THE MONTHLY MAGAZINE FOR SPECTRUM, SAM COUPE AND SINCLAIR QL USERS

Sinclair & SAM COMPUTING

Issue 1 April 1991 Available by subscription only

Unsurpassed coverage of the *Spectrum, SAM Coupé and Sinclair QL.*

Reviews:

- **MasterDOS reviewed**
- **TRACEY mouse digitiser reviewed**
- **QL keyboard interface**

The Sound of Music

Garry Rowland, publisher of *Music Writer*, shows Spectrum 128 users how to get the best from the AY sound chip.

ALSO:
RAM Paging
Public Domain
Latest news
All Formats Fair report
On-Line
Mail order bargains
QL Corner

New!

Sinclair & SAM COMPUTING

THE MONTHLY MAGAZINE FOR SPECTRUM, SAM AND QL USERS.

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Editor:
Daniel Garner

Design:
N.Quinn

Contributors:
Chris Clayton, Paul Wallace, Daniel Garner, Garry Rowland.

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57 Lovers Walk,
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Publishing Manager:
Daniel Garner

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Welcome!

Sinclair & SAM Computing is a brand new magazine catering for all serious users of the ZX Spectrum, Sinclair QL and the SAM Coupé.

If you're looking for unparalleled coverage of serious software and authoratative artilces then ***Sinclair & SAM Computing*** *is the magazine for you!*

We hope you enjoy the magazine!

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Editorial

WELCOME to *Sinclair & SAM Computing!*

As many of your will know, Garner Designs had been running the +3 Users' Group since 1989 and the decision to create Sinclair & SAM Computing was quite hard to make.

However, I'm sure all the +3UG members who are now receiving this magazine instead of our old "+3 Contact" magazine, will agree that Sinclair & SAM Computing is much better.

Besides continuing to support the Spectrum, SSC (the abbreviation for Sinclair & SAM Computing) is also providing full coverage of the SAM Coupé and Sinclair QL.

SSC itself is extremely well supported within the Spectrum and SAM community, the sheer number of companies wanting to advertise in the magzine is a testimony to this fact. We are not however, going to let advertisements dominate the magazine, but they are an important way of readers finding out about various companies' products, and for the companies to increase their sales - something which will ensure that they continue to develop new products.

Our editorial content will be of the highest premium possible and we believe we have got our estimations for the type of columns you'll want to see right. We'll also try to cater for beginners and experts alike by printing apparently technical articles in a nontechnical way that everyone can understand.

We've also got a strict rule that we will never go the way of the 'glossies' and include games reviews in SSC. We do however, accept that there are people who enjoy using their computer for serious uses and also for playing games. To these people we offer ***GAMES Xtra***, a monthly magazine giving a complete round-up of all the best games software available for the Spectrum and SAM Coupé. See page 23 for more details.

We are also publishing a tape and disc called ***Extra!***, which will accompany SSC every month and contains a number of exciting utility programs for you to use.

It is our aim to cater for all users of the Spectrum, SAM and QL, whatever they use their computer for.

That is why we have decided to include columns on modem communications and (starting in next month's issue) a column for those users who use emulators on their computers. This includes SAM users emulating Spectrums, QL and +3 users emulating CP/M, QL users emulating an IBM PC, Amiga users emulating either a QL, ZX81 or a Spectrum, and ST users emulating either a QL or ZX81.

We also give public domain software full coverage as this is a thriving area for both the Spectrum and the SAM. For SAM users we have enlisted the talents of Brent Stevens (who runs the SAM Coupé PD Software Association —the official PD supplier for the SAM) who will be writting a monthly SAM PD column for SSC. For Spectrum public domain connoisseurs SSC has got its own PD library of software totally about 400 programs on both tape and disc —more than enough for the average user.

The fact that we are running a PD library emphasises that Sinclair & SAM Computing is not just a mgazine, but an entire service.

Another part of our service is our *Advice Line* which is a very comprehensive 'helpline' service which is able to answer almost any computer related problem you have. We run a postal answer service as well as a telephone service for added convenience. Our team of experts are immediately at hand to offer the most comprehensive and fastest service possible.As all the +3UG members will know, we also run a mail order service. What +3UG members and new readers won't know however, is that we have expanded the range of goods we stock considerably.

Show Time

Garner Designs plan to exhibit at as many shows that we can find the time to attend. This started last November when we had a stand at the All Formats Fair in London.

We are also attending at March 23rd All Formats Fair in London where SSC is being shown to the public for the first time. We'll also do our best to get to the All Formats Fair which is beiug held in Birmingham on April 21st.

Thanks

May I also take this opportunity to thank everyone who has had a hand in getting ***Sinclair & SAM Computing*** off the ground. Its been tough at times but after nearly 5 months of hard work and planning we are happy with the way the magazine has turned out.

Thanks also to the many goodwill messages we have received from the companies advertising in SSC. Thank you for supporting us, and I hope our readers support you and your products.

On the subject of support, the only way magazines like SSC can really thrive is if its readership actively support the magazine. This can be done by writing an article or two (but please phone first to make sure that it hasn't already been written by someone else). The first couple of issues of SSC should give you a 'feel' for the sort of articles we will be printing, so why not share your knowledge with others. What's more, if we accept your article for publication we'll pay you for it!

I hope you will enjoy this issue of Sinclair & SAM Computing, and stick with us to enjoy many more to come.We believe we are at the forefront of support for the Spectrum, SAM and the QL and we will continue to improve this support as time progresses.

D.G.

News

FIRST WITH THE NEWS FOR THE SPECTRUM AND SAM COUPÉ

Spectrum to SAM Messenger

SAMCO have released more details about their Spectrum to SAM program transfer device. The device, called *The Messenger* will plug into the expansion port at the Spectrum end, and MIDI ports at the Coupé end.

Software in the interface and in the Coupé then allow a 48K program loaded into the Spectrum to be sent to the Coupé, thus avoiding any of the loading errors normally associated with loading Spectrum games on a Coupé.

The Messenger is also able to transmit data from the Coupé to the Spectrum. Although the device, which will cost £29.95, is not in production yet, SAMCO expect it to be ready by the end of March.

SAM Shop Opens

SAMCO have also opening a retail showroom at their current Swansea premises. The opening hours are 9am to 5.30pm Monday to Saturday.

SAM to get Hypertext

The software publishing arm of *Garner Designs* will soon be launching a software package for the SAM Coupé called *HyperScript*

HyperScript is a version of the popular "HyperCard" system available for the Apple Macintosh which allows text and graphics to be stored and retrieved in such a way that anyone can easily create user–friendly interactive applications without the need for programming expertise.

The program allows practically any type of application to be created, and is ideal for educational uses.

The hypertext concept was revolutionary in the Apple Mac world when HyperCard was released and we intend HyperScript to make an equal impact on SAM Coupé users.

We expect to be releasing firm details and availability by late May, with the software's launch shortly after that.

KOBRAHSOFT LAUNCHES NEW VERSIONS

Leading Spectrum utility producers, Kobrahsoft, have released enhanced versions of three of their Spectrum +3 programs.

Version 3.0 of the disk utility *DICE* is now out, as are versions 1.1 of *Disk Management Software* and *Diary*.

Reviews of all three programs will be forthcoming over the next two or three issues of Sinclair & SAM Computing.

Kobrahsoft can be contacted on 078 130 5244, or enclosing an SAE to: Kobrahsoft, Pleasant View, Hulme Lane, Nr. Longton, Stoke-on-Trent, Staffs, ST3 5BH.

SAM TO GET A RANGE OF EDUCATIONAL SOFTWARE

SAMCO have announced a range of educational software for the SAM. The first titles in this range will be *Highway Code* and *Spelling Attack*.

SAMCO are also currently in talks with DATABASE in order to get their best-selling *Fun School* converted to the SAM Coupé.

Teachers Pet Software are also currently converting their large range of Spectrum educational software to the SAM. See their advert in this issue to get their address.

MIDI Sequencing software ready (at last!)

Tim Humphries' long awaited MIDI Sequencer for the SAM Coupé, first demonstrated at the December *All Formats Fair*, will be available at the March 23rd All Formats Fair.

The software features a stylish user interface allowing you to very easily control a MIDI instrument. Despite early difficulties with the MIDI driving software, the system has been perfected.

All the SAM needs now is some music composition software along the lines of *Music Writer*.

ETM goes national

ETM tape magazine has announced that it is now available on a national scale from software stockists.

The games review based publication was one of the first Spectrum tape magazines available and has recently been expanded to cover the SAM Coupé.

Don't be surprised if you don't see it on the shelves of your local computer store though, but if you ask the shop keeper for it he should be able to order it from you.

If you can't get hold of a copy then write to ETM at: 17 Louisville Avenue, Aberdeen, AB1 6TT who will supply one.

New monthly magazine

Garner Designs, publishers of *Sinclair & SAM Computing*, are launching a new monthly games monthly for Spectrum and SAM Coupé called *GAMES Xtra*.

Unlike the three news-stand magazines, Your Sinclair, Sinclair User and Crash; GAMES Xtra is written so that it doesn't alienate those people who think the three 'glossies' are simply comics.

The editorial style is not aimed specifically at the under 15 age group as the others are, and so provides an authoratative round-up of all the best games on the Spectrum and SAM.

Also unlike the 'glossies', GAMES Xtra will be providing full coverage of the SAM Coupé. GAMES Xtra also has an attractive price tag of just 85p per month.

Issue 1 of GAMES Xtra is being launched in the first week of April, although there is a possibility of copies being available at our stand at the March 23rd *All Formats Fair*.

SHOW WATCH

MARCH

All Formats Computer Fair
Royal Horticultural Halls, Victoria, London.
Saturday 23rd March
John Riding (0225) 447453

APRIL

All Formats Computer Fair
National Motocycle Museum, Birmingham
Sunday 21st April
John Riding (0225) 447453

MIDI Music Show
Novotel, London.
April 26-28 (Fri-Sun)
Westminster Exhibitions 081 549 3444

Which Computer? Show
National Exhibition Centre, Birmingham
April 23rd-26th
Reed Exhibitions (081) 948 9800

MAY

Spring Computer Shopper Show
Alexandra Palace, London
May 10th-12th
Blenheim (081) 868 4466

SEPTEMBER

Computer Entertainment Show
Earls Court II, London
September 5th-8th
EMAP Exhibitions (071) 404 4844

Please check details of a show with the organiser before travelling.

COMPUTER SHOPPER DROPS SINCLAIR

Computer Shopper magazine has dropped their Sinclair column due to Timothy Green, writer of the column, not being able to continue with it. Computer Shopper are in 'no hurry' to find a replacement.

The column has long been the only place where serious users found coverage of the Spectrum, SAM and QL (that was until Sinclair & SAM Computing come onto the scene of course).

Mr Green had kept the column's editorial content of a very high standard, and so both he and his column will be missed.

It does seem that Computer Shopper is starting to pursue a corporate path, in much the same way as its American counterpart of the same name. Both Computer Shopper UK and US were, up until about 12 months ago, aiming at a predominantly home computer market, even to the extent of Computer Shopper US having a Sinclair QL column (and the QL is a minority micro in the US).

However, both have swung towards PC coverage, with Computer Shopper US cutting out Atarti ST support as well. Hopefully, Computer Shopper UK won't go the same way.

News

FIRST WITH THE NEWS FOR THE SPECTRUM AND SAM COUPÉ

F-16 gets the SAM treatment

Leading simulation publishers *Digital Integration* are currently putting the finishing touches to the SAM version of *F-16 Combat Pilot.*

The game is a full SAM version programmed by Digital Integration in association with SAMCO. Much is promised for the game, including an enhanced 512K version featuring sampled sound effects from *Blue Alpha*'s new sound digitiser.

The game was a huge success on the 16-bit formats, and looks like being equally as big on 8-bit computers (the Spectrum version of F-16 is due out any day now).

Release date for the SAM version of F-16 is expected to be late April, or early May by the latest. Watch out for a full review in ***GAMES Xtra*** soon.

SAMCO turns 6 months old

After MGT's dramatic crash last year, the future of the SAM Coupé looked very shaky indeed. When Alan Miles and Bruce Gordon set up SAM Computers Ltd, a glimmer of hope was cast upon the SAM. Now, after 6 months of SAMCO that glimmer of hope has resurrected the SAM and has provided a solid base on which future success can be built.

The Coupé is now sold by over 100 computer retailers in the UK, and in 11 other countries. Support from the machine is also stronger than ever.

To celebrate SAMCO's 6-month anniversary, they've released the publicity photograph below (humours captions sent in on post-cards will definately *not* be printed!)

NEWS ITEMS

Although there is a plethora of SAM Coupé related news items in this month's issue, the comparative lack of Spectrum news is not because we decided not to print many, but simply because there isn't many.

This is were you can help. Although we get to hear about the majority of new products and announcements, there are always a few that slip by. And as most of the companies supporting the Spectrum and SAM are an informal lot, it is sometimes you the customer who gets to hear about it first.

So if you do hear something that you think we'd be interested in then please contact us.

QL News

For the next couple of issues, all the latest Sinclair QL news will be contained in the ***QL Corner*** column of SSC.

However, as the overall size of the magazine increases and our amount of QL coverage increases, QL news will be included in the *News* column with Spectrum and SAM Coupé items, and *QL Corner* will concentrate on product reviews.

SHOW REPORT

Daniel Garner takes a look at a recent ***All Formats Fair*** and discovers why so many Spectrum, SAM and QL companies attend them.

A cold Saturday in London ... not the best way to spend your weekend. However, the ever-frequent All Formats Computer Fair on February 2nd brightened the day up. With what seemed like a record crowd already jamming the aisles when I arrived, I looked forward to a show as good as the All Formats Fair last December. Although there wasn't as many stands as that show, the SAM Coupé, Spectrum and QL were very well supported.

On the QL front, Digital Precision, Miracle Systems, TF, Dilwyn Jones Computing and Quanta were in attendance which was pleasing to see. All were doing good business too judging by the throng of people gathered. Digital Precision had a large crowd around them while demonstrating their new word-processor called *Perfection* (see page 39).

The SAM Coupé and Spectrum was well supported as usual, with SAMCO holding mini-seminars every half hour covering a wide range of SAM related subjects. SAMCO were also selling their SAM Bus and 1Mb RAM exapansion board as well as copies of MasterDOS (reviewed on page 9). Enigma Variations had their usual stand and were selling all the latest SAM software, including Sphera and Pipe Mania. The Spectrum Discovery Club were also in attendance promoting their SAM disc based magazine *SAM Supplement* and Dave Tonks was on hand to demonstrate his excellent *Quiz Ball* trivia game (which is now being released by SAMCO very soon). BG Services also had a stand where they were selling VTX modems, copies of the excellent Dr Scroll comms software and also their new SAMplifier which boosts sound output from a SAM Coupe. Also at the show was Steve Nutting of Steve's Software who apart from selling his SC_Assembler and his +D utilities, introduced a range of dust covers for the SAM Coupé. Also new from Steve Nutting is a database program for the SAM called SC_Filer.

EEC Ltd were in attendance as ever, and were selling QLs, Spectrum hardware, printers, disc drives, monitors, and everything else bar the kitchen sink.

I found the show of great interest and anybody who hasn't been to one of the All Formats Fairs recently, then they are whole heartedly recommended. There simply isn't another show which attracts as many companies supporting the Spectrum, QL, and SAM Coupé.

POPULARITY

Ever since the end of those famous *ZX Microfairs*, companies supporting the Spectrum and Sinclair QL have not had the kind of show available to exhibit at.

The big shows like the CES and Computer Shopper simply do not attract many Spectrum, SAM or QL users, and in any case for the majority of companies the cost of having a stand at such a 2 or 3 day show would be excessive.

