Home Computing WEEKLY

An Argus Specialist Publication

May 31-June 6, 1983 No.13

38p

Who'll rule? Let your micro tell you

NOW you can beat TV's election computers at their own game.

In yet another first for Home Computing Weekly, we are publishing in this issue two programs to tell you first and fast which party will win next week.

The two specially-commissioned programs — written by HCW regulars — are for both Spectrum models and for the standard VIC-20.

Use them as the results come in for a minute-by-minute guide and prediction. One of them even has a swingometer....

They start on page 15.

Even TV has taken notice of this innovation by Britain's brightest and best computing weekly. Editor Paul Liptrot was interviewed about it on TV-am.

And plans are well advanced to broadcast one of the programs on the same station.

We are publishing the programs well in advance of Polling Day to give you plenty of time to type them in and get them running.

Now the whole family can enjoy the fun of computing — with a real purpose.

The excitement starts on page 15.

INSIDE

Programs to type in for: VIC-20, Spectrum, TI-99/4A, ZX81

Software reviews for: Spectrum, BBC, Ace, ZX81, VIC-20

Best Seller charts for: Spectrum, VIC, ZX81, Dragon

Tandy halts price rise as Oric printer is launched

Tandy dropped a planned price rise for its colour printer — on the day Oric Products announced its similar model.

Both are made by the same Japanese company with the Oric printer priced at £169.95 and the Tandy version £20.95 cheaper.

Tandy was to bring in a £10 price rise tomorrow, the day on which the Oric printer is due on sale.

Buyer Ted Russell said: "We were going to put up the price, but faced with the Oric printer — and more low-cost printers which will be here by October — we've decided not to."

Unlike Oric, Tandy does not include a lead in the price. Tandy's printer is switchable between RS-232 serial and Centronics parallel interfaces. Leads for RS-232 cost about £3.29 and Centronics type from £14.95 to £19.95.

Oric's printer is not switchable and, accepting only Centronics-type input used by its computer.

Oric has given its model new styling — grey with blue stripes to match the computer — different

Continued on page 5

QUEST

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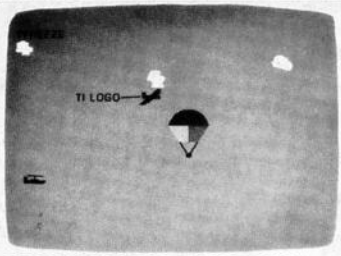

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This microcomputer is based on TMS9900 16 bit microprocessor. It includes 16K RAM, 16 colour high resolution graphic (192x256). The screen display is 32 characters, 24 lines TI-BASIC. Full size keyboard. For Software there are about 1,000 Programs to choose from. There are a lot of peripherals available e.g. Disk Drives, Disk Interface, Speech Synthesizer, Extra RAM. Additional Languages (PASCAL, TI-LOGO, ASSEMBLER).

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TI SOFTWARE

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Compiler	Disk	£79.95
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TI HOME COMPUTER HARDWARE

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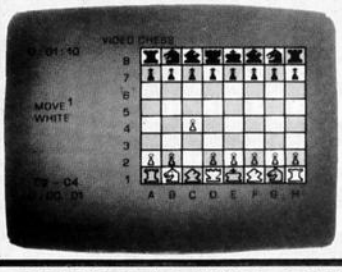

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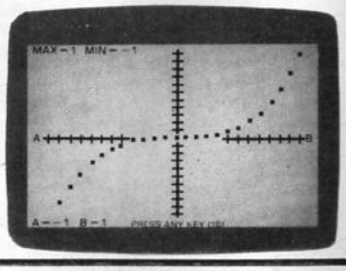

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Something for everyone

Artic is aiming to cater for all tastes with its latest batch of seven programs for the Spectrum. There are also two games for the ZX81, and the price of two of its existing games has been cut.

Two of the programs are additions to Artic's collection for the chess enthusiast. Spectrum Chess II is, according to Artic's Richard Turner, "a vast improvement" on Spec Chess.

Instead of skill levels, you simply set the time you want the computer to think, from 0 to 999 seconds. It is priced £9.95.

Chess Tutor, price £6.95, plays in three levels as well as teaching beginners. Now that the new games are out, the prices of Artic's old games have been cut by a pound each. Spec Chess now costs £8.45 and Voice Chess costs £8.95.

For the arcade game fans, there is Cosmic Debris (£4.95) and 3D Combat Zone (£5.95).

And Artic is aiming at the thinking games player with 3D Quadracube (£4.95) and Adventure E — The Golden Apple (£6.95). Finally, SYS 64 is a program to convert your Spectrum into a 64-column machine. It costs £6.95.

ZX81 owners are not left out. For them, there is a version of Reversi with four skill levels (5.95), and Raider, a Scamble lookalike (£3.95).

This is Artic's first software release for three months. Richard Turner said: "We're aiming to bring stuff out every month. But we try to maintain a high standard with out software, and we're not just going to bring out new tapes to increase our range regardless of quality.

"There's so much software around now that it's difficult for the end user to know which to choose, so we're not going to lower our standards."

Artic Computing, 396 James Reckitt Avenue, Hull HU8 0JA

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Spread out

PractiCalc, a spreadsheet program for the VIC-20 and Commodore 64, has just been brought out by Marketing Micro Software at £24.95 on cassette and £29.95 on disc.

Marketing Micro Software, Goddard Road, Whitehouse Industrial Estate, Ipswich, Suffolk.

LATE NEWS

Atari slash micro prices

Atari has cut the prices of both of its home computers. The Atari 800, with 48K of RAM, is reduced by £100 to £299.99.

As well as a £10 price reduction to £149.99, the 16K Atari 400 now includes a limited offer of a free programmer's kit worth £50. It consists of a BASIC cartridge, reference manual and teaching guide.

Product manager Peter Hradek said the price cuts were part of its marketing strategy rather than a reaction to other makers' recent reductions.

• • •

Political Lynx

Camsoft's programmers have rushed out Election Analyst, one of the first programs for the Lynx, in time for the big day.

According to Camsoft. the program will "turn Lynx owners into instant election pundits".

By feeding in previous election results, opinion poll figures, boundary commission changes and your own factors you can predict the winning party.

Available from branches of Laskys and Spectrum, Election Analyst will cost around £9.99.

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Continued from front page

electronics and an internal power supply instead of the external power supply with the Tandy printer.

Both use tiny ballpoint pens in black, blue, red and green to print at 12 characters per second and for graphics.

They print on paper 4½in wide at 40 or 80 characters in text mode or any number between the two under software control.

Oric's printer, which can be used with both 48K and 16K computers, is 10¾in wide, 6⅜in deep and slopes forwared from 2½in at the back and 1½in at the front.

With an eye to exports, Oric says it will also work in 110 volts in America, after a minor adjustment.

The Oric MCP40, as it is called, can also be used on any other printer providing the same input.

Mr Russell said: "We knew that Oric was bringing out the printer. We don't normally worry too much about the competition particularly at this one is being sold for the Oric.

"We sell ours without incuding a lead because people use them on a wide variety of computers. In fact the demand has been so great that we have been low on stock so we have increased our order.

"Owners of the BBC micro, in particular, have soaked up our stocks and there is now a £35 interface for the Spectrum too.

"It makes sense for us to leave the price at £149."

● Oric Products is mounting a summer promotion from July 1 to mid-September, giving away free software with every computer sold. Four tapes, worth £40, will be included with every 48K model, costing £169.95.

And four cassettes, total value £30, will be given away with the 16K version, due in the shops in early July at £129.95. The free tapes will be two games and one each for education and the home business. The 16K tapes will be adaptations of programs for the 48K model.

Oric Products International, Coworth Park, London Road, Ascot, Berks SL5 7SE

Tandy Corporation, Tameway Tower, Bridge Street, Walsall, West Midlands WS1 1LA

Oric's colour printer — similar to the Tandy model

Micro show hits the Midlands

Calling all Midlands micro fans! The National Exhibition Centre will be the venue for Birmingham's Home Computer Show, which takes place on June 4-5.

You'll find a selection of hardware and software for most micros, plus a range of home computers from £50 upwards for you to try out.

The show will also feature a computer advice centre, run by independent experts, which will offer answers to burning questions like which micro you should choose, and why you're having trouble loading programs.

You could also win not one but two computers — one for you and one for the school of your choice.

Visit the Show from 10am to 6pm on the Saturday, 10am to 4pm on the Sunday. Entrance is £2 (free if you're under eight or an OAP), but there is £1 off if you apply to post.

The Birmingham Home Computer Show is organised by ASP exhibitions, part of Argus Specialist Publications, publishers of Home Computing Weekly.

ASP Exhibitions, 145 Charing Cross Road, London WC2H 0EE

Pop into the PIPS club

Sord, whose Tokyo-made M5 micro is now on sale here, has started a UK club for users of its PIPS software. The company says that PIPS, which stands for Pan Information Processing System, is an easier language to learn and use than BASIC.

Sord, Samuel House, St Labans Street, London SW1Y 4SQ

Orics for Japan

Now Oric-1s can "speak" Japanese. Experts have developed a Kana character generator for use in the Japanese version.

Oric Products and a team of Japanese have jointly formed Oric Japan to make and market the Oric in Japan, plus selling in South East Asia. They expect to sell 120,000 in the 12 months from July.

Fun to learn

Four more VIC-20 programs designed to help children of three to twelve learn while having fun have been launched by Applied Systems Knowledge.

The company was founded by Tom Stonier, professor of science and society at Bradford University, who said the range, nowtotalling 10, was aimed at encouraging children to use home computers for more than just space games.

The new games, which need 8K or 16K RAMpacks and cost £8.95 from retailers, are: Hide and Seek, a graphics memory game; Words, Words, Words, in which younger children create picture stories; Number Puzzler, a variation of bingo and noughts and crosses to teach arithmetic; and Shape Up, to help the very young learn the shapes of numbers and letters.

Applied Systems Knowledge, London House, 68 Upper Richmond Road, London SW15 2RP

Darrell's gremlins

Teenager Darrell Etherington, author of Krazy Kong, has written a novel game for the VIC-20.

It is called Slap Dab and is due for release at the Commodore show on June 8-11 at the Cunard Hotel, Hammersmith.

The idea is to isolate gremlins by "painting" a spuare in such a way as to isolate them.

Anil Gupta, partner in Anirog, which is bringing out the game, said: "I've never seen a game like it and I've seen dozens of arcade games."

Krazy Kong costs £7.90 and Slap Dab, for the unexpanded VIC-20, is £6.

Anirog, 26 Balcombe Gardens, Horley, Surrey

Writing on the 64

Simple Software has re-written its Simply Write word processing program — on sale for PETs since 1981 — for the Commodore 64, and added new features.

Colour and function key operation have now been included in the program, which costs £40.25 on cassette and £46 on disc.

It is also available for the VIC-20 and BBC micro, as well as all PET/CBM models.

Simple Software says Simply File for 64, a database program, is also ready and will be on sale after the manual is completed in three to four weeks.

Simple Software, 15 Havelock Road, Brighton, Sussex BN1 6GL

Radio One's prize program

Radio One is planning to broadcast a computer game — with prizes for the winners.

The idea came up when Chris Lycett, producer of the Simon Bates Show, heard of a newly-released single which has a song on one side and three programs for the ZX81 on the B side.

But first Mr Lycess has to overcome Home Office objections to broadcasting anything which is unintelligable, such as the screech of a stream of data.

So BBC experts are working on ways to make the screech sound musical. They include staff from the Radiophonic Workshop, best known for the title music of Dr Who.

The original ideas was to broadcast a game called Radio One Road Show in which little vans, supposedly driven by disc jockeys, race each other across the screen.

It was written by Chris Sievey, 27, who made the new single and wrote the ZX81 programs on the other side.

Chris Sievey

And it was to have been transmitted on Bank Holiday Monday.

But due to these complications the plan has been put back. Anyway, if prizes are awarded, another program will have to be used. This is because the Road Show game gives a random winner.

The competition, with T-shirts as prizes, will probably invite ZX81 owners to write or call in with the solution to a clue in the program.

Mr Lycett said he was keen to get ahead once the complications are ironed out.

Chris Sievey's record, now out at £1.15, has a song called Camouflage on the A side. The first of the three programs on the B side displays the lyrics to the song and the other two are 16K and 1K versions of a game called Flying Train.

He was being interviewed about it by Simon Bates on Saturday.

Chris, a part-time petrol pump attendent, has made 14 other records since 1976 — three of which crept into the bottom of the Top 100 — including his personal best-seller, I'm in Love with the Girl on the Manchester Virgin Megastore Check-Out Desk.

Camouflage is being marketed by EMI under licence from Chris' own label, Random Records.

The pop-rock number is, in fact, a family affair. Chris plays all the instruments, thanks to a multi-track recorder, apart from drums, played by a friend, Mike Doherty.

