter. Then you have to hope the two computers are tuned to different channels. Once you have over come the logisticial problems of monitor, power supplies and space you can begin to use the Messenger.

Using the Spectrum you are requested to press the button on the back of the Messenger. This should produce a slowly moving stripped border that shows the Messenger is waiting for commands from the Sam. You press the space bar on the Spectrum keyboard to cancel the effect of the Messenger snap button.

Next you have to switch over to the Sam. Load the program disc and press F9 to boot the system and load the Messenger program. You are presented with a 12 option menu. Five options allow you to receive a screen from the Spectrum, view that screen on Sam, save the screen to Sam disc, send the screen to the Spectrum and load the screen from Sam disc. There are five more options to do the same for programs.

The remaining two options are to quit the program and to receive a copy of the Spectrum ROM and store it on Sam disc in place of the emulation file supplied called "ZXROM.SPX". It should go without saying that you should NOT use the program disc sent with the Messenger but rather use a copy of this disc.

If you used the original and used the ROM copy option you would never be able to sell the Messenger to somebody else as you would then be in breach of the copyright on the Spectrum ROM. The manual puts a great deal of emphasis on the use of the Messenger for

illegal copying and the reprecussions of doing this.

The reason for being able to make a copy of the Spectrum ROM is the same as the other Spectrum emulators on the market, to get the maximum compatability with Spectrum programs.

So how do you use the Messenger and what can it do. with everything connected and booted you load a program into the Spectrum from tape as normal. Once the program has loaded and is running you press the snap button on the Messenger and everything will freeze. Then you switch over to the Sam. Selecting option H will receive the program from the Spectrum. It only takes a few seconds about the same length of time as using the Interface 1 network to save and load.

Once completed the program will resume on the Spectrum. So what have you achieved? The program is now also on Sam. It can now be saved to Sam disc using option J or you can continue to run the program on the Sam by using option I.

Unlike most of the Spectrum emulators non of the extra Sam keys work once you are running in Spectrum mode on the Coupé and neither do the LLIST, LPRINT or COPY commands.

You now no longer need the Spectrum as the program can be loaded from disc and run on Sam at any time. When you are running in Spectrum mode on the Sam you get back to the Messenger menu by using the button on the small PCB installed in Sam. This is actually a NMI button like the one fitted to all Sams but this is electronically filtered to give a clean signal.

Now for a little moan of my own. When you save a program to Sam disc you have to type in a name, upto 8 characters long to which ".s" is added. When you are loading a program from Sam disc you have to type the directory entry number. I tried several times to reload "prog1" both with the ".s" and without before realising that I had to type 8. I don't mind one or the other but both is a bit much.

The Messenger is without doubt a remarkable piece of hardware. It preforms everything that it should very well and the transfers have so far been reliable and error free. Unfortunately I am left wondering what use it actually is. All the cassette programs I have will load directly into the Sam using either Specmaker or Spec-clone both of which are far cheaper than the messenger. I don't see the Messenger being used as a way of getting mass storage for a Spectrum as the DISCiPLE and PLUS D do this far better as well as allowing use of printer and 128K programs.

Over all I see the Messenger as a very well engineered solution to a non existant problem. The Messenger is available from Sam Computers Ltd for £39.99, SAMCO can be contacted on 0792 700300.

==========

Continued from page 23.

Code Poker 2.

```
  5 CLEAR 49999: LET firstbyte=50000,
    lastbyte=50009
 10 LET q=130
 20 FOR N=firstbyte TO lastbyte STEP
    5
 30 LET check=0
 40 FOR B=0 TO 4
 50 READ A
 60 POKE (N+B),A
 70 LET check=check+A
 80 NEXT B
 90 READ A
100 IF check <>A THEN PRINT "ERROR IN
    LINE ";Q: STOP
110 LET Q=Q+10
120 NEXT N
130 DATA 33,57,48,17,192,347
140 DATA 93,25,68,77,201,464
```

FORMAT'S FONT LIBRARY

100 CHARACTER SETS FOR SPECTRUM AND SAM

Explained By:- Carol Brooksbank.

Since FORMAT launched the FORMAT FONT LIBRARY on the SAMSPEC label, people have been asking "What is SAMSPEC?" and "What is a font library?".

SAMSPEC is the name given to a new range of software in which both SAM Coupé and Spectrum versions are supplied together on a disc, so it does not matter which computer you have. Even users of both computers will only need to buy the one disc. Standard version is a 3½" or 5¼" disc with SAM software and Spectrum software (which may be 48K or 128K depending on the program). If Spectrum +3 versions are also available, they will be on a 3" disc but without the SAM software.

Users of Art Studio, Flash!, and other graphics packages, will be familiar with the alternative typefaces which come with them. FORMAT's Font library contains 99 such screen typefaces and one UDG "typeface" - arrows, chess pieces, mathematical symbols, etc.