However, when the All Formats Fair came along under the guidance of Bruce Everiss, companies making products for the Spectrum, QL and especially the SAM Coupé virtually adopted the show as their own.

Ever since the start of the All Formats Fair there has been a steady increase in the number of companies attending which support the Spectrum, SAM and QL.

This is extremely encouraging to see, and with many other stands specialising in blank media, disc boxes, listing paper, printers, monitors and other such miscellany, the show is the place to visit.

The majority of the companies attending also count on you to attend. Garner Designs know from their experience of attending the All Formats Fair in November 1990, that the show is a excellent way to meet customers and also to guage their opinions about products and service.

The show is also a grand get-together for the companies themselves. And many users use the show as a meeting place.

However, the most important thing that companies exhibiting at shows such as the All Formats Fair need to see is you. They can only survive with enough support and the All Formats Fair is a way in which they can increase this.

Once common criticism made about the All Formats Fair is that it is always held in London.

Well, the show on April 21st will be held in Birmingham at the National Motocycle Museum. This will not only allow more people from the north and midlands of the British Isles to attend the show, but it will also allow companies which could not afford to travel down to London to attend at the show.

This is all very good news

SC_FILER

SAM Coupé Database

£10.00 DISC ONLY

Massive capacity filing program. 256K version stores 128K of data —512K version stores 384K —in continuous memory, store more with External Ram modules, upto 4.4Mb.
Data is compressed to allow maximum record storage.
Random, rather than fixed, fields for greatest flexibility.
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. Choode 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.

SC_ASSEMBLER 512K 256K

£12.50 DISC ONLY

NOW BOTH PROGRAMS ON ONE DISC, WITH PROFESSIONALLY WRITTEN MANUAL

Powerful 64 col. full screen Editor/Assembler, using no SAM ROM, so compatible with all versions. Disassembler included —Monitor to come in future upgrades. Screen mode 3 uses one of 32 Editor character sets —choose the one you find easiest to read. Recognises the standard opcodes and pseudo–epcodes and 102 undocumented codes. User friendly. Clear error messages —words, not codes. Automatic tabbing. 14-character labels. Hex or decimal input and listing. Search facility. List source code to screen or printer. Two-pass assembler, with or without listing to screen or printer, displays code start and end addresses and length on pass 1. Source files to get you started. Easy enough for the beginner, sophisticated enough for the expert. Now includes converter to allow Lerm Assembler source code to be used with SC_ASSEMBLER. Still includes the FREE Spectrum Emulator: SC_SPECLONE

DUST COVERS: SAM COUPÉ (Matches colour, shape moulding) WATERPROOF, MACHINE WASHABLE, £5.50
PHILIPS CM8833 MONITOR COLOUR WHITE £7.50 PRINTERS–Phone for details 3.5" Discs (Coloured) 60p each,£1 P&P

Cheques payable to S.J. NUTTING Post free UK. Overseas add £1

Steve's Software
/ Narrow Close, Histon, Cambridge, CB4 4XX
☎ 0223 235150 6pm - 9pm

SPECTRUM PRODUCTS

VTX5000 V23 Spectrum Modems with integral Viewdata software.
48K —£15 +2A/+3 —£20 128/+2 —Please ring
(*The Foot* for supporting the right hand side of the +3/+2A when used with a VTX 5000 is now available at 50p)
(For modems add £3 per unit for overseas delivery)

Dr.Scroll for VTX5000, for scrolling BBs.	£5
3 Way Ribbon Cables as used by VTX5000	£8.50
VTX711 RS232 modem interface with s/w and lead. (limited qty) (+ £3 for overseas delivery)	£20
The FIXIT allows 48K add-ons to work on +2A/+3 (add £1 for overseas delivery)	£9.50

SAM PRODUCTS

SAMPLIFIER A Stereo amp powered from SAM. Very small unit which can drive speakers or phones via 3.5mm jack socket.
Amp —£20 Amp + Speakers —£25
(Overseas delivery: Amp + £1, both + £2)

Coming soon —SAM Comms and other goodies for the Coupé!

B.G. Services, 64 Roebuck Road, Chessington, Surrey, KT19 1JX.
Tel: 0831 397 0763 Fax: 081 391 0744

MasterDOS

The definitive DOS for the SAM Coupé?

Paul Wallace reviews this long-awaited piece of software. Is it worth upgrading to? We find out ...

Anybody who has tried to do any real programming in SAM BASIC will know that SAMDOS simply hasn't got the scope needed to make full use of disk files. You can't for example, OPEN files to streams, which is was a major disappointment when SAMDOS2 was released.

MasterDOS however, comes as a bit of a culture shock after being used to SAMDOS. Written by Andy Wright, it does everything that SAMDOS2 does and a whole lot more besides.

MasterDOS provides you with many of the features of systems such as MS-DOS on the IBM in as much that files can be stored in seperate subdirectories in a hierarchical tree structure. This makes file management much easier. Instead of searching through the directory of a disk to find a particular file you can store files under named subdirectories. For example, you could store all your games in a subdirectory called GAMES, or all letters in WORDPRO. Then while you are in one of these subdirectoris, when you do a DIR command only the files in that subdirectory will be listed. thus allowing you to find files much more quickly and easily.

Your current subdirectory can be changed by typing DIR="name". where name is the subdirectory's name. Subdirectoris can also be nested within other subdirectories. So in our example, in the GAMES diretory, you can have two further subdirectories called ARCADE and ADVENTURE. each one containing different types of game. You can find out the current 'path', which denotes which route MasterDOS must take through the disk directories to get to your current one, by typing PRINT PATH$.

Subdirectories can easily to created too. with the OPEN DIR "directory name" command

All the SAMDOS2 command syntax is preserved and so all SAM BASIC programs should work perfectly okay under MasterDOS. SAMDOS formatted disks are also completly compatible with MasterDOS. However, MasterDOS allows you to tailor the disk format allowing a user-defined amount of tracks to be allocated as disk directory space, thus increasing the number of files you can store on the disc (no more 80 file restriction!) but having the side effect of reduced the actual capacity of the disk. MasterDOS also reads and writes to disks 10% faster than SAMDOS.

All the SAMDOS command syntax is preserved and so all programs which use SAM BASIC for their file handling should work perfectly okay under MasterDOS. All the SAMDOS commands work under MasterDOS as they did under SAMDOS. However, filenames can be expanded to tell MasterDOS in which subdirectory to find the file. For example,

LOAD "\sub2\games\frogger"

loads the file 'frogger' in the subdirectory 'games' which in turn is in the subdirectory sub2. It sounds quite complicated, but it is easy to master and is very powerful.

One of the most welcome features though is the "ASK ME" option which allows you to select some files but not all the files in an operation. This works with the ERASE. RENAME. PROTECT, HIDE and COPY commands by placing a question mark (?) after the command. For example.

COPY "d1" TO "d2"?

will prompt you with:

COPY "filename"? (y/n/a/e)

MasterDOS

for each file encountered. If you reply 'y' then the file will be COPYed, 'n' will skip to the next file, 'a' will COPY this file and all the rest it finds without prompting you, and 'e' exits from the command. Very useful indeed.

Another real boon, for single drive users at least, is the BACKUP command which allows you to copy the contents of an entire disk at once. The reason why it is so essential for single drive users is that it uses as much memory as it can to perform the transfer.

RAM disks have also been implemented with MasterDOS (see page 29 for an explanation of what a RAM disk is).

Upto to 5 seperate RAM discs can be set-up and can be used just as if they were normal floppy disc drives.

The RAM discs are numbered 3 to 7, but before you can use them they need to be FORMATed.

Just like a 'real' disk, the RAM disk is divided into tracks, and you can use the FORMAT command to specify how many tracks you wish to set aside for the directory block and the total number of tracks on the disk.

This is where a new keyword is useful. The FPAGES function tells you the number of free RAM pages are available for use by the RAM disk. Using this, you can work out how large you can have the RAM disk bearing in mind that as you open more SCREENS and format more RAM disks, this number decreases.

You are also able to 'swap' drives around so that drive 1 (usually the floppy disk drive becomes the RAM disk). So you can for example, copy the files of a program to the RAM disk, and then by telling MasterDOS that you want the RAM disk to become drive 1, when you run the program from the RAM disc it will automatically look for its files there and not from the floppy disk drive. You can also do the same thing for tape commands. This feat of trickery is achieved by POKEing into the DVAR area and is completely transparent to programs.

MasterDOS is also fully compatible with the battery backed clock/calendar on SAMCO's SAMBUS motherboard. MasterDOS provides the commands DATE and TIME, and the functions DATE$ and TIME$ to set and read it. Files are also automatically date stamped. Even if you don't own a SAMBUS, DATE can be used to set today's date so that files are stamped with the correct date.

MasterDOS's extra commands also provide DIR$ which returns all the file names in a directory as a string, i.e. the same effect as RECORD TO ... DIR # .... RECORD STOP

For programmers, two invaluable functions are DSTAT and FSTAT. DSTAT returns the status of the disk. By setting two parameters, e.g. PRINT DSTAT (1,1), you can obtain the following information: the amount of usable space on the disk, if the disk is write-proctected, amount of free slots for file names on the disk, the total number of files on the disk, the number of files in the current directory, the number of tracks used by the directory and the current drive number.

The FSTAT function allows

SAM Coupé

VERDICT

✓ Essentail for *any* SAM Coupé user.
Provide a whole host of advanced features.
More powerful than DOSs on many other computers.

✗ The only gripe is that it is not bundled as standard with the SAM Coupé.

95%

you to obtain information about files. You can for example find out the length of a file, the file's number in the directory, the file's type and if it is protected or hidden. Both functions tell you if there is an error, e.g. the file doesn't exist of there isn't a disk in the drive, without dropping back to BASIC with an error. Another very useful command.

I think that the most important thing programmers needed from SAMDOS2 was OPEN TYPE files allowing serial and random access of files. However, this was not to be, and we've had the long wait until MasterDOS arrived to save the day. Both serial and random access files are fully supported in MasterDOS. Syntax is as you might expect, OPEN #stream number;"filename" OUT to create a new serial file, and OPEN #stream;"filename" IN

to read an existing serial file. Random access files are opened with:

OPEN #stream;"filename" RND.

Writing to a file is done with:

PRINT #stream number;variables
e.g. PRINT#4;a$,number,"hello".

Reading can be done using:

INPUT #stream number;variables

or by using the INKEY$#stream unction which reads in one character at a time.

The POINT#stream,position command allows you to automatically jump to a specific place in a open file. This is of use mainly in random access files where hashing functions are being used to find file positions. The file pointer can also be found using the PTR # stream number function. The LENGTH #stream number function is also very useful as it allows the exact length of the file on a stream to be read. This is useful if you want to jump to the end of a file in order to extend it. The obligatory EOF function is also included to detect if the end of the file has been found.

If you are an ex-Spectrum user used to using OPEN TYPE files with Microdrives or the Plus D, then you'll love MasterDOS' file handling. It far exceeds that of the Microdrive and Plus D. With MasterDOS, very complex random files can be created and maintained which just couldn't be practically done on a Spectrum.

Sectors can also be read and written to, as in SAMDOS, but with the exception that RAM discs can be treated as 'real' disc in as much as you can read and write sectors on them. Clever eh?

You can now also read and write sectors using addresses greater than 65536, which is a helpfull expansion to SAMDOS's WRITE AT and READ AT commands.

Well thats just about it. Its hard to summarise exactly how astounding good MasterDOS is. Not only has it got everything your likely to want, but it works excellently. MasterDOS's compatability with the SAM Bus is also a great asset. The ability to use the extended memory of SAMCO's memory modules as RAM discs also provides huge flexibility and really transforms the SAM Coupé into a very powerful computer. The documentation accompanying MasterDOS is also very good with thorough explanations which will allow both beginners and experts alike. Also on the MasterDOS are example programs showing you specific features of the DOS in action and act as tutorials. At just £14.95, it is also excellent value for money.

In short, whether you're a programmer or not, MasterDOS is THE most significant product which has been released for the SAM Coupé. Its just a shame that it is not bundled with the SAM itself as it would make a strong selling point for it.

MasterDOS is available from SAMCO (Tel 0792 700300) for £14.95.

N.B. SAM users interested in finding out how RAM disks can be utilised might like to read my article ***RAM Paging*** in this issue on page 29.

I am also writing a follow-up article which will cover usage of RAM paging and MasterDOS's RAM disks and should be ready for issue 3.

You'll also see one or possibly two more articles from me in the next couple of issues which will show you how to get th best from MasterDOS's serial and in particular, random access files.

Paul Wallace.

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TRACEY

Chris Clayton discovers how to turn your mouse into a digitiser for less than £8.

TRACEY is a simple device which is attached to any type of mouse and used in combination with an appropriate mouse driven art program such as Art Studio or Artist II to assist in the copying of an image from a printed page - in effect by tracing it.

Tracey is a small plastic lens, rather like a magnifying glass, with crosshairs forming a sight. It is attached to either side of the mouse with the strips of velcro supplied, enabling it to be removed as required. Looking through the sight, you follow the outline of the object to be drawn, the mouse reproducing the image on screen in accordance with the functions set in the art program being used. It is a very simple idea and at £7.95 quite inexpensive, but does it work?

Well, yes, with some reservations. I expect like most things of this sort practice is important and usefulness will improve with use. I have only given it limited usage so far, partly because at around the same time I acquired a Touchmaster Graphics Tablet and have been experimenting with that. Also, my recently acquired mouse, an AMX for the 48K Spectrum (which works with the Plus 3 in 48K mode) tended to lock up after about 30 minutes use with my 128K Spectrum in 48K mode. Nevertheless, using it in combination with the 48K version of ART STUDIO, and more recently with AMX ART on a 48K which does not lock-up, I have come to the conclusion that with more practice it will be worth the money and time spent on it.

TRACEY does not fit too well to my AMX mouse because of the mouse's physical design and would probably be more secure on some other mice. The two biggest difficulties are:

- keeping the mouse straight, as it needs to be kept perpendicular to the sheet on which you are working - rotating or skewing it from side to side (as I tend to do while it is moving) alters the positioning of the image it produces,

- avoiding distortion caused by the parallax effect, by keeping your eye directly over the sight,

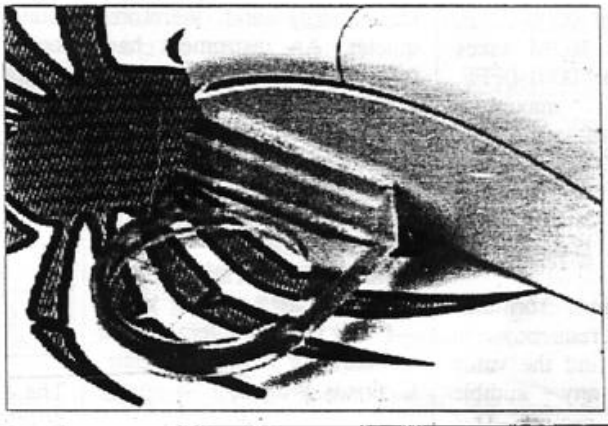
Having a good working surface (a mouse mat), comfortable positioning and keeping the paper fixed will help. Some art packages allow the sensitivity of the mouse to be adjusted and experimenting with different sensitivities could be worthwhile. One tip from my experience is to first plot points at various stages of the image to be drawn as a guide.

The instructions are a well printed but quite short leaflet, plus an additional brief Tracey Tips sheet. Hopefully if the device gets widely used more advice on how to get the best from it will be forthcoming. The main purpose of the instructions is to provide guidance on how to adjust sensitivity for a range of mice/computers such as Amigas, PCs but not the Spectrum. (I suggest that if I had a Macintosh or IBM PC it would also have a scanner to go with it, a much more costly but far superior device unfortunately still not available available for the Spectrum range!).