And the two other vocalists are Chris' wife, Paula, 28, and their babysitter, 22-year-old Winifred Stack, who looks after Asher, 3½, and 4½-year-old Stirling.

Random Records, 3 Moorside House, Oakleigh Court, Timperley, Cheshire WA15 6UG

You could be on our pages

We welcome programs articles and tips from our readers.

PROGRAMS should, if possible, be computer printed to a width of 48 characters (use a new ribbon) and/or sent on cassette. Check carefully that they are bug-free. Include details of what your program does, how it works, variables you have used and hints on conversion.

ARTICLES on using home computers should be no longer than 2,000 words. Don't worry about your writing ability — just try to keep to the style in HCW. Articles most likely to be published will help our readers make better use of their micros by giving useful ideas, possibly with programming examples. We will convert any sketched illustrations into finished artwork.

TIPS are short articles, and brief programming routines which we can put together with others. Your hints can aid other computer users.

Competitive rates are paid.

Keep a copy of your submissions and include an SAE if you want them returned. Label everything clearly and give a daytime and home phone number if you can.

Paul Liptrot, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE

Tidy up a messy micro

Is your micro looking messy? Are there wires all over you carpet? Silent Computers suggest and protects the computer itself, but allows you to put a TV on top and store disk drives, joysticks etc underneath.

By fixing a four-way adaptor to the back of the console, you cut down on untidy wires and have just one mains lead.

Further modules, available soon, will bolt on to the console and allow it to expand as your micro system grows.

The basic console is available in two sizes. Size A is designed for the BBC, Lynx, Spectrum, Jupiter Ace, Oric and ZX81. Model B fits the Dragon, VIC-20, Commodore 64, TI-99/4A and Tandy Colour. They both cost £44 and matching printer stand costs £17 (model A) or £18 (model B).

Silent Computers, 27 Wycombe Road, London N17

Vote with the ZX81

Predict the balance of power as the election results come in — with a 16K ZX81.

Impex Portable Software has rush-released a program called Swingometer which, it says, will do just that. It costs £10.45, including postage, by mail only.

Impex Portable Software, Bedford House, Hockliffe Street, Leighton Buzzard, Bedfordshire.

● *See our Election Special programs for the Spectrum and VIC-20 in this issue.*

Spectrum modems

John McNulty, one of the micro industry's best-known characters, has produced two low-cost modems for the Spectrum, at £49.99 and £99.99.

And he plans to sell a 48K Spectrum, plus interface and modem, for an all-in price of £199.

Mr McNulty created a stir with his campaign against British Telecom's monopoly, — before liberalisation.

Interchange, P.O. Box 240, Watford, Herts WD1 2EH

Padding into graphics

A new A4 size graphics pad for the BBC micro has been produced by Hermes Computer Products. It has two graphics screens per page the second half containing a Teletext screen.

It costs £2.59 and comes with a double-sided reference guide giving graphics commands and Teletext codes.

Hermes Computer Products, 10 Barlow Moor Close, Norden, Rochdale, Lancs OL12 7RN

Sailing Spectrums

Soon after W. H. Smith slashed the prices of Spectrums a Scandinavian man walked into a London branch and bought 10.

Then he went straight back home on the ferry and put then on sale in his own shop.

A spokesman for Smiths said: "It was still worth his while even after paying the tax."

It pays to help the beginner

Gormless, a northern expression meaning ignorant with overtones of stupidity, exactly describes how I feel as a computer novice. Learning new skills is never easy, even with a friendly teacher, and with home computing, you and your manual are on your own.

Suddenly, English becomes a foreign language. My dictionary defines **array** *as: "order of battle: dress — v. to adorn; equip." Can a string array be fake knitted armour? OK, I may not be* **that** *stupid, but it illustrates my point that experts, having learned the jargon, don't realise it's creeping in when they write for beginners.*

When the only thing you know for certain is that you know nothing, where do you go for help? In the absence of a local computer club, there are plenty of books purporting to "simply and completely explain" your micro. But "Here be Dragons", as the old maps used to say.

After many frustrating hours searching for my mistake when the examples didn't come out as the book said they would, two schoolboy errors of fact alerted me to the possibility that the "expert author" could perhaps be wrong. Hard work with the manual proved all "my" mistakes to be errors in the text.

After several reminders, the publishers sent an errata slip, which did not contain several errors I had found. They explained that the book had "now been corrected and reprinted." The new edition still has the errors I found in the original, and is £1 dearer.

Where to turn next? A letter to a specialist magazine? They get hundreds of letters, can't afford to reply individually, and only a few, of general interest, will make it to the letter column. Similar beginner's questions will have been answered umpteen times before. Your chances of getting printed are slim.

So you buy an assortment of mags. Perhaps someone else has got the same question printed. If so, either you won't understand the answer because of the high jargon content, or it refers you to the "full details in our issue of..." (which is now out of print).

I'm an obstinate type. But the small ads in those mags — "Computer for sale" — "hardly used" — "Only two months old" — and the mind-boggling "unwanted present" tell me that many novices find it just too difficult without help.

So here's a point the computer industry might ponder. In their first flushes of enthusiasm, beginners will buy a greater proportion of magazines and games software than the expert. As their expertise increases, they'll want printers, expansion units, toolkit software, bigger computers etc etc.

But if they get turned off and sell their computer and software collection, you not only lose any further sales to them, but also the sale of a new computer and software to whoever buys their second-hand gear. And turned-off people are likely to bad mouth the subject to everyone they meet — which can close the door on a potential customer before you've even knocked. Can the computer industry afford to lose so many sales, all for the want of a little help for the beginner?

Dorene Cox **Dagenham, Essex**

● This space is for you to sound off about the micro scene, to present bouquets or to hurl brickbats. Share your views by sending them to Paul Liptrot, Opinion, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE. Please include your occupation and your interest in computing.

You're all winners

Congratulations to the five winners in our £1,000 software competition, run in our ninth issue with software company Audiogenic.

The winner of the £300 first prize is Francis Ho, of Cromwell Close, East Finchley, London E2, who receives Audiogenic's Wordcraft 20 word processor cartridge plus £150-worth of software from the Audiogenic catalogue.

Second prize winner is Mr A. Mettas, of Picton House, Green Lane, Bradford, who will get Wordcraft 20 along with £50-worth of software.

Winner number three, whose prize is Wordcraft 20, is Gordon Morrow, of Chesham Drive, Belfast.

Winner of the fourth prize, £50-worth of software, is Mr K. L. Langley, of Croft Court, Springfield, Chelmsford.

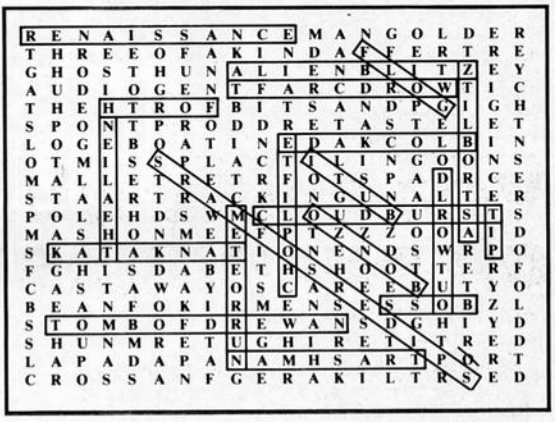
And winner number five is S. A. Flood, of Longley Road, Farnham, Surrey, whose prize is £25-worth of software.

The prizes will be supplied direct by Audiogenic, with a catalogue from which the winners can choose.

But even the thousands who did not win stand to gain. Every entrant is to receive a 10 per cent discount voucher — valid for three months — for any single software order from Audiogenic, whose range covers the VIC-20, Spectrum, Commodore 64, Dragon and Atari.

In the competition readers were asked to find Audiogenic software titles — among a list provided — hidden in a word square.

Here is the word square with the titles marked.



Micros live — OK

If your ambition is to appear on television, you could get your chance this autumn in a two-hour live micro special on BBC 1.

Ian McNaught-Davis will be joined by a panel of micro experts including John Coll of Acorn, Richard Fothergill of the Microcomputers in Education Project, and David Ellis, a specialist in music software, to answer queries and take part in discussions with a studio audience.

Viewers will also be able to phone in and put their queries to the panel.

The programme, which starts all 11 am on Sunday October 2, is part of the BBC's Computer Literacy Project. The project has already spawned two series, The Computer Programme and Making the Most of the Micro, but this is the first live programme — so the producers are keeping their fingers crossed.

According to the BBC's Sue Lynas: "The rality of working with computers is that many things can and do go wrong — but a great deal can be learned when they do.

"The programme makers hope to capture some of the reality in the live programme as well as offering viewers on-the-spot, expert answers to their questions."

Equipment and software will also be demonstrated in a micro "workshop".

If you'd like to take part in the programme, you should send in your questions, comments or suggestions to the address below, giving a day time phone number — but remember, the production team can't answer every letter.

A hint from Sue Lynas: challenging or representiative queries are the most likely to get answered.

Micro Special, PO Box 7, London W3 (XJ

Soft Joe's Software

Sniper – for the Dragon 32

Are you fast? ... are you good? ... can you shoot straight?

... Here's your chance to prove it. Not just another shoot 'em up game, but the ultimate in hit 'em fast, and hit 'em hard games – but this is no game ... your life is at stake!

Fast action machine code game, which calls for a steady trigger, and nerves of steel. 10 levels of difficulty, joystick controlled gunsight, high res graphics and sound. "Smart" targets!!
Game design and dragonware: R. Lowry

Cosmic Defender – for the BBC model B

"I thought I could do it ... now I'm not so sure, 'Hang on to 'em at all costs' were the orders from star command, it could cost me more than I bargained for! Even with the best star fighter in the galaxy!! I've got to hang on ... keep going ... must fight ... but for how long?..."

Defend the federation Plasmaton fuel dumps from the mindless suicide pilots of the alien battlefleet. Use your cosmic starfighters weaponry and hyperspace to destroy the evil enemy ... but watch your fuel, bonus points and fuel cost blood!!! How long can YOU hold out in this fast action game by Anthony Rafferty.

Acnean Mutoids – for the BBC model B

"Where am I"?.. A reasonable question, but the shock answer is only the first in a series of catastrophes that might lie ahead ... A bolt of lightning stabs your eyes as the monitor awakes you from stasi-sleep, only to tell you the worst!

Your interstellar cruiser has been invaded by the evil race known as the acneans – even worse, you are alone!!

In a micro-instant you realise the task that faces you is one of spine-tingling terror – you must risk all to save earth from a horrific destiny. Can you avoid the blood dripping, plasma curdling mutoids and activate the ship's self destruct computer – do you have the courage? Can you save mother earth??, can you save yourself??? the answer is surely ... how??? Superlative graphics and sound make this game by Phil Woodrow, the ultimate challenge!

Bandit – for the Dragon 32

Ruthless ... that's the only way to describe it, try your luck against the meanest fruit machine in the universe. 1,000 credits and you break the bank. It's not easy, but then, you wouldn't expect it to be would you???

You can almost feel your pocket getting lighter in this full feature fruit machine game. Based on a real 20 symbol per reel machine, this superb simulation displays excellent high res colour graphics and realistic sound: random hold and nudge facilities, with the meanest, most vicious gamble feature in the west! without doubt, the most compulsive addictive fruit machine on the market. Specifically for people with deep pockets and money to burn.
Game design and dragonware: R. Lowry

All of these superb games **£6.50** each, inc first class post, packing and VAT.
All orders despatched within 24 hrs of receipt.

Available from all good software outlets or direct from Soft Joe's.

Dealership enquiries to:
Soft Joe's Software, Business Centre, Claughton Road, Birkenhead, Merseyside.

Coming soon – games for VIC 20, Commodore 64, ORIC, Spectrum and Atari. (Ref HCW)

Soft Joe's is the one for me, please rush me ( ) copies of
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☐ Cosmic Defender } Model B ☐ Sniper } Dragon 32
(tick box).

I enclose cheque/P.O. for £ payable to Soft Joe's Software.

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Address .....

.....

Post coupon to: Soft Joe's Software, Business Centre, Claughton Road, Birkenhead, Merseyside.