The fonts include numerous examples of bold; decorative; joined-up writing; reduced fonts suitable for art package SMALL options; outline; italic; serif; non serif; machine-readable; medieval looking; and one which I think is Russian. They can be used with most art packages, for direct printing to screen - even LIST with them if you like. The handbook explains how. I have also found that using one of the bold typefaces on SAM when you work in mode 3, in place of SAM's normal font,

A few of the fonts

All are printed in normal size and proportion

There are usually more than one example of a particular style

SOME ARE DECORATIVE

SOME ARE NEAT AND PRACTICAL

Some look rather Medieval

Below are some of the graphics in the UDG font

Examples Of Fonts

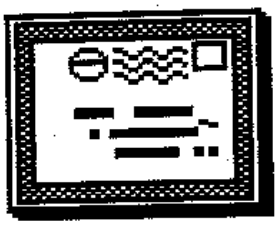
makes the smaller type in mode 3 screens much easier to read.

The support software supplied with Font Library includes programs for producing a complete printout of all the fonts for reference. There is an excellent character designer, from Italy, for the Spectrum, so that you can modify the fonts or design your own. It can hold up to 40 fonts in memory at once. You can copy letters from one font to another, redesign, mirror, turn or invert them, and at the end of the day SAVE anything from 1 letter to 40 complete fonts as a single file. SAM users already have a font designer in FLASH, but can also use this program with SAM under an emulator like SD Software's SPECMAKER.

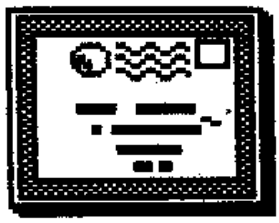
For SAM users, there is a mode 4 screen text design program which allows you to write with any of the fonts, varying the height and width of the characters. It is normally difficult to produce large or differently proportioned lettering on SAM because of the lack of re-scaling options in Flash!, and the CSIZE limitations in SAM's standard BASIC. This program overcomes the problem. It too can hold 40 fonts in memory at once, so you can change typeface, size, proportion and colour in a screen. The fonts can even be used in smaller than usual proportions with the program, but only trial and error will tell you which are still readable when reduced.

The font library is aimed at anyone who likes to use decorative lettering in screens or screen dumps. At £6.95 for software for two computers, it is a very good bargain.

I am grateful to all those who contributed fonts. If you keep sending me your designs we may be able to bring out another "volume". I already have about 20 new fonts to start it off, which I received since the library was published. So start using the character designer and your artistic flair!



YOUR LETTERS



Dear Editor,

After reading Andrew Hoods letter, in the June edition of FORMAT, I wrote letters asking about SAM software to six companies: Ocean, Domark, US Gold, Virgin Mastertronic, Codemasters and Gremlin Graphics.

Ocean and Gremlin both replied: No plans as yet, but all current software compatible. Virgin sent a list of Coupé compatible budget games. The others did not reply.

Yours sincerely, Jonathan Herman.

Thanks Jonathan, if enough people keep writing to software companies we will soon see more top-ten titles appearing on SAM. **Ed.**

Dear Editor,

I have just bought the entire collection of FORMAT right back to issue one and I must say it was worth every penny of it. I recommend all members to secure these pieces of Spectrum, DISCiPLE, Plus D and SAM Coupé history.

I would like to recommend a computer club whose services are beyond imagination. Among other things they offer discounts on software and hardware and arrange sale of secondhand software for members. When I asked about some books they couldn't find right away, they even took the time to search for the books and kept me informed on the progress until one day a letter arrived confirming they had found copies of the books and giving prices. The club is Chic Computer Club, P.O. Box 121, Gerrards Cross, Bucks, SL9 9JP.

Now a tip for +3 users. If you want to use the Plus D from 128k Basic (remember the fixer) type "SPECTRUM" in 128k mode and your are transferred into 48k mode but the ports are now open (you are able to switch the ROM and RAM) and you can load a 128k program or snapshot if you like. Now type RANDOMIZE USR 23354 and you are back in 128k mode. You should then be able to use the Plus D in 128k Basic.

Yours sincerely, Frode Tennebo.

I'm sure others will benefit from your advice Frode. The questions you also asked in your letter have been passed to Nev Young for the Help Page. And no, I did not get the article you sent, could you send it again. **Ed.**

Dear Editor,

In FORMAT 4/10 a reader mentioned the problem of the Plus D becoming detached from the Spectrum with disastrous results.

My solution is to fit a couple of small screws in the holes normally used for Interface 1 (underside of the Spectrum). Then loosen the two case screws on the Plus D nearest the edge connector about half a turn will do. All you now need to do is is loop short lengths of thing wire around the screws tightening them to hold it in place.

Yours sincerely, Malcom Perry.

Dear Editor,

I've been a happy Spectrum user for about ten years now, and a member of INDUG from its very beginning. But now my good old Speccy has started to fail on me and a repair would cost to much. In the other corner the real PC was ready to use so it is goodbye Spectrum.