SideWise does not seem to be contactable by phone for advice but when my TRACEY arrived without velcro my letter produced a very prompt replacement and apology.

TRACEY is available for £7.95 from:

SideWise Ltd.,
PO Box 4,
Totnes,
Devon,
TQ9 7EN.



ALL COMPUTERS

VERDICT

✓ Useable on any computer as long as it has a mouse.
Cheap.
Great for tracing line drawings.

✗ A very steady hand and accurate eye needed to reap the full benefits of the device.
No instructions for Spectrum, SAM or QL users.

75%

The Sound of Music

Garry Rowland, author and publisher of *Music Writer* gives a unique insight into how direct control of the Spectrum 128's AY chip yields much better musical capabilities.

All the 128K Spectrums use the AY-3-8912 sound chip. The chip has three monophonic sound channels and an eight bit i/o port which is used to control the RS232/MIDI port.

The AY-3-8912 can be controlled using BASIC's PLAY command. Quite clever programs can be written using PLAY, but much greater flexibility is available with direct control of the chip. This can be done through BASIC, but is better done using a machine code program. To keep things simple only BASIC will be used in the examples in this article.

The AY- (etc) can deliver simple tones over a wide range of frequencies —from under 28Hz to 110840.4Hz. The range of frequencies is not continuous. The AY's clock runs at 1.7734476MHz and this is divided by 16 to get the basic frequency unit of 110840.4Hz. The frequency of two units would be 110840.4/2.

I have taken the maximum number of units to be INT(110840.4/27.06Hz)-1 = 4095 (0FFF in hex). This assumes the 12 bit value to have a range of 0000-0FFF. The Spectrum ROM takes the range to be 0001-0FFF, making the maximum number of units INT(110840.4/27.067). This small difference is not important, as long as the method you use is consistent.

Using the simple formulae $110840.4/f$ (frequency in Hz), you can find the value for almost any audible frequency you require. This allows for more distinctive sound effects, but music projects can also benefit from direct control of the sound chip.

FUNDAMENTALS

I'm no expert on this subject and I included a bibliography at the end of this article for those who want to take it further.

Music is based on the natural physical harmonics of a sound. For example: when a string is plucked, it vibrates at many different frequencies. The loudest frequency is known as the "Fundamental frequency". Superimposed on this main vibration will be a second vibration at twice the frequency and half the volume of the fundamental. And so it goes on, with harmonics at 3,4,5,6,7 ... and upto 16 times the fundamental frequency. This is known as the harmonic series of a note. Mathematically, the series is infinite.

It's difficult to pick out harmonics greater than a third as each harmonic has less energy and therefore quieter. An instrument has resonances which amplify or suppress different harmonics, creating an instrument's distinctive voice.

You can create a simple scale using these natural harmonics. Take any frequency as a starting point —I will use the international standard for A above middle C, this is 440Hz.

```
440*1  = 440  (tonic)
440*2  = 880  (octave)
440*3  = 1320 (dominant)
440*4  = 1760 (octave)
440*5  = 2200 (mediant)
440*8  = 3520 (octave)
440*9  = 3960 (supertonic)
440*13 = 5720 (submediant)
```

This gives us the notes for the pentatonic scale A major, but spaced out over several octaves. Dividing by 2 one or more times puts all the notes in the same octave:

```
440 * 1   = 440 (tonic)
440 * 9/8 = 495 (supertonic)
440 * 5/4 = 550 (mediant)
440 * 3/2 = 660 (dominant)
440 *13/8 =715 (submediant)
440.* 2   = 880 (octave)
```

This scale is used in the "Pentaforte" program. The program takes the second and third harmonics of each frequency and uses them on the two spare channels to create a richer sounding monophonic voice.

Scales based on natural harmonics are known as "Just Intonation" scales. The frequencies for an eight note just intonation scale can be found by multiplying the tonic (1st note of scale) by the ration given for the nth note.

Note	Ratio	Frequency
1	1/1	440(A)
2	9/8	440*9/8=495 (B)
3	5/4	440*5/4=550 (C sharp)
4	4/3	440*4/3=586 (D)
5	3/2	440*3/2=660 (E)
6	5/3	440*5/3=733 (F sharp)
7	15/8	440*15/8=825(G sharp)
8	2/1	440*2/1=880(A octave)

The frequency for note six differs from that given in the pentatonic scale because the note used in the pentatonic scales was calculated by dividing the 13th harmonic by eight —it is more usual to use the ratio "fifth harmonic divided by three".

The problem with just intonation is that the frequency for any note can vary —depending where you start. If you start with B (given as 495Hz here) then C sharp becomes 556Hz instead of 550Hz!

Even though the standard 440Hz tone has been used as a reference for other notes, the notes will not sound the same as those used by BASIC's PLAY command. This is because PLAY (and *Music Writer*) uses the equal tempered scale.

The equal tempered scale divides an octave into twelve equal parts. This makes the equal tempered scale sound slightly out of tune compared to a just intonation scale.

HOW TO GET A GOOD TEMPER

The equal tempered scale allows instruments like the piano to be played in different keys (as the semitone is always the same size whichever key is used). In theory the human voice and some other instruments like the violin can play scales based on natural harmonics — but, of course, they would be out of tune with equal tempered instruments.

The equal tempered scale is divided into 1200 cents. 200 cents is equal to one wholetone and 100 cents is equal to one semitone. *Music Writer* uses units of 50 cents to get quarter tones. An eighth tone would be 25 cents. The ratio of a note in a just intonation scale is the harmonic number divided by the number required to bring it within the octave of the scale. The ratio of a note in

```
 10 REM Equal Temper Calculator
 20 LET strm=2: REM =3 if LPRINT
required
 30 LET tu=110840.4: LET
log=3986.3136: LET c=2092.96
 40 PRINT #strm;"TONE";TAB
6;"FREQ.";TAB 16;"SOUND UNIT"
 50 FOR i=7 TO 1 STEP -1
 60 RESTORE
 70 FOR i=1200-50 TO 0 STEP -50
 80 READ n$: IF LEN n$ =1 THEN LET
n$=n$+STR$ i
 90 LET f=10^(i/log)*c+.005: LET f=INT
(f*100)/100
100 LET num=INT (tu/f-.5)
110 PRINT #strm;n$;TAB 6;f;TAB 16;num
120 NEXT i: LET c=c/2: PRINT #strm
130 NEXT i: STOP
140 DATA
"qtr","B","qtr","semi","qtr","A","qtr","semi
","qtr","
G","qtr","semi","qtr","F","qtr","E","qtr","s
emi","qtr","D","qt
r","semi","qtr","C"
```

an equal tempered scale is the antilog of (cents/3986.3136). The constant 3986.3136 is obtained from 100/LOG(2^1/12), where 100 is a semitone in cents and 2^1/12 is one twelth of an octave (semitone). The "Equal Temper Calculator" program prints out the frequency and sound unit value for the notes used by *Music Writer*.

If you want to use microtones (tones smaller than a semitone) then you must program the sound chip directly.

SOUND COMMANDING

The sound chip has 16 registers. These are selected by sending the register number (0-15) to AY port address 65533. This port can also be used to read data from the currently selected register. Port address 49149 is used to write data to the currently selected AY register.

Example:
OUT 65533,2 — Selects register 2
IN (65533) —Reads register 2
OUT 49149,125 —Writes the value 125 to register 2

THE "PentaForte" PROGRAM

There is little point in giving a BASIC example that could just as easily have been written using PLAY, so a pentatonic scale using natural harmonics has been used. This program was written for readability, but has been kept simple so that everything runs at a workable speed. You might like to try the following additions: an eight note just intonation scale, an equal tempered scale, adding octaves, note bend, swell (volume control), control via joystick. You may need a BASIC compiler to speed things up though.

Extra!

Issue 1 of ***Extra!***, the companion publication for Sinclair & SAM Computing contains all the programs from this article to save you typing them in.

Also included are enhanced compiled BASIC versions of the programs which work much faster.

Full details about the contents of issue 1 of ***Extra!*** can be found on page 23.

BIBLIOGRAPHY

A Guide to Tuning Musical Instruments by John Meffen (library code 781.91)
The Book of Music —published by Tiger Books International
The Encyclopaedia Brittanica —your local reference library.

Registers used in PentaForte:
Registers 0-5 hold 12 bit sound unit values -

0	Low byte for channel 1
1	High byte for channel 1
2	Low byte for channel 2
3	High byte for channel 2
4	Low byte for channel 3
5	High byte for channel 3
7	Channel enable/disable flag: 255 = all channels off 248 = all channels on
8	Volume for channel 1
9	Volume for channel 2
10	Volume for channel 3

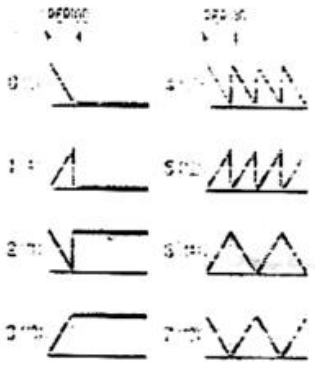
```
 10 REM PentaForte
 20 REM Copyit 1991
 30 LET reg=65533: LET dat=49149:
LET k   $="zxcvbn"
 40 LET vol=15: DIM unit(6): RESTORE
 50 FOR n=1 to 6: READ unit(n): NEXT n
 60 REM turn off sound chip and
wait for key press
 70 OUT reg,7: OUT dat,255
 80 LET i$=INKEY$
 90 FOR n=1 TO 6: IF i$=k   $(n) THEN
GO TO 120
100 NEXT n: GO TO 80
110 REM set pitch of harmonics 1-3
120 OUT reg,0: OUT dat,unit(n): OUT
reg,1: OUT dat,0
130 OUT reg,2: OUT dat,unit(n)/2: OUT
reg,3: OUT dat,0
140 OUT reg,4: OUT dat,unit(n)/3: OUT
reg,5: OUT dat,0
150 REM set volume of harmonics
160 OUT reg,8: OUT dat,vol
170 OUT reg,9: OUT dat,vol/2
180 OUT reg,10: OUT dat,vol/3
190 REM turn on note
200 OUT reg,7: OUT dat,248
210 REM wait for key release or new
note
220 IF INKEY$=i$ THEN GO TO 220
230 IF INKEY$<>"" THEN GO TO 70
240 REM decay note if key released
250 FOR d=vol to 0 STEP -1
260 OUT reg,8: OUT dat,d
270 OUT reg,9: OUT dat,d/2
280 OUT reg,10: OUT dat,d/3
290 PAUSE 1: IF INKEY$<>"" THEN GO
TO 70
300 NEXT d: GO TO 70
310 REM sound unit values for
fundamental frequency
320 DATA 251,223,201,167,155,125
```

ENVELOPES!

All the manuals supplied with the different Spectrum 128 models tend to get a bit vague about using envelopes. The usual suggestion is to try different numbers and see what happens! This article will attempt to describe how to design your sounds a little more purposefully.

The term "envelope" simply describes the shape of data plotted against time. They can be very complex, or they can be very simple like the volume envelopes available on the Spectrum.

The PLAY command uses volume settings by default. If you use the "U" character in a PLAY string, one of the predefined envelopes of the sound chip will be used. To set the envelope to be used you must include a "W" in your string followed by the envelope number (given below). This number is used by BASIC and is not the actual number sent to the sound chip. The number given brackets should be used when the sound chip is accessed directly.



Envelope selection is done in machine code by setting the volume to 16 and sending the envelope number to register 13. It follows that all channels using envelopes must use the same envelope.

Now comes the "X" command. This sets the duration of one period of the envelope. If you don't use the X command this duration is set very high and you probably won't get a very satisfactory result. Using envelope 0 without the "X" number is very hard to distinguish from full volume. For single shot envelopes you need a duration that corresponds to the note length. However, you may want to have an envelope that overshoots note length so that the note cuts off at a higher volume.

GETTING X RIGHT

One unit of "X" is equal to the sound clock multiplied by 256. The sound clock runs at 1/1773447.6 = .00000056 seconds. Multiplying this duration by 256 gives .00014336 seconds per unit of "X".

For example, if you want the single shot period to last half a second you can find the value that follows "X" using: INT (.5/.00014336) = 3487. In machine code this 16 bit value would be sent to registers 11 and 12.

For repeated periods you must divide the X value by the number of repeats you want for the given duration.

HOW LONG IS A NOTE?

If you're working from BASIC you will need to know how long the note is going to be before deciding on the value of "X". The tempo on the Spectrum is given in crotchet beats per minute, so 1/temp gives the duration of one crotchet in fractions of a minute. For all the notes use:

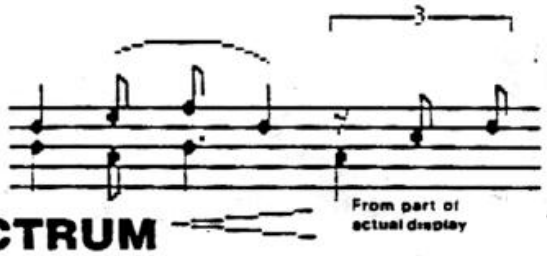
Semibreve	4/tempo
Dotted Minim	3/tempo
Mimim	2/tempo
Dotted Crotchet	1.5/tempo
Crotchet	1/tempo
Dotted Quaver	.75/tempo
Quaver	.5/tempo
Dotted Semiquaver	.37/tempo
Semiquaver	.25/tempo

The result must be multiplied by 60 to get the duration in seconds. The duration of a triplet note can be found by multiplying by .666 (lots of triplets in "the devil's music"!).

You might like to try changing the envelope while playing for variations of the standard effect, but this can only be done effectively using machine code.
The following BASIC program demonstrates how envelopes can be defined using PLAY's "X" and "W" commands.

```
 10 REM Envelope demo
 20 REM Copyit 1991
 30 DIM n(9): FOR i=1 TO 9: READ n(i): NEXT i
 40 INPUT "Tempo (60 to 240)";T
 50 INPUT "Note number (1 to 9)";N
 60 INPUT "Envelope number (0 to 7)";W
 70 INPUT "Number of periods (1 to 435)";p
 80 REM calculate note and period length in seconds
 90 LET nlen=(n(N)/T)*60
100 LET X=INT ((nlen/.00014336)/p): IF X=0 THEN LET X=1
110 LET p$="U"+STR$ T+"W"+STR$ W+"X"+STR$ X+"N"+STR$
N+"C"
120 REM display and play effect
130 CLS : PRINT "play$ =";CHR$ 34;p$;CHR$ 34'Note ";nlen;"
seconds long"
140 LET ctr=INT (nlen/(X*.00014336))
150 IF ctr<1 THEN LET ctr=1
160 IF ctr>14 THEN LET ctr=14
170 PLOT 0,100: IF W=2 THEN PLOT 0,116
180 IF W=0 OR W=4 THEN DRAW 0,16
190 IF W=0 OR W=2 OR W=4 OR W=7 THEN DRAW 16,-16
200 IF W=1 OR W=3 OR W=5 OR W=6 THEN DRAW 16,16
210 IF W=2 THEN DRAW 0,16
220 IF W=1 OR W=5 THEN DRAW 0,-16
230 IF W=6 THEN DRAW 16,0
240 IF W<4 THEN LET W=8
250 LET ctr=ctr-1: IF ctr=0 THEN PLAY p$: GO TO 40
260 IF W=8 OR W<6 THEN GO TO 180
270 IF W=6 THEN DRAW 16,-16: GO TO 290
280 DRAW 16,16
290 LET ctr=ctr-1: IF ctr>0 THEN GO TO 190
300 PLAY p$: GO TO 40
310 DATA .25,.37,.5,.75,1,1.5,2,3,4
```

Music Writer™



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PD DOMAIN

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We have also arranged the entire range into 9 discs and tapes, each containing 100K-170K of programs.

