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YOUR SPECTRUM

No.7 September 85p

& QL USER

HARDWARE SPECIAL

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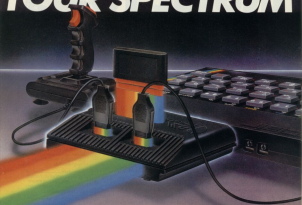
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FRONT LINES

THE MEGA-GAME'S UP!

Following months of speculation, Liverpool-based software house, Imagine, has finally bitten the dust. Rumored to have been struggling for quite some time and now having run out of money and resources, the company has finally been placed into the hands of the official receiver.

The reasons for failure are not likely to be known in any detail until the dust has cleared, but poor sales and a failed contract with publisher Marshall Cavendish were two major contributors to Imagine's downfall. Other contracts which Imagine was rumored to be negotiating — with Apple and IBM — failed to materialize in time to save the company.

The deal with Marshall Cavendish was to supply software for JAPUT — a partwork publication dedicated to the art of writing your own games. Accepting the advance of a reported £200,000, Imagine repeatedly wanted the same amount again in equipment to handle the job — which explains why, when Marshall Cavendish rejected the games, Imagine was left out of pocket to the tune of £400,000.

In a drastic move calculated to lift Imagine's financial situation out of the mire, the company attempted to auction off an entire range of base-wired (sic) titles. K-Tel, Prism and Virgin Software were expected to be interested parties; eventually, however, a deal was signed with distributor, Bore-Jolly. This landed Imagine in court with retail distributor Zeta Services which claimed to hold a contract giving it sole rights to the titles. Imagine made a counter-claim that Zeta had breached the contract by refusing to take delivery of existing stocks by the agreed date.



Doesn't he say? Imagine co-director Bruce Davies couldn't get a new company.

Meanwhile, back at Imagine's HQ, Technical Director Brian Thomas (who resigned from the company, along with Information Manager Tim Best just a week before liquidation) informed us that he was in disagreement with the three other directors. Interviewed after the dust, Davies commented that financial mismanagement was a factor in the failure of the company; Financial Director Ian Herberington felt moved to say little in reply to Davies' "off the record" claims, but blamed the collapse on the contracts incurred by the Marshall Cavendish contract. Morton was also made of pinstriped of Imagine products; Herberington claims that 300,000-400,000 potential tapes were uncovered too long ago.

Could this be the first official resolution of the off-nominal find of *Acropolis* in a London warehouse back in January? Not yet.

As the smoke clears and production resumes, perhaps the biggest question of all is

what will happen to the so-called Mega-games — the project on which the company was devoting much of its time and resources. Due for release sometime in August at a price of £40 each, the games are said to offer graphics and sound between ordinary micro-profiles and the type of laser-disk realism seen in the most recent arcade. Mindfully, Bore-Jolly was forced to say that "The Mega-games will make all other products obsolete overnight." — a comment that seems to have back-fired somewhat.

The rights to the Mega-games already in progress when Imagine went into liquidation are now the property of the official receiver, representing a company asset which can be used to pay the estimated £1.5 million owed to creditors. The intellectual rights to the concept, however, remain the property of the copyright holders.

And this is where the plot thickens, for the 18-strong programming team of Imagine will apparently be joining

former director Ian Herberington, Mark Foster and David Lawson, in the formation of a new company. Herberington comments that the rights to the existing Mega-games are now the property of the receiver, but hinted that the new deal as yet unnamed company would be creating its own Mega-games. Which might go some way to explaining the rumors that are flying around that Imagine's programming team is presently being up in a secret location putting the finishing touches to *Acropolis*. The job is reported to be 80 per cent complete.

Bore-Jolly, too, is setting up its own, separate, company but wouldn't at present go down to the intricacy of telling us what it'll be doing, under existing law, there's nothing to prevent former directors of a liquidated company acting as directors of a new company.

Watch this space for news of the emergent companies, when and if they appear.

TEXT ON YOUR TELLY

A new Teletext adaptor is now available for both the 16K and 45K Spectrum, thus giving Spectrum users all the facilities of the four Teletext channels at a fraction of the cost of a special Teletext TV. The TTX 2000 adaptor costs £145 and includes a power adaptor, 2X interface cable and detailed instructions.

The maker, IRE Ltd, happens too to be designer and manufacturer of the Prism VTX 5000 modem (which won the 1984 "People's Choice of the Year" award) and the company has also announced plans for a teleconference program to allow all TTX 2000 users to receive and download specially broadcast software — rather like the BBC is trying out at the moment on Comix. The downloader facility will be available as an upgrade to IRE.

GETTING THE HUMP

Camel Products has been hard at work producing even more hardware solutions for the humble Spectrum — this time, its first new products all relate to the use of EPROMs.

Camel's first release is the PR0M45B-SP, which allows the programming and checking of 8K and 16K EPROMs. Next up is the R2M45-SP; this lets you load and run EPROMs from power-up, without making use of the Spectrum's own ROM. The last two devices are EPROM erasers — designated the ER45M1 and ER45M2, the latter also includes a timer.

For the inside information, contact Camel Products, telephone 0222 354814.

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QL AFFAIRS

Presented by Leon Heller, Acting Chairman of the Independent QL Users' Group (IQLUG).

OPERATING WITH A DIFFERENCE

QSI Computer Systems Ltd of Cambridge has announced 68K/OS, an operating system for the QL, that appears to offer considerably more than the standard QDOS operating system provided with the machine. According to QSI, Sinclair Research commissioned it in February 1983 to produce a new operating system for an OEM version of the QL, "OEM" (Original Equipment Manufacturer) generally refers to a company that purchases something, then subsequently enhances it in some way for resale to an end user.

QSI is negotiating with Sinclair Research for the rights to let the QL, as a single board computer system case, keyboard, Microdrive and power supply with the 68K/OS operating system to OEMs who wish to use it for such applications areas as computer aided design, terminal emulation, data acquisition, point of sale, etc. Features offered by 68K/OS include: single user, multi-tasking, multiple screen windows; highly optimised disk filing system; device independent I/Os; Unix-like "pipes" for communication

between programs; built-in menu and form handling; command or menu-driven "shell"; integral graphics functions; and ROM resident (FIR). Many of these features were in the original specification for the QL, but have since been left out of the machine that Sinclair Research is currently "shipping".

QSI is negotiating too with several other software houses for the provision of the following languages: Basic, C, Pascal, Fortran 77 and MC68000 assembly. It's also planned to make available business software similar to the bundled Prime packages.

QSI is also making 68K/OS available to QL users (no comment as to the likely cost), and has promised evaluation copies some time in August. These will take the form of a couple of EPROMs that replace those in the machine — with some additional code on a Microdrive cartridge.

It'll be interesting to see how 68K/OS fares against QDOS. Certainly, although games will be lacking out of the box and above the cost of the basic QL system, they'll get some very attractive features. It all boils down to how much it costs, and how long it takes for the additional programming

languages to become available. It might be that 68K/OS will be bought by people who are writing QL software, which is then sold to the ordinary user to run under QDOS.

LIFE WITH THE LIONS

Software house, Joe The Lion continues to threaten us with the possibility of a Spectrum simulator for the QL. We've assumed that the code to emulate Z80 operation on the MC68000 is working, and writing as fast as a lion in Z80! The company is now designing the hardware to allow Spectrum games to be loaded into the QL. Emulating the Z80 doesn't present too great a problem, but it's still impossible to believe it can be got running that fast. We'll be delighted to be wrong.

LOOK WHAT I GOT!

If you want to see what version ROMs you have in your QL, just type PRINT VICES. If the machine responds "A0F", congratulations, you have the latest ROMs, which means that the operating system and SuperBASIC are essentially bug-free. "FM" means that there are several bugs, and TV indicates virtual information

HEY BIG SPENDERS

Taking the lion family business to task, Sinclair Research is going on the offensive with an ad campaign — complete with TV coverage — worth over \$4 million. The campaign is based on claims that the 41.5K of usable memory you get on the Spectrum is greater than computers costing up to three times as much. Another major incentive for purchasers will be the give-away 'product'.

Free with each 48K Spectrum will come the 'Spectrum Six Pack' — a software bundle worth £55.76 which features Chessport Plug, Doublet, Survival Chess, Mad-as-a-Chip and Mouse Game. Using 'You'll be able to buy an 'Expansion System' package for £79.95 giving you good possession of a ZX Microdrive, the Interface 1 unit and a wallet of four Microdrive cartridges, these contain *Exorcist II*, *MicroBASIC*, *3D Jet Attack*, *Games Designer*, and a number of Microdrive demonstration and utility programs.

For anyone at all sceptical of the Spectrum's future in the micro market, Sinclair Research has announced that it's doubling production. This, the company claims, will allow production to ramp up to over 200,000 units per month by the end of the year.

Announced too is the retail availability of both the QL and the flat screen TV from September. Managing Director Nigel Scott says that "While production volumes for both are building up fast, we anticipate that demand will inevitably outstrip supply." Which presumably means that supplies in the shops may well be limited.

IQLUG is a non-profit making independent QL users' group. Further details on the organisation are available from: Brian Flett, Acting Secretary, IQLUG, 34 Oxford Street, Derry, Co. Londonderry, Strathclyde, Bucks. Tel: (0494) 546477.

BETTER BEEPING

Composon has produced a Teletextcard which allows beeps, keyboard clicks and so on, to be played through the loudspeaker of your television set. The device is so small, it fits easily inside the Spectrum's case. It also has the advantage of allowing (unintentionally) programs to be loaded or saved without unplugging leads.

Retailing at £9.95, Teletextcard is fitted by plugging the wires on to various parts of the internal circuitry as directed: this means that if ever your Spectrum needs to be repaired under guarantee, the unit can be removed — leaving no trace that it had ever been installed.

Anyone interested in one of these sound bewitches should write to Composon at 32-33 Langley Close, Boreham, Essex; telephone enquiries on 0127 21429.



GAME, SET AND MATCH POINT



Against the Spectra 2 Spectrum Renaissance may have missed the Wimbledon deadline, but the game's still worth a look.

Well, the Wimbledon fortnight is long since past, but for those who just can't wait until next year, Sinclair Research has brought out a new tennis game called *Match Point*—to help you while away those long winter hours.

"You cannot be serious..." I hear you say! Yes, it's true. Match options include a choice of one, three or five sets, playing human, versus human, human versus Spectrum or Spectrum

playing itself in an exhibition match. Playing speed increases considerably as you proceed through the quarter-finals, semi-finals and finals, and all the rules of tennis are obeyed. Some nice touches in the game include ballhops running out to collect balls from the net, the crowd looking appreciatively from end to end as the ball is played, and the lower-flashing down his racket and clapping

hands to applaud!

The graphics are very good and the Spectrum plays a very good, tactical game—first at the lowest level, in the higher levels, it even manages to somehow anticipate where you're going to hit the ball.

Overall, this is an excellent and realistic simulation, just as much as it is a very playable game. Priced at £7.95, *Match Point* is available from all Spectrum games retailers.

CUT PRICE STORE

For all those who want reasonably priced mass storage, there's good news from Ralston—manufacturers of the Aquarius. It's just announced its tape Spectrum-compatible disk drive. Known as the Quick Disk, it should be available in the shops around the end of August for just £129.

The unit makes use of a 2.8-inch disk which is divided into 40 sectors of 1280 bytes, giving an overall capacity of 512K when formatted (10, 2K W/D) or (44K, (12K, W/D). The DDK includes the usual CATALOG, COPY and ERASE commands.

THE ONE THAT GOT AWAY

Following our modest review of last month, a new one has been rushed to our attention. Superside II is an updated version of the original Superside (*Well, I never! Ed from CIP Software*) and it's sporting no fewer than 170 machine code routines.

Priced at £9.95, it's 100 per cent compatible with both Interface 1 and Microdrive.

This month's call to TP have brought all sorts of questions and queries. First, let's turn to John Semuels of Chesham, Cheshire. John wanted to know how far he could extend his Speccy's memory and where, for that matter, could he keep upgrades. Well—the 20K processor can only normally address 64K directly, so if you take out 128 of that for the 20K that's already shown you're left with 48K RAM space—probably the nearest available in the 48K model.

But, I hear you say, what about those 80K upgrades from East London? You're to be all heard about! The simple answer is that those sort of upgrades don't address the whole 80K at one and the same time—they use banks of memory which can be switched in when needed. For simplicity, I don't see the reason behind the average person buying an 80K upgrade, unless you happen to make a lot of memory-intensive programs possible. The only commercially available programs to use the full potential of the extra memory are those manufacturers for the computer that produce the upgrades, and, perhaps, it's completely new to make the computer any more powerful when running *Art Art Party*, for example.

But on the heels of the TP call concerning the QL and all its versions (including F10, A11, M1, etc.) Dave Thompson from Chesham gave me the line to ask if Spectrum software will run on the QL, and also whether the two systems are compatible. They're good questions, for the QL is a 16-megabyte classer some time back that it had nearly finished a Speccy

FROM THE HIP



Troubleshooter Pete Reporting...

simulator and cassette interface that would allow you to run programs directly.

Unfortunately, all attempted calls since then have been met only with the modems' polite, courteous tone; neither has it the company's website down the Merry Tunnel (perhaps they would like to contact us, if that's not the case).

You can, however, type in most Speccy programs and they should work after a little bit of imaginative conversion. But that's only basic programs; of course, machine code is totally different. Networks between the machines are supposed to work, say the manuals and the adverts have always said they are compatible. But as yet, not even Simon Goodwin is the only person I know who's had any success with the QL, and that's only in one direction: from Speccy to QL, via an old one of the COPY command

which will be explained by Simon in a future issue—just as soon as he's worked out exactly what he did. Hopefully, this is another 'temporary' fix—to be corrected when Sinclair Research has finally come to some agreement with itself over which 20K it's going to use in the QL. For the present state, however, let's just call relationships between the two 'strained'.

Howard Robbins from Dorset reports having a pretty minor, but nonetheless annoying, problem with his 12-year-old son who's becoming very picky with dad's programs. When the screen prompts "press any key to continue..." his son complains that even to press the Shift keys the program won't continue—so you can't press any key at all. Short of changing the prompt to read "press any key except the Shift keys to continue..." Howard has been stuck. Well Howard, here's the solution you've been seeking. Grab from Dilwyn Jones' book *Shocking Scripts* (your new 24 Spectrum Publications), the short chapter should keep your son satisfied.

THE POINT "Press any key to continue..."
HOW TO UNITE... AND IN
WITTS-200 AND 24700-200
THE QUITO 1010

Of course, an even easier solution it was but one read the cue and will have to stop being so picky! (sic) *Troubleshooter Pete*

Pete's plume that is open from *Oliver Spectrum 2* (you can Wednesday and Friday) Ring him on 07-631 7411.

SPECCY STARS IN 'B' MOVIES

Company 'B', a London-based video company, has just completed a video presentation for library Software. To get the perfect picture necessary for video recording, the company's Clive Coll spent some time looking into the Spectrum's video capabilities. This library effort is the result of all this hard work — a picture which is better than you would expect to get from the Speccy at home on your colour telly.

Company 'B's connection with the Speccy doesn't stop there, however, because the outfit's been using a Spectrum for some time away — long before being

approached by library. It's got an electronic clapperboard and an electronic countdown. It is Speccy, both of which have been in action for a while now. And the fun doesn't stop there because as well as an RGB/SD line, the Spectrum will also be controlling the video camera.

Company 'B' is now considering advertising to new-found talent for producing Spectrum videos. If you're interested, contact Clive at Company 'B' on 01-457 9697 and he'll give you instructions on how to find them deep in the murky depths of Soho's Window Street.

ROM SOFTWARE AT LAST!

Parker, which some time ago announced plans for ROM software for the Speccy and Interface 2, has finally come up with some product. In fact, Parker is the first inde-

pendent high-quality; indeed, all offerings include superb graphics and sound. However, one stands out above the others... *Gyrant*. It's a space arcade/action game that has its players piloting their spaceship through the solar system from Neptune towards Earth.

The promotion that's planned is impressive. A machine called a Computer will contain copies of all the games — by simple selection of a number, potential buyers will be able to play whatever they like right then and there.

The games themselves will become generally available by October — at a price still to be decided but which is rumoured to be around the £29.95 mark.



pendent software house to produce software for the format, and Sinclair Research has given the company plenty of support.

The games themselves (announced as *Phoenix*, *Inter 2* and *3*)

SPIELS ON WHEELS

As part of 'WIT Seminars' drive to train its sales teams in all aspects of computing, the company's now acquired two mobile classrooms which will

tour the country. This project is the brainchild of Ronald Staff Manager, Ken Newman; it occurred to him once that he realised it wasn't

TOP TEN TURKEYS



Hey, it's Turkey time! And — surprise, surprise, it's *Jet Set Willy* in the pole position. Well, don't blame us, you voted for it! Votes for next month should be mailed post-haste (if not sooner); just use the coupon on the Top 20 page.

This Month	Last Month	Months In Chart	Title	Company
1	-	1	Jet Set Willy	Software Projects
2	1	2	Transylvania Tower	Richard Shepard Software
3	-	1	Ah Diddums	Imagine Software
4	-	1	Hungry Horace	Melbourne House
5	-	1	Horace and the Spiders	Melbourne House
6	7	2	Mad Martha II	Mike Gern
7	-	1	Planetrick	Pison
8	4	2	Yomp	Virgin Games
9	-	1	Hunchback	Ocean Software
10	-	1	Pobos	Imagine Software

PHOENIX DOUBLES UP

Phoenix Software has just launched a range of games for £6.99 that the company describes as a 'real'. Posh 'em if you must, but basically each cassette contains two games — one arcade and one adventure; complete the arcade version, then flip over for the other.

Part one, *Aster's Risk*, has you shopping enemy ships from capturing the souls of the human race with hypnotic cards. The *Dragon* adventure has you eliminating a corrupt Emperor — and clues and running code are locked inside a rory coded envelope marked 'Panic Packet' — Only Open In Dire



A scene from the *Dragon* adventure game — for those in doubt, there's a 'What's about' provided.