So I wish to thank you for years of good reading, but when my current membership runs out in January'92 I will not be renewing.

Yours sincerely, Rob Crevecoenr.

I'm sorry to hear your Spectrum is sick, it may well be cheaper to buy a second hand machine than get it

repaired in The Netherlands. Or how about upgrading to a SAM Coupé, at least you could then continue to use the experience you have gained. I, alas, am forced to use IBM clones from time to time, but I am always glad to get back to a real computer. Ed.

Dear Editor,

I have subscribe to FORMAT for the last 12 months and I have now renewed my subscription for another year. I have found many of the articles and programs very interesting and helpful. For many years I stuck with the faithful Speccy+ and only replaced this with a SAM Coupé about a year ago. You seem to want readers to contribute articles and programs and for my part I have sent in program listings and cassettes. However this activity to me is rather like sending things into a black hole as there never seems to be any response from you.

I know it is not feasible to write to everybody sending in items and saying whether the material is any good or not, but would it not be a good idea to publish a list of acknowledgements of material received with a brief comment such as ...accepted for future publication or ...not suitable etc. Readers would then feel there was someone at the FORMAT address that was at least looking at their contributions.

I recently sent in two programs for SAM, one was a music sequencer and the other a word processor program. You rang me about the latter because you appeared to have lost it. As requested I sent another tape and listing to John Wase who kindly phoned to say he had received it and would be looking at it. Since then however dead silence - hence my suggestions above.

Yours sincerely, P.J.Williamson.

I am pleased to say we receive many items from readers each week (although I would gladly welcome even more). Every one is looked at as soon as possible and any items not suitable for publication are returned - at the very latest within a month. It is however a good idea to ring us soon after sending items, just to check that it did arrive safely.

I should also point out that I sometimes send items to John Wase, because they are more suited to Short Spot. Likewise John will sometimes send items too large for Short Spot down to me.

Once past this first hurdle there are still several steps before it appears in FORMAT. First it needs to be edited, this will sometime throw up problems that lead to a submission being returned to the author for more work.

OK, we now have the edited article on file, what next? Well I'm sorry to say it could be a long wait. You may understand this delay if I explain that each month I have a limited number of pages to fill - FORMAT can only grow in size as membership grows. With a limit on the number of pages, I have to select articles each month to achieve as balanced an issue as I can. Sometimes an article arrives and because it adds to this balance it will appear quickly, but this is not very often. The average wait is between four and six months. And as with any average that means some article being held on file much longer.

But please don't let this put you (or anyone else) off sending in material, the more we get the greater the variety of articles in FORMAT, everything will appear in print given time. Ed.

Dear Editor,

Would it be possible to publish a list of local computer clubs so people can contact local computer users?

Yours sincerely, Martin Brownlowe.

Long ago I did ask readers to send me details of their local clubs so I could produce a list. Result - two letters only. I'm still willing though, if people write to me I will publish details of their clubs. Ed.

Dear Editor,

Could I just use a little space to pass on some pokes to UNI-DOS users? The pokes are to correct a bug that

has been found by Dick Guy. Users will only experience problems if they use the Command Code nn (hex 3C) to read bytes from the disc buffer. To correct the problem load UNI-DOS then type in and run this little program:-

```
10 POKE @543,16183
20 SAVE OVER D1"UNI-DOS"CODE 8192,6654
30 POKE @7667,0
40 NEW
```

This corrects the problem and saves a new copy of the DOS to drive 1. My thanks to Dick Guy for reporting the only bug we have so far found in UNI-DOS.

Yours, Nev Young. SD Software.

Dear Editor,

Thank you for the help and advice you gave me at the recent All Formats Show in Birmingham. I am pleased to enclose my completed membership form, the sample copy of FORMAT I purchased on the day was incredible. I have been a Spectrum owner since 1987 and although I managed to get a few of the final issues of ZX Computing I have had to rely on second hand books and mags (mostly purchased at radio rallies) to teach me about the Spectrum. I never realised that so much support was still available. Well done INDUG and FORMAT, I will start spreading the word among my friends, as the only serious mag on the market I want to do everything I can to keep you going.

Yours sincerely, John Brentfield.

Thanks John, but next time you don't have to write your praise on the back of a 5 note to get published - use a 20 note instead. **Ed.**

* - * - * - * - * - *

Letters may be shortened or edited to fit on these pages.

This is YOUR letters page so it is up to you, our readers, to fill it. Send your letters to the usual address and mark the envelope LETTERS in the top left-hand corner. Keep your letters as short as you can so we can fit in as many as possible.

* * SMALL ADS * *

SPECTRUM SOFTWARE for sale. Hundreds of titles available, utilities as well as games. Prices from 49p. Send SAE for list to Dan Brice, 178 Forest Road, Kingswood, Bristol, BS15 2EN.

SAM Coupé - As new, unwanted gift, boxed with manuals, disc drive, flask ect. £150, telephone Lucy on 081 671 5385 after 5pm.