Top Ten programs for the VIC-20

1	Panic	Bug Byte (2)
2	Asteroids	Bug Byte (1)
3	Cosmiads	Bug Byte (6)
4	Wacky Waiters	Imagine (5)
5	Race	Commodore (–)
6	Arcadia	Imagine (4)
7	Super Expander	Commodore (–)
8	Blitz	Commodore (9)
9	Intro to Basic 1	Commodore (7)
10	Amok	Audiogenic (8)

Compiled by Boots. Figures in brackets are last week's positions

Top Ten programs for the ZX81

1	Flight Simulation	Psion (4)
2	Monster Maze	New Generation (5)
3	QS Scramble	Quicksilva (1)
4	Chess	Psion (7)
5	Catacombs	J K Graye (–)
6	Space Raiders	Psion (8)
7	Galaxians	Artic (6)
8	10 Games for 1K	J K Graye (–)
9	Gulp	Campbell (–)
10	Scramble	Woodside (–)

Compiled by W. H. Smith. Figures in brackets are last week's positions

Top Ten programs for the Dragon-32

1	The King	Microdeal (1)
2	Space War	Microdeal (2)
3	Planet Invasion	Microdeal (3)
4	Dragon Trek	Salamander (4)
5	Defense	Microdeal (5)
6	Alcatraz	Microdeal (6)
7	Wizard War	Salamander (–)
8	Chess	Dragon (7)
9	Katerpillar Attack	Microdeal (–)
10	Basic Tutorial	Ampalsoft (–)

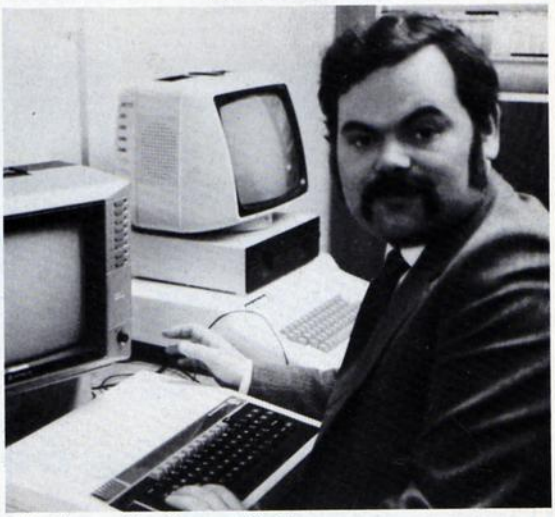
Compiled by Boots. Figures in brackets are last week's positions

Top Twenty programs for the Spectrum

1	Flight Simulation	Psion (1)
2	Hobbit	Melbourne House (2)
3	Penetrator	Melbourne House (3)
4	Transylvanian Tower	Richard Shepherd (4)
5	Horace Goes Skiing	Psion/M. House (7)
6	Football Manager	Addictive Games (11)
7	3D Tanx	dk'tronics (5)
8	Arcadia	Imagine (–)
9	Planet of Death	Artic (6)
10	Chess	Psion (13)
11	Hungry Horace	Psion/M. House (16)
12	Time Gate	Quicksilva (–)
13	3D Tunnel	New Generation (–)
14	Planetoids	Psion (18)
15	Space Raiders	Psion (–)
16	Battle of Britain	Microgame (17)
17	Avenger	Abacus (–)
18	Orbiter	Silversoft (–)
19	Inca Curse	Psion (–)
20	Ground Attack	Silversoft (19)

Compiled by W. H. Smith. Figures in brackets are last week's positions

Row over same-name games



Mike Fitzgerald — "we were first"

Lawyers are taking action against a software company over programs with identical names.

Manchester-based A&F Software says this is, in legal terms, "passing off."

In an action of this type one company hs to show that buyers could confuse the two products.

The row centres on A&F's novelty aracde game, Painter, available for the BBC model B, Spectrum and Atom and soon for the Dragon and Oric-1.

Mike Fitzgerald, A&F managing director, said: "We were the first on the market with a program called Painter, but I've heard of another company that is planning to launch a Painter for the BBC.

"We know that we are totally in the right, but the problem is that the law is very hazy on copyright. But it is very clear on passing off."

His solicitor, Andrew Fairley, has written to the company. Mr Fairley said: "I'm prepared to go to court if I have to. It depends on them."

And Mr Fitzgerald revealed: "Depending on the result of that we will be pursuing another company about our Cylon Attack."

This is a 3D space game for the Atom which will soon be produced for the BBC micro.

A&F says it has come up with an innovation in commercial software, starting with a game for the Spectrum.

Programs for this computer are generally for either the 48K model alone or for the 16K version which will also run on the model with more memory.

However A&F's Jungle Fever, just out at £6.90, will soon be marketed in an extended version for the same price.

Mr Fitzgerald explained: "If you have the 16K Spectrum it will only load the section of the program it can use. The 48K model will use all of the program.

"We are going to try to incorporate this technique in all our programs in the future."

Programs just out from A&F are The Shining Professor and Horror Castle, both for the 32K BBC at £8, and a game for one to four players for the Dragon called Swashbucklers and priced at £6.90, which uses a pirate theme. Bouncer, an £8 arcade-type game for the 32K BBC, is due soon.

Painter for the Dragon and Oric will cost £6.90 and the BBC version of Cylon Attack will be £8.

A&F Software, 830 Hyde Road, Manchester M18 7JD

Micro debut?

Memotech's new computer may make its public debut at the South of England Computer Fair, said organiser Julian Wilde.

The fair will be held on June 12 at Wood Green School, Witney, and Witney-based Memotech is helping with technical advice, said Mr Wilde, the school's deputy head.

Wood Green School, Woodstock Road, Witney, Oxon OX8 6DX

NEW! NEW! NEW!

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Enfield, Middlesex, EN3 4HF, England.

Rainbow

'CHARGEN' & 'DEMO' for **BBC A-B**
Space does not allow full description of this program. Generate in 8 static and 8 flashing colours your own characters. Sizes from 2-24 pixels wide x 8 pixels deep. Full cursor control, actual size of character shown. Press for Byte string needed to generate the character. 'Demo' will show you how to save and incorporate characters into programs. Full documentation for both the programs on one tape. **£8.50**

'LANGUAGE TUTOR' for **BBC A-B, SPECTRUM, ACORN ATOM & VIC-20 (unexpanded)**
The ideal program for the exam swot or revision. Key in your own choice of foreign and English words, the program then presents them at random for your translation. You can save your words on tape and create your own vocabulary database. **£5.00**

'LANGUAGE DATA TAPE' (for machines as above)
Available in German or French, hundreds of words pre-arranged in groups ready to load into the language tutor program. **£6.00**

'READ ARROWS' for **BBC A-B**
A spelling game for primary level. A string of words pass along the top of the screen, shoot down the mis-spelt words with the red arrows. A fast moving game with a real educational value. **£6.00**

'ADDRESS BOOK' for **16K & 48K SPECTRUM** (state which)
This is the one you have been waiting for. Ideal for personal, business and club use. Menu driven includes up to 100 characters per entry and commands like search, add, alter, display, save, erase and print. All you will ever need in a database. **£6.00**

'DATAMASTER' for **VIC-20 (unexpanded)**
A small but flexible database program includes a menu driven list of options like input, view, change, output, load, alpha-sort and clear. Ideal for personal and club records. **£5.50**

'THE GREAT IBERIAN CRYSTAL' for **BBC A-B**
Are you tired of uncompromising adventures, if so this one is for you! A unique game which will have you spell bound. Dare you let loose wild dogs on a man eating warlord? Will the spells work for you...? **£6.00**

'SOLITAIRE' for **VIC-20 (unexpanded)**
This is the familiar classic you normally play with plastic pegs. Make your moves to leave the last peg standing in the middle position. Sounds easy doesn't it! Hours of family entertainment. **£5.00**

'ZAXX' for **VIC-20 (unexpanded)**
Shoot down the aliens with your laser, not just from one angle but from three, some good sound effects, great fun. **£5.00**

'COBRA' for **VIC-20 (unexpanded)**
Just how many of the tasty morsels can the cobra eat, you can move in all four directions. Another fine game with sound, colour and some surprises. **£5.00**

SOFTWARE FOR THE VIC AND COMMODORE 64

UNEXPANDED VIC-20:

SKI-SUNDAY Guide your skier down the forested course, through the slalom gates, avoiding the many hazards, but watch out for the ice.

POLARIS You are in command of a nuclear sub, destroy as many enemy ships and planes with your missiles in 90 seconds, score 400 points and receive an extra 30 seconds on patrol.

Both these games are in multi-colour, with many sound effects and tunes. **£5.50**

JACKPOT Own a fruit machine, just like the real thing, can you win the jackpot, you will be amazed by the graphics, colours, and many sound effects, with nine different tunes, a full machine code program, a very compulsive game **£5.50**.

SWAG-MAN Chase the bullion van round the streets of New York, picking up the swag, but beware you must defuse the time bombs, to gain extra time and fuel, full colour and sound effects, a very original game, requires 3K expansion **£5.50**.

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SUPER BANK MANAGER A full feature version, needs 3K expansion, but will run on any memory size **£7.50**
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Full documentation with all utility programmes.

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LUNAR RESCUE Our own machine code version of that popular arcade game **£7.50**.
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INVASIVE ACTION	SITTING TARGET	RATS
OXO	SMASH THE WINDOWS	TANKER
BOGGLES	SPACE SHIP	PARACHUTE
PONTOON	JET FLIGHT	JETMOBILE
SKI JUMP	PHASER	HIGH RISE
HANGMAN	INTRUDER	THE FORCE
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BBC A/B
ORIC-1

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ORDER NOW!

Fast load for ZX81

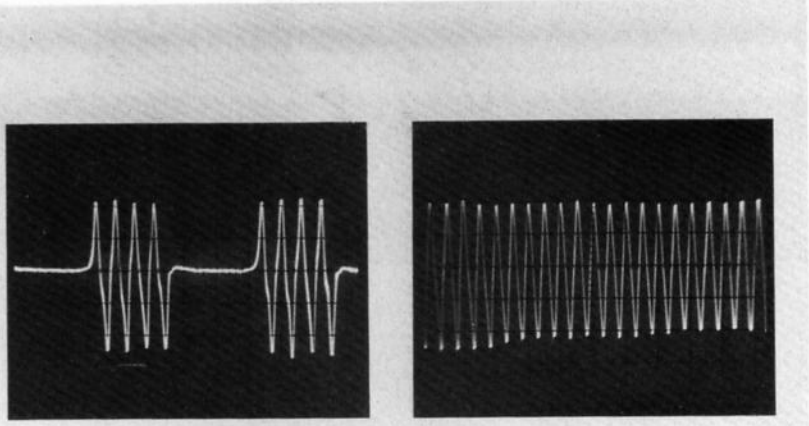
JRS Software says its ZX81 programs will now load 10-15 times faster, thanks to a new fast loading system.

By altering the waveform — without any extra hardware — data is loaded at 300-500 bits per second which means, says JRS, that almost any program is loaded in less than a minute.

Maximum frequency is limited to 4KHz for reliability.

At present the system is only used on ZX81 software from JRS, but the company is believed to be working on a similar system for the Spectrum.

JRS Software, 19 Wayside Avenue, Worthing, West Sussex BN13 3JU



Pictures show the speed difference. Left: two bits under normal ZX81 loading, and right: 21 bits loading under the new JRS system in the same time

Rabbit breeds again

Rabbit has been breeding new programs again — 14 of them in all. There are nine for the VIC-20 and 5 for the Commodore 64, and they should be on the shelves of retailers — including chain stores — in a couple of weeks.

Among the new offerings are Pakacuda, a fishy version of Pacman; Race Fun, in which you have to survive a drive down the wrong side of the motorway; and Critters, in which you fend off 6ft mutant vultures.

The new programs also include Rabbit's first foray into the educational market, with English Invaders. According to Rabbit's Terry Grant: "Words run down the screen and you have to shoot them with the right key depending on whether they're nouns, adjectives or verbs."

All the games will cost £5.99.

But Rabbit won't be resting after bringing out this bumper batch of games. In a few weeks it will be releasing another collection — this time for the Spectrum.

Now the company has decided it is time to copy tapes itself. It has just bought its own tape duplication plant in Manchester.

Rabbit, 380 Station Road, Harrow, Middlesex.

Joysticks for every game

Joysticks control of all ZX games — that's what AGF is claiming for its programmable joystick interface. The interface plugs into the back of your ZX81 or Spectrum, and lets you connect up a range of Atari-compatible joysticks.

You program the interface yourself, so you decide which of the joystick directions will represent which key. Full instructions include a demonstration program for drawing high resolution graphics using joysticks.

If you bought AGF's original interface, you will have first refusal on the new one, which costs £33.95 inclusive of postage and packing.