PD #1
Noughts & Crosses, Revise!, Menu/CAT Utility†, Boot Sector Modifier†, Headload†, Headcopy†, Catt all†, Parameters†, Set Default Utility†, April Menu, CAT†, K Free†, REM Store, Axel F*, BASIC Compressor, Screen Planner, Sort Demo, Date 2 Day, Ultra Clear A Screen, Label Maker, TV Trivia, The Earth, Sunset

PD #2
SecureIt, AutoSecureIt, Logo, Vector 3D, Other Worlds, Varisave, Multi-Flash, Trans 48†, Super Input, SpecTec Demo, Boot†, Sound to Light, Kingfisher, Countryside Scene, Autoloader†, Easylist

PD #3
Calendar, +3 Disk Checker†, Fonts, Recover†, Big Text, Screen Fade, Hex-Dec-Hex Converter, REM Address Finder, 64 Column Display, Chordata, Drawmaster, Axel–F The Sequel*, Fonts Galore, Ramset‡, Crunch†, Double Height Text, INSTR$, LEFT$/RIGHT$/MID$, +3 to 128 BASIC Converter‡.

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PD #9
Trail Racer, MaxiRAM‡, Ball Demo, Editview 2, TV Test 2.

† Spectrum +3 specific and not included on tape version * Not compatible on a Spectrum 48K
‡ Spectrum +2A and +3 specific

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BUT!

Although the term 'public domain' is now widely used and recognised, like most things in the English language it is misused in relation to software copyright.

The UK legal system does not recognise the term 'public domain' anywhere in the Copyright Designs and Patents Act 1988, and so we have to look at other precedents in order to get some real meaning to the term.

Other than computing, the music industry is the only major user of the term which is used to indentify any work that is not covered by copyright.

By law, copyrighted material remains the copyright of the author until 50 years after his death, whereupon its statues as copyright is revoked and thus becomes 'within the public domain'.

Authors who don't wish to retain any kind of copyright on their work must mark their work as PD. This basically means that the author is relinquishing *all* copyright to the software. The scope of the Copyright Act 1988 is such that it is feasible that anyone can 'claim' the copyright and modify or even sell the work.

However, if anyone's just got the idea of doing this with some software marked PD, I would also point out that the meaning of PD work not being able to be copied or sold, has been used in the music industry for so long (over 50 years), that its 'suggested' meaning would quite easily stand up in court.

So there!

CP/M Discs

The S&SC PD Library also contains a number of Spectrum +3 discs for users of the CP/M operating system. There is a total of 9 discs available at present, although a further 2 should be added next month.

CP/M #1
Expanded disk cataloguer, DICE-like disk maintainance utility, disk copying tool and VDE - a good Wordstar compatible word processor.

CP/M#2
A MASSIVE collection of programs and routines. Includes: Anagrams, biorhythms, calendars, currency conversion, disk clean-up utility, file cruncher, library utility, Mastermind game, ASCII file displayer, base conversion, file sorter and much more.

CP/M#3
Another huge CP/M collection including: File extractor, FX80 printer tool, file printer, new RAM disk program, REM remover, find and exchange program, "Wordstar" cleaner and more! Something for everyone.

CP/M #4
Another great assortment of programs: useful text formatter to print on BOTH sides of fan-fold paper, file chopper, control stripper, find word routine, sector editor, word/line counter, SpeccyMex (+3 version of ModemEXecutive) and more! Serious +3 users will love this!

CP/M #5
If you're into programming, get this. It contains: an excellent version of 'C' (with files, including a code optimiser!) PLUS a very comprehensive Z80 assembler.

CP/M #6
Contains a version of the industry standard MICROSOFT BASIC. Also, files for CP/M#5's 'C' compiler and more.

CP/M #7
DBQ - a database with a powerful structured query language, designed for ease of use. Complete with 59K on-disk manual.

CP/M #8
DIMS, an wasy to use card-index style database capable of mail merge, label printing, etc. Can even create mail merge files compatible with Tasword +3.

CP/M #9
DU49 - a superb multi-disk formatter and PLOT33 which will turn your printer into a graphcis plotter!

HOW TO ORDER

Ordering software from the S&SC PD Library is easy. Just fill out the form below and we'll mail your software to you as soon as we can.

PRICES

We've tried to keep costs down to a minimum so that we can offer you these tapes and discs at very low prices. Therefore, you can obtain PD as follows:

Spectrum 48/128/+2/+2A tape - £1.70 each Spectrum +3 disc - £2.70 each

***S&SC PD Library** Order Form*

Name _____
Address _____
_____
_____
Post Code _____
Phone Number _____

I enclose a cheque/postal order made payable to *Gamer Designs*, for the amount of £_____

Send this form with payment to:
Sinclair & SAM Computing, 57 Lovers Walk, Dunstable, Beds, LU5 4BG.

DESCRIPTION	*TAPE/DISK*	*PRICE*
Overseas P&P - add £0.10 per item		
	P&P	**£0.50**
	TOTAL	

SAM Coupé

Public Domain

Brent Stevens kicks off his monthly SAM PD column in SSC with a round-up of what's available

Here I am with a new column for a new magazine. Let me introduce myself, I am Brent Stevens of the *SAM Coupé Public Domain Software Association* (*SCPDSA* for short), a full member of *Team SAM*.

Every issue, I intend to inform you about all the latest Public Domain (PD) software released. I will also be including an order code and price, for those who have already subscribed to the *SAMsational Software*, the *SCPDSA*'s own PD catalogue.

In order to help make PD software available to SAM users, the SCPDSA has been set up under Team SAM. By subscribing for £2.00, you get a free demo disk, and a PD catalogue, supplied every 3 months for a year. Disks featured in the catalogue, can then be ordered directly from the SCPDSA, saving the bother of finding different addresses, and wasting stamps. Some people think of this as a PD Home Computer Club.

As from next month, I will be going into greater detail about the disks currently available, but for now, I'll just go over what to expect from PD.

How about Screens! Already, there is a substantial collection of screens ranging from digitised Atari ST screens to high quality artwork of the Teenage Mutant Hero Turtles.

Next come the animation demos. The highlight of these, is the Total Recall film trailer demo. This features around 70 digitised screens, displayed one after another quite quickly, forming frames of an animation sequence. There are a few other like these, such as Robocop, Mad Max, and Star Wars.

There are animations using sprites, done in SAM BASIC. The Factory Demo, as on the SCPDSA Demo Disk, is a good example of this, and features a Monty Python-like adventure of a 'rebel' head who doesn't want to be covered by chocolate (possibly this is why he had a red nose!?), so he tries to run away (weird eh?).

The utilities are something out of this world. These are 2 Mode combiner utilities, that can mix screen modes together either vertically, or horizontally. You could, for example, have a MODE 4 screen, with MODE 3 text alongside.

There are numerous disk utility programs, that range from file unerasers, to sector checkers, and speedy copiers. Some programs can also read text or screen data from disks, even if the disks are non-Coupé standard (i.e. IBM PC disks).

How about printing text out in MODE 3 CSIZE's such as 4,5, or even 3,4! Whatever your needs, it is very probable that there is already something out to cover most possibilities. There's plenty of simple filing programs out as well.

So who says there isn't much software for the Coupé? Tell them they are wrong, and point them in the right direction. Maybe they are just games players. Well, there aren't too many PD games yet, but the few available, are outstanding. Take Tetris for example. This is a full SAM Coupé version, with brilliant 6-channel stereo sound, playing thoughout the game. In the background is a high quality digitised screen (from the Archimedes), probably of the programmer's girlfriend. Apart from the nice touches, the actual game is very playable, and well worth the £1.25, that it can be picked up for, especially as it is coded in machine code.

A few good BASIC games are around as well. In particular, No Way Back, a horizontally scrolling shoot-em-up, with some of the biggest end-of-level nasties ever to have been seen!

The game can be a little slow at times, but when a SAM BASIC compiler comes out, these games will really be something special. No Way Back also features food intro music.

There are the usual Othello (Reversi) and Connect 4 games, with some versions better than others, and even the odd graphic adventure.

Well, that wraps it up for now. Next month, the actual disks will be reviewed, and any new disks will be included as well.

Brent C. Stevens

REMEMBER!

Remember that the SAM Coupé can also use the large amount of Spectrum 48K PD software available, if you have a Spectrum emulator utility that is. Take a look through the advertisements in this magazines to find out which emulators are available.

Although the SAM PD scene is growing at an encouraging rate, the Spectrum has a couple of years head-start, so if you can't find a suitable SAM program, maybe there's a Spectrum version which you can use in the meantime.

NEWS

SAM COUPÉ PUBLIC DOMAIN SOFTWARE ASSOCIATION
42 EATON DRIVE, KINGSTON UPON THAMES, SURREY, KT2 7QT

Software Association

I enclose my subs for the next six months. May I add how much I look forward to each monthly issue of OUTLET coming through the post box and how delighted I am with the contents. J.W.

.. OUTLET is undoubtedly the most intelligent and interesting magazine for the Spectrum - please keep up the good work. 181/00

.. the standard maintained by [illegible] the disappear[illegible] dedicated so[illegible] enthusiasts w[illegible] OUTLET.

.. OUTLET keep[illegible]

I'd like to say [illegible] month producing [illegible] but they are cer[illegible] high standard of [illegible] 157/27

.. I've been with OUTLET for a year now, and I can say it's one of the smartest moves I've made for ages. the quality is excellent, the service reliable and efficient and the variety of programs is extensive. 168/23

.... my thanks for the many pleasurable hours I have had with your tapes .... I hope you go from strength to strength. 175/25

Thanks a lot for the excellent OUTLET No.035 disk for SAM ... I was facinated with all the information and demonstrations. The SAM information will be especially helpful to me ... thanks again for all your efforts. 169/30

[illegible] .... I [illegible]rat publication, [illegible] 172/05

[illegible]r OUTLET. The [illegible]t running [illegible]s. Thanks for [illegible]o letters 177/03

I must say how impressed I am with the ever increasing quality of OUTLET ... for example PROCROSS was, in my opinion, one of the best utilities for the Spectrum I have ever seen. 182/03

I found your software easy to use, useful and enlightening 195/0

Once again I am impressed with the first class service and care you give your customers. Unique! is the only word that fits ... Thanks again for the trouble you have taken to produce a 5.25" disk of OUTLET to run on the SAM. 203/04

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SAM Coupé Programming

We take a look at how programmers are beginning to get the best out of the SAM Coupé. We also talk to programmers about the problems involved in writting for the SAM.

GAME GUIDE

An in-depth guide to show you how to beat *SIM CITY*.

Had enough of the 'glossies'?

A lot of people agree that the three 'glossy' Spectrum games magazines are nothing more than comics ...

GAMES Xtra is the exception to the rule.

ISSUE #1 OUT APRIL 6th

GAMES Xtra is published by *Garner Designs*, publishers of this magazine.

Not only is ***GAMES Xtra*** produced to the same high standards of *Sinclair & SAM Computing*, but with a cover price of just 85p it much cheaper than the 'glossies'.

Each issue guarantees reviews of the latest software for both the Spectrum and SAM Coupé, not to mention our Game Guides to all your favourtie games. We'll also keep you in touch with all the latest developments.

Copies of ***GAMES Xtra*** can be obtained by sending a cheque or Postal Order for 85p+15p (P&P) to: *Garner Designs* (57 Lovers Walk, Dunstable, Beds, LU5 4BG).

Alternatively, issues 1-3 can be obtained for just £2.70.

CONTENTS ISSUE #1

CIRCUIT DESIGNER
A great public domain program for the Spectrum which allows you to design electronics circuits with ease.

SAMPLEX
A sound sampling program by Damien Guard for the Spectrum. Great user interface and a real-time sample display.

CLIP ART
DTP users will just love this. This collection of around 100 pictures forms part of Garner Designs clip art range.

PRODOS
Add flashy effects to your programs with this set of extension commands to ZX BASIC.

LIFE
The hypnotic quality alone makes this program excellent. 'Life' generators have always been a source of fascination, and this fast machine code version for the Spectrum is no exception to this.

ARTICLE FEATURES

The Sound of Music
Copies of the programs detailed in this issue's 'Sound of Music' article by Garry Rowland, including enhanced compiled BASIC versions.

RAM Paging
Copies of ***MaxiRAM*** and ***RAMDisk***, as detailed in this issue's 'RAM Paging' article by Paul Wallace.

BILLBOARD
Our resident advertisement feature containing adverts from all your favourite companies, as well as sample screenshots from their products.

S&SC Extra

The monthly tape and disc for Spectrum and SAM Coupé users

S&SC Extra is the perfect companion to ***Sinclair & SAM Computing***. Each month it contains a whole host of programs for you to use and enjoy.

We also save you from typing in listings from the magazine by putting the programs themselves in each issue.

Also packed with dynamic advertisements from many companies and actual screenshots from their products

Coming in tape versions for the Spectrum and disc versions for the SAM Coupé and Spectrum +3 its a must for everybody serious about their computer.

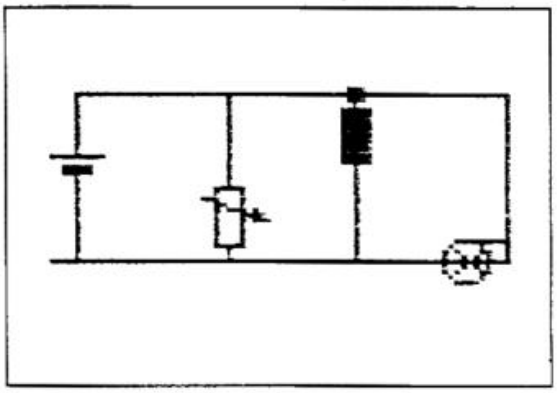
Circuit Designer

All Spectrums SAM disc version works with MasterDOS

This program has come all the way from a German author via a Danish PD library to the UK, where we have translated the instructions from German to English. The program is an easy to use, yet quite powerful electronic circuit designer.

The program allows you to place virtually all the electronic symbols your likely to need on the screen with the cursor keys. Components supported are: resistor, LDR, potentiometer, capacitor, diode (including zener), NPN and PNP transistors, LED, transformer, lamp, IC, microphone, loudspeaker, switch, battery, and others too. Text can be added to designs too.

As well as actually designing circuit diagrams, you can load and save designs and print them out to a printer. As the designs are saved in standard SCREENS format, you could also incorporate your designs into a DTP package.



LOADING INSTRUCTIONS

Files: CIRCUIT.BAS
Load with: *LOAD "CIRCUIT.BAS"*

Full instructions are given in the program itself should you become stuck.

This program can be used on a non-MasterDOS SAM Coupé by using one of the Spectrum emulator utilities on the market with the tape version. Please see page 26 for details on how SAM users can get the tape version of ***S&SC Extra*** at low cost.

SAMPLEX

All Spectrums

This PD sound sampler for the Spectrum is one of the best we've seen. With its nice user interface and real-time sample 'meter' it is very easy to use, and the sound quality of samples is very good.

The program even comes with three samples that the author has created. However, these do not do the program justice, and in our experiences with the program much better quality samples can be achieved.

Sample speed can also be altered to get interesting effects.

LOADING INSTRUCTIONS

Files: SAMPLEX.BAS, SAMPLEX.DOC, SAMPLEX.SCR, SAMPLEX.Z80, ED209.PRM, ED209.SMP, MONEY.PRM, MONEY.SMP, POWER.PRM, POWER.SMP.