BARGAIN SAM 256k, new ROM, 2 drives, printer interface and cable, all manuals ect. Also Speccy 128k(black) Plus D (no drive), interfaces, books, 20+ original games ect. £250 THE LOT - NO OFFERS. Phone John on 0375 859901.

RAMPRINT printer interface with instant access Ramwrite word processor. Boxed, full instructions £22 ono. Write to Adrian Musk, 103 Brook St, Soham, Cambs, CB7 5AE.

WANTED URGENTLY A copy of Qualitas produced by Seven Stars Publishing. Also a SAGA keyboard in reasonable condition. Also any utilities / information / help with Swift Disc. Contact Nick Lytton, 21 Plantagenet Road, New Barnet, Herts, EN5 5JG.

MOBILE HOMES for rent near Eindhoven in the Netherlands. Some vacancies until 30 Sept. Tel: 0704 544263 or write to R.N.Suffolk, 40 Portland St, Southport, Merseyside, PR8 1HN.

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SHORT SPOT SPECIAL

NEW WAYS TO WRITE ON SAM

By:- John Wase.

As promised in Short Spot here are a couple of programs that show what can be done to produce different lettering on SAM screens. Both programs are quite long but well worth typing in.

The first program, well two actually as there is a set up program and a demo, comes from John Marshall. It creates a new character set that allows printing up to 51 characters across the screen in mode 4 or 102 characters in mode 3. In mode 4 it gives a very clear character set, although one or two letters could do with a little redesign I feel, still as the data statement for each character is given you should be able to make changes as required.