Emergency'.

Both games will sit on to either a 16K or 48K Spectrum, and

you'll find them at Bown and all good (not to mention, bad) computer stores.

possible to send all staff to the training centre.

With three new vehicles, it'll be possible for even part-time staff to be trained at or near their place of work.

This is great news for people who dread going into shops on Saturdays, a time when usually one is around to help with technical problems. The

mobile classrooms will be on the road until October, and back again after Christmas. Who ever said that 'WIT Seminars' wouldn't take computers seriously?

Trashman



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**It's the fun game of
the year — Trashman.**

From the moment you sit
down to play you'll be thrilled by
this exciting, original, laugh a
minute game.

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of the world, but you know the hazards —
speeding cars and pavement cyclists can
both shake you up. Let's face it cars can
be hard.

But if that isn't enough you've got the
other problems of vicious dogs, the other
effects of commuting in the transport cide on our
lives (many in the future).

Not only will you be gripped by the action
you'll be amazed and amused by the high quality
graphics.

With seven levels of play featuring three
attempts to finish the game (assuming you are not
run over by a car) Trashman will provide even the
most experienced games player with a thrilling
challenge. 1 or 2 player option, Hall of Fame and
jeopardy, "comparability" ensure this game has all the
best arcade features.

Trashman is available **NOW** for the MSX
Spectrum. Ask for it today at your local
computer store!

Only £5.95

*Requires basic knowledge of Pascal & graphics

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Generation
Software**

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PHIEW — WHAT A SCORCHER!

Some time back, Melbourne House published *SuperCharge Your Spectrum* — in effect, a handy selection of ready-to-run machine code routines (multi-directional scrolls, scroll sound effects, program re-numbering abilities and so on). Now from the same stable (and author) comes

Advanced Spectrum Machine Language, a book containing far higher grade routines that cover areas of the 48K Spectrum that have never before been explored.

Right from the word go, author David Webb shows things like animated loading screens, all you enter

know about statistics, the lowdown on pixel animation techniques, an interrupt-driven print processor with full screen horizon generation, and true Hi-res colour; all in all, pretty impressive for a mini-book. And what's more, most of it is actually as good as it sounds, the only exception for me was that animated loading screen turned out to be the Master Miskelid — as opposed to real animated characters that move across the screen while a program loads.

Several chapters of the book turn attention to the design and development of a sprite routine which is

absolutely flicker-free. In fact, though this is probably the only part of the book to fall below the standard of the best arcade games, all the same, you will end up with a sprite routine worth having.

At times, David Webb tends to babble on a bit, but he always gets there in the end. Overall, *Advanced Spectrum Machine Language* is clear and well thought out, and it's also excellent reading for the most experienced of programmers. It's probably the best Spectrum book of the year so far and, without doubt, receives the 10 and of approval.

Tony Samuels



When it is Webb wrote *One of the World's Worst Games* in the dark ages of 1989, you can hardly over-estimate it to read this. Certainly, few such intentionally terrible books can claim to have made the transition from book to radio, then to film. TV, record and, finally, home computer. CWL has created a whole series to continue this with *Just Wayne* (whose last-selling *One of the World's Worst Games* was released in 1990) the software incarnation of his radio. This game is available for the 48K Spectrum at £7.99 from about computers, and CWL is planning versions for the IBM PC, Amiga, BBC Micro, Macintosh and MSX machines to appear in the near future.

DK'S NEW FACE

DK's *Travis* are programmable joystick controllers which any software from any supplier to be used with joystick control. It can be programmed quickly and simply from the keyboard, or with the machine code software



supplied. Both joystick and keyboard can be used simultaneously and, in most cases, the joystick can even be programmed while the software is running. The port will accept any Atari-type joystick, and the interface is compatible with Interface 1 and Microdrives.

Incorporated in the design is a through connector that lets you join goodies like printers and so on into the back. The price is £22.95 and it should be in the shops soon.

DOWN THE GARDEN PATH

Calling all Spruce owners who enjoy a spot of gardening. Here for your edification is the first ever computerised plant database, called (unusually) *Grove Pages*. With it you can easily dig out the data on

the ideal plants to add bloom to your gardening requirements.

You can walk around the package for up to five of 17 characteristics simultaneously — such variables as height, hardness, sun, water and

soil needs, pruning, months of flowering, colour and so on — as you ride around for the ideal plant. You can also weed out of the database, comprehensive details on over 250 flowers, shrubs and

trees, Latin names, or even stick-worms can be used in the search.

The cassette implants into £8.95 Spectrum and costs £9.95 mail order from Practical Software, 40 Weymouth Road, London SW18.

SINCLAIRWATCH

Hardly after publishing *Sinclair Watch* continues to try writing the more authoritatively (doesn't?) of the mini-mag — going by its own self-impression of *Walter Mondale* on the Presidential trail. And when we say it isn't working? One month published has already managed to print a full colour picture of Colin on the front cover — handling an interview that suggests still empty questions as why you can't buy bottles of the great man in high street shops. And I thought there was an *Onion* publication in April. Actually, it's concerned that homes up and down the country are now displaying Anso's image on walls and doors — only thing is, for some reason many of the pictures are covered with tiny holes.

Actually, apart from delivering pictures, there are, of course, other ways of noting admiration. Numerous readers as that were shocked customers, have taken to

smashing a brick in brown paper to *Practical*, *Country*. Wonder if they'll get enough to build an entrance?

Hang up all those who use the CNet receiving the ultimate accolade of attention on the weekly fancy *Spring* *Image* TV programme. The gist of a moment in twelve around a product that takes 15 days to come — I can't imagine what it was all about.

Many were surprised to hear of Inaghi's recent demise. Following some financial problems. One of the largest Spectrum software houses, it was always thought to be very successful, despite the constant stream of non-payment of bills. The company certainly knew how to write and market good games — and also how to be unmanageable. Declared assets are supposed to include a BMW, Porsche and N32, presumably acquired to help give the programmers an ego trip. Ex-dictator, Colin Staker, is now probably very glad to

get sacked earlier this year — following the phone tapping episode; he's currently working for Jet Set Software company, Software Projects.

Doesn't Sinclair Research realise the only way it's likely to get back-to-back acceptance from a still suspicious public is by making the blank cartridges be more widely available. But, I hear you say, they're already widely available in the shops — at £4.99! For many potential purchasers I believe the price still remains an insurmountable stumbling block. Of course, Sinclair Research would reply that no way could they match normal retail customer prices and still keep the books profitable — after all, we're talking about different orders of magnitude: quality. But the fact is, Sinclair Research may just have to bite the bullet to a greater cause. It must be the only way the company will ever fully succeed with its controversial system of storage. By Chatterbox.

BETA BASIC 1.8

ENHANCED BASIC FOR SPECTRUM 48K
FOR GRAPHICS — STRUCTURED PROGRAMMING
— DATA HANDLING

Beta 1.8 is a new powerful program that will save you a lot of time and money. It is the most powerful BASIC ever written for the Spectrum 48K. It is the most powerful BASIC ever written for the Spectrum 48K.

Features: Completely new single-key commands to program code. Beta 1.8 is designed to allow you to write programs with minimum time. It is the most powerful BASIC ever written for the Spectrum 48K.

Price: Beta 1.8 is available for £10.00 (includes 1000 copies of 1000 copies).

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QL Utilities

FOUR programs on one Microdrive for the Sinclair QL.

"Nothing very dramatic . . . could be quite useful" (PCW).

1 "Load"

Displays directory in columns, and allows LOADING of programs with single key-press. Without this, the directory will overflow the screen if you have more than about 18 files on cartridge; also "Load indiv-program" has 17 improvements!

2 "Q Mark"

Will allow you to FORMAT a cartridge repeatedly (as recommended by SINCLAIR). You only have to enter a name and number once.

3 "Q Back"

Makes back-up copies of cartridges. One key-press will copy all files onto an empty cartridge, or you may single step and choose whether or not to copy each file. If receiving cartridge is not empty, you will be asked whether or not to overwrite any remnants of a file about to be copied. You can copy from many cartridges onto one until it is full.

4 "Q Print"

Will delete any file with a single key-press, so be careful with this one!

Instructions:

On Pages and in a QURL file (for when you lose the paper!). All four programs will work with the extra microdrive if you get them, and have been successful with cartridges holding over 80 files each.

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RUMBLERS

Software sleuth, Ron Smith, wrestles with the rumours from around the houses.

afterwards". Elementary, my dear Paula.

PLAY IT AGAIN

A lot like "Forever" that writing completely new programs is to constant existing ones to such in different machines — which is precisely what Salamander Software (in most probably, Jeff Minter and Co) is doing at the moment.

Towards the end of last summer, Llamasoft released one of Minter's famous arcade games for the CDTV cd. Called *Howe* (because, the player starts off by "pinching" his neighbour's Air-Me so that he can cut the lawn (14 lawns actually). However, the (who owns the mower) isn't too happy about all this. In fact, so angry is he, that he decides to give "him" class around the hedges and flower beds. You neutralise by setting your dog, Rover, on to him.

At this point, things really start to get out of hand. In your hurry to escape the wrath of Jim, you accidentally move down a few flower beds — which upset the gardener enough for him to join the posse. And finally, as if all that wasn't enough, Rover gets a bit belligerent about the noise and starts barking at the mower; the stupid animal receives a short-back-and-side, runs off yelping and meowling, the Air-Me overboard. Phew!

Anyway, blind Minter is well into the controversy (claims Salamander's Chris Holland) and the finished program should be available for the Spectrum in good time for the Christmas. There's no information on price as yet.

WHO DONE IT?

Bringing an already hot earth to the role of a private detective, *The Dan Diamond Trilogy* is the latest project of Salamander Software. It's a collection of three text-only adventures based on Raymond Chandler's famous character, Sam Spade. As you progress through the game you'll uncover clues (along with a few red herrings) that should solve the case.

But what case? Says Peter O'Brien, "It's quite likely that you won't find out until the last adventure." — by which time, presumably, you'll have been shot at, stabbed, or at the very least beaten senseless for no apparent reason. To add to the atmosphere, appropriate sound effects have been included for when a gun is fired or when Sam

runs out of oxygen (?). The whole trilogy comes complete for £14.95, and should be in the shelves by late August or early September. More details will be available on request, for those who get stuck.

SPACE COWBOYS

If you've ever pictured yourself as a sort of helpful, cosmic Holli's Angel, then Softlab's upcoming shooting might be just what you're looking for. It's claimed that it'll be an interplanetary adventure where the player travels around on a spacecraft without wheels. Well, who needs wheels in space?

Known as *Starlink*, the object will be to zoom over to a planet and pick up all the aliens (25), and then yet whether they're to be released or "disappeared" and take them back to your space ship. But beware! If you return without having collected every last one of them, you'll be punished by losing one of those of your lives.

"Starlink" will be available around the end of August," claims Softlab's Martin Davis, "and will include not only adventure, but also strategy and shoot-out-up action as well." The price hasn't been finally nailed down, but it's expected to be in the usual £5.95-£9.95 range.

IT'S IN THE STARS

Strategy (and tactics) will both be included in a game which it's said will be the best of its kind when it's launched in October — according to a CP Software spokesman.

Called *Superstars 2.2* "... it beats CDS's *Colonel 2.0* with no trouble at all. In fact, it wipes

it out", claimed the man from CP. He also said that when *Superstars* played its games against *Colonel*, it won four and drew two. With *Colonel* being generally considered the current "champion", a result like that just can't be ignored.

Another program being written by CP Software will be of particular interest to those concerned with astronomy, or perhaps even astrology, because it allows the user to look at the planets of our solar system in their current positions at any given time. Just enter the date, and so on, and away you go. Watch this space for details.

A SPORTING CHANCE

Olympic isn't a currently suffering both the management and staff of Manchester-based Ocean Software, as they work on something called *Daily Thompson's* *Lexisaurus*.

Featuring all 15 events (jousting, the 100-, 400- and 1500-metre sprints, 110-metre high hurdles, javelin, discus, putting the shot, pole vault, high jump and long jump), this looks like being a winner from sheer novelty value alone. But Ocean's not just relying on that. Explains their *Mr. Flanagan*, "We have three programmers working on the graphics, and one on the sound." "Great," but why is it being called *Daily Thompson's* *Lexisaurus*? "Because a little black man is competing," says Flanagan. And also, presumably, because Thompson just happens to be the best in his field (ouch!).

There's no release date at the moment but it'll retail for £5.95, and be either keyboard or joystick compatible, with a two player option. ☺

OH, YAH!

Unfortunately, being a slick, our social climber doesn't have a clue how to go about it. So it's going to be up to you — the player — to help and advise our unsophisticated, unworldly public write their points of succumbing in his desire to live in Hampstead. If MH's programme men keep to their production schedules, you should get the opportunity to do just that sometime in October, for a mere £5.95.

Still proving elusive, however, is Melbourne's long awaited *Starlink* Holmes adventure. Says publicity manager, Paula Byrne, "The official launch date is now the 11th of September, and copies should be in the shops soon



As a result of slipping a deal with the BBC, CML is now working on a computer adaptation of the very popular *Dan Diamond* television series, to be in the shops by the end of August. Says Andrew Woodhead, the game's author, "The game will be either keyboard or joystick compatible."

The Sinclair QL and you



Exploring the Sinclair QL — An Introduction to SuperBASIC Andrew Nelson, £4.95

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THE YS TOP 20

Welcome back to the chart that you know isn't fixed. As usual, not only do we have your top twenty favourite games, we have your top-ten turkeys too (speaking alternately).

First polling slip out of the bag for this month came from Stephen Perry of Hemel Hempstead. Our usual price of three new packages is on its way.

Don't forget, you can send in your vote every month, just fill in the form (or take a photocopy if you don't want to mutilate your magazine). By the way, you'll notice there's more room on the voting slip for you to put a personal comment next to each of your five top 20 votes. We'll be using the best of these (with name-checks) in our next chart.

Post all entries to: YS Charts, Time Spectrum, 14 Rathbone Place, London W1P 1DL.

YS TOP 20 READER POLL

My top five games on the Spectrum are:

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YS TOP TWENTY CHART

1	3	3	LUNAR JETMAN ULTIMATE	A COMPLETE ARCADE ADVENTURE THAT TAKES PLACE ON THE MOON	
2	1	4	JET SET WILLY SOFTWARE PROJECTS	BEFORE, TO MANIC MINER, GO WITH WILLY TO SO MANY EXCITING LOCATIONS.	
3	NEW	1	SABRE WULF ULTIMATE	A MAZE GAME WHERE YOU SEARCH FOR THE FOUR PARTS OF AN AMULET TO COMPLETE YOUR TASK.	
4	2	5	MANIC MINER SOFTWARE PROJECTS	JOIN MINER WILLY IN HIS QUEST FOR THE MISSING KEYS.	
5	NEW	1	MUGSY MELBOURNE HOUSE	AN UPDATED GRAPHICAL VERSION OF KINGDOMS SET IN THE 1920'S.	
6	7	3	TRASHMAN NEW GENERATION SOFTWARE	TRY AND EMPTY THE DUSTBINS IN THE FASTEST POSSIBLE TIME, AVOIDING SWAPPING EGGS AND KILLER BICYCLES.	
7	NEW	1	WORLD CUP ARTIC	LIFELIKE SIMULATION OF A FOOTBALL GAME, ADDS TO THIS RECREATION OF THE WORLD CUP MATCHES.	
8	10	5	FIGHTER PILOT DIGITAL INTEGRATION	A 3D FLIGHT SIMULATION PUTS YOU IN THE COPILOT'S SEAT OF A FIGHTER PLANE.	
9	4	4	SCUBA DRIVE DURELL SOFTWARE	PUR ON YOUR WETSUIT AND PLUNGE INTO THE DEPTHS IN SEARCH OF TREASURES.	
10	9	5	ATIC ATAC ULTIMATE	A FULL GRAPHICAL ADVENTURE IN AN ARCADE GAME FORMAT.	
11	16	3	FRED QUICKSILVA	YOU TAKE THE ROLE OF AN ARCHAEOLGIST, LOOKING FOR TREASURE IN AN OLD MINE.	
12	NEW	4	HUNCHBACK OCEAN	A NOT MOVING ARCADE GAME WHERE YOU JUMP THE WALLS TO SAVE ISABELLA.	
13	11	5	DEATHCHASE MICROMEGA	RETURN OF THE BOY, LIVED A SOFTWARE REPRODUCTION OF THE EPIC 'ON TOP OF THE CHASE' SCENE.	
14	6	5	ANT ATTACK QUICKSILVA	AN AMBITIOUS 3D ADVENTURE IN THE CITY OF ANTITCHER.	
15	8	5	CHEQUERED FLAG PSION	JOIN THE GRAND PRIX CREDIT AND RACE IN SOME OF THE GREATEST TRACKS IN THE WORLD.	
16	5	5	JET PAC ULTIMATE	BUILD A SPACE SHIP, THEN TACKLE THE GALAXY FOR BOMB BOMS AND TREASURES.	
17	NEW	3	THE HOBBIT MELBOURNE HOUSE	AN ADVENTURE BASED ON THE BOOK OF THE SAME NAME.	
18	15	4	CHUCKIE EGG A&F SOFTWARE	POWERED EGGS HAVE TO BOUNCE UP ALL THE EGGS FROM THE MATHS, GET OUT AND EAT UP ALL THE CORN.	
19	NEW	1	LORDS OF MIDNIGHT BEYOND SOFTWARE	A MULTI-SCREEN GRAPHICAL ARCADE GAME WHICH IS NOT IN THE FORM OF A MALLA FAMILY TREE.	
20	13	3	WHEELIE MICROSPHERE	A LIFE-OR-DEATH RACE AGAINST DOUBT, BACKFIRE, BUSES AND MANIC HYDROHOOS.	

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RATAPILLA
NETAMORENOS

With reference to your *Krazy Knappe* program, may I be so bold as to indicate what I think are errors and general cock-ups in said program?