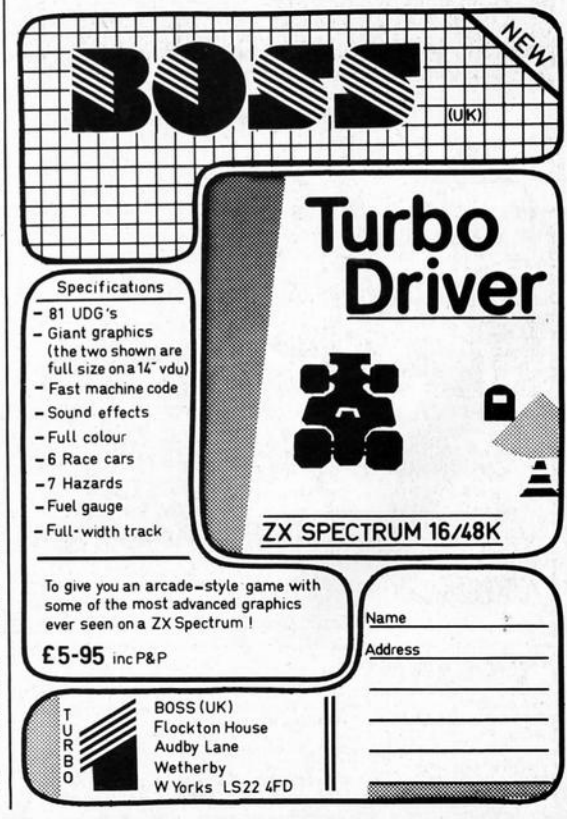
AGF, 26 Van Gogh Place, Bognor Regis, West Sussex, PO22 9BY

Try before buying

It's a risk to pay out for a program you haven't seen — especially when the program in question is expensive. Hilderbay thinks it has found the answer — a demonstration tape which shows three of its small business programs for the 48K Spectrum and sells for £3.95.

The three programs on the tape are Payroll, which costs £25 in its complete version, Stock Control (£25) and Statutory Sick Pay (£40.25).

Hilderbay, 8-10 Parkway, Camden Town, London NW1



THE NEW AND UNIQUE C.A.D.* PROGRAM FOR THE BBC MICRO (32K)

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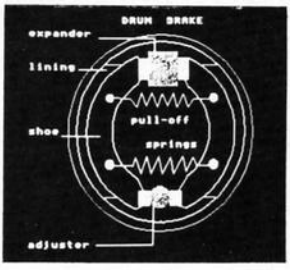
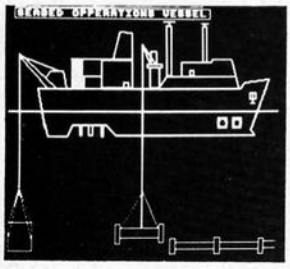
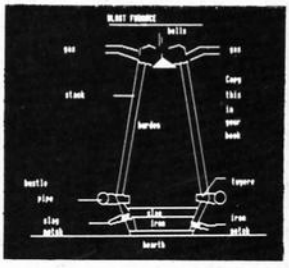
This program must be seen to be appreciated – your imagination is the only factor to limit its individual applications.

- Modes 0,1,2,4,5 (can be changed when program is running).
- Multiple display of arrays enables infinite complexity.
- **FUNCTIONS:** Line, rectangle, triangle, circle, text (upper and lower case) and colour pallet (8 colours and flashing).
- **DRAWING AIDS:** Alignment grid, circle copy, delete, free memory, purge memory, variable cursor speed, clear screen and redraw.
- Shapes can be filled or outlined (no need for Fill Routines).
- Save and load to tape in about 20 seconds, or to disc in 2 seconds.
- SPECIAL FACILITY – Rubber band mode – A very flexible and variable line drawing facility – must be seen.
- Free "redraw" routine to enable the pictures created to be displayed in your own programs.
- The disc version allows screen saves, which take approx. 3 seconds.
- **Recommended by BBC Micro User.**
- Future developments will include processing packs which will provide additional features such as arcs, elipses, air-brush, printer dump and many more. Cassette users may purchase an additional cassette containing these features, but disc users will be able to return their disc which will be upgraded to the latest specification, and the user will only be charged the difference between the two versions.
- GRAFSTIK (joystick cassette version) **£7.95**
- GRAFKEY (keyboard cassette version) **£7.95**
- GRAFDISC (combines both on one disc) **£12.95**

(the examples shown are all unretouched off-screen photographs of some of the program's capabilities).







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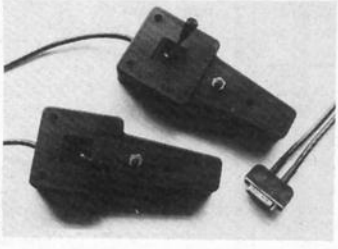
Disc **£10.95**



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PROGRAMMERS

We are constantly seeking new and interesting programs. Why not send yours for appraisal? Do not worry if the presentation is not to professional standards – we are looking for new ideas and we will advise and assist in bringing your program to the required standard. You have got nothing to lose but much to gain – So why not send your program today? 40 Track disc if possible or two copies on cassette. In some cases we will even provide disc drives against future royalties.

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All prices inclusive of VAT + Carriage – No Extras.

Interpod interface — all the right connections

Printer link for 64

Commodore 64 owners will be able to link their machines to a wide range of printers and disk drives, using a new interface from Oxford Computer Systems.

Called Interpod, the device plugs straight into the 64's serial port, and provides the RS232 and IEEE interfaces that allow connection with the most standard computer peripherals.

Oxford Computer Systems, Hensington Road, Woodstock, Oxford OX7 1JR.

Don't lose your memory

It can behave just like an ordinary ZX81 RAMpack. But the difference is that if you take it off the computer, you don't lose the data stored in it.

It's Cambridge Microelectronics' new CRAMIC-81 16K RAM unit, which uses special low power consuming CMOS chips and a lithium battery to provide permanent data storage — well, as permanent as you're likely to need.

The makers say that the unit will hold its contents for 10 years. How can they be sure? According to a company spokesman. "The battery manufacturers have ways of testing these things. They can do an accelerated test that is then translated into ordinary usage."

CRAMIC has a ribbon connector to ensure a firm connection, and an adaptor so that an ordinary RAMpack can be connected up at the same time.

The two units then occupy the same memory area and you can switch from one to the other. This would allow two separate programs to run alternatively, with alternating screen displays. The unit will set you back £92.

Cambridge Microlectronics, 1 Milton Road, Cambridge CB4 1UY

Computer care

A 12-month extended warranty is being offered by Computers For All dealers at prices starting at £15.

Arranged through an insurance company, it covers items like the complete cost of repair due to mechanical or electrical breakdown.

The service is called Computer-Safe and will be available either at time of purchase of home computer equipment or within 30 days. As an introductory offer, equipment bought between June 1 last year and May 31 can be covered.

Computers For All, 72 North Street, Romford, Essex

School titles

Panther Programs, set up to produce only educational software, has brought out its first nine titles.

Priced at £5.95-£8.99, they run on the 16K ZX81, both Spectrum models, the VIC-20, Dragon and Atari computers.

Seven are for children from pre-school to 12 and two are study aids for senior pupils. Two others are Artist, at £11.99, and Postman for the VIC-20 costing £5.99.

Panther Programs, 25 Dugavel Gardens, Silvertonhill, Hamilton, Scotland

Micro sales soar as prices drop

Although the following information is not strictly related to home computers, I thought you might be interested in current marketing trends over here.

In general, the price of personal computers (there is no specific category here called home computers) has come down by 10-33 per cent during the last six months. Even so, according to market analysts, the price reduction alone is not causing the increased sales.

It turns out that most consumers are willing to spend more money on a hardware-software package tailored for their exact needs, than the actual price of the computer itself. Dealers have indicated that more and more personal computer buyers are parents who buy them for their children who are using them in school.

Many retailers have also indicated that over half to three fourths of their customers are "entry-level computer literate." This makes a real change from the customer of even a year or two ago. It also means that the retailers must run their stores differently. They now must give full hardware and software support, including offering classes which not only teach owners how to use the machines but are also geared at getting first-timers to buy.

Overall, personal and home computer sales are skyrocketing. Many dealers are reporting sales as much as three to five times ahead of projections. Dealers have come to the realization that employing programmers as sales people just doesn't get it.

What must be done to convince people to buy is to explain to them in non-technical terms what computers can do, and what they can do for the particular customer in question. Let's hear it for user-friendly salespeople, finally!

Dealers who sell a range of computers are finding that their biggest sellers fall into the $150 to $250 price range, for what you call home computers. When software is included, the biggest selling packages cost from $200 to $500. In terms of features, colour, sound and memory are rated most important. The first two features count most heavily to the game players. Customers who are interested primarily in memory are also usually interested in other applications, most notably educational programs.

Many dealers find that the most helpful features on the smaller personal (home) computers are the function buttons, which can be defined to do commands without repetitive programming, and the HELP keys. Most dealers agree that they could sell more computers if they could get more computers to sell. The demand is literally incredible.

In terms of the plug-in game cartridge market, marketing strategies have varied all over the place.

About a year ago or so, it was common practice to sell the games outright, but this year many retailers have turned to game rentals. Many cite the fact that lots of new games are only slightly redone versions of older games, and therefore many customers would arather try the games out before buying.

Most sellers of game cartridges can be grouped into one of two categories — those who sell lots of games for little profit each or those who sell far fewer games but sell them for a much higher price.

See you next week.

Bud Izen
Fairfield, California

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Who'll win? Find out first and fast with your micro

Beat the TV experts at their own game with two programs to use as the General Election results come in. We're printing them today to give you plenty of time to type them in and get them running before June 9

Election Special for both Spectrums by David Nowotnik

What will you be doing on election night? If, like millions of us, you will be watching the results on TV, why not put your home computer to good use?

You can store and analyse the results as they come in with my program for the Spectrum.

The program is arranged in three parts, with an optional extra facility if you have a 48K Spectrum.

From the main menu you can select a results entry sequence, a results analysis routine, or a bar chart to provide a visual guide as to which party is winning the race.

The extra routine for 48K Spectrums is a filing system, which allows you to recall the results from any constituency. This routine appears in line 5000 onwards, so 16K Spectrum owners can save time by not typing in these lines.

The results entry sequence (lines 2000-2210) asks you for constituency name (this is limited to 10 characters), and the votes cast for the three major parties (the SDP/Liberal Alliance is counted as one party) and the other parties.

You will be asked for the number of other parties. When you have entered this information, enter the votes for each one these parties; the program will add them for you.

The program automatically assigns the seat to the winning party of the four. Unless one of the "others" is a winning candidate, be sure that the total of votes for "other" parties does not exceed the actual winner, otherwise the seat will be awarded to the wrong party.

The votes entry subroutine appears in lines 600-660. This checks that your entry is valid (i.e. it is integer, positive, and contains no non-numeric characters).

This prevents the nightmare crash of the program due to an error in results entry after several hours of use! Note, if you do cause a BREAK, restart with GOTO 1000.

The analysis routine (lines 3000-35000) provides you with a "swingometer" (lines 3030-3120), and a table showing the percentage of total votes polled by each party, the seats held at the end of the last Parliament, and the predicted result.

The swingometer copares the ratio between the Conservative and Labour parties this time, with the last General Election (when the ratio was 0.84, Lab/Con.) to give a percentage change in that ratio.

The prediction of the outcome of the election is made in lines 3210 to 3310.

```
  10 REM Election Special
  20 REM by David Nowotnik
  30 REM     May, 1983
  40 REM
  50 IF PEEK 23731<200 THEN LET
c=0: GO TO 70
  60 LET c=1: DIM r$(650,10): DI
M t(650,4)
  70 LET nr=0: LET tv=0: LET tvc
=0: LET tvl=0: LET tvs=0: LET tv
o=0
  80 LET cs=0: LET ls=0: LET ss=
0: LET os=0
  90 DIM u(4)
 100 DIM z$(13,32)
 110 LET z$(2)="
 120 LET z$(3)="
 130 LET z$(4)="
 140 LET z$(6)="
 150 LET z$(7)="
 160 LET z$(8)="
 170 LET z$(10)="
 180 LET z$(11)="
 190 LET z$(12)="
 200 DIM p(4): FOR i=1 TO 4: REA
D p(i): NEXT i
 210 DATA 334,239,42,18
 490 GO TO 1000
 500 LET ll=INT (l/8): LET l1=l-
8*ll: IF ll>32 THEN LET ll=32: L
ET l1=0
 510 IF l<=0 THEN PRINT : PRINT
: RETURN
 520 IF ll=0 THEN GO TO 550
 530 FOR i=1 TO ll: PRINT PAPER
c;" ";: NEXT i
 550 IF l1=0 THEN PRINT : PRINT
: RETURN
 560 INK c: LET x=8*ll: FOR i=1
TO l1: PLOT x,y: DRAW 0,7: LET
x=x+1: NEXT
 570 PRINT    PRINT : RETURN
 600 INPUT LINE x$: IF x$="" THE
N GO TO 600
 610 FOR k=1 TO LEN x$: IF x$(k)
>"9" OR x$(k)<"0" THEN GO TO 600
 620 NEXT k: RETURN
 650 PRINT AT 20,2; PAPER 0; INK
 6;"How many 'other' candidates
"
 660 GO SUB 600: LET ov=0: IF VA
L x$=0 THEN GO TO 690
 670 FOR h=1 TO VAL x$: PRINT AT
 20,2; PAPER 1; INK 6;" Enter t
he votes for # ";h;"
 680 GO SUB 600: LET ov=ov+VAL x
$: PRINT AT 19,17;ov: NEXT h
 690 PRINT AT 20,1; PAPER 2;"
                            ": RET
URN
 700 FOR i=13 TO 19: PRINT AT i,
2;"
": NEXT i: RETURN
1000 BORDER 5: PAPER 5: INK 0: C
LS
```

Roy Jenkins of the SDP/Liberal Alliance

The calculation is based on the results of the last General Election, shown in **table 1.** For the three major parties, there is an approximate relationship of; $y = 11x - 140$, where y is the number of seats gained, and x is the percentage of total votes cast.