The set up program produces a RECORDed string that can them be loaded into your own programs and BLITZed to produce the screen text. Printing colours can be altered as can the size. As an added bonus you can also print text on a pixel alignment, you are not limited to the character cells of normal printing. The REM statements will help you to understand the program.

```
10 REM ***51 chars/line in any Mode
   !*** by John Marshall. ****
20 REM RECORDs the PLOTs needed to
   print all 96 standard printable
   ASCII characters to the BLITZ st
   ring 'ltr$' (96*204=19584 bytes
   long)
30 REM you don't have to type in al
   l the REMs! Lines 54000-95 conta
   in the character definitions-jus
   t type in the ones you need.
40 REM once you have run this progr
   am to generate the 5x8 chars, yo
   u don't need it to print them bu
   t save it in case you want to ch
   ange the shape of any character.
50 REM the program saves the BLITZ
   string which is all you need in
   memory to print 5x8 chars(be car
   eful using CLEAR or RUN or the s
   tring will be deleted!)
60 REM it is usable in any mode-in
   mode 3 enter FATPIX 0 or FATPIX
   1 for 102 or 51 chars/line.
70 REM to change colour enter PALET
   TE recpen,NEW-COLOUR or similarl
   y with recpaper(recpen & recpape
   r are the pens that were used wh
   en the letters were RECORDed).
80 REM the character set is easily
   readable with only 8 pixels high
   , so you have 22 lines as on a S
   pectrum;use CSIZE 8,9 for 9 pixe
   ls high (extra space between row
   s of characters)
100 LABEL recletters
110 CSIZE 8,8: LET recpen=15: LET re
    cpaper=0: LET csetaddr=256+DPEEK
     SVAR 566
120 GOSUB amendchars
130 RECORD TO ltr$
140 FOR b=0 TO 95
150 PRINT AT 0,0;CHR$ (b+32)
160 FOR c=0 TO 7
170 GOSUB testbits
180 IF INKEY$<>"" THEN FOR i=1 TO 70
    0: NEXT i
190 NEXT c
200 CLS #
210 NEXT b
220 RECORD STOP
230 SAVE "cset51" DATA ltr$()
240 STOP
500 LABEL testbits
510 LET byte=(PEEK (csetaddr+(b*8)+c
    ))
520 FOR e=4 TO 0 STEP -1
530 IF byte>=(2↑e) THEN LET byte=byt
    e-(2↑e): PEN recpen: PLOT (4-e),
    (7-c): GOTO 550
540 PEN recpaper: PLOT (4-e),(7-c)
550 NEXT e
560 RETURN
800 LABEL amendchars
810 RESTORE 900: FOR a=1 TO 96: READ
     char$: PRINT char$;: FOR b=0 TO
     7: READ cbyte: POKE csetaddr+((
```

```
    (CODE char$)-32)*8)+b,cbyte: NEX
    T b: NEXT a
890 RETURN
900 DATA " ",0,0,0,0,0,0,0,0
901 DATA "!",0,4,4,4,4,0,4,0
902 DATA """",0,10,10,0,0,0,0,0
903 DATA "#",0,10,31,10,10,31,10,0
904 DATA "$",4,15,20,14,5,30,4,0
905 DATA "%",25,25,2,4,8,19,19,0
906 DATA "&",0,8,20,8,21,18,13,0
907 DATA "'",0,12,4,8,0,0,0,0
908 DATA "(",0,2,4,4,4,4,2,0
909 DATA ")",0,8,4,4,4,4,8,0
910 DATA "*",4,21,14,31,14,21,4,0
911 DATA "+",0,0,4,4,31,4,4,0
912 DATA ",",0,0,0,0,0,6,2,4
913 DATA "-",0,0,0,0,14,0,0,0
914 DATA ".",0,0,0,0,0,6,6,0
915 DATA "/",0,2,2,4,4,8,8,0
916 DATA "0",0,6,9,9,9,9,6,0
917 DATA "1",0,4,12,4,4,4,14,0
918 DATA "2",0,6,9,2,4,8,15,0
919 DATA "3",0,15,1,6,1,9,6,0
920 DATA "4",0,2,6,10,15,2,2,0
921 DATA "5",0,15,8,14,1,9,6,0
922 DATA "6",0,6,8,14,9,9,6,0
923 DATA "7",0,15,1,2,4,8,8,0
924 DATA "8",0,6,9,6,9,9,6,0
925 DATA "9",0,6,9,9,7,1,6,0
926 DATA ":",0,0,6,6,0,6,6,0
927 DATA ";",0,0,6,6,0,6,2,4
928 DATA "<",0,0,2,4,8,4,2,0
929 DATA "=",0,0,0,15,0,15,0,0
930 DATA ">",0,0,8,4,2,4,8,0
931 DATA "?",0,12,2,2,4,0,4,0
932 DATA "@",14,17,23,21,23,16,14,0
933 DATA "A",0,4,4,10,14,17,17,0
934 DATA "B",0,30,17,30,17,17,30,0
935 DATA "C",0,14,17,16,16,17,14,0
936 DATA "D",0,30,17,17,17,17,30,0
937 DATA "E",0,31,16,30,16,16,31,0
938 DATA "F",0,31,16,30,16,16,16,0
939 DATA "G",0,14,17,16,23,17,15,0
940 DATA "H",0,17,17,31,17,17,17,0
941 DATA "I",0,14,4,4,4,4,14,0
942 DATA "J",0,15,2,2,2,18,12,0
943 DATA "K",0,18,20,24,24,20,18,0
944 DATA "L",0,16,16,16,16,16,31,0
945 DATA "M",0,17,27,21,21,17,17,0
946 DATA "N",0,17,25,21,19,17,17,0
947 DATA "O",0,14,17,17,17,17,14,0
948 DATA "P",0,30,17,17,30,16,16,0
949 DATA "Q",0,14,17,17,21,19,14,0
950 DATA "R",0,30,17,30,20,18,17,0
951 DATA "S",0,14,16,14,1,17,14,0
952 DATA "T",0,31,4,4,4,4,4,0
953 DATA "U",0,17,17,17,17,17,14,0
954 DATA "V",0,17,17,10,10,4,4,0
955 DATA "W",0,21,21,21,21,21,10,0
956 DATA "X",0,17,10,4,4,10,17,0
957 DATA "Y",0,17,17,15,1,1,30,0
958 DATA "Z",0,31,1,2,4,8,31,0
959 DATA "[",0,14,8,8,8,8,14,0
960 DATA "\",0,8,8,4,4,2,2,0
961 DATA "]",0,14,2,2,2,2,14,0
962 DATA "↑",0,4,14,21,4,4,4,0
963 DATA "_",0,0,0,0,0,0,0,31
964 DATA "£",0,6,9,28,8,8,31,0
965 DATA "a",0,0,6,1,7,9,7,0
966 DATA "b",0,8,8,14,9,9,14,0
967 DATA "c",0,0,7,8,8,8,7,0
968 DATA "d",0,1,1,7,9,9,7,0
969 DATA "e",0,0,6,9,15,8,7,0
970 DATA "f",0,3,4,14,4,4,4,0
971 DATA "g",0,0,7,9,9,7,1,6
972 DATA "h",0,8,8,14,9,9,9,0
973 DATA "i",0,4,0,4,4,4,4,0
974 DATA "j",0,2,0,2,2,2,2,4
975 DATA "k",0,8,8,10,12,12,11,0
976 DATA "l",0,4,4,4,4,4,4,0
977 DATA "m",0,0,26,21,21,21,21,0
978 DATA "n",0,0,14,9,9,9,9,0
979 DATA "o",0,0,6,9,9,9,6,0
980 DATA "p",0,0,14,9,9,14,8,8
981 DATA "q",0,0,7,9,9,7,1,1
982 DATA "r",0,0,11,12,8,8,8,0
983 DATA "s",0,0,7,8,6,1,14,0
984 DATA "t",0,4,4,15,4,4,3,0
985 DATA "u",0,0,9,9,9,9,7,0
986 DATA "v",0,0,17,10,10,4,4,0
987 DATA "w",0,0,17,17,21,21,10,0
988 DATA "x",0,0,17,10,4,10,17,0
989 DATA "y",0,0,9,9,7,1,1,14
990 DATA "z",0,0,15,2,4,8,15,0
991 DATA "{",2,4,4,8,4,4,2,0
992 DATA "|",0,4,4,4,4,4,4,0
993 DATA "}",8,4,4,2,4,4,8,0
994 DATA "~",0,5,10,0,0,0,0,0
995 DATA "C",14,17,21,21,21,17,14,0:
     REM the C at the start of this
    line is the copyright sign.
```