Load with: *LOAD "SAMPLEX.BAS"*

Full instructions of how to use the program are detailed comprehensively in the program itself, and can be accessed by pressing SPACE from the main screen.

S&SC Extra

LIFE

All Spectrums SAM compatible with Spectrum emulator utility

Life describes the population evolution of a group of orgaanisms which are developing under the effects of over and under population. Each individual of this population is known as a cell. Each cell has the possibilty of two states of being, either alive or dead (simple, eh?).

At each stage in each cell in the environment responds to the dynamic effects of its immediate neighbours, i.e. the eight cells surrounding it, to the following rules:

• Death —a live cell (1) can only remain alive if it is surrounded by two or three live neighbours. If this is not satisfied, the cell with either feel overcrowed or lonely and so die (0).

• Birth —a dead cell (0) will come to life (1) only when it is surrounded by three live neighbours. The cells in *Life* need three parents to induce a birth.

So there you have it, a simple set of rules which go some way to mimic the cellular automation of real life.

Just like in real life, in *Life* collections of cells can sometimes become life forms. These are self supporting groups of cells which will exist for an infinite amount of time, unless interaction from nearby volatile cells occurs. The most dynamic of these life forms is the Glider which not only sustains itself, but also has the capacity of movement in a straight line through the environment.

Life also allows you to genetically engineer the environment in order to create life forms and experiment with different cell patterns.

All in all, *Life* has the capacity to give you infinite enjoyment.

LOADING INSTRUCTIONS

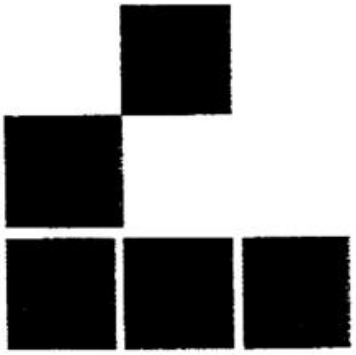
Files: LIFE.BAS
Load with: *LOAD "LIFE.BAS"*

When *Life* has loaded you will experience a short delay while some important machine code is set up in memory. However, once this has been done the main menu will be displayed which contains 4 options.

The first allows you to edit the environment. A cursor will appear on the screen which can be moved about using the cursor keys. To create live cells press 'S' and move the cursor around. To create dead cells press 'C' and move the cursor around. To go back to the main menu press SYMBOL SHIFT and Q at the same time.

The second option creates a random environment of between 100 and 5000 live cells. The third option allows you to define the operational parameters of the program. You are first asked whether you want the environment to have a border. If you do not, then cell activity will 'wrap' around from top to bottom, and left to right, and vice versa. You are then asked if you want a continuous evolution. If you do not, then after the state of each cell has been determined you must press any key to repeat the process.

The fourth option actualy starts the evolution process. Pressing 'X' will return you to the main menu. A time may come in the evolution where the entire environment is stable, i.e. no groups of cells are changing their state in such a way that it is effecting the environment. In this case you have to press 'X' to get back to the main menu.



This is a glider formation – able to sustain itself and also traverse in a straight line .

CLIP ART

All Spectrums & SAM

This selection of around 100 pictures for Spectrum and SAM users is ideal for DTP work, or within art packages. All the pictures are in standard SCREENS format.

INSTRUCTIONS

Files: CLIP.1 .... CLIP.25
CLIP.BAS

A special viewer program called CLIP.BAS has been provided so all the clip art files can be viewed.

The clip art files themselves should be loaded in the DTP program or art package as SCREENS files.

COMPATABILITY

With the programs which 'only' work from 48K mode on a Spectrum, on the +3 disc version of ***S&SC Extra*** we have specially configured these programs so that they load from disk into 48K mode thus making them completely compatible.

For SAM Coupé users, these programs can be used with the aid of one of the many Spectrum emulators available, e.g. SAMTAPE from LERM Software.

PRODOS

Spectrums in 48K mode
SAM with Emulator

This programs for Spectrums in 48K mode adds a number of commands to ZX BASIC which allow you to do all manner of things, such as set up windows, display large text, draw dotted lines, fill areas, display text at 64 characters per line, and much much more.

It comes with an excellent demonstration program which show off all the new commands in great detail, and as it would take more space than I have to describe all the command I advise you to take a look at the demonstration program to see how each command works.

INSTRUCTIONS

Files: DEMO,
PRODOSDEMO,
PRODOS1.1
Load with: *LOAD "DEMO"*

Once the demo program has been loaded, you are given the option of 'swap' or 'direct'. The latter speeds up the demo slightly.

The 'PRODOS1.1' code file loads in at 60000 and is 3787 bytes long.

SAM Coupé programs

The SAM version of *S&SC Extra* contains a number of SAM specific programs. Because a lack of space this month, we can only list the programs. Each purchaser of the SAM disk version will however, also receive a comprehensive instructions booklet detailing the use of each of the programs.

The full contents of the SAM disc is as follows:

Automenu - An easy to use disk loader program
Autoconfig - Configures MasterDOS to your needs
Tetris - A great machine code game ***(see page 20)***
Disclone - Sector level disk copier utility
Slideshow - A collection of attractive SCREENS with viewer program

Clip Art - See above for full detail
Circuit Designer - See above for full details
BILLBOARD - A plethora of advertisements

S&SC Extra

The Sound of Music

All Spectrums with 128K memory

To accompany this issue's *Sound of Music* article by Garry Rowland, we have the programs listed in this excellent article.

INSTRUCTIONS

Files: TEMPER.BAS, PENTA.BAS, ENVELOPE.BAS, ENVELOPE2.BAS, PENTA2.BAS

The ENVELOPE2 and PENTA2.BAS programs are compiled versions of the original BASIC programs, and so work faster and are more responsive.

RAM Paging

MaxiRAM +3 +2A RAMDisk - 48K

The ***MaxiRAM*** and ***RAMDisk*** programs are fully described in this issue's *RAM Paging* article.

INSTRUCTIONS

Files: MAXIRAM.BAS,
RAMDISK.BAS, RAMDISK.BIN

BILLBOARD

Billboard contains a whole multitude of advertisements from all your favourite companies, including actual screenshots of products in action.

Unlike other mediums, *Billboard* allows you to see exactly what a program looks like before you buy it.

There are also advertisements from user groups, fanzines, PD libraries.

Load with: *LOAD "BILLBOARD.BAS"*

Using *S&SC Extra*

Spectrum +3 disc

A special menu program has been provided to enable easier loading of the programs. This can be loaded by selecting the LOADER option from the +3's main menu, or by typing *LOAD "DISK"* from +3 BASIC. Full instructions of how to use the menu program are included in the program.

SAM Coupé disc

As with the +3 disc, a menu program is included on the disc to aid the loading of programs. This can be loaded by pressing F9 to boot the disc. Full instructions of how to use the menu program are included in the program.

Spectrum tape

Each copy of the *S&SC Extra* tape comes with an information sheet telling you the order in which the programs are stored on the tape. This sheet also allows you to mark down tape counter readings so that you can find each program quickly.

BACKING UP YOUR DISC

It is essential that Spectrum +3 and SAM Coupé users back up their discs straight away in case it becomes corrupted in the future.

On both the disc versions we have placed a program called 'CLONE.BAS' which will automate the copying of the contents of your *S&SC Extra* master disc to another blank disc.

To load this program type:

LOAD "CLONE.BAS"

On-screen instructions will lead you through the process.

FAULTY TAPE/DISC?

Although we do our utmost to ensure that your tape/disc works correctly, occassionally a disc may become corrupted.

If you cannot get your tape/disc, or a particular file on it, working then please send the tape or disc back including an SAE for a free replacement copy within a month of the cover date to:

Garner Designs,
57 Lovers Walk,
Dunstable,
Beds,
LU5 4BG.

HOW TO ORDER S&SC EXTRA

Name _____

Address _____

PLEASE TICK THE VERSION YOU REQUIRE:

Spectrum tape (£1.95) _____ Spectrum +3 disc (£3.00) _____ SAM Coupé disc (£2.20) _____
SAM disc + Spectrum tape (£2.90) _____ (Needs a Spectrum emulator to use the programs on the tape on the SAM)

Issues 1-3 of: Spectrum tape (£5.10) _____ Spectrum +3 disc (£8.40) _____ SAM Coupé disc (£6.00) _____
SAM disc + Spectrum tape (£8.40) _____ (Needs a Spectrum emulator to use the programs on the tape on the SAM)

I enclose a cheque/postal order made payable to *Garner Designs* for _____

Please fill out this form in BLOCK CAPITALS
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Most poeple will at some point encounter some problem, whether it be software or hardware realted, which they can't solve. This is of course extremely infuriating, especially when the manual you have doesn't help at all.

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The *Advice Line* service also has two methods of use. These are the telephone service and the postal service.

The telephone service should be your first contact with us with your query. Our experts will do their very best to help you with your query.

However, some queries just cannot be answered over the 'phone. For example, if you have a program which you cannot get to work or a monitor with non-standard connections; the only way that we are going to be able to help you is if you provide us with information like data sheets, listings, etc.

This is where you should use our postal service. We've taken a leaf out of the book of *BBC Acorn User* magazine by providing a guaranteed fast service. In SSC's case, we guarantee to answer your question within 12 working days of us receiving it — however complex your question is.

Not only is the service fast, but its also very comprehensive —the answer to your query will be a detailed (but not jargon-ridden) word-processed document containing any diagrams or listings that we feel you require. We will also, of course, return any material which you have sent to help us.

In order to operate this fast service and employ only the most knowledgeable experts, we are charging a minimal amount of £1.75 to cover administrative costs and postage (i.e. you don't need to enclose an SAE).

However, our guarantee is that if we can't get the answer to your answer to you within 12 working days or we can't answer your question, then we'll refund your money in full. A further guarantee is that if after receiving our reply to your question you're still 'none the wiser', then we'll rewrite our reply so that you can understand it.

In short, you can't lose and for your £1.75 you are getting an extremely fast and professional service.

TELEPHONE ADVICE LINE

If you can, please use the telephone service first because we may be able to answer your question straight away.

When you call, please have all the relavant information in front of you. It may also be an idea to sit in front of your computer when you call with any relavant software already loaded.

The *Telephone Advice Line* is in operation at the following times:

Mondays, Wednesdays, Thursdays and Fridays from 2pm until 5pm.

Postal Advice Line

To use the postal service, clearly describe your problem and fill out the form below in BLOCK CAPITALS.

Send these, and photocopies of all the information you think will help us to answer the question.

We have recruited experts which cover all aspects of Spectrum and SAM Coupé use, as well as people who can answer more general questions such as those relating to languages like 'C' and Pascal.

QL Users

At present, our telephone and postal services don't extend to Sinclair QL users. However, this should be rectified by late April when a full service will be offered.

Advice Line

If you have a problem with a Spectrum or SAM Coupé, a piece of commercial software, some hardware or a program you are trying to write then ***Sinclair & SAM Computing*** is at hand to help. The *Advice Line* service guarantees the following:

• A full answer to your question within 12 working days for just £1.75.

The service will answer the problem and return all materials received within 12 working days of receipt. If we fail to keep this promise within the time limit, your cheque or postal order will be returned with our answer —you can't lose!

If you feel our answer is written in a too technical manner (i.e. you can't understand what the Dickens we're on about!) then we'll be happy to rewrite our answer so that you can understand it for no extra charge.

Please also note that debugging your programs could be a complex task and we cannot guarantee that we can give a full solution. However, we'll give as much detail as we possibly can.

Sinclair & SAM Computing Advice Line

Name _____

Address _____

_____

_____

Daytime Telephone Number _____

I enclosed a cheque/postal order for £1.75 made payable to: *Garner Designs*

Garner Designs, 57 Lovers Walk, Dunstable, Beds, LU5 4BG.

Advice Line Answers

Even though this is the first issue of *SSC*, we have already received a number of questions due to the fact that *Advice Line* takes over from a similar column we run in our old +3 Contact magazine.

Each issue we shall be printing a selection of the questions (and of the course the answers), which we receive in the previous month. These will consist of queries from both our telephone and postal service.

Hopefully, you will see one which will help you out without even having to contact us for help.

Colour Printing

I've recently purchased a Star LC-10 colour printer which I intended to use on my +3 and my son's 128K Spectrum.

Once I bought a lead, I got it working okay with my +3, but because the printer is a centronics one I couldn't get it working on the 128K. How do I get the printer to work on the 128?

Secondly, although I've been able to print out text in different colours, I have yet to work out how to print screens in colour. Whenever, I use the COPY command or use the Multiface 3 to print out a screen all I get is a black and white dump or a grey-scale one when I use COPY EXP. How can I print out screens in colour?

Paul Reynolds
Lancashire

*To answer your first question, in order to get any centronics printer working on a Spectrum 128, 'grey' +2, 48K or a 48K+ you first need to purchase a centronics printer interface. This plugs into the expansion port of the Spectrum at one end and the printer itself at the other. Special software (which is supplied) then configures the computer to use the centronics interface when you want to print anything. The interfaces are relatively cheap at around £20. **Datel Electronics** (Govan Road, Fenton Industrial Estate, Fenton, Stoke-on-Trent, ST4 2RS, tel:0782 744707) sell one called **InterPrinter** which will do the job well.*

As for printing screens out in full colour, none of the Spectrum models are directly capable of this feat. However, there are two pieces of software available which will do a very good job for you.

*These are the **Datel Colour Printer Driver** by Datel Electronics, and **Rainbow** by Garner Designs (i.e. us!). Datel's software costs £19.99 on tape or +3 disc, while Garner Designs Rainbow software costs £6.95 on tape or +3 disc.*

*Both these pieces of software will work with Datel's **InterPrinter** centronics printer interface.*

FILE TRANSFER

Can you tell me how I can transfer a number of word processor files created with Tasword onto my PCW? I've been told that I need RS232 interfaces for both computers, but I have been able to find one for the Spectrum.

J.Barry
Cleveland

*Although there are no dedictaed RS232 interfaces still available for the Spectrum, EEC Ltd (see their advert on page 45) sell the **Interface One**, which amongst other things has got an RS232 port which can be accessed from BASIC.*

You will probably have to get a lead custom made for you as the RS232 socket on the Interface 1 is not a standard shape. The connections however, are standard.

You can opt to make the lead in two different ways. You can either make a direct connection lead which links the Spectrum to the PCW directly or a two-stage lead utilising a null-modem.

The first method is achieved by linking the pins as follows:

Spectrum end	PCW end
RX	TX
TX	RX
Ground	Ground

The second method involves you using two standard RS232 cables, one in each computer of course, linked mid-way with a 'null modem' device which switches the RX and TX as described in the first method.

WANTED!

Technical Correspondents specialising in:

- QL hardware,
- QL programming (inc. 68008 and SuperBASIC),
- Minerva use with the QL,

... to help us complete our team of QL specialists for freelance work associated with SSC's *Advice Line* column answering questions by post.
Will take just a few hours a week. All Technical Correspondents will be paid at our standard rates.

Final application date is April 10th 1991.

If you specialise in any or all of the above, please apply to Daniel Garner, Garner Designs, 57 Lovers Walk, Dunstable, Beds, LU5 4BG; or call 0582 472067. If you write then please include a phone number where we can contact you.

RAM Paging

Paul Wallace shows 128K Spectrum users how to get the most from the extra RAM. SAM Coupé users are also given an introduction to the subject.

Much play has been made about the extra 80K of memory that the 128K Spectrums have in comparison to the Spectrum 48K. However, as any BASIC programmer will know, the Spectrum only allows BASIC programs to be written in 41K chunks. The RAM disc can be used to extend the amount of memory available to both BASIC and machine code programmers, and this article shows you exactly how you can get the best out of the beast. Spectrum 48K users need not switch off either because the article also details a public domain utility which endows their Spectrum with a Spectrum 128K-like RAM disc.