The Dodge facility cannot be used to complete (an event add) to the Rastapala — to state, add line: 101 (C) 101 101.

4. *Journal of Management* is required to have a handling time of less than 120 days.

Along, you start with some credits and still have a go left when the credit counters shows 000 To cure, change CTR in line 1716 to 1-27-1-100-11 and also make line 170 credit

LET C=CHR(1+OF C=0 THEN
PRINT AT 10,20, PAPER 0;
"0" INPUT "NO CREDIT —
PRESS ENTER FOR MORE";LINE
AT 10,20, 50,500, 200

This leaves the display ready to go when you run out of money. (The original shows start with one credit — that credit is used before you go, hence the first display is of nine credits and the program shows 000 credits are your last spin. TDS.

Twidge is too inflexible if I didn't want to make it too easy. TP) — to ease this, change line 16.50 on BNDG to TS, I also changed BND to G, A is 1.350. (Hick about 0.5.)

How about misnumbering line 1216-1310 to 2-12, deleting 1216-1310, moving line 30 to 13, adding a line 1: G3-713-13 and changing G3-50 to 1203 in lines 130, 340, 370, 400, 430, 460, 490, 5400, 1540, 1590 to G3-50/3 2. This will marginally speed up the work. (2004/07/1)

I also changed three Bells to give a reward of 12, by altering the "100" in line 1044 to 100 and the first "11" in line 1055 to 12. And I added a SAYE line — where's yours? (It's not necessary to waste program space with a line that the program never calls itself. TP's

Just in case you're interested, I did all these changes, then attempted to reassemble using BetaBasic; however, it failed — not taking cold time. I HATE

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

Oh well, nothing wrong with a little compromise, I suppose.
Toshihiro's wife

UNZIPPING TAPPED ZIP

I'd like to take this opportunity to clear up a few more points that have arisen out of the ZTP articles. I'm sorry to say that I seem to have made a bit of a mix-up out of another lot of

FORUM

Is there something you're not telling us? Write to Forum, Your Spectrum, 14 Rathbone Place, London W1P 1DE.

settings. Perhaps this will sort
itself out.

In Listing 3, the total of the data is 7364. Five not ideas where the figure of 7364 came from! The last three items are data are "dummy" values not used by the code — hence they need not be PGMed (although they should be read if you want to end up with the total of 7364). The data lines were program-generated — hence the overuse (which has no effect on the program) — at least that was they're correct! Lines 140 and 145 set up the "vector" pointers which tell *ZW* where to find the code for PL107 and DRA59. They aren't saved but, like most of Listing 4, they alter the library which, indeed,

The "calculations not allowed" error is a tricky one — it turns out that Listing 4 is at fault. For some arcane reason the listing was garbled. In the third column on page 64 you will find the explanation of how TDS, which "calls the MATHS routine twice, to process an X and Y coordinate."

Examination of the listing shows that T3's third priority, Peter Shaw, re-typed the line with only one call to BLATHIS, so that the Y co-ordinate is not repeated. Later, ZAP finds a number where it is expecting to find a colon or end-of-line marker — the computer assumes that you're trying to use an "extra number" after FLATT or DRA W and inserts "calculation not allowed". The solution is to add an extra call to BLATHIS in line 7258, so that it starts.

FROM: Bob Smith, Sales Dept. (408) 555-1234
TO: Mr. Jones, Marketing Dept. (408) 555-5678

This brightens the X co-ordinate, the separation (a comma) and then the Y co-ordinate. If you've got the rest right, ZAP should then work.

I'm sorry the information got so garbled... please accept my apologies.

Concerning the ZAP Compiler Office, I also have to apologize to readers who received their copy late. The delay was caused by a postal disaster in London, which meant that letters took up to three months to reach some offices.

The digesta has now moved and delivery is back to normal.
 Steven Goodrich, Birmingham

MODIFICATION WADNESS

11. <http://www.pearsoned.com>



that I took home issue 4 and prepared to enter Andrew Fournell's *Dumps of Distinction* program, only to read — with mounting horror — that his routine "takes out the old Epson (MS type and unsorted) keyboard C."

However, as the program was just what I'd been looking for, I had a crack at modifying the code for my clipped-out MOSM. After altering the line feeds, changing the mode to double density bit image and using five bytes instead of three (handling some overlapping of bytes in the last byte of the first colour becomes the last byte of the next), a reasonable simulation was achieved.

Mal Williams, Durham

[illegible]

2001.00	LD	40.0	7446.0
20	LD	4.0	0.0
21	LD	4.0	0.0
22	LD	4.0	0.0
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176	LD	4.0	0.0
177	LD	4.0	0.0
178	LD	4.0	0.0
179	LD	4.0	0.0
180	LD	4.0	0.0
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196	LD	4.0	0.0
197	LD	4.0	0.0
198	LD	4.0	0.0
199	LD	4.0	0.0
200	LD	4.0	0.0

If you're the proud owner of a "clapped and MIBB", try the patented code from *Mad Minutes of Business Input Andy Powers's* *Minutes of Distraction* working.

WHAT THE LORD GIVETH...

I'm writing to give warm and emphatic support to the letter entitled "Microdriving" — written by John Asplund — which appeared on page 2 of T2.

I too have spent a fortune on software. I too have the intention of making money by copying and selling pirated software, and I too wish to get the best advantage of my own paid-for processors. I enjoy the facility of being able to run programs from my Microdrive, with all that this offers in the

way of speed and compactness, and therefore I feel that the obstacles placed in my way are both frustrating and unacceptable — especially when one considers how easy it is to transfer from tape to tape using two tape recorders.

Any advice, procedures, software or hardware which will enable non-technical and non-aiding users to transfer taped programs to Microdrives are, in my view anyway, much to be encouraged (like Toman and Campbell). Otherwise one starts to wonder about the purpose of having a Microdrive in the first place.

Ian Ross, Rotherham

At least one company (Romaine-Robin) is selling software which will allow users to copy commercial programs to Microdrive in a file depending on user whether that will cause any programmes to be the primary hard-disk. I suspect the reason there is no such software currently on Microdrive is the cost of the cartridges and their duplication — until Sinclair Research reduce the price of the cartridges, Microdrive owners are likely to find themselves discriminated against. I've said it before and I'll say it again — life isn't a line of choice. Ed.

THOSE FLICKERING VALUES

Regarding the letter from Mike Mueslin in the June issue which contains the well-known problem of the 'flickering' of the values returned from the keyboard input ports, here's one solution your readers may like to consider.

To divide a binary number by 32 we would move the point five places to the left — so the returned eight-bit binary number from the input port would then, in fact, consist of the three high bits (including the 'noisy' bit 6), so the integer and the five low values as the fraction. We can then subtract the integer. Multiply by 32 and we've a whole number again which, as it doesn't contain bit 6, doesn't flicker. The expressed value is, of course, 31 ((+16+4+2+1)) but we can then simply add 256 to give the original expressed value of 255.

The following short program will, I think, prove the theory:

```

1 REM PRESS KEYS
2 GOTO 1
3 INP INP=IN(0-31)
4 OUT(0-31)=INP
5 IN LET INP=INP
6 INP=INP-256
7 IN PRINT INP:GOTO 3
8 END

```

I hope the above ramblings may be of some interest and use to someone. May I take this chance to thank you for publishing the best magazine on the market.

Derek Hirst, Barnsley

You certainly may... and we thank you for your suggestions. J.L.

JET SET LOONY

Seeing your article in issue 4 about Aer Jet 8000 I felt compelled to write to you

about some locations you've missed out. The Gaping Pit is not the most obvious one, though even I haven't visited it. Secondly, and more importantly, you omitted three major locations; here's how you got to them.

Writ on the bow till 11.45pm (Smith time), which may seem an awful long time to you as usual. Spectators. At that moment, a tub will get tossed up on a large wave and you must then jump on. It takes you to Cruise Corner (a desert island in an landfill). Then you climb up a guile tree to arrive at Tree Tops — The Nuptial, from which you catch the bird that travels up towards In The Clouds. From there you can control yourself all over the house (flurry things happen when you try to enter the water or the Marine Bedroom) and from that point, it should be possible to find The Gaping Pit (though I've not tried it myself). It also shows the 'White Attack' and makes it possible to go through battles (five puts you down where you are, so be careful) afterwards the first disintegration. Robin Palmer, Chester

Wry, it's right... but (if you wish) In The Clouds is enough you actually get awarded by a ball of fire coming in from the left that fires (twice) Billy, then always then make an lot volcano under Phobos, and then — and then — and then — OK, clear off volcano? Ed

DISAPPOINTED DUMPER

In *Dumps of Distraction* on page 25 of T2, issue 4, you give ratings for the Hildeberg.

Kompton and Kompton E interfaces. The trouble is I don't have these, could you please tell me what mode have to be done to get the fitting to run with my Sinclair ZX Interface 1? By the way, this is the first time I have bought your map and I like it. Keep up the good work. No Rail, Nidrop

To get *Dumps of Distraction* sending me (please) 1, and/or following lines to the listing.

```

0000 00000000 00 00 00 00
0000 000000 00 00 00 00
0000 0000 00 00 00 00

```

For some reason my particular printer keeps cutting in the middle of the dump. So if you share a similar problem, I can only suggest you try a lower baud rate. Andy Powell. Ed

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SMOOTH MOVES

Does your Speccy output sometimes look like it's suffering from a bad case of the shakes? Relax... let things slide with Simon Goodwin's cure for jerky graphics!

Presented here is a short machine code routine that lets you move graphics smoothly around the screen, without suffering the restrictions of the Spectrum character grid. Graphics and ASCII characters can be positioned at any high-resolution co-ordinate with a simple Basic command. You're not restricted to the 768 'PRINT' positions — you can place characters at any point on the 256-by-176 Hi-res grid.

The program uses only 120 bytes of memory and is completely re-loadable, which means that you can load it anywhere in memory. It works without problems on a 128K computer. Another advantage over the usual PRINT AT command is that this one allows you to use an extra thirty-odd user-defined graphics. In addition to the usual 21 user-defined graphics (character codes 144-164), you can define and position characters 165 to 255 with the *FX Smooth Moves* routine.

INTO LOAD MODE

The Basic listing loads the machine code into any area of memory. Type in the listing, taking care over the DATA statements, and then decide where you wish to store the code. On a 48K Spectrum you might want to put the code at address 64500. Type CLEAR 64500 to null Basic; that it must not use addresses above 64499, and then RUN the program. You'll be asked for a 'load address' — enter 64500. The program reads the DATA and stores from memory address 64500 onwards.

If you've made a typing error in the DATA, an appropriate message will appear. Correct the error and RUN again. Don't test the routine until the 'Position character'... message appears; the code is then ready for use. It's a good idea to SAVE everything, just in case an error has slipped past the 'check' in the loader.

On a 128K Spectrum (assuming you have no other machine code in memory) you might put the code at address 31630. Type CLEAR 31630 and then specify a 'load address' of 31670. Of course, you can load the code anywhere you like, although it's best to protect it with the CLEAR command, or it could be overwritten by Basic.

The routine provides a Hi-res version of the command.

PRINT INK 0: PAPER: OVER 1: AT 0: GOTO 6

The syntax is rather different:

RANDOMIZE RANDY: X=USR 6

Where 'x' and 'y' are the horizontal and vertical co-ordinates of the top left corner of the character, 'x' is the ASCII code of the character and 'y' is the address where you stored the routine. See:

RANDOMIZE RANDY: Y=65: USR 64500

will position a letter 'A' (character 65) at the top left corner of the screen — assuming you stored the machine code at address 64500. The RANDOMIZE is a 'dummy' to hold the result of the USR call. If your program uses random numbers you should replace RANDOMIZE with a dummy variable assignment, such as:

LET dummy=0: GOTO 176: GOTO 64500

You're allowed to specify coordinates or character codes with expressions as well as variables or numbers. For instance:

RANDOMIZE! 300: GOTO 140: GOTO Y10: GOTO 64500
*** GOTO 6000

is allowed. Our routine uses a neat technique to lock the three previous expressions on the line, before the USR call. If there are more or less than three values, a 'Parameter' error will be reported. Make sure that you've used the correct separator — AND, equals and plus — between the co-ordinates, the character code and the USR call. If you're using calculations more compli-

cated than addition, subtraction, multiplication and division, you may need to put each co-ordinate or character code in brackets — so that the routine can distinguish them.

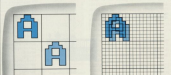
The machine code contains extensive error-trapping. It won't let you use y co-ordinates less than seven, since each character is eight lines high. A character at co-ordinate 0.6 would have its bottom line at y co-ordinate minus one! The 'bigger out of range' error message appears if you use vertical co-ordinates less than seven or greater than 173. X-co-ordinates beyond 248 simply 'wrap around' to the opposite side of the screen; decimal values are rounded to the nearest whole number.

A SMOOTH OPERATOR

The second Basic program shows the features of the routine quite clearly. A ball bounces around the screen at a variety of speeds. It's positioned using 'LET d=' rather than 'RANDOMIZE', so that the random number sequence is not constantly re-started whenever the ball moves. The listing is fairly straightforward, but make sure you type commas (not semicolons) in line 300.

The machine code always uses the OVER 1 setting, so that any character can be erased without destroying the background, simply by re-drawing it in the same place. The characters take on the colour of the INK, where they are plotted. This avoids the need for compli-

PIXEL MOVEMENT



Using *Smooth Moves*, you have the full 176-by-256 pixel grid within which to plot your 2560s, 'special' 000s or the normal character set. The left-hand diagram shows character movement in one block jump; the illustration on the right shows how the character would make the same jump accurately pixel by pixel in eight movements.

SMOOTH MOVES

used code to save and restore registers, and prevents weird effects as objects pass one another.

The Spectrum normally uses character codes 160 to 255 to represent keywords — words like THINK, PRINT and so on. There's never any need to store these around the screen, so our machine code program lets you define an extra 91 user-defined graphics in their place. Together with the 21 standard user-defined graphics, this gives you 122 characters to play with.

LABEL	ADDRESS	COMMENT
SYSTEM POINTERS		
USER	0C7B	User graphics pointer
CHARS	0C30	Character set pointer
BLACK	5000	Block graphics buffer
STACK	5000	Maths stack end pointer
STACK	5000	Maths stack start pointer
ROM ROUTINES		
MAKER	3838	Make graphics ind
POKE1	72A4	Find address of pset
POP_A	70A2	Pop Altos maths stack

The table above shows the system pointers and ROM routines used in Smooth Moves, giving their labels and addresses. This is for the assembler's use only, and need not be typed in.

The assembler code for Smooth Moves — just as that one last one — has the interesting machine code tricks that Simon's used.

POKE	1320	000	05000	"Fetch end of stack"
POKE	1330	1	000	"Fetch end of stack"
POKE 2A4000	1340	POKE1	LD	HL, (STACK)
POKE 03	1350	POKE1	LD	HL, (STACK)
POKE 08	1360	1	"3 numbers on stack?"	
POKE 08	1370	08	08, 18,	
POKE 2A4000	1380	LD	HL, (STACK)	
POKE 010000	1390	LD	HL, 18	
POKE 08	1400	000	18, 00	
POKE 0200	1410	000	18, 00	
POKE 2A400	1420	JR	2, F0000	
POKE	1430	1	"3 parameters needed!"	
POKE 0F	1440	001	0	
POKE 14	1450	000	25	
POKE	1460	1	"Find the char. code"	
POKE 2A4000	1470	F0000	CALL	POP_A
POKE	1480	1	"Divide into 3 groups:"	
POKE	1490	1	"0-127 ASCII chars"	
POKE	1500	1	"128-143 block graphics"	
POKE	1510	1	"144-255 user defined"	
POKE FB00	1520	0F	120	
POKE 2A400	1530	JR	0, A0000	
POKE 17	1540	LD	HL, 0	
POKE 0400	1550	000	144	
POKE 2A400	1560	JR	0, B0000	
POKE	1570	1	"Must be a 100"	
POKE ED000000	1580	LD	HL, (00000)	
POKE 1800	1590	JR	10000	
POKE ED000000	1600	LD	HL, (00000)	
POKE	1610	1	"Find character type"	

In principle the new characters are defined in exactly the same way as the old ones. They follow the others in memory, which means that you will have to expand the user-defined graphics area before you can define more than the standard 21 characters. On a 48K computer you'd use the following commands to expand the graphics area to cope with 122 characters:

```

CLEAR 4000 : POKE 2A00,40 : POKE 2A70,
100

```

The POKEs adjust the system variable CHARS so that it points to entry 728 (71 * 8) bytes further down memory. They don't reserve memory for any machine code, so you'd probably use CLEAR 64000 and load the Smooth Moves code at 64500 (or thereabouts).