This relationship does not hold for minor parties, and is complicated by the fact that there are more seats in this election due to boundary changes (650 as compared to 635 last time).

No easy mathematical rules can be applied to the prediction of seats won by the "minor" parties; the program will always predict 20 (line 3310).

The analysis routine will not operate until at least five results have been entered. While there are few results to analyse, the swingometer might well swing wildly, and the predicted results will alter dramatically with each constituency result. However, as the evening progresses, and the database grows, the predictions and swingometer should settle down to give a fairly stable — and reliable — prediction of the outcome.

The bar chart sequence provides a multicoloured display which demonstrates at a glance the relative positions of the parties. This routine appears in lines 4000-4220, with the high resolution bar drawing routine at 500-550.

The optional filing scheme for 48K Spectrums will allow all, or selected results to be shown on the screen. When asked to enter constituency name, pressing ENTER only will cause every result to be presented on the screen.

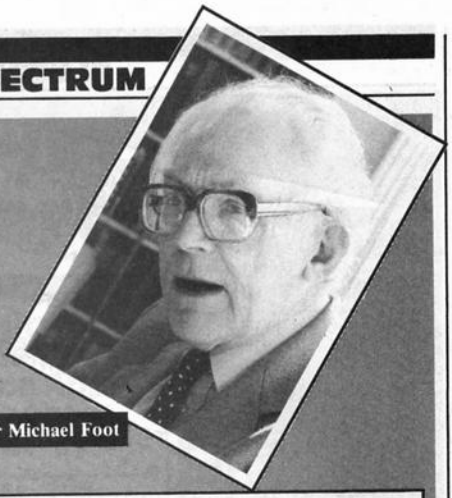
The constituency name can be truncated; for example, enter A, and all constituencies beginning with A will be displayed.

If by 3 am you feel in need of a little sleep, but plan to carry on using the program the following day, BREAK the program, and save with the direct command SAVE "election" LINE 1000.

Whatever you do **don't** use CLEAR, or else you can say goodbye to many hours work.

Table 1 — analysis of results at the last General Election

Party	% of votes	No. of seats
Con	43.9	339
Lab	36.9	268
Lib	13.8	11
Others		17



Labour leader Michael Foot

```
1010 FOR i=1 TO 13: PRINT PAPER
2; INK 1;z$(i): NEXT i
1020 FOR i=13 TO 19: PRINT PAPER
 2;AT i,0;"  ";AT i,30;"  "
1030 NEXT i: PRINT PAPER 2;z$(1)
;z$(1)
1040 PRINT AT 14,4;"SELECT: 1. E
nter results";AT 15,12;"2. Analy
sis";AT 16,12;"3. Bar chart";AT
17,12;"4. Constituencies"
1050 LET y$=INKEY$: IF y$="" THE
N GO TO 1050
1060 LET y=CODE y$-48: IF y<1 OR
 y>4 THEN GO TO 1050
1070 IF y=4 AND c=0 THEN GO TO 1
050
1080 GO SUB 1000+y*1000
1090 GO TO 1000
2000 REM Enter results
2010 GO SUB 700
2020 PRINT AT 14,3;"Constituency
: ";
2030 INPUT y$: IF LEN y$>10 THEN
 GO TO 2030
2040 PRINT y$;AT 16,3;"Conservat
ive: ";: GO SUB 600
2050 LET cv=VAL x$: PRINT cv;AT
17,9;"Labour: ";: GO SUB 600
2060 LET lv=VAL x$: PRINT lv;AT
18,4;"Liberal/SDP: ";: GO SUB 60
0
2070 LET sv=VAL x$: PRINT sv;AT
19,9;"Others: ";: GO SUB 650
2080 INPUT "     Is this O.K.? (y
/n) ";q$
2090 IF NOT (q$="y" OR q$="n") T
HEN GO TO 2080
2100 IF q$="n" THEN GO TO 2000
2110 LET nr=nr+1: LET tv=tv+cv+l
v+sv+ov
2120 LET tvc=tvc+cv: LET tvl=tvl
+lv: LET tvs=tvs+sv: LET tvo=tvo
+ov
2130 LET u(1)=cv: LET u(2)=lv: L
ET u(3)=sv: LET u(4)=ov
2140 FOR i=1 TO 4: FOR j=1 TO 3:
 IF u(j)<u(j+1) THEN LET y=u(j):
 LET u(j)=u(j+1): LET u(j+1)=y
2150 NEXT j: NEXT i
2160 IF u(1)=cv THEN LET cs=cs+1
2170 IF u(1)=lv THEN LET ls=ls+1
2180 IF u(1)=sv THEN LET ss=ss+1
2190 IF u(1)=ov THEN LET os=os+1
2200 IF c=0 THEN RETURN
2210 LET r$(nr)=y$: LET t(nr,1)=
cv: LET t(nr,2)=lv: LET t(nr,3)=
sv: LET t(nr,4)=ov: RETURN
3000 IF nr<5 THEN RETURN : REM A
nalysis
3010 BORDER 3: PAPER 6: INK 0: C
LS
3020 PRINT AT 1,5; PAPER 1; INK
5;"   ELECTION ANALYIS
3030 PLOT 70,140: DRAW 120,0,PI
3040 PRINT AT 4,6;"30";AT 6,6;"2
5";AT 8,7;"20";AT 10,8;"15";AT 1
1,10;"10";AT 12,13;"5";AT 12,16;
"0"
3050 PRINT AT 12,19;"5";AT 11,21
;"10";AT 10,23;"15";AT 8,24;"20"
;AT 6,25;"25";AT 4,25;"30"
3060 PRINT AT 10,0; PAPER 2; INK
 7;" Swing  ";AT 11,0;"   to "
;AT 12,0;" Labour "
3070 PRINT AT 10,25; PAPER 1; IN
K 7;" Swing  ";AT 11,25;" to the"
;AT 12,25;" Tories"
3080 LET sw=INT 100*(((tvl/tvc)-
.84)/.84)
3090 LET sw1=sw: IF ABS sw>30 TH
EN LET sw=SGN sw*30
3100 LET an=(ABS sw*PI)/60
3110 PLOT 130,140: DRAW -(50*SGN
 sw*SIN an),-(50*COS an)
3120 PRINT AT 4,15;INT ABS sw1;"
%"
3130 PRINT AT 16,0; PAPER 5;"Tor
ies",,"Labour",,"Alliance",,"Oth
ers",,
3140 PRINT AT 15,8;"% Votes"; PA
PER 5
3150 LET per=(INT (1000*(tvc/tv)
))/10: PRINT AT 16,10;per
3160 LET per=(INT (1000*(tvl/tv)
))/10: PRINT AT 17,10;per
3170 LET per=(INT (1000*(tvs/tv)
))/10: PRINT AT 18,10;per
3180 LET per=(INT (1000*(tvo/tv)
))/10: PRINT AT 19,10;per
3190 PRINT AT 14,16; PAPER 6;"Se
ats   Seats";AT 15,14;" before
 Predicted"
3200 PAPER 5: FOR i=1 TO 4: PRIN
T AT i+15,17;p(i): NEXT i
3210 LET pss=1100*(tvs/tv)-140:
IF pss<10 THEN LET pss=10
3220 IF pss>450 THEN LET pss=450
3230 LET psl=1100*(tvl/tv)-140:
IF psl<10 THEN LET psl=10
3240 IF psl>450 THEN LET psl=450
3250 LET psc=1110*(tvc/tv)-140:
IF psc<10 THEN LET psc=10
3260 IF psc>450 THEN LET psc=450
3270 LET tps=pss+psl+psc
3280 LET psc=INT (630*(psc/tps))
: PRINT AT 16,26;psc
3290 LET psl=INT (630*(psl/tps))
: PRINT AT 17,26;psl
3300 LET pss=INT (630*(pss/tps))
: PRINT AT 18,26;pss
3310 PRINT AT 19,26;"20"
3320 PRINT : PRINT PAPER 2; INK
7;"   Press any key to continue
  "
3490 IF INKEY$="" THEN GO TO 349
0
3500 RETURN
4000 REM Bar chart
4010 BORDER 3: PAPER 7: INK 0: C
LS
4020 PRINT AT 1,6; PAPER 2;"  El
ection Results  ";AT 3,0; PAPER
1; INK 6;"  The number of seats
won is       shown in this bar
chart      "
4025 LET q=0: LET p=150: FOR i=1
 TO 2: LET p=p+100: IF cs>p OR l
s>p OR ss>p OR os>p THEN LET q=q
+100: NEXT i
4030 PRINT AT 7,2; INK 1;"Conser
vative"
4040 LET y=104: LET l=cs-q: LET
cl=1: GO SUB 500
4050 PRINT INK 2;"  Labour": LET
 y=80: LET l=ls-q: LET cl=2: GO
SUB 500
4060 PRINT INK 4;"  Liberal/SDP"
: LET y=56: LET l=ss-q: LET cl=4
: GO SUB 500
4070 PRINT INK 5;"  Others": LET
 y=32: LET l=os-q: LET cl=5: GO
SUB 500
4080 INK 0: PLOT 0,20: DRAW 255,
0
```

```
4090 FOR h=0 TO 250 STEP 50: PLO
T h,20: DRAW 0,-4: NEXT h
4100 FOR h=0 TO 5: PRINT AT 20,6
*h-(h=5);q+50*h: NEXT h
4200 PRINT "                Press any key to
continue"
4210 IF INKEY$="" THEN GO TO 421
0
4220 RETURN
5000 IF nr=0 THEN RETURN : REM f
ile
5010 GO SUB 700
5020 PRINT AT 14,2; PAPER 7; INK
 2;"                Enter Constituency Name
5030 INPUT y$
5040 FOR k=1 TO nr
5050 IF y$="" THEN GO TO 5070
5060 IF y$<>r$(k, TO LEN y$) THE
N GO TO 5110
5070 GO SUB 700: PRINT AT 13,10;
r$(k);AT 15,3;"Labour";AT 17,5;"Liberal/
16,7;"Conservatives";AT
5080 FOR j=1 TO 4: PRINT AT j+14
,15;(k,j): NEXT j
5090 PRINT AT 19,4; PAPER 6; INK
 2;"Press any key to continue"
5100 IF INKEY$="" THEN GO TO 510
0
5110 NEXT k: RETURN
```

Tory leader Margaret Thatcher

Election Special for the standard VIC-20 by Allen Webb

Perhaps one of the most memorable aspects of any general election is in the sight of the experts on TV using their computer analyses to predict the result.

With the number of home computers about now, many people will be planning to make their own statistical analysis of the voting.

My program was developed to form a simple nucleus routine for such analysis.

The program provides a constant display of the number of seats gained — as a barchart — the percentage of the total vote gained by each party and the analysis of each constituency as it is input.

In order to indicate which party is which, the results are coloured red-labour, blue-conservative, yellow-alliance and black-others.

The bar charts show the number of seats in increments of 100 this being indicated by graduations at the top of the screen. Since the length of the bars is scaled, the exact numbers of seats are printed to the right of each bar.

The actual operation of the program is quite simple, apart from the problem of data verification. During the time that results are being reported, there is always the danger of inputting a constituency twice.

Due to the shortage of memory, it is not feasible to store the name of each constituency as it is entered.

Instead, each name is reduced to a two byte number and stored in this form.

This technique will spot any attempt to input the same constituency twice provided that it's spelled the same way each time.

On running, the program sets up the basic display. You are then asked to input the name of a constituency. The name is verified and stored if it is not a repeat. You are then asked to input the votes polled for each party.

The results are ordered using a bubble sort to establish the winner and the majority. The winner's tally of seats is incremented and the display refreshed. The loop is then repeated.

As it stands, the program leaves you about 200 bytes free.

If you have an expanded VIC I suggest that you add either a database of the previous results or an opportunity to input the previous result of each constituency. This will allow you to calculate the swings in voting.