Right, SAVE the program and then RUN it, it will save an array to disc with the character set in it. Then type in this little demo so you can see how to use the array in your own programs.

```
 1 REM 51 chars/line examples
10 REM example calls to the 'pr51'
   procedure
20 REM xos and yos can be changed t
   o place the text in different po
   sitions.
30 REM xos (possible values 0-248)
   is the x-coordinate of the botto
```

```
    m-left corner of the text; yos (
    0-168) is the y-coordinate
 40 REM xrg is the x-range; yrg is t
    he y-range of the graphics scali
    ng system.
 50 REM eg. PLOT xrg-1,yrg-1 will FI
    LL the pixel AT the top right co
    rner of the SCREEN. Doubling xrg
     halves the width of 51-char tex
    t AND other BLITZed graphics
100 CSIZE 8,8
110 PEN 15: PAPER 0: CLS
120 LOAD "cset51" DATA ltr$()
130 LET xrg=256: LET yrg=192: REM no
    rmal xrg and yrg values
140 LET xos=0: LET yos=168: pr51 "12
    3456789012345678901234567890123
    45678901234567890123456789012345
    67890123456789012345678901***!!!
     51 pixel-precise characters per
    line! !!!***",44,37
150 LET xos=0: LET yos=0:pr51 "by Jo
    hn G Marshall, March 1991."
160 FOR i=1 TO 1000: NEXT i
500 PAPER 1: CLS
510 LET yrg=96: REM half normal valu
    e therefore double height
520 LET xos=0: LET yos=80:pr51 "Doub
    le height!",34,15
530 LET yrg=192: REM normal height
540 LET xrg=128: REM half normal val
    ue therefore double width
550 LET xos=0: LET yos=0:pr51 "Doubl
    e width!!",46,3
560 LET xrg=256: LET xos=0: LET yos=
    124:pr51 "You can print BLITZed
    graphics like these in almost an
    y size or colour! The characters
     are PLOTted, notDRAWn, so when
    you enlarge them beyond their or
    iginal size, you get gaps betwee
    n the dots."
570 LET yos=80:pr51 "You could try d
    efining a 'vector graphics' char
    acter set using DRAW when you re
    cord them. Sucha set could be en
    larged without gaps."
580 FOR a=127 TO 0 STEP -1: PALETTE
    0,a: FOR b=1 TO 3: NEXT b:NEXT a
1000 DEF PROC pr51 pr$,prink,prpaper
1010 DEFAULT prink=15,prpaper=0: REM
     if prink or prpaper not specifie
    d in procedure call, they remain
     the same as before
1020 LET oldxos=xos: LET oldyos=yos
1030 PALETTE 15,prink: PALETTE 0,prpa
    per
1040 FOR a=1 TO LEN pr$
1050 LET thisltr=CODE pr$(a)-32
1060 IF thisltr<0 OR thisltr>95 THEN
     GOTO nextltr
1070 BLITZ ltr$(thisltr*204+1 TO (thi
    sltr+1)*204): REM each RECORDed
    letter takes 204 characters of t
    he BLITZ string ltr$
1080 LET xos=xos+5
1090 IF xos>xrg-5 THEN LET xos=0: LET
     yos=yos-8
1100 LABEL nextltr
1110 NEXT a
1120 LET xos=oldxos: LET yos=oldyos
1130 END PROC
```