On a 16K computer load the machine code at 31600 and reserve space with:

```

CLEAR 6000 : POKE 2A00,40 : POKE 2A70,
100

```

When you come to program the user-defined graphics, you POKE the patterns into memory as usual. The only difference is that you can't use the UKR "enter" function to locate characters after UKR "a". The extra characters all follow at eight-byte intervals. User-defined graphic "a" has character code 144, so you can find the definition of the character with code "76" by typing:

```
PRINT UKR "a" - 8 (16-144)
```

TRICKS OF THE TRADE

Smooth Moves uses some interesting machine code tricks, so I've listed the assembler code of the program as well as the Basic loader. This is the longest listing, assembled using version 2.1 of Patrice's excellent *ENTAS* assembler.

```

0000 0000 00000000 0000 0000
0100 0000 0000 0000 0000 0000
0200 0000
0300 0000 0000 0000
0400 0000 0000 0000
0500 0000 0000 0000
0600 0000 0000 0000
0700 0000 0000 0000
0800 0000 0000 0000
0900 0000 0000 0000
0A00 0000 0000 0000
0B00 0000 0000 0000
0C00 0000 0000 0000
0D00 0000 0000 0000
0E00 0000 0000 0000
0F00 0000 0000 0000
1000 0000 0000 0000
1100 0000 0000 0000
1200 0000 0000 0000
1300 0000 0000 0000
1400 0000 0000 0000
1500 0000 0000 0000
1600 0000 0000 0000
1700 0000 0000 0000
1800 0000 0000 0000
1900 0000 0000 0000
1A00 0000 0000 0000
1B00 0000 0000 0000
1C00 0000 0000 0000
1D00 0000 0000 0000
1E00 0000 0000 0000
1F00 0000 0000 0000
2000 0000 0000 0000
2100 0000 0000 0000
2200 0000 0000 0000
2300 0000 0000 0000
2400 0000 0000 0000
2500 0000 0000 0000
2600 0000 0000 0000
2700 0000 0000 0000
2800 0000 0000 0000
2900 0000 0000 0000
2A00 0000 0000 0000
2B00 0000 0000 0000
2C00 0000 0000 0000
2D00 0000 0000 0000
2E00 0000 0000 0000
2F00 0000 0000 0000
3000 0000 0000 0000
3100 0000 0000 0000
3200 0000 0000 0000
3300 0000 0000 0000
3400 0000 0000 0000
3500 0000 0000 0000
3600 0000 0000 0000
3700 0000 0000 0000
3800 0000 0000 0000
3900 0000 0000 0000
3A00 0000 0000 0000
3B00 0000 0000 0000
3C00 0000 0000 0000
3D00 0000 0000 0000
3E00 0000 0000 0000
3F00 0000 0000 0000
4000 0000 0000 0000
4100 0000 0000 0000
4200 0000 0000 0000
4300 0000 0000 0000
4400 0000 0000 0000
4500 0000 0000 0000
4600 0000 0000 0000
4700 0000 0000 0000
4800 0000 0000 0000
4900 0000 0000 0000
4A00 0000 0000 0000
4B00 0000 0000 0000
4C00 0000 0000 0000
4D00 0000 0000 0000
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4F00 0000 0000 0000
5000 0000 0000 0000
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6800 0000 0000 0000
6900 0000 0000 0000
6A00 0000 0000 0000
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6E00 0000 0000 0000
6F00 0000 0000 0000
7000 0000 0000 0000
7100 0000 0000 0000
7200 0000 0000 0000
7300 0000 0000 0000
7400 0000 0000 0000
7500 0000 0000 0000
7600 0000 0000 0000
7700 0000 0000 0000
7800 0000 0000 0000
7900 0000 0000 0000
7A00 0000 0000 0000
7B00 0000 0000 0000
7C00 0000 0000 0000
7D00 0000 0000 0000
7E00 0000 0000 0000
7F00 0000 0000 0000
8000 0000 0000 0000
8100 0000 0000 0000
8200 0000 0000 0000
8300 0000 0000 0000
8400 0000 0000 0000
8500 0000 0000 0000
8600 0000 0000 0000
8700 0000 0000 0000
8800 0000 0000 0000
8900 0000 0000 0000
8A00 0000 0000 0000
8B00 0000 0000 0000
8C00 0000 0000 0000
8D00 0000 0000 0000
8E00 0000 0000 0000
8F00 0000 0000 0000
9000 0000 0000 0000
9100 0000 0000 0000
9200 0000 0000 0000
9300 0000 0000 0000
9400 0000 0000 0000
9500 0000 0000 0000
9600 0000 0000 0000
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9800 0000 0000 0000
9900 0000 0000 0000
9A00 0000 0000 0000
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9E00 0000 0000 0000
9F00 0000 0000 0000
A000 0000 0000 0000
A100 0000 0000 0000
A200 0000 0000 0000
A300 0000 0000 0000
A400 0000 0000 0000
A500 0000 0000 0000
A600 0000 0000 0000
A700 0000 0000 0000
A800 0000 0000 0000
A900 0000 0000 0000
AA00 0000 0000 0000
AB00 0000 0000 0000
AC00 0000 0000 0000
AD00 0000 0000 0000
AE00 0000 0000 0000
AF00 0000 0000 0000
B000 0000 0000 0000
B100 0000 0000 0000
B200 0000 0000 0000
B300 0000 0000 0000
B400 0000 0000 0000
B500 0000 0000 0000
B600 0000 0000 0000
B700 0000 0000 0000
B800 0000 0000 0000
B900 0000 0000 0000
BA00 0000 0000 0000
BB00 0000 0000 0000
BC00 0000 0000 0000
BD00 0000 0000 0000
BE00 0000 0000 0000
BF00 0000 0000 0000
C000 0000 0000 0000
C100 0000 0000 0000
C200 0000 0000 0000
C300 0000 0000 0000
C400 0000 0000 0000
C500 0000 0000 0000
C600 0000 0000 0000
C700 0000 0000 0000
C800 0000 0000 0000
C900 0000 0000 0000
CA00 0000 0000 0000
CB00 0000 0000 0000
CC00 0000 0000 0000
CD00 0000 0000 0000
CE00 0000 0000 0000
CF00 0000 0000 0000
D000 0000 0000 0000
D100 0000 0000 0000
D200 0000 0000 0000
D300 0000 0000 0000
D400 0000 0000 0000
D500 0000 0000 0000
D600 0000 0000 0000
D700 0000 0000 0000
D800 0000 0000 0000
D900 0000 0000 0000
DA00 0000 0000 0000
DB00 0000 0000 0000
DC00 0000 0000 0000
DD00 0000 0000 0000
DE00 0000 0000 0000
DF00 0000 0000 0000
E000 0000 0000 0000
E100 0000 0000 0000
E200 0000 0000 0000
E300 0000 0000 0000
E400 0000 0000 0000
E500 0000 0000 0000
E600 0000 0000 0000
E700 0000 0000 0000
E800 0000 0000 0000
E900 0000 0000 0000
EA00 0000 0000 0000
EB00 0000 0000 0000
EC00 0000 0000 0000
ED00 0000 0000 0000
EE00 0000 0000 0000
EF00 0000 0000 0000
F000 0000 0000 0000
F100 0000 0000 0000
F200 0000 0000 0000
F300 0000 0000 0000
F400 0000 0000 0000
F500 0000 0000 0000
F600 0000 0000 0000
F700 0000 0000 0000
F800 0000 0000 0000
F900 0000 0000 0000
FA00 0000 0000 0000
FB00 0000 0000 0000
FC00 0000 0000 0000
FD00 0000 0000 0000
FE00 0000 0000 0000
FF00 0000 0000 0000

```

A demonstration program featuring a shell branching around the screen at a variety of speeds. (Make sure you type commands and not numbers in line 205.)

The assembler listing starts with the definition of a few constants used later in the program. These are defined at the head of the listing so that they can be checked and altered easily. They also make the program easier to read, especially if it doesn't immediately spring to mind that, say, 0C51H is the address of the Maths stack pointer! These ROM routines have been used, to minimise the program size and keep things simple.

The machine code is in three main sections. First, the parameters (the coordinates and character number) are checked, then the character definition is located, and finally the character is positioned on the screen. The parameter checking relies on the way the Spectrum evaluates expressions. In a simple case like:

```
PRINT 2+3*4
```

the computer must work out the multiplication before it does the addition. This is because the correct answer is 14 (or 3+12), not 20 (3*4).

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Abstract *Abstracts of the 1998 Annual Meeting of the American Psychological Association, Washington, DC, August 1-5, 1998.*

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 104

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11. <http://www.fishbase.org>

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2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542 2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607 2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620 2621 2622 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634 2635 2636 2637 2638 2639 2640 2641 2642 2643 2644 2645 2646 2647 2648 2649 2650 2651 2652 2653 2654 2655 2656 2657 2658 2659 2660 2661 2662 2663 2664 2665 2666 2667 2668 2669 2670 2671 2672 2673 2674 2675 2676 2677 2678 2679 2680 2681 2682 2683 2684 2685 2686 2687 2688 2689 2690 2691 2692 2693 2694 2695 2696 2697 2698 2699 2700 2701 2702 2703 2704 2705 2706 2707 2708 2709 2710 2711 2712 2713 2714 2715 2716 2717 2718 2719 2720 2721 2722 2723 2724 2725 2726 2727 2728 2729 2730 2731 2732 2733 2734 2735 2736 2737 2738 2739 2740 2741 2742 2743 2744 2745 2746 2747 2748 2749 2750 2751 2752 2753 2754 2755 2756 2757 2758 2759 2760 2761 2762 2763 2764 2765 2766 2767 2768 2769 2770 2771 2772 2773 2774 2775 2776 2777 2778 2779 2780 2781 2782 2783 2784 2785 2786 2787 2788 2789 2790 2791 2792 2793 2794 2795 2796 2797 2798 2799 2800 2801 2802 2803 2804 2805 2806 2807 2808 2809 2810 2811 2812 2813 2814 2815 2816 2817 2818

SMOOTH MOVES

The Smooth Move code takes advantage of the way Basic works out the results of a calculation, by ensuring that the co-ordinates and character number have been worked out, but not combined together, as the USR call is performed. The three numbers are languishing on a "main stack" of temporary results during the USR call. The machine code can read the numbers which have been so helpfully made ready by Basic, and then put things tidy afterwards so that Basic can carry on once the USR call is over.

FE10 2600	1630	INSTR	LD	H,0
FE11 6F	1640		LD	L,0
FE13 2F	1650	ADD	HL,HL	
FE14 2F	1660	ADD	HL,HL	
FE15 2F	1670	ADD	HL,HL	
FE16 1F	1680	ADD	HL,DE	
FE17 1006	1690	JR	SPRINT	
	1700			
FE19 000000	1710	BLANK	CALL	PRINTER
FE1C 21925C	1730		LD	HL,BLANK
FE1F 63	1740	SPRINT	CALL	HL
FE20 0001	1750	POP	LD	
	1760			"Push 1 onto display"
FE22 00A229	1760	CALL	POP,A	
FE23 6F	1770	LD	H,A	
	1780			"Push 1 onto display"
FE26 65	1790	CALL	HL	
FE27 00A22D	1800	CALL	POP,A	
FE28 6F	1810	POP	HL	
FE2B 6F	1820	LD	L,A	
FE2C 65	1830	CALL	HL	
	1840			"Poppen B screen lines"
FE2D 0000	1850		LD	C,B
FE2F 6F	1860	PLINE	POP	HL
	1870			"Step up to next line"
FE30 2B	1880	DEC	H	
FE31 8F	1890	FORN	HL	
FE32 2A	1900	INC	H	
	1910			"Convert coord to H,L"
	1920			"No address in H, L & D"
	1930		FORN	BC
FE34 44	1940		LD	B,H
FE35 44	1950		LD	C,L
FE36 00A002	1960	CALL	PRINT	
FE37 6F	1970	POP	BC	
	1980			"Copy bit offset to B"
FE3A 43	1990		LD	B,A
	2000			"See if char is on grid"
FE3C 4F	2010	FOR	A	
FE3D 80	2020	OR	B	
	2030			"Send font anyway"
FE3E 007000	2040		LD	A,110+01
	2050			"Store name of on grid"
FE40 2011	2060	JR	J,STORE	
	2070			"Generate id bit mask"
FE42 0B	2080		OR	HL,HL
FE43 2600	2090		LD	H,0
FE45 6F	2100		LD	L,A
	2110			"Reverse shift count"
FE46 2000	2120		LD	A,B
FE48 90	2130	FOR	B	
FE49 47	2140		LD	B,A
FE4A 2F	2150	SHIFT	ADD	HL,HL
FE4B 10F0	2160	BLANK	SHIFT	
	2170			"Put mask in DE"
FE4D 0B	2180		LD	DE,HL
	2190			"Mix into the display"
FE4E 7E	2200		LD	A,0A1
FE4F 44	2210	FOR	B	
FE50 77	2220		LD	HL,A
FE51 25	2230	INC	HL	
FE52 76	2240		LD	A,B
FE53 46	2250	STORE	FOR	HL,A
FE54 77	2260		LD	HL,A
	2270			"Advance through font"
FE55 0023	2280	DE	LD	LD
	2290			"Convrt one line done"
FE57 05	2300	FOR	C	
FE58 2005	2310	JR	HL,PLINE	
	2320			"Tidy stacked A,B, BC&D"
FE5A 6F	2330	POP	HL	
FE5B 6F	2340	POP	HL	
FE5C 22A55D	2350		LD	STACK,HL
FE5F 6F	2360	RET		
	2370	END		

```

100 REM ***** BASIC *****
110 REM By Simon W. Goodwin
120 REM
130 REM Load address'AL
140 LET A=0
150 REM 10, 10, 10, 10, 10
160 REM 0
170 LET C=0
180 REM 1,0
190 REM 1
200 IF (1000000) THEN REM "
210 REM "
220 REM "Position character C
230 REM "
240 REM "
250 REM "
260 REM "
270 REM "
280 REM "
290 REM "
300 REM "
310 REM "
320 REM "
330 REM "
340 REM "
350 REM "
360 REM "
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950 REM "
960 REM "
970 REM "
980 REM "
990 REM "

```

Here's one last bit of code to see how the Smooth Move code works. It's a Basic loader program which runs on the Smooth Move.

This gives an convenient way of proving numbers from Basic to machine code, without the hassle of PEKING and FORKING. We can ensure that temporary results are ready by our choice of separators between the co-ordinates. In the command

RANDOMIZE LANDY-1-USR

Basic sends the addition first, to get the correct answer — adding is always done before comparison (=) and comparison are done before AND. This idea is explained on page 12 of the thin "Introduction" manual which came with your Spectrum.

On the way through the expression, Basic works out any calculations needed to find X, Y and C, since those calculations should have a higher priority than the 'plus' at the end of the line.

If you want to use equals, AND, or other so-called "logical operations" in

your calculation of x , y and z , you must put the relevant calculations in brackets, so that Basic will work the whole value out before it reaches the `USR` call. A list of priorities is on page 203 of the Spectrum manual. Logical operations have priority '2', '<', '>' or '3'.

Basic puts temporary results in an area called the 'maths stack'. Two system variables are used to mark the top and bottom of this area: each value stored within it takes up five bytes.

Lines 1340-1450 of the assembler are used to check that the maths stack is 12 bytes long when the `USR` call is reached: this means that three values are ready. If the stack does not contain three values, the routine stops with a 'Parameter' error — this is generated by lines 1440 and 1450.

A CHARACTER STUDY

The ROM subroutine `POP_A` is used to read a number from the maths stack and into the `A` register. Lines 1470-1580 fetch the character code, which is the last byte calculated and hence at the 'top' of the stack. They test the code to decide whether the character is a block graphic, a user-defined graphic or an ASCII character. There's no definition of the block graphics in the ROM — those are generated as required by a routine called `MAKER`, which puts the patterns specified by a code in the `B` register at address `BLKCH`.

In the case of ASCII or user-defined characters, the routine fetches the appro-

priate start address from the system variables (`UT005` points to the user-defined graphics and `CHARS` points to the ASCII symbols). The character code is multiplied by eight (since each definition takes eight bytes) and the location of the character is found by adding the start address to the resultant value. `GPOINT` copies the address of the character definition into register `IX`, for safe-keeping.

`POP_A` is used twice more to fetch the y and x co-ordinates where the character is to be displayed. The loop from `PLINE` onwards puts the character into video memory, one line at a time. Register `C` is used to count the lines.

The program takes the co-ordinates of each line and uses a ROM call to find the address where that line should appear. The ROM subroutine named `PIXEL` takes x and y co-ordinates in registers `C` and `B`, returning with the address of the byte required in `HL`, and the position within the byte in `A`. The character definition is fetched and shifted sideways if need be.

Each line of the Spectrum display corresponds to 32 bytes of video memory. The contents of that memory determines what's displayed on the line. The normal Spectrum `PRINT` routine uses one byte per character on each line, which means that characters cannot be printed partly in one byte and partly in the next. *Smooth Move* allows you to split characters between one byte and the next (hence the floor control over positioning). The character code is put into

one end of the `HL` register pair, which is shifted sideways until it's at the required place on the boundary between `H` and `L`. The `ADD HL,HL` instruction is used to shift the value — every time you add a binary value to itself it moves one place to the left, because each column has twice the value of the one to its right.

At `STORE` the graphic line is mixed into the display with the `XOR` instruction — the machine code equivalent of `PRINT OVER`. The program loops back to `PLINE` until all eight lines of the character have been positioned.

TRYING UP

The routine can't return to Basic until both stacks — the processor stack and the maths stack — have been put back the way they were found. Line 2330 shoves away the coordinate information which was on the processor stack. Finally, the value of the maths stack pointer is retrieved, so that Basic doesn't get confused by the sudden loss of three data items. The `USR` function returns the value zero, since `B` and `C` have both counted down to nothing.

This program is only an introduction to Hi-res animation on the Spectrum. The best graphic routines handle large shapes, with automatic animation and motion, collision detection, and so forth. One day I might divulge the secrets of the *ES Super System*, which puts most of the power of a dedicated arcade machine at your fingertips — that's if I ever finish writing it... 

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Tasmerge £10.95

This program will allow you to transfer Masterfile data into Tasword. This gives you the facility to use Tasword for mail merge, printing forms, acknowledgement of orders, etc. You are also able to specify the line and column of each field.

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jokest?
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the answer — but be warned — this
game will send you overboard!



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GOING OVER BOARDS

Feeling out of touch with your Spectrum? Then join Henry Budget as he fingers his way through five replacement boards — all out to prove that pressing keys doesn't have to be a rubbery experience.

Ask a harassed owner of the Spectrum to point out their least favourite aspect of the machine and it's odds-on that 99 per cent will plump for the keyboard as the prime culprit — which is hardly surprising, considering it feels not unlike a bank of dead metal. Added to the peculiarities of its media-rubber action are the allied quibbles of a non-standard spacing, a fiendishly complicated system of Shifts and Symbol Shifts to access the various keywords, and punctuation symbols littered everywhere.

While Sinclair Research's revolutionary keyboard and status-checking system works well enough for the beginner, it tends to stifle the familiarity that occurs on a more regular kind of computer keyboard. Remember, however much that typing is simply not possible on a regular

Lo-Profile Keyboard

Price £49.95
Supplier Advanced Memory Systems, Woodside Technology Centre, Great Lane, Appledram, Warrington WA4 6NQ.