A RAM Disc (or virtual disc) is basically an area in the computer's RAM (Random Access Memory) which is set aside to store programs and data. The RAM Disc works much like a disc drive, i.e. you can save files to it, load files from it, erase files which are on it, etc. However, whereas floppy disc drives store files on discs which can only be erased when the user requires so, a RAM disc is erased when then computer is turned off. For this reason, RAM discs can only be used to store files on on a temporary basis. What's the use of a temporary disc drive? Well, a major advantage is its speed - loading a program onto the RAM disc is very quick compared to using a convention disc drive.

Usage on the +3/+2A

The syntax to use the RAM Disc is exactly the same as for using using the built-in 3" disc drive in that you can use the normal *LOAD*, *SAVE*, *MOVE* commands, etc. The RAM Disc is assigned the drive identifier of *M:* ,with the internal 3" drive being *A:* and an external drive being *B:*. Because +3DOS claims some of the +3/+2A's extra memory for its own purposes, the RAM Disc on a +3/+2A is smaller in capacity than on the 128K/+2, being 58K compared to 86K on the earlier 128K machines. For example, to store the program currently in memory onto the RAM disc, calling it THISPROG, you would use the following command: *SAVE "M:THISPROG"*. To load it back, the command is: *LOAD "M:THISPROG"*. To see the contents of the RAM disc, use: *CAT "M:"* or *CAT "M:" EXP*. Programs can be copied from floppy disc to RAM disc using the *COPY* command, e.g. *COPY "A:*.*" TO "M:"*

Usage on the 128K/+2

Commands to use the RAM Disc are as for cassette operations except the filename in quotation marks is prefixed with a *!*. So for example, to use the *SAVE* command to store a program called THISPROG on the RAM Disc the syntax would be: *SAVE ! "THISPROG"*. The *!* prefix is also required for *LOAD*, *MERGE* and *ERASE* commands for use on RAM Disc files. A list of the files currently stored on the RAM Disc can be seen by typing *CAT !*.

Programming

If you write programs which normally exceed the 41K BASIC boundary, then the RAM disc is an easy way of 'increasing' the memory available to program in. For example, if a program requires the use of tables of data which are referred to by the computer at different stages in the program, it is a simple job to store the tables on the RAM disc as DATA files and bring them back into memory (with the *LOAD !* command) whenever they are needed. This is the principle of the OVERLAY. An area of memory is set aside specially for recieving blocks of data - data files - brought down from the RAM disc. If the blocks are of unequal size, the area must be bit enough to hold the largest. Suppose the largest file is 6000 bytes long. Allowing for the fact that memory from 65368 is reserved for user-defined graphics (UDGs), the first byte of the data file should be at 59368.At the beginning oF the program you need the statement *CLEAR 59367* to set aside that area of memory as the OVERLAY AREA. To bring down a file from the RAM disc into this area the command *LOAD "M:file" CODE 59368* on a +3/+2A is used, or *LOAD ! "filename" CODE 59368* on a 128K/+2. Even a very large file is transferred in an instant, with very little interruption to the flow of the program. When a different set of data is required it can be brought down to overlay part of, or the whole of the existing data. It is best to be systematic and always load the data to the start of the overlay area.If you are doing a good deal of overlaying, it is worth setting up a variable, say *OAREA*, with the start address of the overlay area, e.g. *LET OAREA=59368*. Then the loading command can be simplified to *LOAD "M:filename" CODE OAREA*, or *LOAD ! "M:filename" CODE OAREA* on a 128K/+2. If you have two sets of data which will both fit into the overlay area at the same time, and particularly if you are reading data continually from one block and storing it in another, you can benefit by having

Figure 1 - Using overlays in a loop, where two data sets are resident in the overlay area at the same time. Data is transfered from set 2 to set 1.

```
5 LET oarea=59368
10 LOAD "M:set1" CODE oarea: LOAD "M:set2" CODE
(oarea+1000): REM Replace LOAD "M:..." with LOAD ! "..."
on a 128K/+2.
20 FOR w=1 to 30
30 LET value=PEEK (<address in set2>)
40 LET newvalue=value: REM 'value' subject to calculation
and stored as 'newvalue'. e.g. LET newvalue = value * PI
50 POKE <address in set1>, newvalue
60 NEXT w
70 SAVE "M:set1" CODE oarea,1000: REM 128K/+2 - SAVE
! "set1" CODE oarea.1000
```

both sets of data in the overlay area but at different positions so that thay do not overlay each other. You might fo doing that repeatedly, in a loop (see Figure 1) but if there is not sufficient room for both sets of data, transfer between RAM and RAM disc is so fast you can *LOAD "M:xxx"* and *SAVE "M:xxx"* or *LOAD ! "xxx"* and *SAVE !"xxx"* data files alternatively in a loop without any appreciable loss of speed - Figure 2. Note that in Figure 2. the loop includes the *SAVE* command so that data stored in the RAM disc is updated each time round the loop.

Figure 2 —using overlays in a loop with only one data set resident at any one time. Different tables are brought down to the beginning of the overlay area when required by the loop.

```
5 LET oarea=59386
10 FOR w=1 TO 30
20 LOAD "M:set2" CODE oarea: LET value=PEEK (<address in set2>): REM
Replace LOAD "m:..." with LOAD ! "....." on a 128K/+2
30 LET value=newvalue: REM 'value' is subject to an unspecified calculation
and stored as 'new value', e.g. LET newvalue=value*w
40 LOAD "M:set1" CODE oarea: POKE <address in set1>, newvalue: REM
Replace LOAD "M:..." with LOAD ! "..." on a 128K/+2
50 SAVE "M:set1" CODE oarea,5000: REM 128K/+2 - SAVE ! "set1" CODE
oarea,5000
60 NEXT w
```

It is surprising how easily a program can grow to such a size that it no longer fits into the main RAM. Yet certain sections of programs are probably used only very occasionally. There may, for example, be a section at the beginning of the program for selecting options, dimensioning arrays and assigning values to variables. That section may never be returned to again, yet it occupies valuable space for the entire running time of the program. A program normally (if it is well structured) consists of a main program which calls a number of subroutines. Many of these subroutines may be quite lengthy and could almost be a mini-program and may be quite lengthy. These subroutines may also call other subroutines for such purposes as handling displays, creating sound effects, displaying things on the screen, etc. These 'secondary' subroutines which are used by the primary subroutines are usually relatively short.

It is the primary subroutines which make up the bulk of such a program. Yet at any given time, only one of them is being used. It is the idea of dynamic programming to store each primary subroutine on the RAM disc and bring it down into main RAM only when it is required. The working program thus consists of the main program (which is short) containing a number of short secondary subroutines, and the primary subroutine which is currently in use.

Dynamic programming relies heavily on the *MERGE* command. All the primary subroutines the main program needs will be stored on the RAM disc. They all must begin with the same line number, e.g. 8000, and their lines must be numbered in even increments, say 10 line steps. Their first line must be greater than any line in the main program and secondary subroutines, but their length is not that important (except the combined length of the main program, the secondary subroutines and the largest of the primary subroutines on the RAM disc must not exceed the 41K BASIC boundary).

To bring a primary subroutine into action, the main program has statements of the type:

On a +3 :- *MERGE "M:newsub": GO SUB 8000*
On a 128K/+2 :- *MERGE ! "newsub": GO SUB 8000*

Such statements merge the required subroutine into the main program quite quickly. When a primary subroutine is merged, its lines replace those of the same lines belonging to the subroutine which was merged in previously. If the previous subroutine was longer than the new one, the final lines of the previous subroutine will remain there at the end of the program. They will not be used, of course, since there is a *RETURN* at the end of the subroutine. Before the subroutine is merged, it is transferred from the RAM disc to the area of memory following the resident program. That area must must be big enough to accomodate your longest subroutine.

This means you must plan and take careful note of how much space your main program is taking up as you develop it. To overcome this restriction some long subroutines may have to be held on the RAM disc in sections, each starting at line 8000, and merged and called one at a time. Other subroutines may be unavoidably long, especially when they consist mainly of a long loop. They can also be held on the RAM disc as two or more sections but their line numbers are consecutive blocks - 8000-8090, 8100-8190, and so on. The sections are each merged one after the other, building the complete subroutine before it is called. The economy of memory here is that by merging short sections, we do not need to allow so much space for the merging process.

One of the features of merging is that it also merges any variables associated with the merged program. If they have the same names as variables in your main program, those values will be replaced by those of the merged program. This can lead to difficulty, particularly with variables set at the beginning of the program which are supposed to retain their value for the enitre run-time of the program. This problem leads to 'mysteriously' changing variables and of course crashes. The solution to this problem is to type *CLEAR* before you save a subroutine onto disc. That rids the subroutine of all its variables and so eliminates the problem.

128K/+2 Programming Tips

Although Spectrum 128K/+2 programmers have a very usable RAM disc, there are no commands available which allow you to erase the whole RAM disc in one go, or to rename a file. Because the +3/+2A's RAM disc is routed via +3DOS, these fetaures are built-in as standard.

+3/+2A Programmers Tips'

Because +3DOS claims some of the RAM disc for its own use, the BASIC programmer is left with only 58K to work with, which upgraders from a 128/+2 to a +3/+2A will find very annoying. However, it is possible to limit the amount of space that +3DOS 'steals' in order to increase the size of the RAM disc to 62K (its absolute maximum). The method to do so is quite simple, but reserved for machine code programmers however. Having said that however, this issue's ***S&SC Extra*** contains a public domain utility called

MAXIRAM which does the job of boosting the RAM disc from 58K to 62K for you.

For those machine code programmers wishing to know how this can be done, the idea is based around the DOS SET 1346 routine in +3DOS at 013Fh (319d). Page 237/238 of the +3 manual details what it does, but in our case we need to use the routine to only give +3DOS the smallest space possible for its cache and buffers. This can be done by setting the D, E, H and L registers to 0, 0, 0 and 128 prior to calling the DOS SET 1346 routine (remembering of course to switch the +3DOS ROM into memory at 0000h (0d). Although once this routine is called, it erased the contents of the RAM disc, you are left with a 62K RAM disc to use. Page 238 of the +3 maunal says that 'a cache size of 0 will still work but will seriously impair the floppy disc performance' - this is not strictly true as all normal loading, saving, copying, etc can be done without noticing any differnce whatsoever. However, if you are copying particularly large files (over about 50K) from disc to disc you may experience problems with the *COPY* command not being able to cope properly. This is because the buffer is not as big as it is normally and so results in some abortive *COPY*s.

Machine code programming and the extra RAM

Machine code programmers must approach the extra RAM in the 128K Spectrums completely differently. There is no RAM disc as far as machine code is concerned, just a number of 16K RAM 'pages' which can be interchanged in the memory area from 49152-65536.

Unlike using the extra RAM from BASIC, 128K, +2, +3 and +2A machine code programmers can look at the extra RAM in exactly the same way as the method for switching RAM pages into memory at 49152 is the same for all 128K Spectrums. There are 8 RAM pages in total which make up the 128K of memory. Some of the pages are used for certain purposes however, like page 5 which is usually switched in at location 4000h (16384d) and is used as screen memory. Page 2 is usually switched in at 8000h (32768d) and is used by BASIC as data storage as is page 0 which is switched in at C000h (49152d). On the +3/+2A a chunk of page 7 is used by +3DOS fo storage.

To the run-of-the-mill BASIC programmer the RAM pages are completely 'transparent' and will be of no real direct use except if he uses the RAM disc which uses the RAM pages as storage. However, to the machine code programmer, the facility of having much more memory available that can be 'paged' in and out at will is very useful.

Switching different RAM pages into locations C000h-FFFFh (49152d-65536d) is a simple easy task and doesn't take up too much space or processor time. The following assembly program shows how easy it is to switch between the eight RAM pages.

```
10 REM RAM Disc Erase
20 CLEAR 49151
30 PRINT "RAM Disc Catalogue:": PRINT
40 CAT !
50 INPUT "Do you really want to erase all these files ?"; LINE A$
60 IF A$="N" OR A$="n" THEN STOP
70 POKE 23388,23
80 DIM A$(255,10)
90 LET COUNT=0
100 LET F=59815
110 LET COUNT = COUNT+1: FOR N=1 TO 10
120 IF PEEK (F+1)=0 THEN LET COUNT=COUNT-1: GO TO 150
130 LET A$(COUNT,N) = CHR$ PEEK (F+N)
140 NEXT N
150 IF F>60390 THEN GO TO 170
160 LET F=F+20: GO TO 110
170 FOR N=1 TO COUNT
180 ERASE ! A$(N,1 TO 10)
190 NEXT N
200 PRINT "ALL FILES ERASED!"
210 STOP
```

Explanation: After displaying the catalogue in the normal way (i.e. *CAT !*), line 70 switches in RAM page 7 (16+7=23). RAM page 7 contains all the filenames of the files on the RAM disc. These names are then read into the array AS. Once done, the loop from line 170 to 190 erases all the files in turn.

```
10 REM File Renamer
20 CLEAR 49151
30 PRINT "RAM Disc Catalogue:":PRINT
40 CAT!
50 POKE 23388,23
60 DIM A$(10): DIM B$(10): DIM C$(10)
70 INPUT "Enter file to rename: "; LINE A$()
80 INPUT "Enter new name for "+A$()+": "; LINE B$()
90 LET F=59815
100 FOR N=1 TO 10
110 IF PEEK (F+1)=0 THEN GOTO 150
120 LET C$(N)=CHR$ PEEK (F+N)
130 NEXT N
140 IF C$=A$ THEN GOTO 170
150 IF F>60390 THEN GO TO 220
160 LET F=F+20
170 FOR N=1 TO 10
180 POKE F+N,CODE B$(N)
190 NEXT N
200 PRINT "File Renamed!"
210 STOP
220 PRINT "File not found!"
```

Explanation: Once again, after displaying the catalogue, RAM page 7 is switched in by line 50. You are then asked to enter the filename of the file you wish to rename and the new name to wish to give it. The routine then reads each filename in the catalogue and if it matches with the contents of A$() then a jump is made to line 170 where a loop renames that file. If a match is not found, line 150 makes a jump to line 220 where a suitable message is displayed.

```
LD   A,17      ; Number in accumulator must equal 16+page number. In this case page 1.
LD BC,32765    ; Prepare for switch
OUT (C),A      ; Perform switch
LD   (23388),A ; Keep BANKM system variable upto date.
RET            ; End.
```

Once a RAM page has been paged inm you can store machine code, or for example a screen. You could then switch the page out by using the same routine as above but with a different page refernece in the accumulator. Once another page has been switched in, although the data you put into the previous page has 'vanished', by re-paging that RAM page you can access all the data you put in it once again.

This technique of RAM page switching is well used in Spectrum games programming, with many games now coming in 128K versions. The programmers now use the RAM pages to store extra machine code that would either previously been left out or would have been included only in a tape-based multi-load game.

64K RAM Environments

The +3 is unique among the Spectrum family in that it may have an entirely RAM environment with no ROM present at all. This RAM only environment provides a contiguous 64K of readable and writeable memory from 0000h-FFFFh (0d-65536d). This 64K environment hasn't been put to use that much though with only Locomotive Software's CP/M Plus operating system (to my knowledge) using true 64K paging. The advantage of this environment is that if your machine code programs do not need the ROM routines of ROM 3 (the 48 BASIC ROM) or any of the others for that matter, you can completely lock them out and thus freeing the space. However, the complete lack of ROM routines means you must write your own routines for things like screen handling, printer driving, etc.