Another ingenious approach is that of Robert Brady. I thought it was so ingenious that you would like to see it. It just cries out for all sorts of modifications and alterations. It is written as one huge procedure, with a five line demo preceding it. Each letter is actually drawn, using PLOT and DRAW. Roberts' come out rather like on a big plotter, where the letters are also drawn. It would, I suppose, be possible to do this on a Spectrum. We could do with some good 9-point and 24 point printer drivers, too. and what about an HP plotter compatible driver..... But I digress. Here it is...

```
    1 REM **BigltBrady***
    5 MODE 3: CSIZE 8,8
   10 BIG "BIGLETTERS BY ROBERT BRADY"
      ,12,12,0,174,5
   15 BIG "OH YES IT CAN DO SMALL AS W
      ELL",4,4,0,160,5
   20 BIG "BIGLETTERS",40,20,0,150,5
   25 BIG "SMALLLETTERS",4,4,0,100,2
   30 BIG "NOTE CAPITAL LETTERS ONLY (
      DONT ASK WHY OKAY)",4,4,0,10,5
 1000 REM USE PROCEDURE:-BIG string,x
      size,y size,x pos (top left),y p
      os (top left),spacing
60000 DEF PROC big b$,x,y,xx,yy,sp
60010 FOR Z=1 TO LEN B$
60015 RESTORE 62500
60020 DO : READ A$: LOOP UNTIL A$=B$(Z
      )
60030 READ A$
60040 PLOT XX,YY: FOR N=1 TO LEN A$ ST
      EP 2
60050 IF A$(N TO N+1)="UF" THEN DRAW 0
      ,Y
60060 IF A$(N TO N+1)="UH" THEN DRAW 0
      ,Y/2
60070 IF A$(N TO N+1)="UQ" THEN DRAW 0
```

```
      ,Y/4
60080 IF A$(N TO N+1)="RF" THEN DRAW X
      ,0
60090 IF A$(N TO N+1)="RH" THEN DRAW X
      /2,0
60100 IF A$(N TO N+1)="RQ" THEN DRAW X
      /4,0
60110 IF A$(N TO N+1)="DF" THEN DRAW 0
      ,-Y
60120 IF A$(N TO N+1)="DH" THEN DRAW 0
      ,-(Y/2)
60130 IF A$(N TO N+1)="DQ" THEN DRAW 0
      ,-(Y/4)
60140 IF A$(N TO N+1)="LF" THEN DRAW -
      X,0
60150 IF A$(N TO N+1)="LH" THEN DRAW -
      (X/2),0
60160 IF A$(N TO N+1)="LQ" THEN DRAW -
      (X/4),0
60170 IF A$(N TO N+1)="UR" THEN DRAW X
      ,Y/2
60180 IF A$(N TO N+1)="UL" THEN DRAW -
      X,Y/2
60190 IF A$(N TO N+1)="DL" THEN DRAW -
      X,-(Y/2)
60200 IF A$(N TO N+1)="DR" THEN DRAW X
      ,-(Y/2)
60210 IF A$(N TO N+1)="dr" THEN DRAW X
      /2,-(Y/2)
60220 IF A$(N TO N+1)="dl" THEN DRAW -
      (X/2),-(Y/2)
60230 IF A$(N TO N+1)="ul" THEN DRAW -
      (X/2),Y/2
60240 IF A$(N TO N+1)="ur" THEN DRAW X
      /2,Y/2
60245 IF a$(n TO n+1)="x1" THEN PLOT P
      EN 0,xx,yy: PLOT xx+x,yy
60247 IF a$(n TO n+1)="x5" THEN PLOT P
      EN 0,xx,yy: PLOT xx+x/2,yy
60250 IF a$(n TO n+1)="x2" THEN PLOT x
      x+x,yy
60260 IF a$(n TO n+1)="x3" THEN PLOT x
      x+x,yy-y
60270 IF a$(n TO n+1)="x0" THEN PLOT P
      EN 0;xx,yy
60280 IF a$(n TO n+1)="dq" THEN DRAW P
      EN 0;0,-(y/4): DRAW PEN 15,0,-1
60290 IF a$(n TO n+1)="x4" THEN PLOT x
      x,yy-y/2
60998 NEXT N: LET XX=XX+X+sp
60999 NEXT Z: END PROC
62500 DATA "1","x1DF"
62510 DATA "2","RFDHLFDHRF"
62520 DATA "3","RFDHLFRFDHLF"
62530 DATA "4","DHRFUHDF"
62540 DATA "5","RFLFDHRFDHLF"
62550 DATA "6","RFLFDHRFDHLFUH"
62560 DATA "7","RFDF"
62570 DATA "8","DFRFUFLFDHRF"
62580 DATA "9","RFDHLFUHRFDFLF"
62590 DATA "0","RFDFLFUF"
62600 DATA "A","DFUHRFUHLFRFDF"
62610 DATA "B","DFRFUFLFDHRF"
62620 DATA "C","RFLFDFRF"
62630 DATA "D","DFRHurulLH"
62640 DATA "E","DFRFLFUHRFLFUHRF"
62650 DATA "F","DFUHRFLFUHRF"
62660 DATA "G","RFLFDFRFUHLH"
62670 DATA "H","DFUHRFUHDF"
62680 DATA "I","RFLHDFLHRF"
62690 DATA "J","x1DFLFUQ"
62700 DATA "K","DFUHURDLDR"
62710 DATA "L","DFRF"
62720 DATA "M","DFUFdrurDF"
62730 DATA "N","DFUFdrdrUF"
62740 DATA "O","DFRFUFLF"
62750 DATA "P","DFUHRFUHLF"
62760 DATA "Q","DFRFUFLFDFRFul"
62770 DATA "R","DFUHRFUHLFDHDR"
62780 DATA "S","RFLFDHRFDHLF"
62790 DATA "T","RFLHDF"
62800 DATA "U","DFRFUF"
62810 DATA "V","DHdrurUH"
62820 DATA "W","DFRHUHDHRHUF"
62830 DATA "X","drdruldlurur"
62840 DATA "Y","drDHUHur"
62850 DATA "Z","RFdldlRF"
62860 DATA "%","DQRQUQLQx2dldlx3UQLQDQ
      RQ"
62870 DATA "£","x1LHLQDFLQRFLFRQx1LHLQ
      DHLQRF"
62880 DATA " ","x0"
62890 DATA "$","RFLFDHRFDHLFRHUF"
62900 DATA "?","RFDHLHDQdq"
62910 DATA "!","DHDQdq"
62920 DATA ">","drdl"
62930 DATA "<","x1dldr"
62940 DATA "(","RFLFDFRF"
62950 DATA ")","RFDFLF"
62960 DATA "=","RFx4RF"
62970 DATA "+","x5DFUHLHRF"
65000 REM THIS CAN'T DO LOWER CASE LET
      TERS
```