The description 'slip, black but slim' might easily be misconstrued by some, but as dedicated readers of a computer magazine I'm sure you'll realise at once that I'm talking about the Lo-Profile keyboard.

Internally, the keyboard can only accept the ZX Spectrum's main PCB — the various connectors hang out the back through slots, allowing you to add whatever's necessary. It comes supplied with a photographic aid advertisement for the device — presumably to pass on to a friend — and a single sheet of instructions showing you how to fit it all together. Using logic, it's easy enough to assemble but nowhere does it mention that you've got to unplug the old keyboard, and that the Spectrum's PCB must give the right way round.

Once fitted, at first sight it looks really nice, with a decent set of keys all properly laid out and a numeric pad set off to the right. All the legends are printed clearly on the keys in the same colours as the original, the only one missing is Shift — which ought to be on the Space bar, but isn't. The cursor keys are repeated on the numeric keypad but features no own Caps Shift and '*' keys at all.

The casing is much wider than it needs to be — presumably designed on the premise that bigger looks better — and although the top is made of a substantial plastic, the base isn't and tends to 'give' under

Lo-Profile Keyboard

The Lo-Profile's keypad legends are printed clearly in the same colours as the original. Take care with the keyboard's connector as this does seem rather flexible.

The cursor keys are repeated on the numeric keypad, also Shift and '*' keys to boot.



Things at the base is constructed from supportive plastic, the bottom of the unit, however, is in fact made of 'give' under pressure.

Some of the keyboard's keys are slightly higher than on other units, for example the enter key. This is a helpful reminder from the larger personal computers.

pressure. The keyboard surround is also rather flexible; it has provision for 1.1 mounting plates but only six were fitted.

Overall, the unit worked very well, but the initial feeling that it looked smart slowly evaporated once it had sat on the desk for an hour or two. But for those who hold great regard by personal appearance, the Lo-Profile is definitely a 'looker'.

FDS Keyboard

Price: £49.95
Supplier Future Micro Systems, The ZX Centre, 71 Dale Street, Liverpool 2.

A sleek, black plastic casing surrounds a controller that's really rather pleasant to look at. But the first obvious problem was a complete lack of any instructions — such is a reviewer's lot.

Still, inside the case I found two sets of possible mountings for the Spectrum's PCB — and as only one clears the keyboard, that was easy to solve. Unfortunately, only two of the four pins lined up with corresponding holes on the PCB — which is hardly good news from the mounting point of view. The power lead from the transformer has to go to the keyboard first, and a short lead from there connects to the PCB.

There appear to be mountings for the transformer but I suspect these might be best ignored for safety reasons. One of the two ribbon cables was damaged, a wire having broken off at the joint between the cable and the plug; both were rather short, making installation harder than it should have been.

The standard set of Spectrum keys have been added to

in an intelligent way, with a cluster of cursor keys, a full-size Space bar and a Shift key on each side of the keyboard. Also included are keys designated Control, F1, C and Sym — all labelled in bright red, the remainder are grey or black.

Once in operation I discovered the extra keys, F1 and C, select the lower and upper keywords printed on the keys — a neat idea and one which saves playing octaves across the keys to reach both Shift and Symbol Shift. The legends are screen-printed — which is one better than stick-on labels, but so badly done in some cases that it's a nuisance which is the least desirable method.

Overall, but for the quality of the handling touches, I'd have to proclaim the FDS a pretty decent unit. Better keypad-printing is a must and the

membrane, still there are several word-processing programs available!

Obviously, many of the major objections could be alleviated by the simple addition of a full QWERTY keyboard that uses full-travel keys; this, however, is surely not the ideal answer. Many of the difficulties experienced by users trying to cope with the above-mentioned shifting system could be solved through the addition of extra keys to handle the most commonly occurring characters — such as the punctuation and mathematical symbols, and the Delete key.

While carrying out such re-engineering, an astute designer can also build-in switches to control the power and isolate the RAR lead while recording. And further enhancements could include a case big enough to hold various

	Lyn Profile	Transform	Dr Tronics	Fisher FDS	Road
Keyboard type	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical
Action	Excellent	Good	Good	Good	Fair
Full-travel keys	No	No	No	No	No
Numeric keypad	Yes	Yes	Yes	No	No
Cursor keypad	Yes	Yes	Yes	Yes	No
Function keys	No	Yes	No	Yes	No
Extra Shift keys	Yes	Yes	Yes	Yes	Yes
Full Space bar	Yes	Yes	No	Yes	Yes
Size (cm)	438-378-52	487-359-75	395-358-78	348-328-78	358-338-88
Weight (kg)	0.88	1.3	1.1	1.8	1.5
Case material	Plastic	Metal	Plastic	Plastic	Metal
Label method	Screenprint	Screenprint	Sticker-on	Screenprint	Sticker-on
RF switch	No	No	No	No	No
Power and isolate	No	Yes	Yes	Yes	No
Power switch	No	Yes	No	No	No

installations of the PCB needs to be made much more secure. And, as usual, I still have serious reservations about installing the power supply and inside the box.

Transform Keyboard

Price £38.95

Supplier Transform Ltd, 41 Kestle House, Potchستر Road, Beckenham, Kent.

This case has obviously been designed to look nice, and it certainly does — for almost £70, you'd have every right to expect something special.

Constructed from metal, the unit obviously presented to designers with the problem of isolating the Spectrum's PCB from its own case. Their solution was to request that you leave the bottom half of the computer's casing attached to the PCB — hardly the easiest of ways around the difficulty, but it does solve the problem.

The power supply goes in first, and the whole thing (plus case) is stuck down with one of those double-sided pads.

Both a power switch and LED are provided but you'll have to be adept with a soldering iron to fit them; the instructions for fitting these extras are not at all clear. Another source of worry is the fact that the case isn't earthed once again, you've got metal voltage hanging around, just waiting to bite you.

While the Road unit is built of solid metal that's formed into a proper box, the Transform Keyboard is flimsy by comparison. Littered with sharp-edged corners, it feels as if the slightest pressure could collapse it with such little support, the board is prone to excessive flexing.

There are extra keyboard facilities on-board which include both Delete and Full

Transform Keyboard

A separate numeric keypad, provided in the right profile, means keyboard adjustment of the case keys are improved using with separate Caps Lock and " keys.

An LED is provided to help if necessary tell you if the keyboard is powered on.



Extra on-board keyboard facilities include single Full and Delete keys, as well as lines to get you only " mode. The keyboard is well-secured, but there is a slight problem with the keyboard itself being prone to flexing.

Single LED switch is provided as the power indicator so if you do sleep enough with a soldering iron it's not that is.

FDS Keyboard

The case has been constructed from strong solid plastic.

The ventilation slots they provide the means of cooling an overheating power supply, but take care not to allow a paper clip or something in there ... or there could be trouble!



The modified keys take this job at the more advanced mechanical and mechanical, but they're all the screen-printing and a little bit of wiring.

Instead of the keyboard include separate cursor keys, two function keys to allow a simple method of accessing these handy extended modes, and a single delete key.

keys, as well as a full numeric keypad; once again, however, the Block Function isn't labelled — but I'm sure you'll find it.

Dr Tronics Cased Keyboard

Price £40

Supplier Dr Tronics, Unit 1, Stone and Industrial Estate, Salford Works, Essex CB11 3AD

Definitely one for the Dr Tronics fans! A really solid, black plastic case with a real key caps of the Spectrum's existing keyboard on the left and a 17-key numeric/sifting keypad on the right.

The Spectrum's PCB fits on to four plastic pillars, and that's you're expected to use the screws that came out of the computer — so don't lose any of them! The power supply will also fit inside the case, although

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GOING OVER BOARDS

components of the system... such as the power supply, Microdrive, Interface 1 and other add-ons. All these possible options have been considered while judging the five keyboards under test.

No, the question we're going to be asking ourselves is just how far have the manufacturers gone towards creating the 'ideal' replacement? But there's nothing in the tail, add a keyboard to your Spectrum and, although you're going to be enhancing its usefulness, you're going to raise its overall price to a level where you're justified in expecting something very special indeed. That's the high level

of criteria to which the five units here have been subjected.

CONCLUSION

Just one of the keyboards on test comes close to meeting the existing criteria. I initially laid down for a replacement unit, and that's the Fuller F100, even have the finishing touches let it down a bit. From a manufacturer's point of view, the best made by far was the product from Hewlett, given a set of decently engraved keytops, this would rate very highly as a direct replacement system — and it's also quite attractively priced.

Of the rest, the LaCoc Profile had most to offer but lacked the extra function keys of the Fuller model and could also do with more support for its keyboard. The D4/Trensis unit needs to be

supplied with the keys engraved or moulded — stick-on labels that the customer has to apply are not really sufficient. Otherwise it's a substantial add-on.

The Trensis device seems to be a little over-priced for the facilities it has to offer over its cheaper rivals. Despite that it's recently been rated 'top keyboard at the moment' by one of our magazine rivals, maybe you should check it out to see if I've missed an endearing quality or two.

On a final note, now that Sinclair Research has perfected the newer type of membrane — as used on the QL — it would be interesting to speculate whether the add-on companies are likely to make the switch too. It could be the key to success!

it has to be removed from its casing before you can install it. That means there's a healthy 240 volts floating just an inch or so away from the Spectrum PCB and keyboard. The manual points out that static can kill — but even if nothing unwanted happens, the mainframe will probably affect the picture quality.

The D4T element comes in when you find the sheet of self-adhesive stickers, to be used to label the blank keyboard! The result is cheap, messy and unlikely to last as long as the legends printed on Uncle Sir Clive's original rubber legends. Inexpensive support is provided for both the keyboard and keyboard (which say under pressure) but the key actions are quite nice.

That apart, if the keyboard came supplied with the keys engraved or moulded, then I'd have to vote it a very reasonable product.

Wool Electronics HEBI
Price: £27.95
Supplier: Wool Electronics,
44 Southport Road, Ormskirk,
Lancashire L26 5BP.

If you see about weight as a good judge of a product's quality, you're certain to be pleased with this one! Tipping the scales at a good old 1.5kg, this metal-cased keyboard seemed at first to be a solid prospect.

The system keyboard support proves better than that offered by many a rival and the main board stays firmly locked on to four metal studs mounted

Wool Electronics HEBI

1. The keyboard is made of metal and weighs in at 1.5kg. This is a good indicator of its build quality.

2. The keyboard is made of metal and weighs in at 1.5kg. This is a good indicator of its build quality.



3. The keyboard is made of metal and weighs in at 1.5kg. This is a good indicator of its build quality.

D4/Trensis Cased Keyboard

4. The keyboard is made of metal and weighs in at 1.5kg. This is a good indicator of its build quality.

5. The keyboard is made of metal and weighs in at 1.5kg. This is a good indicator of its build quality.



6. The keyboard is made of metal and weighs in at 1.5kg. This is a good indicator of its build quality.

7. The keyboard is made of metal and weighs in at 1.5kg. This is a good indicator of its build quality.

on the base. The 'manual' consists of two photocopied sheets, plus an extra note slipped in, this warns that one of the leads to the keyboard must be twisted, and that the user should beware of long component leads from the Spectrum's PCB shorting out on the metal base. Mindboggling!

Unfortunately, apart from its full-size Space bar, the device is once again a real key copy of the original. But with no numeric keyboard added the unit is certainly compact and, being built of heavy gauge metal, it's virtually guaranteed to last. The same, however, cannot be said of the keyboard itself — it was many little keytops that feature stick-on legends. Oh well, at least they're born stuck on for good.

This could have been a winner, had the quality of the keyboard matched up to that of the casing. As it is it's still a whole lot better than the Spectrum's rubber pads and very reasonable at the price.

The Quill

48K Spectrum



£14.95

The Quill is a major new utility written in machine code which allows even the novice programmer to produce high-speed machine code adventures of superior quality to many available at the moment without any knowledge of machine code whatsoever.

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SUDDENLY, IT'S THE 64K SPECTRUM!

sich toasters. The snag is that you can't use the extra memory, even though it's powered up, tested and in full working order. There's apparently no difference in performance between a 48K Spectrum and a 64K Mark 3 machine.

POSTAL PROCESSING

The Spectrum uses a Z80 processor, which can only address — or control — 64K of memory directly. The computer contains 16K of vital ROM without which it would completely ignore the user, so we're only left with an absolute maximum of 48K. This 48K limit is rather like having a postman who can only remember house numbers of up to three digits — bad news if you live at number 1173, since your post ends up at number 173 (I once had a house in Birmingham where precisely this happened).

You can get around the problem by having a new postman who can handle longer numbers (that is, a new processor — such as the ZLI 68008 — which can address 65536). Alternatively, you

could duplicate some addresses and teach the postman to choose between the duplicates, according to where he or she has been previously. In computers, this technique is called 'paging': it's used in the Z801 add-on boards made by Memotech.

USING YOUR 64K

So far it may seem as if there are no real advantages in owning a Mark 3 Spectrum. This is true, unless you're interested in voiding your warranty and digging around inside the computer. Hardware modifications will certainly be needed to bring the extra 16K under software control, but they'll be quite simple — certainly less complicated than the 'SoftROM' project presented in issue 2 of TS. That design allowed users to change the contents of the ROMs by putting 16K of RAM in its place; perhaps Mike Lord will come up with a revised project for Mark 3 Spectrum owners?

Once you've got your extra RAM under software control, the possibilities are endless. The extra space can be used for machine code or other languages (so long as you don't destroy crucial information such as the font, and the code used to handle the keyboard and display). You could just use the memory to connect the bugs in the Spectrum ROM, or as a neat way of parking in extra routines of your own. If you can re-locate the Spectrum screen-display and re-write the device drivers (which handle the keys,

display, printer and so on) — you could even run the CP/M operating system on a Spectrum. That would equal a few manufacturers!

Another approach would be to use paging to provide a choice between two 16K 'banks' of memory; an OUT instruction could be used to swap the banks. With care this would allow you to use 64K of RAM as well as the 16K ROM, but commercial software wouldn't use the facility and you'd have to adapt your own programs to select different banks as required. Your Spectrum would behave as if it had 16K ROM, 12K of normal RAM plus one 16K RAM bank which used the same addresses and could only be accessed one at a time.

FURTHER IMPLICATIONS

There may be other reasons why Sinclair Research has kept quiet about the re-design of the Spectrum. It would be a pity that the 16K Spectrum will soon be discontinued — certainly the upgrade procedure from a 16K to 48K machine will have to change, since there'll be no room for the 16K chips once the 64K ones are fitted. It's also possible that the initial price of the Spectrum could be cut further, now that the new design is on the market. The production cost of a Spectrum should drop if only eight memories are used.

If you find any secret quirks of the Mark 3 Spectrum, TS would like to hear about it. And if you've just bought a Mark 6 machine... **TS**

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fantasy

SOFTWARE

"Ziggy turned, his fingers clutching the trigger of his capsule gun, something had startled him or had it?"

He looked back, he had grown very tired from his many exploits in THE PYRAMID negotiating 120 different chambers and coming face to face with some pretty nasty aliens.

No sooner than he had accomplished this mission, he was summoned by Time Lord Hamilton (known as Super Ham to his friends) to go to DOOMSDAY CASTLE and to save the Universe from the infinitely evil Scarthar. This being no small task took several megayears. By this time Ziggy was completely exhausted, his capsule battered, dented and wobbling as he limps in the direction of home, a real super hero of our time. Unable to leave the Universe undefended he radioed his great friend and colleague Beaky on the planet of Crackit to stand guard until his return.

Beaky would normally assume this role without a second thought, however he had his own problems to face for the dreaded Eggknatchers had returned to threaten the very existence of his breed. Beaky's survival instincts do not allow him to leave Crackit until he has reared enough chicks to fight off the Eggknatchers. In order to crack it, he must pass

through 12 different stages each getting progressively harder.

So we have it, Ziggy returning home for a complete refit under the illusion that Beaky is defending the Universe, surely it can't take Beaky that long to secure his own species and when will Ziggy be back....?"

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RAPSCALLION

RAP

New from Bug-Byte and tipped for the top comes Rapscallion — a multi-screen graphic adventure. Ross Holman finds out whether it lives up to the claims of being "The next Manic Miner"...

First impressions of games can easily be misleading, and this was certainly the case with Rapscallion. Described by Bug-Byte as a "fully animated cartoon adventure", you play the part of a usurped king who has had his crown and castle stolen by Rapscallion the Rogue — and as if this wasn't humiliation enough, he's then incarcerated in his own dungeon.

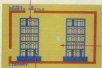
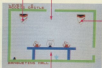
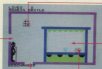
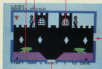
But help is at hand in the shape of a feisty Fairy Princess. Not only does she set him free, she also turns him into a bird — giving him the ability to transform at will into a cat, while suffering only the loss of one of his six lives. Once in this bagged state you, the player, can control the character, moving around the forty-plus rooms of the castle (actually, I found 41 altogether) attempting to re-capture his

rightful inheritance.

GRIPPING GRAPHICS?

The loading screen, now practically an art form for some companies, is not particularly gripping, but in its favour it does show some of the graphics used in the game. In fact, one unusual feature of much of the Rapscallion graphics is that they're drawn at half resolution — giving

THE THIRD DOMAIN-INSIDE



a similar chunky look as found on Commodore machines but without, of course, the multi-colour. It's hard to say whether this was done to create an individual style, or just used as a device to save memory, perhaps it was laziness! Anyway, after a long load, you're greeted by a page of instructions, followed by more and more. Sensibly, you have the option of skipping past them to the control options.

Wading through the instructions, you'll find all you need to know about the game. You discover there are three distinct sections, called The Wilderness, The Magic Labyrinth and finally, The Castle itself. To progress on to the next level, you need to complete a set task, for example, to leave The Wilderness, you have to collect the key to The Magic Labyrinth. Some rooms contain large diamonds which, when touched, impart useful information; others have pipes jumping up and down on touchdown, who generously give you gifts.