This option will, however, be complicated by the boundary changes.

```
10 POKE55,236:POKE56,24
20 PA$(1)="■■■■":PA$(2)="■■■■":PA$(3)="■■■■":PA$(4)="■■■■"
30 PRINT"□";
40 PRINT"|  |  |  |  |  % VOTE
50 LI=9:GOSUB480: PRINT"_____":IFFL=0THEN320
60 LI=20:GOSUB570:PRINT"CONSTITUENCY":INPUTSE$
70 T=0:FORI=1TOLEN(SE$)
80 C$=MID$(SE$,I,1):IFC$=" "THENNEXT
90 T=T+I*(ASC(C$)-64)
100 NEXT
110 IFSN=0THEN160
120 CO=1
130 OF=6380+(CO-1)*2:PV=PEEK(OF)+PEEK(OF+1)*256
140 IF T=PVTHEN60
150 CO=CO+1:IFCO<=SNTHEN130
160 SN=SN+1:OF=6380+(SN-1)*2
170 POKEOF+1,T/256:POKEOF,T-PEEK(OF+1)*256
180 FORI=1TO4
190 GOSUB570:PRINTPA$(I);" VOTE":INPUTVO(I):TV=TV+VO(I):NEXT
200 FORI=1TO4:IN(I)=I
210 OS$(I)=PA$(I)+"........."+STR$(VO(I)):CV(I)=CV(I)+VO(I):NEXT
220 F%=0
230 FORI=1TO3
240 IFVO(I)>VO(I+1)THEN270
250 F%=1:Q=VO(I):VO(I)=VO(I+1):VO(I+1)=Q
260 Q=IN(I):IN(I)=IN(I+1):IN(I+1)=Q
270 NEXT
280 IFF%=1THEN220
290 V1=VAL(RIGHT$(OS$(IN(1)),LEN(OS$(IN(1)))-13))
300 V2=VAL(RIGHT$(OS$(IN(2)),LEN(OS$(IN(2)))-13)):MA=V1-V2
310 VA(IN(1))=VA(IN(1))+1
320 FL=1:PRINT"■"
330 LI=-1:FORI=1TO4:LI=LI+2:GOSUB480
340 V$=RIGHT$(STR$(VA(I)),LEN(STR$(VA(I)))-1):GOSUB510
350 PRINTPA$(I)BA$V$" ":IFTV=0THEN380
360 V=(INT(CV(I)/TV*1000)/10)
370 CC=16:GOSUB490:PRINT"   ■■■■"V
380 CC=0:NEXT
390 LI=LI+2:GOSUB490
400 LI=10:GOSUB480:PRINTSE$
410 LI=LI+1:PRINTTAB(10)"VOTES"
420 LI=12:FORI=1TO4
430 LI=LI+1:GOSUB480
440 PRINTOS$(IN(I)):NEXT
450 LI=LI+2:GOSUB480:PRINT"■MAJ."MA"SEAT■"SN
460 LI=LI+1:GOSUB480:PRINT"_____"
470 GOTO60
480 POKE781,LI:SYS60045
490 POKE781,LI:POKE782,CC:POKE783,0:SYS65520
500 RETURN
510 BA$="":VA=VA(I)*96/400
520 CH$(1)="▌":CH$(2)="▌":CH$(3)="▌":CH$(4)="▌":CH$(5)="
    ■■":CH$(6)="■■":CH$(7 )="■■"
530 IFVA<8THEN550
540 BA$=BA$+"■■":VA=VA-8:GOTO530
550 BA$=BA$+CH$(VA)
560 RETURN
570 LI=21:GOSUB480:LI=20:GOSUB480:RETURN
```

Pictures: York Evening Press

Fire! And it's your chance to be a hero

Now's your opportunity to prove your skill in the fire service, thanks to Vince Apps and his program for the standard TI-99/4A

The firebugs have been at work again. This time it's a tall apartment building burning from the top down.

Your task is to try and catch the unhappy residents as they leap from the windows of the burning building.

My Fireman program runs on the standard TI-99/4A.

Move the firemen and blanket using keys S and D with the alpha-lock button in the off position. Press the shift key first if you need extra speed.

As the fire moves downwards you will have less time in which to prevent the luckless inhabitants from coming to a sticky end.

Catch as many as you can in the blanket, but miss 10 and I'm afraid that's the end of your career with the fire service!

```
100 REM
110 REM    FIREMAN
120 REM
130 REM    BY VINCE APPS
140 REM
150 GOTO 910
160 REM    MOVE SUBROUTINE
170 REM   LOOK AT KEYBOARD
180 CALL KEY(0,K,S)
190 OFC=FC
200 IF (K<>115)+(FC<6)THEN 220
210 FC=FC-1
220 IF (K<>100)+(FC>30)THEN 240
230 FC=FC+1
240 IF (K<>83)+(FC<6)THEN 260
250 FC=FC-3
260 IF (K<>68)+(FC>28)THEN 280
270 FC=FC+3
280 IF OFC=FC THEN 340
290 REM    PRINT FIREMEN
300 CALL HCHAR(23,2,32,30)
310 CALL HCHAR(23,FC-1,137)
320 CALL HCHAR(23,FC,139)
330 CALL HCHAR(23,FC+1,138)
340 RETURN
350 REM    FALLING MAN SUBROUTINE
360 IF JP=1 THEN 450
370 REM   NEW MAN
380 CL=INT(RND*18+9)
390 RW=TRW
400 ST=131
410 JP=1
420 NJC=NJC+1
430 IF NJC/5<>INT(NJC/5)THEN 450
440 GOSUB 800
450 RW=RW+1
460 IF RW<>24 THEN 570
470 REM   MISSED
480 LST=LST+1
490 CALL SOUND(500,220,4,-5,2)
```

```
500 CALL HCHAR(24,CL,146)
510 JP=0
520 M$=STR$(LST)
530 PSN=25
540 GOSUB 740
550 IF LST=10 THEN 1380
560 GOTO 720
570 CALL HCHAR(RW-1,CL,ST)
580 CALL GCHAR(RW,CL,ST)
590 CALL SOUND(100,5280/RW,4)
600 CALL HCHAR(RW,CL,145)
610 IF RW<>23 THEN 720
620 CALL HCHAR(RW,CL,ST)
630 IF FC<>CL THEN 720
640 REM   SAVED
650 SVD=SVD+1
660 CALL SOUND(300,550,3)
670 CALL HCHAR(23,FC,139)
680 JP=0
690 M$=STR$(SVD)
```

```
700 PSN=12
710 GOSUB 740
720 RETURN
730 REM    PRINT@ SUBROUTINE
740 FOR J=1 TO LEN(M$)
750 CH=ASC(SEG$(M$,J,1))
760 CALL HCHAR(1,PSN+J,CH)
770 NEXT J
780 RETURN
790 REM   NEW LAYER
800 TRW=TRW+2
810 RW=RW+2
820 IF TRW>22 THEN 1300
830 FOR J=7 TO 28
840 CALL SOUND(100,-5,2)
850 CALL HCHAR(TRW-3,J,32)
860 CALL HCHAR(TRW-2,J,32)
870 CALL HCHAR(TRW-1,J,136)
880 NEXT J
890 RETURN
900 REM   PROGRAM START
910 RANDOMIZE
920 CALL CLEAR
930 CALL SCREEN(8)
```

How it works

160-340 move firemen subroutine
180 look at keyboard
190 store old position
200-270 select direction and distance
300-330 print firemen
360-720 falling man subroutine
370-440 new man
450 increment level
480-550 missed man
570-600 print man
650-710 saved man
740-770 simulation of Print at command
800-880 remove layer from building
910 program start
950-1050 define characters and colours
1060-1080 initial values
1100-1170 draw building
1190-1210 print headings
1220-1240 print firemen at start
1260-1280 main program loop
1300-1350 end of game
1380-1420 10 lives lost

Hints on conversion

Texas Basic has some unusual commands for graphics and sound:

CALL CHAR (number, hexadecimal string) controls the user definition of characters. Number refers to the ASCII code of the re-defined character.

CALL HCHAR (row, column, number) prints the character whose ASCII code is number at position row, column on the screen. The TI99/4A has a screen size of 24 rows by 32 columns.

CALL GCHAR (row, column, variable) is the equivalent of PEEK. The ASCII code of the character at position row, column on the screen is left in the designated variable.

CALL SOUND (d, f, v) sounds a note of frequency, f, duration d milli-seconds and volume v.

CALL KEY (O, K, S), the equivalent of INKEY$, will leave the ASCII code of the key pressed in the variable K.

CALL CLEAR clears the screen. A direct equivalent of CLS.

TI-99/4A PROGRAM

```
940 REM   DEFINE CHARACTERS
950 CALL CHAR(130,"FFFFFFFFFFFFFFFF")
960 CALL CHAR(131,"FF818181818181FF")
970 CALL CHAR(136,"000091AADFEBFFFF")
980 CALL CHAR(137,"3078307CB33148CC")
990 CALL CHAR(138,"0C1E0C3ECD8C1233")
1000 CALL CHAR(139,"000000000081FF")
1010 CALL CHAR(145,"3838917E38382844")
1020 CALL CHAR(146,"0000000138FE7830")
1030 CALL COLOR(13,13,1)
1040 CALL COLOR(14,7,1)
1050 CALL COLOR(15,5,1)
1060 FC=6
1070 OFC=6
1080 TRW=7
1090 REM   DRAW BUILDING
1100 CALL VCHAR(6,7,130,17)
1110 CALL VCHAR(6,28,130,17)
1120 FOR J=6 TO 22 STEP 2
1130 CALL HCHAR(J,8,130,20)
1140 NEXT J
1150 FOR J=7 TO 21 STEP 2
1160 CALL HCHAR(J,8,131,20)
1170 NEXT J
1180 REM  HEADINGS
1190 M$="SAVED:          LOST:"
1200 PSN=5
```

```
1210 GOSUB 740
1220 CALL HCHAR(23,FC-1,137)
1230 CALL HCHAR(23,FC,139)
1240 CALL HCHAR(23,FC+1,138)
1250 REM   MAIN LOOP
1260 GOSUB 180
1270 GOSUB 360
1280 GOTO 1260
1290 REM  SUCCESS
```

```
1300 CALL SOUND(500,330,2)
1310 CALL SOUND(500,450,2)
1320 CALL SOUND(500,360,2)
1330 CALL SOUND(900,500,2)
1340 PRINT ::"CONGRATULATIONS!"::
1350 PRINT "LIVES SAVED:";SVD
1360 GOTO 1430
1370 REM   FAILURE
1380 FOR J=550 TO 110 STEP -20
1390 CALL SOUND(150,J,2)
1400 NEXT J
1410 PRINT ::"10 LIVES LOST - DEMOTION TO"
1420 PRINT "BRASS POLISHER, 3RD CLASS!"
1430 END
```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How the software companies get it taped

There's more to software duplicating than meets the eye. Candice Goodwin finds out what goes on behind the scenes at Kiltdale, which does the duplicating for some of the best-known software names in Britain

You need good programs to make it in the software business — that's obvious enough. But many an aspiring software company has got the programming right, only to hit the rocks because of problems in getting their tape copied.

Badly-copied tapes that load inaccurately or won't load at all are a familiar hazard for micro owners, and the chances are that once you've had a bad tape from a particular company, you'll think twice about buying from them again. Retail chains like W H Smith are also starting to get tough with companies whose tapes are unreliable.

The trouble is, a lot of software companies try to copy tapes themselves, or go to duplicating companies geared up for copying music cassettes. Either way the equipment they use is likely to be designed for music — not for micros.

What's the difference? To find out I talked to Peter Fanshawe, of Kiltdale, the company that duplicates tapes for Imagine, Commodore, Rabbit, Bug Byte, Dragon Data and Richard Shepherd, to name but a few. Kiltdale was set up in 1980 and will soon be celebrating production of its millionth data cassette. It reckons to turn out around 100,000 program cassettes a week.

Software duplicating equipment doesn't need to be as flexible as audio equipment, but it does have to be a lot more accurate. If a few components of an audio signal are lost in the recording process, it's unlikely that you would be able to hear the difference.

But lose part of a software signal and you've lost some vital pieces of data, and the resulting tape may contain errors or be unloadable.

To reproduce the sounds made by your favourite musicians, audio recording equipment has to be able to respond to a wide range of sound frequencies. This kind of versatility isn't important in data duplicating, for as anyone who has listened to the sound made by a program cassette will know, it's hardly music to the ears.

But data duplicating equipment has to be able to respond accurately to a more limited range of frequencies.

Though programs are all saved on tape in the form of binary data, the actual way this is carried out varies widely from computer to computer. Many computers use a system of high-pitched and low-pitched tones to represent binary ones or zeroes. The frequency of the tones is crucial to avoid false data creeping in.

Some computer manufacturers including Commodore use a timing system, somewhat like Morse code, to distinguish a one from a zero in the audio signal. Once again, accuracy is all when copying this signal on to tape.