Well that's two very different approaches to screen printing. Both could be improved I'm sure. Any amendments, improvements, additions or alternatives you can come up with will receive due consideration for printing in Short Spot if you send them to me at the usual address printed at the end of each months column. Meanwhile my thanks to John Marshall and Robert Brady for starting the ball rolling.

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We were FIRST to offer a commercial quality Filing System, which will handle an unlimited amount of virtually ANY type of info, by storing data on disc, rather than in memory. FILEMASTER is used by Schools, Doctors, Businesses etc. & many Home Users & Collectors with Plus D or Disciple. FileMaster has lots of features which users find more and more useful as data mounts up over a period of time ..... Thats because when writing programs, we think ahead, about eventualities. What if a file grows too large for memory? What if the user forgets how the search flags, for example, are set up? What if ....?

Here at BetterBytes we think 'WHAT IF' a lot. This we believe, is one of the main keys to better programs, and its the users of our software who reap the benefits from all of our efforts.

Our target is programing excellence. We aim for our programs to become outstanding additions to your software collection. Experience has shown that BetterBytes programs hit the mark, and are NOT cast aside, hardly ever to be used again.

We believe our software is an investment which is repaid, time and time again over the years.... Thats because our programs have inovation, thought and many 'WHAT IFS' built right into them.

Software of this special quality can't be written overnight. BetterBytes programs can take a long time to write... because we put so much into them.

We were FIRST to offer a real Word Processor re-written specially for Plus D & Disciple, and are still the only software house within the whole Spectrum range, to offer a large built in THESAURUS. Thats TWO FIRSTS for our popular program FASTWORD PLUS.

BetterBytes dont just write progs for customers to use... we write them for customers to use and ENJOY. Our software is easy to operate, is very friendly with excellent graphics and has enjoyment built right in ! Get added power and pleasure from your Disc Drive/s.

We were the FIRST to bring a program to help organise the files on your discs. The budget priced DISC ORGANISER plays an essential part in any users collection, with routines that simplify and speed up File Maintenance on the Plus D/Disciple.

If you LOVE using your Spectrum with Plus D/Disciple, then one of the best investments you can make is a BetterBytes software purchase.

DISC MANAGER

Get a complete profile of your disc collection - ON ONE DISC. Pinpoint location of any prog FAST. Suite of 5 progs.Total control. Only £12·95

DISC ORGANISER

Organise the content of your discs. Ideal Housekeeping Tool.Disc-Doctor with Sector Check/Repair. Recover. Fast load & much more. Value £5.

FILE MASTER

Unlimited data storage.Fast Search & Sort. Tailor to suit your needs... EASY TO USE. Pull-down Menus & Windows. Print opt. Only £8·95

FASTWORD PLUS

A unique package. Wordprocessor + built-in Thesaurus ! Find related words. Check spelling/meaning etc. Needs Tasword2 code. Only £9·95

DISC MATE

Disc copier and Toolkit. Minimises disc swapping. Multiple Load/Save Copy in ANY order.Disc/Sector/File checks. Intelligent file recovery. Bad sector Lockout etc.Only£10·95

UTILITY DISC

More than 9 useful progs on 1 disc. Inc AUTOBOOT, a blisteringly fast Cat-Loader, worth the price of this disc alone. A real Treasure Trove of worth-while utility programs. £10·95

WHEN ORDERING Please give FULL details of Interface & Drives.

COMING SOON!

THE SAM MASTERDOS
DISC ORGANISER

FREE

If you've read this Ad, you wont be surprised to learn, that, after months of work, we're still developing ideas for our latest creation ! Thats because we want our first SAM title to be EXTRA special. We're building greater power, ease of use and that special BetterBytes quality, right into the program. As you know it takes time to write something thats really good.

Heres one program that is definitely worth waiting for !

2 PLUG TAGS * FREE WITH EVERY PROGRAM!

Plug identification tags help avoid appliance leads getting mixed up & give greater electrical safety.

Stocks of computer related titles are limited but others are available. State preferred appliance titles (2 per prog ordered). Pot luck if title is not available.

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