You're offered a comprehensive list of joystick options — additionally, there are two keyboard control layouts. A nice touch is that you can SAVE your current

status at any time during a game, then LOAD it in again to continue from where it left off. The trouble there is if you carry on to complete the game, you're only going to get a loss rather than full credit of The Castle. One thing, though — you're only given the option to LOAD the SAVE'd details once; just before the first game. If you want to play from the same point again, you'll have to re-LOAD the whole game, which is very tedious.

IN THE WILDERNESS

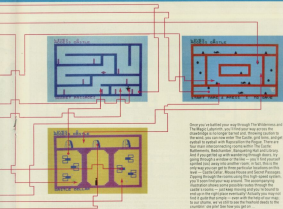
Off we go, and the first thing we see is the Dungeon, complete with skeleton and Rapacious the Roper placing the king in chains. Up comes the Fairy Princess who turns him into a bird and thereafter off (no coin a pleasure). At the top of the screen, there's an indicator of lives left, current sector, and any objects you've collected or powers you possess; at the bottom is the name of the current room. Moving around, you soon realise that all the graphics more by cursor block stages and any animation only takes place over two frames — which is rather disappointing. With many of the timing and

manipulative skills removed, Rapacious is no slacker and for his fairly even so, interest is maintained by the degree of complexity and variation — not to mention the large, colourful graphics.

Each room contains a number of large fixed graphics and sometimes large moving graphics. Cats, for example, are six by six cursors, and smaller 30-cursor graphics (spiders, for instance) are two by two cursors. Gaps in a room's border signify doors to other rooms. Most graphics are harmless and you can move through them without damage; some (usually those falling from above) will slow you down — touching flames or spikes will speed you up. There's subtlety too, because some graphics will kill or affect you, depending on the point you're in at the time; for instance, cats kill the bird but not the fly — flies on the other hand, get trapped in spider's webs and the only way out is to transform into a bird, losing a life in the process.

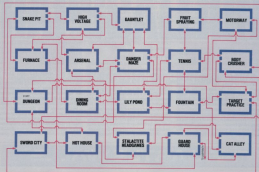
If you're killed you turn into a ghost, a condition that allows you to explore to your heart's content (and in the knowledge that no further harm can come to you). The trouble is, touching the gems

SIDE THE CASTLE WALLS

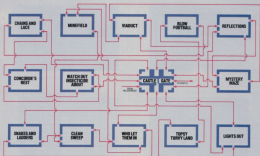


Since you've killed your way through The Wilderness and The Magic Labyrinth, you'll find your way across the drawbridge is no longer barred and, throwing (clutch to the wind, you can now enter The Castle, and hence, and get mystical to mystical with Rapacious the Roper. There are four main interconnecting rooms within The Castle: Bathrooms, Balconies, Banqueting Hall and Library. And if you get up with wandering through doors, try going through a window or the roof — you'll find your next spiritual (and) away into another room. In fact, there's the only way you can get to these particular locations in the first — Castle Cellar, House Floor and Secret Passage. Copying through the rooms using this high-speed system, you'll soon find your way around. The accompanying illustration shows some possible routes through the castle's rooms — just keep moving and you're bound to end up in the right place eventually! Actually you may not find it quite that simple — even with the help of our map. In our opinion, we're still to see the best of the best in the computer via game that you get it ...

THE FIRST DOMAIN — THE WILDERNESS



THE SECOND DOMAIN — THE MAGIC LABYRINTH



LAURENCE WILKINSON

As you may have guessed from the above maps, the sequence of room positions is hardly what you would call logical... In fact, it's all a bit of an enigma to say the least. The best way to familiarize yourself with your surroundings is, of course, to take a tour of one of the buildings, to have a wander round to view different rooms, remember where you left your keys, and so on. You'll want to consider the following: for the first level — The Wilderness — your task is to connect the dots and then touch them. They provide extra lives as well as the power to make visible the key to The Magic Labyrinth. Once that key is found, you can make your way into it and start searching for the three rewards again. The best approach is to start out the path ahead as a ghost.



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JOYSTICK JURY

Your Spectrum is on the lookout for clubs to take part in Joystick Jury. Interested??? Just drop a line to Ron Smith, Joystick Jury, Your Spectrum, 14 Rathbone Place, London W1P 1DE.

This month's joystick jurors are all members of the Stevenage Computer Club, 106 Mobbsbury Way, Stevenage, Herts. They are: Ian Hemmingway, Phil Morse, Frank Pelling, Owen Pugh and Monty Trent.

The club was formed about 18 months ago and currently has a membership of about 45, with members' ages ranging from eight to 70 years. It meets twice a month — at the Stevenage Library and the Leisure Centre. Membership costs £6 per year... half price for children and OAPs. For more details, phone Frank Pelling on 0438 353659 (evenings and weekends).



BULLSEYE
Masterdisk/11.00

The five darts games on this tape comprise 501, Cricket, Round the Board and Noughts and Crosses, all of which can be played on any one of five difficulty levels. **Miss** The graphics are below average and the colour is only a little better. But the speed is what really lets this game down; the whole thing is written in Basic. It also has a tendency to 'reset' unaccountably.

Hit This will probably appeal to older gamers, but might be a bit tedious for youngsters. Graphics, speed and colour are all fairly average and the absence of a sound-track is a high score-disappointing.

Hit Darts is a difficult game to transfer on to a computer, and is probably a bad idea anyway. But this could have been improved by a speedier-up and better use of colour.

MISS

HIT

MISS



METAGALACTIC ILLAMAS
Salemite Software/15.00

Mutants descend from walls that break when bombarded with well-aimed spit. The creatures then drop to the surface and wander into Woodville.

Miss Both colour and graphics are fairly pleasing, if not spectacular, and the speed seems to match the action quite well. It's easy on the eyes and fingers, but not particularly addictive.

Hit The detached Illamas and the ricocheting spit are both quite novel, and graphically very good. There are different speeds for spiders, Woodville and the Illamas, all of which are adequate.

Hit Everything in this game looks good — well-defined graphics, fast speed, excellent choice of colour and pleasant sound. The only problem is it requires almost no effort to control.

MISS

MISS

HIT



PSI-SPY
Parker/12.00

In the labyrinth of the wandering planet, there is great wealth and adventure for anyone willing to challenge the active guardians. Collect the five keys of Zar, the without them, exit is impossible.

Hit Excellent graphics with some very fine detail — all made even better by the choice of some vivid colours. It can even be bewildering until you've worked out what's going on.

Hit It looks good, and probably sounds good (it supports the Cursus Microspeech unit), but it does appear to be needlessly complicated. After a dozen attempts, it's still not really clear what you should be doing.

Hit A photographic mind would be an advantage for memorising all the instructions in this over-complicated game; even so, once understood, it's enjoyable.

HIT

MISS

HIT

JOYSTICK JURY



THE FALL OF ROME

Amiga/Am50

Take command of Rome and help it to survive while the Eastern Empire is causing trouble. You have the resources of the entire Empire at your disposal; used wisely, they might just stop civilisation being swept away by the marauding tribes.

Miss Attempting to quell the fall of Rome can really be quite addictive — providing you don't expect too much tactician-type action. A few battle scenes would improve matters.

HIT

Hit This is a good idea for a strategy game, even though the graphics aren't exactly spectacular. The map is drawn well and the result is an acceptable screen display.

HIT

Hit The inputting of all the variables is very tedious — and so is waiting for the program to make its calculations. It even responds with "Please be patient..." while it's thinking.

MISS



BUFFER ADVENTURE

Buffer Music Ltd/PS-85

You enter the Buffer Music shop in order to discover what it goes on behind the scenes. Unfortunately, it's not possible to leave until you locate your missing credit cards and the friendly staff insist on you buying your way out.

Miss It's refreshing to come across an adventure with a theme that's quite different from all the others... it's just a pity there are no graphics.

HIT

Hit An adventure behind the closed doors of a well-known, south London computer shop is a very good idea and this one is particularly well executed.

HIT

Hit While the idea behind this game is fairly good, it does suffer from being text-only and the overall presentation is average. It also takes a long time to escape.

MISS



REVENGE OF THE KILLER TOMATOES

Phoenix/PS-85

Meanwhile, back on the vegetable patch, help the market gardener to escape from the killer tomatoes, manic moustaches and psychotic omelets.

Hit Play begins at a fairly fast speed and increases as you progress, though not to the point where the game becomes too difficult.

HIT

Miss The graphics aren't really very inspiring, and the colours are rather dull — neither of which exactly encourages you to play on. However, the game improves a little if you're using a joystick.

MISS

Miss Sorry, but this one's really boring and unoriginal — despite the title! Gardening isn't much fun at the best of times, but it's made even worse here with the threat of angry vegetables coming after you. It's boring appeal is absolutely sick.

MISS

Amiga
Commodore
PC/XT/AT



The on-board computer
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displaying conditions
of the ship including
energy levels etc.
[Screenshot 1]

An on-screen
target designated
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to be highly space
battles, there are no
display units that
help.

For another status
report area — this
controls you how
the ship is taking
the battle.



3D BAT ATTACK

Chameleon Software/PS-85

Trapped inside a 3D maze, trying to gather up gold blocks, your task is to fight your way along to the next level.

Miss Oh, yes, not another maze game! The 3D representation of the maze is OK, and so are the bats. Use of colour is adequate, which gives quite reasonable clarity, but it's still just another unoriginal program.

MISS

Hit This game for one very like to first appeared in a listing in a certain magazine under the title of 3D Maze. It was OK, for time, but as a commercial product, it's awful. Graphics, colour and speed are all uninspiring.

MISS

Hit Players can choose their own degree of difficulty by entering on different levels, with a greater or lower number of bats. Both the graphics and the colour are above average, making for a very playable game.

HIT

KOSMIK PIRATE

Chameleon Software/PS-85

As the captain of space craft Red Beard 1, you begin a reign of terror in the outer corners of Earth. Decisions are made via the on-board computer — however, unfortunately, RED is out of date and doesn't possess the obligatory 'cheat' feature found in all modern craft.

Hit It's a game that tries to incorporate graphics action with information from the on-board computer. Unfortunately, the graphics are more like those to be found in 2000 programs, and the text is often unreadable — because of the poor choice of colours. Playability is virtually non-existent, and it won't keep anyone sitting

at their machines for long.

Miss The most exciting features of this game are the blue and yellow lines that spriggle over the screen as the program is loading. The graphics are unclear and ill-defined, while the colours blend so well that it's not always possible to read the displayed information; the second hit makes matters still worse.

Miss The game is quite fast, and responds quickly to your commands. It's just a pity it doesn't include a self-destruct button! There's almost no sound, which means that it can't irritate you too much; unfortunately, the graphics are appalling and disorienting between screens of printed information is virtually impossible.

JOYSTICK JURY



CARNIVAL Epicure Software/15.99

This is a good old shooting gallery game where your job is to blast all the targets from the first round, then shoot the crawling bears before moving on.

Best The sound sets the right mood for a start in the shooting gallery, and the graphics open you an extra mine. The problems in this game is easy, and moon gets boring.

Hit The graphics are average and not too exciting, and much the same can be said for the use of colour. The six available sounds help things along a bit, and it's probably very suitable for young children.

Frank While it might be ideal for computer games novices, it's still just another version of an arcade shooting gallery program. Most disappointing of all is the extremely unimaginative use of colour.

MISS

HIT

MISS



ANTICS Big Apple/15.99

Boots Boy has been captured by the vicious ants and is being held captive somewhere in their nest. Luckily, help is at hand in the shape of comical butterflies.

Frank The idea's quite good, but it's not clear why a boy should be found in an ants' nest. Nevertheless, realistic use of colour, high-standard graphics and a comfortably slow playing speed make

playing enjoyable.

Hit A very addictive game that'll give hours of amusement, even though there are many similar programs on the market. A lot of thought has gone

into the graphics.

Miss However, because solitary are used, while the ants and bugs jump after him. The 'butterfly' sound effects are rather nice and it's well worth trying, if only for the superb demonstration of the sound capabilities.

MISS

HIT

HIT



The same buildings of the detailed installation. Most of 10 screens use up the computer screen.

Because some sound sets, which take you through the sound capabilities.

The article level in which solutions have been found to your problem.

The article level in which solutions have been found to your problem.

PSYTRON

Byond Software/17.99

The player eventually becomes the Psytron — something far than human and more than a computer — and is put in charge of the Psychic 5 installation. Your job is to cope with the defensive demands when the attack comes. The overall aim is to process the information (and highly detailed it is) supplied in the 28-page booklet accompanying the program.

Hit The graphics are excellent, with instant access to the two views around your base, all of which detail the surrounding buildings and landscapes. And a near perfect use of colour goes even further towards making the overall display

start really clear. Each year a program

comes along that sets the standard by which the others must be judged.

Frank The idea is simply splendid, and there's no much going on it's impossible to get bored. With its well-defined, clear and colorful graphics, and a manageable but challenging speed, the game is addictive from the very start, and gets there in as the player progresses.

Miss There are six levels to the game, but it's like a great deal of practice to get there — especially as the speed is very fast. However, there's not a lot of sound used, but this goes unnoted alongside the superb graphics. Overall, it's one of the most interesting games for years on in the market.

comes along that sets the standard by which the others must be judged.

MILLIONAIRE

Incentive Software/15.99

Having just written what you consider to be a commercially viable program, you now have to try and sell it. With just £500 of your own, the ultimate aim is to achieve millionaire status.

Frank Since 99 per cent of this game is question and answer, the graphics aren't really important — even so, they look good. For me, there's nothing like

losing your ability to succeed in business.

Hit There are many games of this type on the market, but winning and losing in an effort to make a million is great fun — especially with characters

like 'The Great Gatsby'.

Miss While it's fun to play, the lack of originality is a big problem. And I found the virtual absence of graphics and sound tended to make a playing just a little tedious.

HIT

HIT

MISS

PAC-MAN

Atari/15.99

The Pac-man, as usual, scores points by eating all the dots in the maze while avoiding the pursuing ghosts. There are four flashing power pills, located one in each corner of the screen.

Frank It's totally unoriginal, but that doesn't make a bit of difference to the playability. The speed increases as you progress

and the colour is just right.

Hit Atari has spoiled us with its old formulae — it's just as good as the original and is not likely to be equalled. It's also

one that all the sound effects have been included.

Miss Technically, it's as good as most

other Pac-man type games, and no doubt

some people will go for it. However, there must be better similar games now available, even though the speed gets quite challenging.

HIT

HIT

MISS

Last month, we looked at a circuit for a Centronics parallel interface for the ZX Spectrum. So, assuming all you out there have now constructed perfect working units, the time has come for us to go through the software that's required to drive it.

SAFETY FIRST

The main problem with having a piece of driver software resident in RAM is that sometimes it can interfere with another piece of code, preventing you from printing anything while it's loaded. To overcome this, I've made our driver software self-relocating — that is, it'll move itself to a safe area after loading. To achieve that happy end, the code is first loaded into a work area, at address 26000. (This is outside the area required for Microdos, and will not need changing if you intend putting the software on that medium.)

Let's take a more detailed look at the software. The first program you'll come up against is the Basic loader program, which also does a little housekeeping.

```

10 LOAD ""CODE""
20 LET A=259000
30 CLEAR A
40 PRINT "Loaded. Enter address
  printing" : "PROM any number except 0 into
  2228" : "to turn the facility off."
  "PROM 2228.0"

```

The above Basic loader program, this should be typed in first of all and **SAVED**.

The function of line 10 is obviously to load the driver code into the workspace and line 20 passes control to the machine code routine at 26000. It's a function of the Spectrum operating system that the content of the 230 BC register pair is returned to Basic when making from a USER subroutine, thus LET A=USER 26000 means that, on exiting from the code that begins at address 26000, the BC register pair contents will be put into the variable A. The monitor at 24000 means that at exit time, BC holds an address below the driver software, so that line 30 can use the CLEAR command and reset RAMTOP to the new position. Resetting RAMTOP below the driver software offers protection against it being overwritten.

STEP BY STEP

Let's take a look now at the listing of the driver code. The left-hand side contains only line numbers and these should not be mistaken for addresses or op-codes. If you have an assembler, then you can type in the listing as it stands; if not, you'll have to use the data block and a sophisticated Hex loader — which I'll provide you with later.

Loading first at the monitor part of the listing (lines 0000-0100), here we take the current Basic stack pointer and save a copy in HL. Next, 80 is subtracted from it to give a safe address for us to work — that is, for stack workspace. This address is where the end of the driver software will be, after relocation. So, where will the start be? Well, that's calculated by lines 0120-0150. Line 0120 loads D6 with the length of the driver code, and if

SOFTENING UP THE HARDWARE

Once you've built the **DIY Centronics** interface from last month's issue, you're ready for John Flansley's software to get you into print; and here it is...

we subtract that length from the address of the end of the code, we get the address of the start of the code — which is saved at a location labelled NEXTART. Simple, eh?

Progressing to lines 0160-0190, here is where we calculate the difference between where we are and where we will be — storing it at a location labelled DELTA. Line 0200 loads H0 with the base address of the channel information; the channel information contains addresses of the input and output routines associated with that channel. For our application, we want to divert Channel 1, the printer channel. Each entry in the channel table is five bytes long, and therefore the beginning of the Channel 3 entry will occur 15 bytes after the start of the table.

CALL and table addresses must be altered to reflect their new position after relocation. Lines 0210-0230 do this, using the difference in addresses already calculated (DELTA). This routine of four instructions will be repeated for the other three alterations required, at labels CC2+4, CC3+4 and CC4+4 (see lines 0430-0450). This is where the actual move takes place, using the block move command LDIR.

Look now at lines 0460-0540. The BC register pair is set up for its return to Basic. This is to ensure it contains the new address to which RAMTOP must be set — in order to protect the code that's just been moved. The flag byte TOKEN is cleared so that token printing occurs initially and then the return to Basic is effected.