According to Peter Fanshawe: "Our duplicating system is specifically designed and set up for data. Our mastering system is designed to cater for the peculiarities of any computer." Kiltdale even use a special kind of tape, made to ensure that as few as possible of the tiny metal oxide particles on the tape coating fall off and cause data loss. Once again, the loss of a few particles won't affect a music cassette, but could wreck a program recording.

When a tape arrives for duplication at Kiltdale, the first thing they do is try it out. Peter said: "Tapes we are sent often have mistakes in them. You wouldn't expect it from the large manufacturers, of course — but it does happen". The tape is then loaded into the computer and a new master tape produced. "By doing it that way, we can clean up the original signal, so that our master is actually better than the original", Peter said. The master is recorded on a loop of quarter-inch tape, and from that the program is transferred to large reels of cassette tape, each reel holding enough tape for 25-150 programs. An electronic pulse marks the end of each recording.

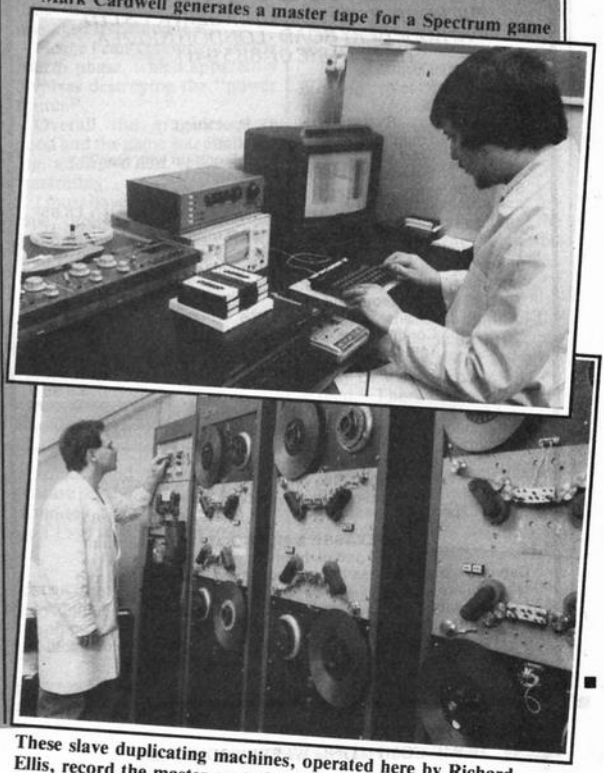
The tape reels are then put onto a winding machine which, guided by the electronic pulses, cuts off the individual lengths of tape and puts them into cassettes. The cassettes are then ready for labelling, and packing into boxes with inlay cards — which Kiltdale can also supply.

According to Peter Fanshawe: "We deal with all sizes of companies, from individuals right up to the big organisations. I'd recommend anyone thinking of selling software commercially to go and see the duplicating company they're thinking of using first and check them out.

"Don't be tempted by the get-rich-quick bonanza — have your tape made and packed professionally".

And if you want to go and see for yourself how your computer tapes are produced, there's a standing invitation from Kiltdale to visit their factory and have a look around. Write to them at PO Box 2, Andoversford, Cheltenham GL54 5SW.

Mark Cardwell generates a master tape for a Spectrum game



These slave duplicating machines, operated here by Richard Ellis, record the master on to large reels of cassette tape

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Wacky Waiters £5.50

Imagine, Masons Buildings, Exchange St East, Liverpool

Here for once is a game with an entirely original plot. You control a waiter who rushes from side to side of the screen serving customers with wine. The screen is divided into six floors linked by five lifts, and the waiter must be carefully guided on and off the lifts (errors are terminal).

Stumbling while carrying the wine results in a warning and three warnings result in the sack. The use of graphics was fair and animation good. The use of sound, however, was negligible.

Personally I found the game rather unsatisfying. Having developed a good plot and designed some good graphics, the programmer seems to have run out of steam.

I prefer good accurate instructions, but this game came supplied with a piece of rather tedious prose which bored rather than informed.

A.W.

instructions	55%
playability	60%
graphics	80%
value for money	55%

★ ★ ★

XENO II £6.00 VIC-20 + 16K

Anirog, 26 Balcombe Gardens, Horley, Surrey

Not so much a new game, as one built up of four separate phases, each with a different and familiar scenario.

Phase one involves landing a space ship through a meteor storm; tricky but not too diffucult.

Next you have to destroy three sets of space mines which home in on you.

The third phase is a simple wave of space invaders. During this phase I found the controls a little sluggish and I haven't managed to complete it.

Hence I can't comment on the fourth phase, which apparently involves destroying the "power source".

Overall the graphics were good and the game was challenging, addictive and, most of all, frustrating.

I must have been given a rogue tape, though, since I found the game appallingly difficult to load successfully.

A.W.

instructions	85%
playability	75%
graphics	80%
value for money	85%

★ ★ ★ ★

Gridtrap £7.95

Sumlock, Royal London House, 198 Deansgate, Manchester M3 3NE

If I had to choose one program to demonstrate the game playing potential of the unexpanded VIC, this is the one I'd choose.

You have to move your player over a number of bombs to defuse them and gain points, while at the same time avoiding the randomly-positioned skulls and the evilly moving industrial boot.

As if this was not enough, as you move over the screen you leave a trail behind you which you cannot retrace or cross over, although there is a special scroll facility which allows the screen background to be moved to the right or left to bypass any gaps in the screen.

Bonus points can be gained by moving over the randomly-placed flags. As you progress from one screen to another the number of boots pursuing you increases up to a maximum of four.

The game makes excellent use of the VIC's ability to change the dimensions of the television screen and to create double-height user-defined graphics.

The sound generators are also put to good use throughout the game, with a melody playing throughout the game independently of what is happening on screen. There is a constant display of score, hi-score, elapsed time and the time left until the bombs detonate.

This is for my money the best non-cartridge game available for the unexpanded VIC. See what you think!

M.B.

instructions	80%
playability	95%
graphics	95%
value for money	85%

★ ★ ★ ★ ★

Triad £7.95

Sumlock, Royal London House, 198 Deansgate, Manchester M3 3NE

The first time I saw an arcade game with aliens swooping down from the 'space invader' pack I was spellbound. That was quite some time ago now, and any game relying solely on that theme these days has to be extra special. This has the usual theme, but lacks any memorable features. I found it rather boring.

That isn't to say that it's easy to beat. But the reward for wiping out one screen of aliens is just the same again, only quicker.

I can't particularly praise the graphics, and the only added feature is the self-play routine after ten seconds or so if you don't start a new game yourself.

B.J.

instructions	80%
playability	50%
graphics	60%
value for money	50%

★ ★

There's no limit to Atari's antics on the screen

You're limited only by your imagination when building screen displays with Atari's micros. Philip Bramley shows you how

On the Atari computers, unlike most others, you are not limited to the screen formats provided by the manufacturer.

Although there are 12 standard graphics modes (0-11) these need only be a basis for any other mode you care to design using the facilities of Atari's second microprocessor.

ANTIC, as it is known, is a true microprocessor. It has its own set of instructions, a program and data. Its program is called The Display List and its function is to control what appears on the screen. To understand the Display List it is helpful to have at least a basic idea of how a television screen is drawn.

An electron beam is generated at the back of the TV tube and is host towards the phosphor coating on the inside of the screen's surface. Where it hits, the phosphor glows and we see a point of light.

The beam starts at the top left corner of the screen and draws a line from left to right.

As it travels the strength of the beam is controlled so that some parts of the phosphor can glow more brightly than others. When it reaches the right-hand edge of the screen the beam is turned off and brought back to the left edge and at the same time lowered slightly, each left-right horizontal sweep being known as a scan line.

Then another line is drawn similar to the first. The process is continued until the bottom of the screen has been reached. Then the beam is turned off and returned to the top left ready to begin again.

Since the phosphor only glows for a very short time after the beam has moved on we must constantly re-draw the screen image so it appears to be on all the time.

In this country the TV standard is PAL, a 625-line system. Thus each screen image consists of 625 horizontal scan lines. This is complicated because in order to avoid flicker each screen is composed of two interlaced fields of lines.

First all of the odd numbered lines are drawn and then all of the even ones. So each field has 312½ lines and 50 fields are drawn each second. As the computer does not do interlacing, as far as it is concerned each successive field is superimposed and made up from 312 horizontal scan lines. One field therefore makes up a complete image.

Incidentally, have you ever wondered why the Atari 400/800 computers (or the VIC-20 and Commodore 64 for that matter) only normally allow you to use a small box in the middle of the screen to display your prorgams? You may have envied the full screen display of the BBC micro.

The problem with any machine that has been designed in America is that over there they use a different TV standard known at NTSC.

This system is based on 525 lines and, other than completely redesigning the display format for UK use, the manufacturer can only use 525 out of our total of 625 lines and leave extra blank space at the top and bottom of the screen.

The NTSC system also has interlacing, so its screen as far as the Atari is concerned is made up of 262 scan lines. The fact that 60 fields are drawn each second is one reason why some Americn software runs a bit slower over here and it is worth being cautious if you buy programs direct from the States.

Even some of the items in the Atari Program Exchange (APX) catalogue are not recommended for PAL systems.

Since it is not advisable that the computer picture disappears off the top and bottom of the TV screen only 192 horizontal scan lines are used (giving a small border on the NTSC system but a much larger border on our screens).

This means that the normal limit of resolution using the Atari computers is 192 pixels vertically. This is used in graphics modes 8, 9, 10 and 11.

In order that the computer can provide a screen display it must set aside a section of RAM user memory for the screen data. The video circuitry must then convert the data into signals which the TV will understand. In our case, the television interface adapter (GTIA) takes care of the signal that goes to the television and it is supplied with information by ANTIC.

From Atari BASIC we can access nine graphics modes, namely 0-8 (graphics modes 9-11 are considered by the computer to be other forms of mode 8). In graphics mode 8 we are normally given 320 pixel resolution horizontally.

Since each pixel is either foreground or background colour it only needs one bit of information to store its current colour. This means that eight horizontal pixel values can be packed into one byte of RAM user memory.

For one complete row of 320 pixels we therefore need 40 bytes of storage space.

Each row is stored in memory next to the previous one and the total graphics 8 screen will take up 7,680 bytes. On the other hand graphics mode 7 can plot each pixel in any of four colours. So each pixel needs two bits of storage giving four pixels per byte.

With 160 pixels horizontally we again find that we need 40 bytes of RAM user memory to store each row of the screen display but only 3,840 bytes for the total since there are half as many rows altogether.

The computer creates graphics mode 7 by sending the same information to the TV screen for two consecutive scan lines before it looks for data for the next graphics row. This gives us a vertical resolution of 96 pixels.

The display list is a short program used by ANTIC to tell it where to find the screen data in RAM and how to interpret it. Table 1 shows all the ANTIC mode numbers and how each number is interpreted in terms of pixels per model line, scan lines per mode line, number of colours and so on.

The most interesting thing to note is that there are five ANTIC modes which are not used by BASIC. 2, 3 and 4 are character modes 12 and 14 are interpreted as graphics. When you change screen modes from Atari BASIC the computer writes a list of all the ANTIC mode numbers for any lines used on the screen. So in graphics 0 the display list consists of 24 '2' instructions and so on. ▶

The other instructions used by ANTIC are as follows:

- Blank lines are represented by the number 16 × (N-1) where N is the number of blank scan lines needed. So eight blank lines (equivalent to the height of a BASIC mode 0 character) would be 16 × (8-1) = 112. Three of these eight blank line instructions are used to start each display list. These ensure that the picture does not run over the top of the TV screen on the NTSC system. Does that give you any thoughts?
- The first ANTIC mode number in the list has 64 added to it and is known as the Load Memory Scan Command (LMS). In BASIC mode 0 the LMS would be stored as 66. It is always followed by two extra bytes which indicate the starting address of the screen data.
- At the end of the display list there is a JVB instruction. This stands for "jump and wait for vertical blank" when the electron beam on the TV is returned to the top left of the screen. This always has the value 65. It is followed by two bytes which form the address of the first byte of the display list so that the computer can know where to go when it is ready to start the next field.

ANTIC MODE NO.	BASIC MODE NO.	TYPE	NO. OF COLOURS	SCAN LINES PER MODE LINE	CHARS. PER LINE	BYTES PER LINE	BYTES PER SCREEN
2	0	TEXT	2	8	40	40	960
3	NONE	TEXT	2	10	40	40	760
4	NONE	TEXT	5	8	40	40	960
5	NONE	TEXT	5	16	40	40	480
6	1	TEXT	5	8	20	20	480
7	2	TEXT	5	16	20	20	240
8	3	GRAPHICS	4	8	40	10	240
9	4	"	2	4	80	10	480
10	5	"	4	4	80	20	960
11	6	"	2	2	160	20	1920
12	NONE	"	2	1	160	20	3840
13	7	"	4	2	160	40	3840
14	NONE	"	4	1	160	40	7680
15	8	"	2	1	320	40	7680

Table 1

The computer normally reserves space for the screen data at the top of RAM user memory then the display list is created immediately below it, the actual starting location depending on the graphics mode selected.