Unlike 'normal' paging which uses port 7FFDh (32765d), the I/O port used for 64K environment and ROM switching is port 1FFDh (23399d). In the scope of this article, the only bits of the port we are interested in are bits 1 and 2. Page 190 of the +3 manual gives details of the other bits, but in order to tell the I/O port we wish to use a 64K RAM paging we need to make sure tgar bit 0 is set to 1 (which controls ROM/RAM switching).

The 64K environment is to some extent user definable, with a choice of 4 RAM page configurations to choose from. The table at the top of the page shows the various configurations.

The pages indicated are in sequence from 0000h-FFFFh (0d-65536d) in 16K blocks. Programmers would be wise to note that if they wish to use time critical routines, some of the RAM pages are in contended memory where they share time with the video circuitry, thus slowing the effective clock frequency from the norm of 3.55MHz to 2.66MHz. Pages 4 to 7 are contended, while pages 0 to 3 are uncontended and so are more preferable to time critical code. Programmers wish to use the screen must also note that the 0,1,2,3 configuration doesn't have page 5 or page 7 available for screen memory, but is much faster as a result. However, the 4,5,6,7 configuration makes two screens available, but is slower because of this. Programmers using the 4,7,6,3 configuration must also remember to select screen 2 so that RAM page 7 becomes usable screen memory.

Writing code to work in a 64K environment can be a nasty business at the best of times and is not advised as the ideal introduction to RAM paging to a beginner. The method of creating code to run in your 64K environment is as follows. Firstly, use an assembler to make assemble your code into normal RAM, and if everything is okay, reassemble it to 0000h (0d). You must remember that the RST 38h routine is needed so make a space in your code for it.

Now add a piece of code to move your code to the bottom page, i.e.

```
DI
LD   A,bottom page of RAM configuration ; this will be 10h (16d, i.e. page 0 - remember 16+page number) or 14H (20d, i.e. page 4); or 1Ch (28d - to switch in screen 2 in the 4,7,6,3 configuration)
LD BC,7FFDh
OUT (C),A
LD HL,start of your code
LD DE,C000h
LD BC,4000h
LDIR
LD BC,1FFDh
LD   A,page number disk on/off: i.e. 4,5,6,3 configuration with disk off is 05h (5d)
OUT (C),A
EI
JP start
```

Possible RAM configurations

Bit 1	Bit 2	RAM Pages used	Disk on/off
0	0	0,1,2,3	09h/01h
1	0	4,5,6,7	0Bh/03h
0	1	4,5,6,3	0Dh/05h
1	1	4,7,6,3	0Fh/07h

As a demonstration, use 14h (20d) for the bottom page, 0000h (0d) for HL and 05h (5d) for the actual page number. That will set up a simplified ghost copy of ROM which you can muck about with.Start, by the way is 0 or 11B7h.

SAM Coupé RAM Paging

The SAM Coupé has a rather different way of using extra RAM. However, most programmers will never really need to directly control it because SAM BASIC doesn't impose a limit on the size of your program, in the Spectrum's case about 41K.

Therefore, most programmers have more than enough memory diecrtly available without having to resort to using RAM paging.

Although SAM BASIC takes care of fiddly RAM management, the story for machine code programmers is very different.

When programming in machine code you are, like a Spectrum programmer, reduced to using a 64K addressing range imposed by the Z80 processor.

RAM paging is similar to that on a 128K Spectrum, but has some fundamental differences which make it a bit more powerfull. However, as the SAM is a more complex beast you have to take rather more care and planning than on a Spectrum in order to keep everything running smoothly.

PAGING SYSTEM

Two read/write registers control the entire paging system in SAM.

These are LMPR (low memory page register) at I/O address 250d and HMPR (high memory page register) at I/O address 251d.

The 64K addressing range is split into 4 16K sections, arranged in 2 blocks: as the diagram shows.

The LMPR register is used to control the block A,B, and HMPR controls the block C,D.

Utilising LMPR and HMPR is a simple task and just envolves writing a value to the port with an OUT instruction.

However, before you do this you must understand what the SAM Coupé when you write values to these register ports. Each time you use one of the registers you are in effect paging in two RAM pages.

This is because when you write a value to one of the ports, for example '03h' to the LMPR port, then RAM page 3 is paging into section A of block A.B. However, page 4 is also automatically paged into section B of block A.B.

The exact same thing happens with the HMPR port too.

For example,

LD A,00h
OUT (LMPR),A
LD A,04h
OUT (HMPR),A

The effect of the piece of code above is shown in the diagram at the top of the page.

Both the LMPR and HMPR ports are 8 bits ports, with only the lower 5 bits of each used during paging operations, representing pages 0 to 31 (or 0 to 15 on a 256K SAM).

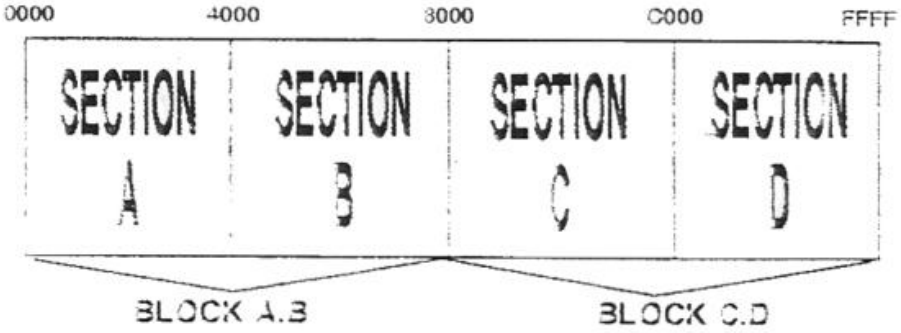
Unlike the Spectrum, using RAM page switching from within BASIC programs is quite difficult on the SAM. As SAM BASIC contains quite complex memory management routines which allow your BASIC programs to span many RAM pages, you must make sure that SAM BASIC doesn't encroach on your machine code in a RAM page.

This can be done from BASIC using the OPEN TO command which allows you to define the last past SAM BASIC can use for its own purposes.

You can then put you code in pages after this. However, you must also make sure that you do not overwrite DOS or the screen memory pages.

The page allocation table at locations 5100h-5120h can be used to see what each RAM page contains. Bytes marked with 00h are unused, bytes marked with 40h are BASIC pages, those with C0h are screen pages and DOS pages are marked with 60h and utilities pages are marked with a 20h.

Well, that's the basics needed to start experimenting with RAM paging on the SAM. I will however, be doing a follow-up article in a couple of issues



time which will be for SAM programmers only.

SPECTRUM 48K RAM DISK?

A month or so ago, we came across a program in a European PD library which provided the Spectrum 48K (and all other Spectrums in 48K mode) with a fully working RAM disk.

The program works amazingly well and is very easy to use. The program adds commands to ZX BASIC so to load a program from the RAM Disc you just type *LOAD "name" or *SAVE "name" to save a program.

We've included the program on this issue's ***S&SC Extra*** tape and disc.

Full instructions are given in the program, however after loading it (with *LOAD "RAMDISK.BAS"*), type *L"" This loads up a program which is auto-installed on the 48K's RAM disk and tells you on screen how to use all the commands.

What's more, the size of the RAM disk is also configurable. Before you install it, use the CLEAR command to alter RAMTOP and upon installation of the RAM disk, the size will alter accordingly.

Although, the maximum size of the RAM disk is limited, many of the concepts described in this article can be put into practice. However, as it does not use any sort of RAM paging system and thus uses normal Spectrum memory, you must use BASIC to control it. However, the program gives programmers great scope, epsecially those who are constantly loading in small(ish) programs to use, becuase with the help of ***RAMDisk*** you can load them all in at once, and store them on the RAM disk for near-instant loading. This will speed up program development a great deal.

For non-programmers, ***RAMDisk*** is equally useful. As long as the programs you wish to use consist of one BASIC program each (i.e. no CODE files which need to be loaded from tape/disk), the programs will happily sit on the RAM disk until you want to run one, and when you do, a quick *L "name" will oblige.

I'm really surprised that such an excellent program as ***RAMDisk*** had not come to light before we found it, so I'd advise all Spectrum users to get a copy of it on ***S&SC Extra*** double-quick.

MasterDOS

SAM users feeling a bit left out at not being able to use a RAM disk from BASIC would do well to take a look at our review of SAMCO's MasterDOS on page 9.

MasterDOS provides a very very comprehensive RAM disk system which is completely user configurable and extremely fast and flexible. This is especially the case if you have external memory modules attached to your SAM. Dr Andy Wright's foresight in allowing you to access RAM disks at track and sector level is also a boon. In short, MasterDOS's RAM disk is what a RAM disk is actually defined as being, i.e. a device which acts in exactly the same as a floppy disc drive.

I would like to thank everybody who has helped to write this article. It draws some of its content from an article I wrote for +3 Contact six months ago.

However, I have refined that original article to include the routines for 128K Spectrums, the SAM Coupé and the ***RAMDisk*** program which Daniel Garner was fortunate to find in a Danish PD library last year.

Paul Wallace

Subscriptions

SPECIAL OFFERS

To celebrate the launch of issue 1 of Sinclair & SAM Computing we have put together some special offers for all our new readers. For many of you, you will have just purchased issue 1 to 'try berfore you subscribe' - I hope everyone has enjoyed this issue. We believe it is the best magazine of its kind on the market and we hope you'll stick with us to see it improve and grow.

Sinclair & SAM Computing Subscriptions

3 issue subscription - £5.25 (fully inclusive)
6 issue subscription - £9.00 (fully inclusive) i.e. £1.50 per issue!
12 issue subscription - £16.20 (fully inclusive) i.e. £1.35 per issue!

I think you'll agree that our 12 issue subscription offer is extremely cost effective. Especially so when you consider that this issue is really just a taster of things to come. In coming months, the size of the magazine will increase allowing us to pack more articles and more reviews into each issue of Sinclair & SAM Computing than any of our rivals. What's more, our A4 format also allows us to pack much more information and authoratative comment into every page.

So why not subscribe to what is the fastest growing Spectrum, SAM or QL magazine available.

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For those readers who want to read ***Sinclair & SAM Computing*** and ***GAMES Xtra*** each month, please take advantage of our low cost combined subscriptions below.

3 issue subscription of Sinclair & SAM Computing and GAMES Xtra - £7.40, i.e. £2.47 for BOTH magazines
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12 issue subscription of Sinclair & SAM Computing and GAMES Xtra - £18.30, i.e. £1.53 for BOTH magazines

All it takes is a good head for figures to work out that these subscription offers are extremely cheap and extremely good value for money.
However, all the offers are valid for a limitted period only, uniil June 1st 1991 in fact. So get your skates on and make sure you get a subscription to ensure your regular supply of Sinclair & SAM Computing and GAMES Xtra.

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Tasword +2 (Spectrum +2 tape)	Tasman	£19.95	£16.99	SPECTAS2
Music Writer - Reference Edition	Garry Rowland	£25.00	£20.00	MWRED
Music Writer - Muso's Edition	Garry Rowland	£15.00	£12.00	MWMED
(MW is for all Spectrum with 128K)				
DICE V3.0 (Spectrum +3 disc)	Kobrahsoft	£14.95	£13.50	KOBRDICE
DMS V1.1 (Spectrum +3 disc)	Kobrahsoft	£14.95	£13.50	KOBRDMS
Plus 3 Diary (Spectrum +3 disc)	Kobrahsoft	£12.95	£11.50	KOBRDIAR
CD2 Tape to SAM Disc Transfer Utility (SAM Coupé disc)	Kobrahsoft	£10.95	£9.99	KOBRCD2SD
SM1 Multiface Suite (48/128 tape)	Kobrahsoft	£12.95	£11.50	KOBRMFCAS
Flexipage (Spectrum tape)	Flexibase	£13.50	£12.50	FPAGETAPE
Flexipage (Spectrum +3 disc)	Flexibase	£13.50	£12.50	FPAGE+3D
Flexipage (SAM Coupé disc)	Flexibase	£13.50	£12.50	FPAGESAMD
Flexipage Demos	Flexibase	£2.00	£1.25	FPAGEDEMO
Dr.Scroll (48/128/+3 tape)	BG Services	£5.00	£4.25	BGDRSCROLL
Mini Office (Spectrum 48/128 tape)	Summit	£2.99	£2.00	MINIOFFICEC

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Mouse Holder	Columbus	2.99	2.20	MOUSE11
Spectrum 48K PSU	Columbus	9.99	7.75	SPEPSV
Spectrum +3 PSU	Columbus	29.99	25.00	SPEC+3PSU
Spectrum + Dust Cover	Stack	5.99	4.50	DUST3
Spectrum 128K Dust Cover	Stack	5.99	4.50	DUST4
Spectrum 48K Dust Cover	Stack	5.99	4.50	DUST5
Spectrum +2 Dust Cover	Stack	5.99	4.50	DUST7
Spectrum +3 Dust Cover	Stack	5.99	4.50	DUST8
Cheetah Light Phaser 48K	Cheetah	24.99	19.99	CHELIG1
Cheetah Light Phaser 128K	Cheetah	24.99	19.99	CHELIG2
Magnum Lightgun (+3)	Virgin	29.99	25.00	MAGNUM2
Magnum Lightgun (48K)	Virgin	29.99	25.00	MAGNUM3
Magnum Lightgun (+2)	Virgin	29.99	25.00	MAGNUM4
Monitor Stand	Columbus	19.95	15.99	KIT0630
Caspell Ribbon Refresh	Caspell	8.95	8.45	RIB0100
Printer Stand	SD	12.95	8.95	PRA8700
10 x 3" discs	Maxell/Amsoft	29.99	21.00	MAM3
10 x 3.5" discs	TDK	19.99	14.00	TDK3.5
10 x 3.5" discs	GOLDSTAR	9.99	7.50	GOL3.5
10 x 5.25" discs	KAO	9.99	7.35	KAO525

Joysticks —Huge range, please phone.

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Description	*Supplier*	*RRP*	*Our Price*	*Order No*
VTX5000 modem (48K)	BG Services	£15.00	£14.00	VTX48K
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SAMplifier (SAM Coupé)	BG Services	£20.00	£19.00	SAMPLBG1
As above but with Stereo speakers	BG Services	£25.00	£23.50	SAMPLBG2
The Fixit for the Spectrum +2A/+3	BG Services	£9.95	£9.45	FIXITBG

PRINTER RIBBONS

Description	*Supplier*	*RRP*	*Our Price*	*Order No*
Star LC10 (Black)	NuKote	5.11	3.50	STLC10
Star LC24-10	NuKote	8.95	6.50	STLC24
Panasonic KXP 1090/1091/1092	NuKote	5.85	3.90	PANAKXP
Amstrad DMP2000,3000	NuKote	5.55	3.20	ADMP23
Amstrad DMP 4000	NuKote	8.31	5.75	ADMP4
Citizen 120D	NuKote	9.20	4.00	C120D
Epson FX 80,80+,85,FT80	NuKote	4.62	3.20	EPFX80
Epson EX800,1000	NuKote	5.54	4.20	EPEX
Epson FX100,100+,100FT,FX105	NuKote	6.35	4.05	EPFX100
Epson LQ800	NuKote	4.33	3.50	EPLQ800
Epson LQ1000	NuKote	6.06	3.99	EPLQ1000
Epson GX80,LX80,LX86,LX90	NuKote	3.34	2.99	EPGXLX
Epson MX80,MX82,MX70	NuKote	4.62	3.05	EPMXX80
Epson MX100,MX100 Mk3	NuKote	6.35	3.99	EPMX100

Printer not listed? Call us and we'll try our best to find a ribbon for you.