The above routine has reset the channel information so that it can tell the Spectrum operating system that, when it wants to output a character to the printer, it should pass that character to our routine, and not use the ZX Printer routines. The operating system will enter our routine with the ASCII code of the character to be printed, in the accumulator A.

TALKING FORMATS

Before going on with the listing, it's perhaps prudent to discuss the format of a Spectrum Basic file. The Basic keywords stored are not in their full ASCII form (for example, GO SUB is not stored as the five ASCII characters 'G', 'O', 'S', 'U', 'B', but as a single byte 'TOKEN', whose values are in the range 183 to 233). If we are to print these cor-

rectly, then we must interpret all bytes in that range and decode them into their full ASCII form. Hang on though... If we want to send graphic data to the printer, then we need to send bytes in that range that do *not* need decoding. To overcome this problem, the driver routine has a 'flag byte' labelled TOKEN. This is resident at location 2228 in the new defined ZX Printer buffer, and is normally set to zero — which ensures that tokens are decoded correctly. If you wish to send data bytes to the printer, and don't want them decoded, then you must first PROM 2228 with any value other than zero, and token printing will be disabled.

```

000000      ORG 26000
000110  L     NEXTART
000120  LD     HL,0
000130  LD     HL,TOKEN
000140  LD     HL,0
000150  LD     HL,DELTA
000160  LD     HL,0
000170  LD     HL,0
000180  LD     HL,0
000190  LD     HL,0
000200  LD     HL,0
000210  LD     HL,0
000220  LD     HL,0
000230  LD     HL,0
000240  LD     HL,0
000250  LD     HL,0
000260  LD     HL,0
000270  LD     HL,0
000280  LD     HL,0
000290  LD     HL,0
000300  LD     HL,0
000310  LD     HL,0
000320  LD     HL,0
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000340  LD     HL,0
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000360  LD     HL,0
000370  LD     HL,0
000380  LD     HL,0
000390  LD     HL,0
000400  LD     HL,0
000410  LD     HL,0
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000440  LD     HL,0
000450  LD     HL,0
000460  LD     HL,0
000470  LD     HL,0
000480  LD     HL,0
000490  LD     HL,0
000500  LD     HL,0
000510  LD     HL,0
000520  LD     HL,0
000530  LD     HL,0
000540  LD     HL,0
000550  LD     HL,0
000560  LD     HL,0
000570  LD     HL,0
000580  LD     HL,0
000590  LD     HL,0
000600  LD     HL,0
000610  LD     HL,0
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000680  LD     HL,0
000690  LD     HL,0
000700  LD     HL,0
000710  LD     HL,0
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000800  LD     HL,0
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000900  LD     HL,0
000910  LD     HL,0
000920  LD     HL,0
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000990  LD     HL,0
001000  LD     HL,0
001010  LD     HL,0
001020  LD     HL,0
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001110  LD     HL,0
001120  LD     HL,0
001130  LD     HL,0
001140  LD     HL,0
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002100  LD     HL,0
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002120  LD     HL,0
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004350  LD     HL,0
004360  LD     HL,0
004370  LD     HL,0
004380  LD     HL,0
004390  LD     HL,0
004400  LD     HL,0
004410  LD     HL,0
004420  LD     HL,0
004430  LD     HL,0
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004460  LD     HL,0
004470  LD     HL,0
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004490  LD     HL,0
004500  LD     HL,0
004510  LD     HL,0
004520  LD     HL,0
004530  LD     HL,0
004540  LD     HL,0
004550  LD     HL,0
004560  LD     HL,0
004570  LD     HL,0
004580  LD     HL,0
004590  LD     HL,0
004600  LD     HL,0
004610  LD     HL,0
004620  LD     HL,0
004630  LD     HL,0
004640  LD     HL,0
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004670  LD     HL,0
004680  LD     HL,0
004690  LD     HL,0
004700  LD     HL,0
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004990  LD     HL,0
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005060  LD     HL,0
005070  LD     HL,0
005080  LD     HL,0
005090  LD     HL,0
005100  LD     HL,0
005110  LD     HL,0
005120  LD     HL,0
005130  LD     HL,0
005140  LD     HL,0
005150  LD     HL,0
005160  LD     HL,0
005170  LD     HL,0
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005990  LD     HL,0
006000  LD     HL,0
006010  LD     HL,0
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007600  LD     HL,0
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007850  LD     HL,0
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007870  LD     HL,0
007880  LD     HL,0
007890  LD     HL,0
007900  LD     HL,0
007910  LD     HL,0
007920  LD     HL,0
007930  LD     HL,0
007940  LD     HL,0
007950  LD     HL,0
007960  LD     HL,0
00797
```



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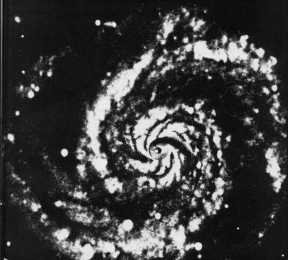
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Black Mirror is a new game for the ZX Spectrum. It is a puzzle game where you control a character who can move through a 2D environment.



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Black Mirror

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This is the mainline code disassembly of a section of extended Basic routines which expand Minibase Basic type up to 255 new parameters, all the basic "inner" i.e. programming code with no macros, followed by another (upper to lower case) forward and copy routine parameters. (Note that this program only works with minibase 1 installed, and the system variable vector of 255760 and 255760 should be set to the value 0x25A0F.)

[illegible][illegible][illegible]

```
LD R,1  
JMP @R+  
ORGLD LD R,FF  
NOP  
ORGLD JMP @R+  
LD R,FF  
NOP  
LD C,R  
RST LD ORGLD  
JMP @C+  
END
```

You can print a USB anywhere in the screen using the routine `Print`. You access this utility using the command `"PRINT x,y [n]`, where `(x,y)` is the pixel co-ordinates of the top-left of the character and `n` is the number of the title (0 is "0", 1 is "1", and so on).

[illegible][illegible]

This part of the program provides a placeholder in case of any disorientation; the command is used in the form "SCROLL to *x*" and without a destination direction.

```

5004. CALL SPACE
      RT 10 EPTIAN
      CALL STEND
      RT 10 FNDINTL
      AND 3
      LTR 0, 0, 0, 0, 0

```

```

JM Z SCRL5
:scroll right
CP Z
JM Z SCRL1
:scroll up
CP Z
JM Z SCRL5
:scroll left
JM SCRL5
:scroll down
SCRL5 LD R,+100
:do of lines on screen
LD HL,+10000
:1st of screen
SCRL5 AND R
:clear carry
LD R,+30
:no of lines per line
CP HL
:shift 1 bit right
SHR HL
:next byte on line
DJNZ SCRL4
DEC R
:next line
JM Z SCRL5
JM END1
SCRL5 LD R,+100
LD HL,+10000
:1st of screen
SCRL5 AND R
LD R,+30
SCRL5 RL R
:shift 1 pixel left
DJNZ SCRL5
DEC R
JM Z SCRL5
JM END1
SCRL5 AND R
:clear carry
LD DE,+10000
:1st byte of screen
LD R,Z
:no of 'sections' to
:be scrolled
SCRL7 PUSH BC
LD R,B
:no of character lines
:per section
SCRL5 EX AF
LD R,Z
:do of pixel lines per
:character = 1
SCRL5 LD R,D
LD L,E
AND R
RL
:pixel to next pixel
:line
PUSH HL
LD BC,+30
LOOP
DEC DE
JM NZ SCRL5
SEC HL,BC
:adjust pointer to start
:of next character line
PUSH HL
LD BC,+30
LOOP
POP DE
EX AF
DEC R
JM NZ SCRL5
JM END1
SCRL5 LD R,+100
LD R,H
LD R,L
LD BC,+30
DDU HL,BC
:adjust pointer for next
:character section
EX DE,HL
LD R,B
POP BC
DJNZ SCRL7
LD HL,+10000
LD R,+100
:clear line the last line
SCRL5 LD HL,R
R already contains 0
AND HL
DJNZ SCRL5
JP END1
SCRL5 LD DE,+10000
:1st location on screen
LD R,Z
SCRL5 PUSH BC

```

```

LD R,B
EX AF
LD R,Z
SCRL5 LD R,D
LD L,E
DEC R
PUSH HL
LD BC,+30
LD R,B
POP DE
DEC R
JM NZ SCRL5
LD R,H
LD R,L
DDU HL,BC
LD BC,+30
DDU HL,BC
EX DE,HL
LOOP
POP BC
DJNZ SCRL5
LD HL,+10000
LD R,+100
JP SCRL5
:clear top line

```

This last routine provides better sound effects. The commands used in the form "ZAP + (n)" n H, where n specifies whether you require an expansion, shifting down or a delay time.

```

ZAP CALL SPACE
BAT 10 FASTINH
CALL STROD
BAT 10 FNDINT1
AND R
JM Z ZAP5
CP Z
JM Z ZAP1
CP Z
JM Z ZAP5
LD IY+0F,00
BAT 30
:adjuster out of range
:error code
LD BC,100
LD HL,10
JM ZAP5
LD BC,FFFF
LD HL,1000
ZAP5 LD DE,4
LD R,10
ZAP5 PUSH BC
PUSH DE
PUSH HL
PUSH SP
BAT 10 REPER
:next speaker of tone
EX AF
POP HL
POP DE
POP BC
POP BC
DDU HL,BC
:change frequency
DEC R
JM NZ ZAP4
JP END1
ZAP5 DI
LD R,(BORDER)
BCCH
BCCH
BCCH
:reorder colour
LD R,B
LD R,HL
DEC R
DJNZ ZAP5
:random delay to
:produce white noise
OUT R,R
:activate speaker
NOP 10
:10000 speaker offset
R
LD R,H
DD L
LD R,Z
EX AF
LD ZAP5
JP END1

```

BASIC AT A STRETCH

RST 10h followed by the starting address (this is true for all the new command routines).

PRINTING PIXELS

The next routine allows a user-defined graphic character to be placed anywhere on screen. The reason for restricting it to UDIGs is that it's unlikely that anyone would want to print a lot of text like this (since the routine handles only one character at a time) and, if required, the UDIGs may be re-defined as letters.

The syntax for the command is:

***PRINT x,y**

Where (x,y) are the pixel co-ordinates of the top left corner of the character (x lies between zero and 255, y between zero and 179) and z is the number of the UDIG (UDIG A is zero, UDIG B is one ... UDIG U is 20). For example:

FOR n=0 TO 240:PRINT A,B,C:NEXT n

The above will glide the first UDIG (in this case capital W) across the screen. This time the extended syntax checker looks for three numbers separated by commas.

In the routine routine, the data for the UDIG is found and shifted across to give the correct information for the screen memory; the listing contains the code and full comments. The routine ends with the attribute bytes being set to the permanent colours.

PIXEL SCROLL

The scroll command allows pixel scrolling of the entire screen. The actual command is:

***SCROLL n**

Where n is a numeric expression controlling the direction of the scrolling (n must lie between zero and 255, but only the most low value is used):

n=0 (or -0,A,...) scrolls right one pixel
n=1 (or 1,B,...) scrolls up
n=2 scrolls left
n=3 scrolls down

For example, to scroll one whole character down, you could use:

FOR i=0 TO 8: *SCROLL 255: i

This moves the screen by eight pixel lines. The syntax checker this time looks for only one numeric argument. Only the lowest two bits are used (giving a range of zero to three) and the routine jumps to each separate scrolling routine. The left and right scrolls are fairly simple — they just shift each line of 32 bytes by one bit. The up and down scrolls are complicated by the layout of the screen memory, but all they do is move each line into the one above or below, clearing the first one.

The colour attributes are not affected at all, since they have only character block and not pixel resolution.

SIMPLE SOUNDS

The final routine is a simple sound effects generator — useful for games if nothing else. The command syntax is:

ROUTINE	VALUE	COMMENT
GETCHAR	1A	Assembles current char on BASIC line into A
GETCHAR	20	Assembles next char, ignoring spaces
SEND	1B0	Normal send handler
SEND	9B7	Subroutine to exit command routine in syntax check time
END1	6C7	Routine to exit in runtime
EXPTNUM	7C0	Syntax checker for expecting a numeric expression (just in the stack)
POWBT1	7B0	Fetches number into A from stack
SHAPR	3B6	Low-level routine routine H5 - 431 SBCfreq-3C 725 04-freq situation
SHAB0	74	Reads next character including spaces
SHAB0	-23A24	System variable holding attributes for the lower screen and border
STACKA	2C08	Pulls A out to the calculator stack
SHAB0	-23A77	System variable holding x & y co-ordinates of last pixel plotted
SHAB0	2A64	Relative drive channel, lanes & y offsets from BC & 00 registers
POWBT0	22A4	Converts co-ords in BC to an address in H5
SH0	-23A73	System variable holding address of user-defined graphics data
POWBT0	0C8	Sets attributes for the screen system H5
TEMP	040	Sets temporary colours (used by POWBT0) to the permanent colours

The BASIC routines and addresses used by the program.

*SAP n

Where n, between zero and two, specifies the type of sound:

n=0 gives an explosion noise

n=1 gives a falling tone

n=2 gives a rising tone

For example:

FOR i=1 TO 100: *SAP INTEND1/2:NEXT i

The above will give several seconds of 'rising' sound (well, more exactly than SHAPR). The computer again looks for a single argument and checks its value; if it's out of range, it gives an error, otherwise it jumps to the specific routine. The rising and falling tones are produced by short bursts of changing frequencies, while the explosion is produced by sending 'random' data from the ROMs to the speaker port.

A COMMANDING LEAD

You can check from the assembler listing several important points about adding new commands:

1. First, the syntax is checked — using EXPTNUM for numeric expressions and CP " " to check for separating commas. This section ends with CALL SEND.
2. Next comes the runtime routine and, since the values of the arguments are on the calculator stack, these can be pulled off into the A register with PNDINT1.
3. The runtime code ends with a jump to END1.
4. Any subroutines in the Basic ROM that may be called via RST 10h. Note that all registers are preserved while the ROMs are paged.
5. Before the code will run, the vector at 23775 must point to the beginning, with a jump back to ERISA at the end to trap genuine syntax errors.

The code may be entered using either an assembler or the Basic program provided which will relocate the 558 bytes of machine code anywhere in memory; it should run on a 16K Spectrum, so long as Interface 1 is connected.

To use it, set lines 10 and 20 to the desired starting address (for example, 30000 in a 16K machine and 64700 in a 48K model). Next, S.A.V.E. the program to case there is a mistake (which is usually fatal in machine code). Now, R.U.N. the program and after a few minutes a message will appear on the screen; the code has been loaded in memory but will have no effect since the vector at 23775 has not been altered. To use the extra commands enter the hex in the message — as a single line rather than two separate POKs, otherwise the machine may crash.

If NEW is entered the vector is reset; however, the code is still in memory, so repeat the two POKs to allow the commands to be used. We've seen a simple interpreter that will allow up to 26 new commands, but with only four examples, there are 22 more possible words, so get working!

ASSEMBLER NOTES

The assembler used was the Artic version which, in fact, is slightly non-standard. The main differences between it and a standard assembler are:

EQV is replaced by the '=' sign.
A *Disassembly* is an hexadecimal listing preceded by '+' or '-', in which case they are in decimal.
SHAPR, *SHAPR*, and so on do nothing; the number or label is simply placed in the source code where the *SHAPR* would occur, and *EE AFAF* is entered as *EE AF*. **ES**

CHANNELS AND STREAMS

As promised in our July issue, Ian Boardman continues his quest to open up a new stream to a new channel. Read on and check out his progress...

Last issue, I was rambling on about streams and channels, hoping to excite the nerve endings of any readers out there who could help me in my quest to open up this little-known area of Spectrum knowledge. Well, for all those of you still asleep in the back row, I've managed to come up with most of the answers — no, this month, I will be providing you with a routine to open a new stream to a new channel!

OPENING TIME

Opening a stream can be performed simply through various FORKs — the problem comes in creating a new channel. Whereas the stream data is absolute (the start of which is pointed to by the system variable STREAM) the system variable CHANNELS holds an address or vector which can, and does, move.

All this work was done on a Spectrum devoid of an Interface 1 unit, though the routine should be usable with said unit attached. Unexpanded, the Spectrum uses seven channels: -3 to -1 are for internal use, leaving Channels 0 to 3 for us to do something with. However, if we do use one of these it will have to be at the expense of the screen, keyboard or printer (you pays no money, etc). Much better, then, to create new space filled with channel data of our own channel — hence the need to CALL the 'make space' routine from the ROM.