GAMES GALORE

We also stock a large range of Spectrum games on tape and disc, all at discount prices. Our full range can be found in ***GAMES Xtra*** which is detailed on page 23.

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Postage and packing is charged at £1.20 per order. However, if you live in Europe or overseas then please add an additional 95p per item

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We plan to make the Letters column a monthly column in Sinclair & SAM Computing, but the only way we can do this is if we get enough mail each month.

We hope that the Letters column will be a place where readers can express views and opinions about any computer related subject.

We also welcome any comments about Sinclair & SAM Computing including suggestions about how we can improve it.

So if you have any comments to make or have a view you want to share, then please do not hesitate to write in and tell us.

Letters

To kick off the first Letters column, we have a letter from Bob Brenchley, who edits Format magazine ...

FORMAT PUBLICATIONS.
34, Bourton Road,
Gloucester,
GL4 0LE,
England.

Tel: 0452 412572

THANKS

I read with great interest in the final issue of +3 Contact about your new magazine, Sinclair & SAM Computing, because I have a Spectrum 128 as well as my +3 and I also intend to get a SAM now that it appears to have got over the initial problems.

Keep up the good work. I look forward to receive each issue of Sinclair & SAM Computing.
B.Clarke, Walsall

Ed: *There are a lot of ex-Plus 3UG members out there who also have other Spectrums or a SAM or QL, so Sinclair & SAM Computing is an added bonus to them. We've had many brief letters from ex-Plus 3UG members congratulating us on the new magazine.*

We have also of course had a couple of people saying that they are worried that Spectrum +3 coverage will suffer now that we are covering other computers. This will definately not happen. Even if an article is not Spectrum +3 specific, if its relating to the Spectrum then it should be of equal worth to you.

Mr D.Garner,
Garner Designs,
57, Lovers Walk,
Dunstable,
Bedfordshire,
LU5 4BG.

27th February 1991.

Dear Mr Garner,

News has arrived on my desk that you plan a new magazine for the Spectrum and SAM Coupé. My I be the first to congratulate you on this new venture. It is good to see someone else who believes the future is bright for these excellent machines.

Some of your readers may be surprised to see a letter from 'the competition' in your pages. Well I thing this market is big enough for both of us, and a couple more perhaps. Spectrums have sold in their millions, SAM is selling in its thousands, more and more people are finding that these machines are both affordable and versatile. The 'games players' have had there way for too long, they have their three 'glossy' mags to read, now people want to use their computers. FORMAT may have a few years head start on you but the market is growing and the thirst for knowledge is great.

May you, and the machines we both seek to support, prosper. Hopefully, separately and together, we can fly the flag and convert many more people to the Spectrum and SAM.

Yours sincerely,

Bob Brenchley
Editor.

If you have any comments to make, or views to share, then please write to:

The Editor, Sinclair & SAM Computing,
57 Lovers Walk,
Dunstable,
Beds, LU5 4BG.

Ed: *Thanks for the comments Bob. I do agree that the market is big enough for Sinclair & SAM Computing and Format. However, as for more than two magazines catering for serious users, I'm not sure. The market will not gain any conerence if there are multitudes of amateur fanzines also trying to compete.*

I agree that the games magazines have had their day (Sinclair User's ABC figures are down by 14% for example), but this is because most people are fed of them —'infantile comics' is a phrase I keep seeing in readers' letters about them.

That's the main reason why we've created GAMES Xtra, i.e. so that people can buy a games magazine without feeling patronized by it.

QL Corner

Welcome to our Sinclair QL column — providing a monthly insight into all the latest QL news and products ...

Welcome to the QL column for Sinclair & SAM Computing. Although SSC's, coverage of the QL is starting off with only a 3 page slot in the magazine, this will be expanded of the coming issues. There will also be general articles relavant to the QL too, such as our series on programming in 'C' which is due to start in issue 3.

Perfection

One of the most exciting pieces of software I've seen for a long while is *Perfection* from *Digital Precision*. Billed as THE word processor, its list of features seem to support this claim well. But will hardened Quill or Text^{87} users be converted?

For a start, DP's tests show that Perfection is 'dozens of times faster than Quill on manu operations'. The program is also full configurable, allowing you to make a tailored version of the program so suit your ability. You can for example, choose to turn the menus off to allow a bigger screen workspace. File compatibility is essential for word processing, and Perfection is no exception to this. It accepts file from al the other major QL word processing packages automatically.

Multitasking has also been well employed. Perfection multitaks natively allowing a number of copies of Perfection to run simultaneously each with a different document loaded. Digital Precision also have an expanded version of program ready, called Perfection Plus which incorporates spelling checking. There are also two sets of dictionaries. A full 225.000 word one and a truncated one for users with smaller amounts of on-board memory. Spelling checks can be made as you type each word, or from any point in the document to another.

Perfection's fast searching also allows it to be used as a database. Forward and backward searches are available to allow this. The software's speed is also in evidence with screen scrolling, which hinders many other pieces of software. Perfection can also be interlinked with Professional Publisher to create a very powerful DTP system on your QL.

Perfection will work on an expanded QL, and come on disk for £79,95, or £119 if you want Perfection Plus with its massive spelling checker dictionaries.

PC Keyboard Card

One of the complaints that users have about the QL is that it keyboard stinks. The choice of flat keys by Sinclair was definately a wrong one! However, over the years replacement keyboards have attempted to rectify the situation with varying success.

However, our European neighbours in Germany have come up with THE replacement. Jeurgen Falkenberg has designed a small(ish) device which will take an input from a standard IBM PC keyboard and allow you to use it as a replacement for the normal QL keyboard. The device

comes in two versions, an internally mounted card and a kit for external mounting.

The perpetrator of the QL keyboard's problems is the Intel 8049 chip which acts as a 'relief' chip for the 68008 processor. To install the keyboard card, the 8049 first needs to be carfefully removed. The 8049 is then inserted into a mounting connector on the keyboard card, and then the keyboard card with the 'piggy back' 8049 is inserted into the connector on the QL's PCB which the 8049 used to inhabit.

Well that's the hard bit done, now you have to thread the cable out of one of the case somehow - through the expansion port on the left of the QL is the best place.

The externally mounting card fits via the ROM port and so is much easier to install (although the internal card is no hassle at all).

All you need now is an IBM PC keyboard, either an XT or AT keyboard (a couple of jumpers on the PCB configure the card for either). These can be picked up quite cheaply at auctions (as low as £10 if your lucky), or you can elect to buy a new one. Better still, if you also have an IBM PC, you can swipe the keyboard every time you want to use the QL.

The keyboard card is completely transparent to the QL. The QL boots up as usual and the keyboard works as the old QL one did, but with a few added extras. These include deleting with PC keyboard's backspace key instead of CTRL-left, and the ESCAPE key doing the equivalent of CTRL-Break, i.e. it breaks into a SuperBASIC program.

QL-Keyboard-90 is available in the UK from EEC Ltd for £75, or £17 for the kit to make the externally mounted version. These prices do not include an IBM keyboard.

Despite its high price tag, the device does everything it says it does and eradicates that annoying keyboard bouncing that we have all grew to hate our QL's keyboard for. If you can afford it, get one!

EEC Ltd can be contacted on 0753 888866.

European Microfair

Dutch QL user group *Sin_QL_AIR* have organised a QL based show in Einhoven, Holland on April 6th.

I expect most of the European companies supporting the QL will be there, as will many UK companies who regularly make the trip to these shows in Europe.

Hopefully, the show will be as well supported as the recent show in Brussels organised by *Club Sinclair BruQsL*. Around 500 people attended and most exhibitors were very happy with the show.

The *Sin_QL_AIR Microfair* is being held at St.Joriscollege, Roosenlaan 296, Einhoven, Holland.
Those good folks at Quanta though, are organising a trip to the show.

QL Corner

However, by the time you read this it may be too late to get a place on the trip. Contact Phil Borman at Quanta on 0933 460690 for details.

Emulation

The QL is one of the most emulated computers at the moment, with one of the most popular systems being *QL Emulaotr* for the Atari ST by *Jochen Merz Software*.

Jochen Merz have recently updated the program to included better keyboard handling, a new disk drive controller, a new serils port driver and an updated version of Tony Tebby's *SuperToolkit*, amongst others. The reported hard disc drive bugs have also been rectified, thus making the system much more robust and useable.

Jochen Merz Software can be contacted at: *Im Stillen Winkel 12, 4100 Duisberg 11, West Germany*. Or you can telephone them on: *(Germany) 0203 501274*.

By the way, Sinclair & SAM Computing will soon be starting a column for emulator users, either a QL, Spectrum or SAM emulating another computer, or another computer emulating a QL, Spectrum or SAM.

PD Library

A new public domain software library has been set up by R.Dunnett called *Qubbesoft PD*. The library is growing slowly and is distributing software on single-sided or double-sided 3.5" disk.

Each disk contains 10 programs, and is free apart from a very reasonable 50p copying charge per disk.

Disks can be obtained by sending the appropriate number of disks with return postage, or by sending £1 per disk you require (50p copying charge and 50p for a disk) and return postage.

Further details can be obtained by sending a large stamped address enveloped to:
R.Dunnett, 38 Brunwin Road, Rayne, Braintree, Essex, CM7 5BU.

Alternatively, you can contact him via the bulletin board he runs. Its telephone number is *0376 47852* and is a V23 Viewdata board operating on a ring-back basis (i.e. you call the board and after it rings a few times hangup and then redail in a few seconds).

QL Writers Wanted

As we expand our Sinclair QL coverage in ***Sinclair & SAM Computing*** we will be in need of QL users to writer articles on a regular basis. We will also need someone to co-write this column.

So if you have any articles, or ideas for articles please contact the Editor, who can tell you want our rates for published articles are.

The last six months has seen a re-emergence of modem use on the Spectrum. The re-availability of VTX 5000 modems and their cheap price has lead many more people into the world of comms.

The last six months has even seen someone starting up a bulletin board run on a Spectrum +3.

Whatever will we see next?

On-Line

All the latest news for modem users from **Daniel Garner**

Good News

In a rather unexpected announcement, Micronet has decided to *lower* its time charges and quarter subscription charges.

As from 1 April 1991 the time charges for the off-peak period (before 8am and after 6pm Monday to Saturday and all day Sundays) drop from 1p per minute to 0p per minute. Peak time charges will rise from 7p to 8p per minute though. Quarterly subscriptions will be £30 per quarter.

Although Micronet members have already been sent these details by post, these new rates will go some way to regain some of those people who deserted Micronet when they raised their chanrge a couple of years ago.

BT's decision to cut the charges must surely be a sign of falling membership figures which have left areas such as the Atari ST area almost empty of members' letter recently.

However, this can only be a good thing for those who are currently members, and also those who were considering it.

Duopoly Doldrums

Campaigners for cheaper telephone calls have long critised the duopoly of British Telecom and Mercury Communications. However, this week the government has decided to open up the market so that other companies can compete for telephone operation networks. This competition will mean cheaper calls in the long run.

Already earmarked to get into telecommunications are several UK cable TV companies who can use exisitng cable network to carry phone lines, and larger companies such as British Rail, although their track record for 'getting you there' is not a good omen for reliable call connection! However, there is also some chance that some of the big US telephone companies may try to get a share of the UK market. And with several of these companies offering subscribers an extremely good service in the US, I hope that the government does not stop their advances.

QL Comms

There is a surprising number of BBS which support the QL, one of the best being *QBBS* which is run by *TF Services*.

It features a lively mail area, QL echomail across Europe via Fidonet. Mail is divided into subject areas which makes a pleasant change, and allows you to read mail from other users on a particular subject.

There are also a number of information files which contains useful hints and tips on a number of subjects. There is also a file area for you to download files from.

There is also a list of bulletin boards supporting the QL on QBBS, which is reprinted here just to show that there is a lot of on-line support available for the QL.

Some of these boards also cater for the Spectrum. The major one being *Fourth Dimension* which caters for all Sinclair machines. The mail section is well contributed to and the board is laid out nicely (it uses the same software as *QBBS* on a SInclair QL).

It has a multitude of Spectrum software to download, as well as

UK			
LAU	081 751 6096	V23v	24 hrs
QBUG	0272 666187	V21/23 Scrolling (ringback)	2230 to 0830
Sector	0772 454328	V21/23 Scrolling	Non office hours
Fen Tiger	0954 210692	V23v (ringback)	24 hrs
Gnome	081 888 8814	V23v	24 hrs
Grizzly	0772 828975	V21/22/22bis Scrolling	24 hrs
Cybernet	071 978 8595	V21/22/22bis/23 Scrolling	24hrs
Network 23	0274 482021	V23	10pm-7am
4th Dimension	0202 600305	V21/22/22bis/23 Scrolling	2100 to 1800
QBBS	071 706 2379	V21/22/22bis/23 Scrolling	23 hrs
QUBBE	0376 47852	V23v (ringback)	24hrs
GOSH	02572 67186	V21/22/23 Scrolling	2300-0800
BLANDFORD	0258 455117	V21/22/22bis/23 Scrolling	2100-0800 Sat/Sun
HOLLAND			
JAN B	010-3135216520	V21/22/22bis/23 Scrolling	24hrs
SBOX	010-31167966854	V21/22/22bis/23 Scrolling	2200-0430

Key — *V23v* is Viewdata (Prestel-style) *Scrolling* boards require settings of 8 bits, no parity and 1 stop bit Ringback denotes that you should call the board, let it ring twice, hang-up; and then re-dail.

On-Line

supporting their own commercial scrolling comms software for the Spectrum and VTX5000 modem called *Dr Scroll*, which at just £5 is excellent. Its Xmodem capabilities put it way ahead of anything else available.

FAVOURITE BOARDS

Have you got a favourite boards that you regularly access? If so, then please tell us about it.

We're slowly building up a complete list of all the boards supporting the Spectrum, QL and SAM and how good they are.

GARNER DESIGNS BBS

As many of you will already know, plans are already in hand for the setting up of our own bulletin board system to provide 24-hour customer support and the contents of our PD library on-line to download.

Although, the practice of companies setting up bulletin boards to provide their customers with upto the minute product news and customer support in widespread in the USA, for some reason the idea has not really caught on that well on this side of the Atlantic.

Our plans are already well advanced and we are close to getting some sort of system up and running pretty soon.

The BBS will cater for Spectrum, Sinclair QL and SAM Coupé (which will hopefully have some comms software release for it very soon), with files to download for all these machines as well as mail areas and an extension to our *Advice Line* service to allow you to get your questions answered via the BBS.

See next month's issue for openning dates, etc.

CONTACT US

Modem users can e-mail *SSC* at the following places:
PRESTEL - MBX 582472067
BT GOLD - 74:MIK775

We'll also be adding BBS to the above over the coming months as and when we find out which BBS readers use. We'll then arrange so that we are contactable via those boards as well.

We're especially eager to hear from *Micronet* subscribers who read *SSC*.

FREE ADVERTS!

Yes its true! If you're a SYSOP of a bulletin board which supports the Spectrum, QL or SAM then you can claim your FREE advert in the *On-Line* column of *SSC*.

The advert will be a 1/16 A4 sized and can contain anything advertising your BBS you want. The advert will run for as long as you like, and you can change the contents of the advert as often as you want. All we ask is that if you stop running the BBS for some reason, please tell us so we can stop the advert.

Although, it may take a while for this offer to catch on, if we get too many SYSOPs claiming adverts then the adverts will be split into two sets, each set being printed in alternate issues.

So if you're a SYSOP, send details of what you want your advert to say (bearing in mind that there is only a limited amount of text that can be shoe-horned into a 1/16 A4 page slot!) remembering to state the hours, protocol and of the course its telephone number to the usual SSC address.

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Friday 19th April

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