As far as Sinclair Research is concerned the stream number is synonymous with the channel number, and as such is a source of confusion. While it's a useful rule of thumb, it's not a necessity. In theory, it would be quite possible to have, say, 10K of channel space... but there are limitations — namely that only stream and channel numbers between zero and 15 (inclusive) will be accepted. In the example I have given, the output routine of our new channel — Channel 4 — points to an

	ADDRESS	COMMENT
This is a short set-up routine, taking some room in memory for our new channel.	LD HL, #PROM	Because the precise space we want within the channels area can be calculated to find, there is little bit of cheating as we get in hardware from PROM.
	BBC HL	This is a prerequisite. The CALL we're going to use.
	LD BC, #0000	Another prerequisite. I have the size of the space we want to make.
	CALL # 1000	This is a CALL to the 'make-space' routine within the Spectrum's ROM. HL has to point to the first byte after the space and BC needs to hold the length of the space. When the program has RET'ed from the 'make space' routine, HL will hold the last byte of the space.
We can now fill our newly created space in the CHANNEL area with our own data. A check back to last month will reveal that the first two bytes will form the output routine (the one we will use), the next two form the input routine and lastly, the specifier (channel number 4, S, R or P). We will stick to Channel 3 and use 'P'.	INC HL	
	LDI HL, #4	The lowest significant byte (LSB) of our output routine.
	LD HL, #4	This is now loaded into the first of our new addresses.
	INC HL	The next of our new addresses goes into HL.
	PUSH HL	We are going to need this address again later.
	LD A, #00	The next significant byte (MSB) of our routine.
	LD (HL), A	This is loaded into the allocated address.
	INC HL	The next free address — the start of the input routine.
	LD A, #00	The LSB of the input error routine.
	LD (HL), A	Which is stored away.
	INC HL	The next free address.
	LD A, #00	And the MSB for it.
	LD (HL), A	Is stored away.
	INC HL	The next address.
	LD A, #00	Is the code for the letter 'P' — our specifier.
	LD (HL), A	Without a recognised specifier, we would get an error routine whether we wanted to be not.
Having made the space of our channel and loaded it with the data we want, the offset has to be found so that it can be stored in the STREAM area.	POP HL	
	LD DL, (CHANNEL)	The vector that will return the start address of the channels area to DL.
	AND A	Clears the carry flag ready for calculation.
	SBC HL, DL	The difference between the start of the channels area and the start of the extra space we've made becomes our offset. It's currently held in HL.
	EX HL, HL	We need to know the offset, but HL is in demand for other things. A simple swap. Then, is the answer. HL is back to other uses, while offset is in DL. As that's needed now it is the place in DL where the channel offset can be stored.
	LD HL, #10000	This is not a vector, and has to be loaded as an absolute value or else HL will be incremented.
	LD B, 4	The stream we are interested in goes into the B register.
	ADD A, B	This allows for Streams -2 to -1.
	ADD A, B	Each of the seven streams that come into use on powering up the Spectrum have two bytes of offset data allocated to them. The total number of bytes they occupy is done in the addend and forms our streams offset for Stream 4.
	LD B, 0	It might not be forgotten that, even though we're using base value offsets, an offset can still be a two-byte number and in these cases must be treated as such.
	LD C, 0	That 1 byte of the offset.
	ADD HL, BC	The streams offset is added to the streams base address, to give the location we want in the streams area.
	LD (HL), 0	The LSB of our channel offset goes into the lower of the streams addresses.
	INC HL	Points to the next streams address.
	LD (HL), 0	Loads the address with the MSB of our channel offset. RET goes to flow.

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After the school closure, some 100 teachers created using the Business Graphics program and use the software (included separately) as a computer-aided tool, as well as verbally re-derive solving a different (new) math as interesting as the group. The next step was the program to create different graphs to create the same way as the school class.

With the CIL looming so high on the micro horizon, many of you out there must have looked at the bundled software that comes free with the machine with something akin to envy. Well, don't fret... there's a software outfit out there ready, willing and able to help.

This package will allow you to create graphics of any data you care to type in; several formats are offered, including block line graphs, bar charts, straight line graphs, bar charts and histograms. You can also fill above and/or below the graphs with color, either in a solid fill or 'hatching'; there are 17 different shades of 'hatch' allowed. Once the graph/chart has been drawn, you can overlay another of a similar or different format, and labels (titles only) can be positioned anywhere on the screen). SAVE it to tape, COPY it to a printer or plot device — the choice is yours.

The program comes complete with comprehensive instructions on how to enter data, and a menu-driven to boot. A word of advice though...to start with don't try to draw too many graphs at once, it's unsettling that it takes a little planning to achieve the best results. Also, be restrained in the use of colour and 'beats' options until you're familiar with the program, otherwise it could lead to some confusion. If the filling-in options run too slow for your purpose, try speeding them up with the Shift-FP Command - you'll find it's fully compatible.

[illegible]

Figure 8-10 Copying custom variables. PASTE in a keyboard macro, set the custom attributes and then the content.

```

400 END MAIN
400 PRINT "*****"
*****
400 PRINT "A 4,0,111 Single or Multiple Line
      Graph - Variable Entry Mode"
400 PRINT "A 4,0,111 Single Line Graph-Multi
      Entry - Variable Entry Mode"

```

[illegible]

Lesson 100–101 Print the main menu, offering a choice of five graphics to create or draw.

THE INPUT "SELECT APPROPRIATE NUMBER" IS
THE OF WHICH THERE ARE TWO TYPES

Linear Plot: Select the type of graph. If you choose option six (circles), the program will draw a circle for you.

[illegible][illegible][illegible]

U_lower/1000 - 0.0000 Input values for vertical and horizontal scales. Since the columns add to one the results will sum to 1.

[illegible]

Lines 1029-1056 Input graph and node titles, the chosen colour, and print them according to the request.

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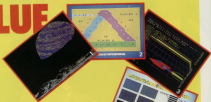


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LENGTH	BOX PRICE (\$)	QTY.	VALUE
5 reels (c. 5)	0.55		
10 reels (c. 10)	0.80		
15 reels (c. 15)	0.85		
18 reels (c. 18)	0.55		
20 reels (c. 20)	0.75		
30 reels (c. 30)	1.30		
50 reels (c. 50)	2.00		

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```

      LET x=0: REPEAT 1000, 1/500: GO TO BAC20
BAC10: IF 1/500=0 THEN LET x=x+1: IF x=1000 THEN
      LET y=0: REPEAT 1000, 1/500: GO TO BAC20
BAC20: IF 1/500=0 THEN LET y=y+1: IF y=1000 THEN
      LET z=0: REPEAT 1000, 1/500: GO TO BAC30
BAC30: IF 1/500=0 THEN LET z=z+1: IF z=1000 THEN
      LET w=0: REPEAT 1000, 1/500: GO TO BAC40
BAC40: IF 1/500=0 THEN LET w=w+1: IF w=1000 THEN
      GO TO CODE 1215: THEN RETURN
CODE 1215: CODE 1215: AND CODE 1215: GO TO CODE 1215
      AND CODE 1215: THEN PRINT "1000 1000 1000 1000"
      PER BAC40: y=0: REPEAT 1000, 1/500: LET x=x+1: IF
      x=1000 THEN LET z=0: REPEAT 1000, 1/500: GO TO BAC30
      LET y=y+1: IF y=1000 THEN LET w=0: REPEAT 1000, 1/500:

```

Lines 8700-8800 Add labels to the completed graph. Lines 8800-8850 Check for the cursor keys being pressed and move the cursor. Line 8790 reads text at the cursor.

```

0000  REM  INSTALLING
0001  CLS
0002  PRINT "MENU: 1-INSTALLATION, 2-PRINT
0003  PRINT "          BUSINESS OBJECTS in a program
0004  PRINT "          assigned to picture charts and graphs. The re-
0005  PRINT "          sulting drawing may be photoscoped to produce
0006  PRINT "          lecture slides, copied to tape, or print-
0007  PRINT "          ed."
0008  PRINT "After entering the program you
0009  PRINT "will be presented with a menu offering a choice
0010  PRINT "of two graphs and three chart modes."
0011  PRINT "
0012  PRINT "The program offers a choice of a
0013  PRINT "vertical, horizontal, and numbered entries. Re-
0014  PRINT "sults of the entries will be printed. These should
0015  PRINT "be limited to 20 characters for horizontal
0016  PRINT "and 12 for vertical."
0017  PRINT "
0018  PRINT "END OF PROGRAM. PRESS ANY KEY TO CONTINUE."
0019  PRINT "
0020  GOTO 0

```

Lines 8800-8870 The first page of instructions. There are printed page by page. Notice how lines 8820, 8860 and 8870 appear five times — the use of a subscript would have been much easier.

```

END PRINT IMAGE 1:"INSTRUCTIONS":PRINT
PRINT "On various stages you will be g
you the option to enter a another graph
or start of your session from the menu: P
END PRINT "You will be given the option to e
nize the last entry when entering data.
PRINT
PRINT "The color can be selected. The
throughout the program and through an initial
option you select the background color.
the use of colors should be constrained
for the best results particularly where dis
play is approx 1280 x 1024. The use of col
screen":PRINT
PRINT "Press 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, [ ] to continue":PRINT
PRINT
PRINT
PRINT

```

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```

VNODE PRINT "DRAWING IS COMPLETING"; PRINT
VNODE PRINT "Before drawing a graph you can
up choices to fill above or below the graph
and make simple choices."; PRINT
VNODE PRINT "DRAWING IS GRAPH SELECTION"; PRINT
VNODE PRINT "Graph fit on a window line graphed
high points within selected entry on the
vertical and horizontal axis. All line of
line chosen require a defined number of entries
on the horizontal axis."; PRINT
VNODE PRINT "Entry 1 to 6 points in a
line of data to be entered together. (4
line number) will choose the first line graph
with the different value."

```

THE NEW YORK TIMES

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WICORRATIVE TAPES

PROGRAM POWER

```

9100 PRINT "WGET 0,0,0"RAW KEY TO CONTINUE": P
9105 G
9100 CLR

```

Line 9100-9105 Page 1 of the instructions.

```

9110 PRINT "ENTER 1-10 INSTRUCTIONS": PRINT :
9115 PRINT "ENTER 1-10"
9120 PRINT "ENTER 1-10 will be necessary to
  experiment with different graph outputs
  (lines, Pages 1 and 2). combine satisfactorily
  by with any others. Both bar charts work as
  well together providing you watch the color
  combinations. It is suggested that charts
  1 and 4 only be used with chart 5 if four
  channel entries are not above 12. Again match
  colors."
9130 PRINT "WGET 0,0,0"RAW KEY TO CONTINUE": P
9135 G
9100 CLR

```

Line 9110-9135 Page 4 of the instructions.

```

9150 PRINT "ENTER 1-10 INSTRUCTIONS": PRINT :
9155 PRINT "ENTER 1-10"
9160 PRINT "ENTER 1-10 will be necessary to
  experiment with different graph outputs
  (lines, Pages 1 and 2). combine satisfactorily
  by with any others. Both bar charts work as
  well together providing you watch the color
  combinations. It is suggested that charts
  1 and 4 only be used with chart 5 if four
  channel entries are not above 12. Again match
  colors."
9170 PRINT "WGET 0,0,0"RAW KEY TO CONTINUE": P
9175 G
9150 CLR

```

Line 9150-9175 Page 5 of the instructions.

```

9200 GOTO 910

```

Line 9200 Returns to menu.

```

9999 GOTO "Micrograph" 1,100 1

```

Line 9999 The cassette SAVE routine.

CHIP CHAT

BY STEPHEN SITUATONO

Talking Spectrums! Yes, it's possible — using this neat 82 byte machine code program. Any speech or noise recorded on a cassette can be reproduced on the Speccy; all that's needed is a bit of time and a few precautions.

Those of you with access to an assembler program will be able to make use of the main listing without too many problems. The only thing to bear in mind is that the Hex numbers are prefixed by the hash (#) symbol.

If you haven't got an assembler, no need to panic — simple type in the machine code loader program and enter the data provided. If you manage to make an error, this will be indicated and you'll have to start over. If there are no errors recorded, the program will then SAVE and VERIFY the code to cassette; if you have a Microdrive, change lines 44 and 54 of the loader program as required.

To use the program you must reserve some room for the speech data by typing CLEAR 32767 — this will provide space for about five seconds worth of speech data (being stored from location 32768 to 65535). You can always lower or raise RAMTOP if you wish to have longer or shorter periods of speech respectively.

First of all, you must prepare a cassette recording of the five seconds of speech (or any other noise) that you wish to record on

the Speccy. Type RANDOMIZE USB 65535, but do not press Enter. Press the Play button on your cassette recorder and, just as the prepared speech is about to start, press Enter. About five seconds later, the "OK" message should pop up on-screen. If you pressed Enter too early, you can abort the program by hitting the Space key.

To hear the recorded speech, type RANDOMIZE USB 65535 ... and listen very carefully. You may experience a lot of background noise on your recording but there are one or two things you can do to alleviate this problem:

1. Remove the MYC lead when playing the speech into the Spectrum.
2. Record your own voice, speaking in a loud and clear fashion.
3. Experiment with the tone and volume controls of your cassette machine until you get the best results.

To SAVE your speech data to tape, type:

```
SAVE "DATA" C00(0-1),N00(0-0-1)
```

Where 0 is the number used in the original CLEAR statement. Here's that:

Before the assembly listing of Chip Chat — note that the Hex numbers are prefixed by the hash (#) symbol.

LINE	LABELS	INSTRUCTIONS	COMMENTS
10		ORG 65535	
20			
30	HLA	RESTORE	Imports the RAMDISK counter and scans the keyboard.
40		OR	
50		LD HL, RAMPT	
60		INC H	HL ← RAMTOP + 1
70	LOOPS	LD B, 8	The number of bits per type.
80	LOOPS	LD B, 8	
90		IN A, 0FE	Alert is made to see if the Space key has been pressed.
100		HLA	
110		JRNC STOP	
120		LD B, 0	Alert is made to check that there is a signal on the HLA port.
130		IN A, 050	
140		JRNC NOT	
150		SET J, 0	
160	JOIN	RLC HL	There is a signal at the left port, so save it.
170		OUTLOOP	Repetitor of right bits.
180		INC H	
190		CALL OVER	A check is made for the end of data space.
200		JR LLOOPS	If there is more room in memory, then read more data.
210	STOP	G	End of data recording.
220		NOT	
230	NOT	RLC HL	No signal has been received from the HLA port.
240		JR JOIN	
250	IFCAX	RESTORE	
260		OR	
270		LD HL, RAMPT	
280		INC H	
290	LOOPS	LD B, 8	
300	LOOPS	LD B, 8	
310		IN A, 050	
320		JRNC YES	
330		RLC A	These lines perform similar functions to lines 38-240, except that the data is output to the Spectrum's speaker from its memory.
340		OUT (HL, A)	
350		RLC HL	
360		OUTLOOP	
370		INC H	
380		CALL OVER	
390		JR LLOOPS	
400		NOT	
410		SET A, 4	
420	YES	SET A, 4	
430		JR LLOOPS	

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[illegible]

CIRCE

Sinclair Research breaks the time-honoured tradition of 'never having to say sorry' over lunch at the Carlton Tower Hotel. Roger Munford reveals the proceedings.

Holed up in a luxury suite of the Carlton Tower Hotel, high above London's West End, the editors do the crime of computer writers (or so they'd like to think) sit down for lunch with Sir Clive Sinclair, plus businessmen Nigel Seale and David Karlin. Minutes for the summit? To 'put the story straight' about the QL. Therefore, pulled in as no extra cost was long of the handless software, David Porter of Prime.

"Reports in the press contained errors which we feel may be our fault — and this concerns us as any error in the British press will be soon around the world", began Sir Clive. The patriotic didn't protest something of a tone-serious. "Putting the record straight" then switched to something of a slap-off of IBM, Acorn and Commodore — all of which, he claimed, had been equally (if not more) late with their own products. Warning in this theme, Sir Clive went on to tell us of the mistake welcome the QL had received in Japan and the U.S. Why, he inferred, couldn't the British press get it right?

Arming himself with a slide projector, Nigel Seale then attempted to allay fears that the QL was running behind schedule. He said the 28-day delivery should be okay by the time you read this and that there'll be an extensive revision of the User Guide by August — plus faster turnaround of upgraded QLs. He expects too to be announcing additional manufacturers of the add-on unit. More interesting news is the fact that the 68000 family could be the one on which Sinclair Research will be basing its products for the next decade — "and it wouldn't surprise me if the 68000 was used into the decade after as well", quips Seale.

Looking on as Microdrives (back up all your Spectrum users) Seale asserted the simple market truth that once the demand goes up, that the price will come down. "I can't say when or how much, but it'll be significant", he went on to confirm that, yes, there have been the obvious comparisons with disks, but the techniques employed with Microdrives could eventually give them the technology to produce storage of up to 1M, that, apparently, is still on the drawing board.

Additional hardware



LUNCH WITH SIR CLIVE

support for the QL will include 128K RAM, VCR RAM, Winchester hard disk unit, modem and terminal emulator, monitor, printer and Z801488 interface. However, Seale wouldn't be drawn into the big question of 'when'. Perhaps the company is going to wait and see what other manufacturers are going to do, and then just fill in the gaps.

Ending the presentation, Nigel Seale pronounced the QL to be a potential 'million seller' — 750,000 this year and 750,000 in 1987.

David Karlin has obviously

picked up a few pointers from his boss on how to tackle the 'difficult' questions. Dealing with some of the more pedantic queries from those assembled, on the tricky subject of software bugs Karlin told us "of course, silly and overrated" things will crash the machine — "if you get the answer wrong through a 'complicated' expression, then this is not significant... no Basic ever written is perfect — within that we are perfect".

And talking of getting 'complicated', David Porter managed to get himself in a

mighty tangle over whether the Prime packages were 'multi-tasking' or 'concurrent'. Once he'd suitably defined the two in a way that showed the QL to be multi-tasking, the point was raised that it would be near impossible for the average punter to be able to do it anyway. David Karlin noted "the facilities are there for the software houses — and I believe that users who require it will learn 68000 machine code language". Hmmm.

Perhaps the whole point of the meeting was that Sinclair Research wanted to say sorry for being so late — certainly the press boys gave them every chance, again and again — even to the point where, in a hushed moment, Sir Clive was heard to emit the strangled cry, "For God's sake, we're going to do it better". In the continuing barrage, Sir Clive went on, "we're not at all happy that we let people down. It takes a long time to launch a product — it's all a bit of a balancing act which we got slightly wrong, but the way we got it wasn't too bad in the opposition." Again, a loose reference to companies like Amstrad (indeed, according to Sir Clive, have introduced "an old-fashioned computer").

It was left to Nigel Seale to make Sinclair Research's point. "I think honestly that it's very easy to have 20/20 hindsight — we could all do it better again. The difficult thing is to design products now which will be good in 1986. Nobody wants this — and we get it in 1987/1988. We didn't want to be late this time, and we don't want to be late in the future."

That, one would imagine, is the final apology and, thankfully, Seale wanted any reference to 'other' companies, if the other companies don't want to say sorry for their lateness, then that's their bad manners — unless you're MANITing in Bookline, two wrongs still don't make a right. Sinclair Research's 'suffers' from having a man at the top who is known throughout the world, and it's always nice to knock a person that a fortune company. On the other hand, you could argue that Sinclair Research wouldn't be in the position it's in now without the legend — a paradox which requires those with a wings and roundabouts must be told how to say sorry nicely.

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