You can find this location by peeking location 560 and 561 which hold the low and high bytes respectively.

Similarly the address at the start of the screen data is held in locations 88 and 89.

Now let's get some of this theory to do something useful. Listing 1 shows the most difficult way to go about it by creating a completely new display list in a safe place in memory and then telling ANTIC where it is. The list omits the three blank lines at the top of the screen and then spaces out the normal graphics 0 display to fill the screen by using a double blank line instruction between each text line.

It will become obvious if you changed the background colour. Incidentally, this expanded screen occupies 238 scan lines. You must always use less than 240 scan lines or the screen will "roll".

It is also worth remembering that drawing the screen does occupy the computer for a significant proportion of its time — the shorter the display list, the faster the rest of the program will run.

If you think of the screen image as merely a pile of mode lines, then any combination of ANTIC modes can be used. As I say, Listing 1 makes life more difficult by creating a completely new display list.

Normally, we can cheat by using the original and then modifying it as we wish. Listing 2 uses this approach and shows graphics 7, 2, 0, 1 and 8 all on the screen at once. The easiest way to create the display list is to start with graphics mode 8 since it is easier to shorten the list than to lengthen it.

Listing 1

```
100    REM Expanded Graphics 0 Mode
110    ? CHR$(125) : SETCOLOR 2,0,0
120    REM
130    REM Find existing display list
140    DLIST = PEEK(560)+256*PEEK(561)
150    REM
160    REM use page six for new list
170    REM
180    REM LMS and screen address
190    POKE 1536,64+2 : REM LMS byte
200    POKE 1537,PEEK(DLIST+4)
210    POKE 1538,PEEK(DLIST+5)
220    REM
230    FOR N=1 TO 45 STEP 2
240    POKE 1538+N,16
250    POKE 1538+N+1,2
260    NEXT N
270    REM
280    REM JVB and display list address
290    POKE 1585,65
300    POKE 1586,0
310    POKE 1587,6
320    REM
330    REM Tell ANTIC about display list
340    POKE 560,0
350    POKE 561,6
```

Listing 2

```
100    REM Mixed Mode Demo
110    GRAPHICS 8+16 : POKE 752,1
120    SETCOLOR 2,2,6
130    SETCOLOR 0,7,8
140    DLIST = PEEK(560)+256*PEEK(561)
150    POKE 559,0
160    POKE DLIST+3,64+13
170    FOR N=6 TO 39
180    POKE DLIST+N,13
190    NEXT N
200    POKE DLIST+40,7
210    POKE DLIST+41,2
220    POKE DLIST+42,6
230    POKE DLIST+112,65
240    POKE DLIST+113,PEEK(560)
250    POKE DLIST+114,PEEK(561)
260    POKE 559,34
270    REM
280    TOPSTART=PEEK(88)+256*PEEK(89)
290    MIDSTART=TOPSTART+35*40
```

```
300  BOTSTART=MIDSTART+200+400+200
310  HI=INT(MIDSTART/256) : POKE 89,H1
320  LO=MIDSTART-H1*256 : POKE 88,LO
330  POKE 87,2
340  POSITION 1,0 : ? # 6; "atari mixed modes"
350  POSITION 14,1 : ? # 6; "by using"
360  POSITION 0,3 : ? #6; "custom display lists"
370  C = 1
380  FOR A=0 TO 159 STEP 3
390  REM
400  H1=INT(TOPSTART/256):POKE 89,H1
410  LO=TOPSTART-H1*256:POKE 88,LO
420  POKE 87,7
430  C=C+1:IF C=4 THEN C=1
440  COLOR C
450  PLOT 0,34 : DRAWTO A,0
460  PLOT 159,0 : DRAWTO 159-A,34
470  REM
480  H1=INT(BOTSTART/256):POKE 89,H1
490  LO=BOTSTART-H1*256:POKE 88,LO
500  POKE 87,8:COLOR 1
510  PLOT 0,0:DRAWTO A*2,69
520  PLOT 319,69:DRAWTO 319-A*2,0
530  NEXT A
540  GOTO 540
```

Lines 100 to 260 create the new display list. Lines 230 to 250 place a new JVB and display list start at then end of our shorter list and, in order not to confuse ANTIC while we change this, lines 150 and 260 disable the screen display completely until we are finished and then turn it back on again.

Once the display list is complete we must tell ANTIC how to interpret the screen data otherwise it will still think the whole screen is in graphics 8. To do this we treat each different mode on the screen as a separate smaller screen and lines 280 to 300 define the starting location of each of these.

Top-start is the graphic 7 area and is at the beginning of the screen data so we use the value found in the locations 88 and 89. Mid-start is the text area in the middle of the screen so to find the start of this we add 35 graphics 7 mode lines each of 40 bytes screen memory.

Bot-start begins below the text area so we add to mid-start 20 bytes for the graphics 2 line, 40 bytes for the graphics 0 line and 20 bytes for the graphics 1 line (all of these values can be found in Table 1),

Then, each time we want to print or plot in a particular area of the screen we poke the modified start into locations 88 and 89.

So far, only ANTIC knows of our alterations and we must tell the computer which new mode it is in after each change by poking the value into location 87, otherwise, it will think that all of the screen data must be still in graphics 8 and produce gibberish in the other mode areas.

Some recently introduced computers, such as the BBC micro, allow you to combine high resolution graphics and text on the same screen. Although versatile, the big disadvantage of the method used here is the amount of memory gobbled up.

The Atari Display List lets you combine any number of graphics modes on the screen without using any more memory than is absolutely necessary. Any combination of 16, 4, 2 and 1 colour graphics and the different text modes, can be mixed at will.

You are only limited by your imagination.

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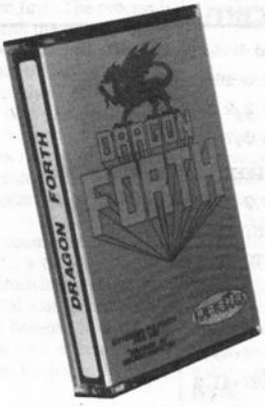

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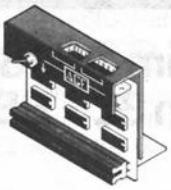

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Widgit Software, 48 Durham Road, East Finchley, London N2 9DT

This tape contains three programs — all of which are concerned with simple addition/subtraction of whole numbers using the "building block" method.

Widgit has used a lot of ingenuity and skill to create an entertaining educational program, using hi-res graphics and some machine code to produce superior animation. Colour and sound are also used well.

The programs loaded first time, and instructions were clear and concise. They were all well error trapped, bug free and user friendly.

Adding shows a crane and two sets of up to nine crates, with a train below them. The crates are loaded on to the train in two parts — the two parts of the sum — and, when the correct result is entered, the train puffs its way off screen.

Subtract uses the same idea, but this time a boat is being unloaded (by a little man running up and down a ladder) before steaming off into the sunset.

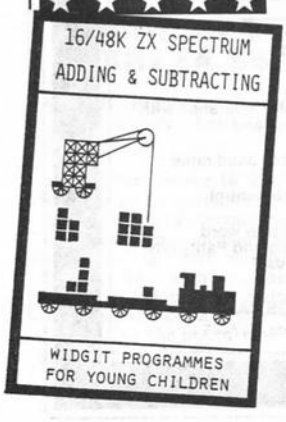
Ducks shows ducks entering (+) or leaving (-) a river. The child enters how many and the answer.

These are superb early learning programs with graphics which would put many a Spectrum arcade style game to shame. Wholeheartedly recommended for children of pre-school or infant plus age.

R.E.

instructions	95%
playability	100%
graphics	100%
value for money	100%

★★★★★



Shape-Sorter £5.25

Widgit Software, 48 Durham Road, East Finchley, London N2 9DT

An excellent set of three programs, **Shape-sort, Houses** and **Size Sort,** all of which use colour, sound and graphics to produce an interesting exercise in basic perceptual skills for young children aged two upwards.

All three programs loaded first time, gave brief but adequate instructions, were suitably simple to use, and well error trapped.

Shape Sort displays four different shapes at the top of the screen, and in the middle of the screen is the shape which has to be matched. The child moves the shape along by pressing the space key.

Houses shows four houses, one of which is slightly different. A car is drawn and has to be moved to the odd one out (keys are the same for all programs). When the correct house has been chosen a "lady" runs from the house to the car and drives off. Two levels of difficulty are supplied.

In **Size Sort** five objects are displayed and have to be selected in order of size, largest first.

These programs will be of great value to young children — but as well as using three-dimensional shapes and objects, not in place of!

R.E.

instructions	95%
playability	98%
graphics	100%
value for money	100%

★★★★★

Counting £5.25

Widgit Software, 48 Durham Road, East Finchley, London N2 9DT

I am pleased to say that Widgit's programs achieve their stated aims: to provide educational and entertaining programs for children aged two years plus.

This tape contains four programs, all of which loaded first time, were easy to operate, worked without any bugs, were user friendly and well idiot proofed. All programs used sound, colour and superb graphics — the animation on **Count 100** was better than on some arcade-type Spectrum games!

Aimed at pre-school and infants plus age range, **Count** displays a random number of monsters and the child types in the correct number.

Count cats shows a random number of trains, elephants, cats and houses. The child has to input the amount of the type of object the computer chooses.

Rockets: up to four rockets with up to four spacement in each appear. On entering the correct total of spacemen the rocket(s) take off.

Count 100: a number of men are displayed in tens plus any extra units. The child must enter the correct total.

R.E.

instructions	95%
playability	98%
graphics	100%
value for money	100%

★★★★★

Alphabet £5.25

Widgit Software, 48 Durham Road, East Finchley, London N2 9DT

Aimed at children aged two upwards, this program for the 48K Spectrum uses colour, sound and hi-res graphics to give practice in selecting letters of the alphabet.

It loaded first time and concise instructions are given on screen and cassette insert. The program auto-ran, always a good idea with educational programs, and an option of three levels is offered.

Level one lets the parent limit the number of letters used in the program, and level two uses the complete alphabet. The program works by selecting and displaying a picture in colour hi-res graphics — subsequent pictures follow in alphabetical sequence, and the child enters first letter of the name of the object.

Level three displays a graphics lower case letter, large size. The child types in the corresponding uppercase keyboard letter and, if correct, the picture is then drawn.

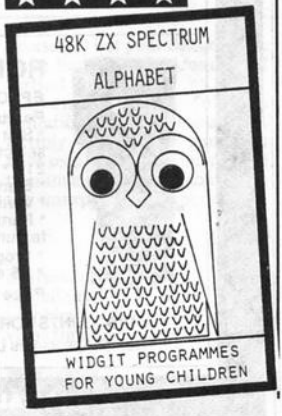
The computer plays a verse of Baa Baa Black Sheep for a correct answer — good, positive motivation.

The pictures do tend to take a while to be drawn and after the first few times are easily recognised. I found that children got impatient because they wanted to enter their letter before it was complete. Nevertheless a valuable program.

R.E.

instructions	95%
playability	75%
graphics	100%
value for money	90%

★★★★



Primary Arithmetic £4.95

Rose Cassettes, 148 Widney Lane, Solihull, West Midlands B91 3LH

The value of this sort of program is in the tirelessness of the computer and the instant feedback to answers, plus, of course, positive motivation by presenting a "reward" for a series of correct answers.

Of its kind, this is a very good cassette, containing four drill-type programs covering the basic rules of number. The numbers of each sum are presented clearly and in large type, and there are three levels for each program — units, tens and hundreds.

The child's name is requested at the start and used frequently, along with simple but pleasant prompts, making the whole program very user friendly.

The "motivation" is a balloon whose facial features increase or decrease on correct/incorrect answers, finally taking off. Colour and sound are used effectively.

Although this is a useful and valuable program, it could have been improved. When an incorrect answer is entered you are given a "try again" message — some form of hint would have been nice, and an analysis of error followed by corrective text would have been perfect.

Answers to all sums are entered in logical order, digit by digit, remainders are included in division, and subtraction is by the decomposition method. The tape loaded after several attempts.

R.E.

instructions	80%
playability	68%
graphics	90%
value for money	90%

★ ★ ★ ★

Invisible Man £5.95

Chalksoft, Lowmoor Cottage, Tonedale, Wellington, Somerset TA21 0AL

This is a program for the 48K model to help children learn about compass points and co-ordinates by hunting for an "invisible man" hidden in a 15×8 grid. The idea is to key in co-ordinates until you find all the positions his body occupies on the grid. If your attempt is unsuccessful, you're given a hint in the form of a compass bearing — "try South West", for example.

On-screen instructions are very brief, but quite explicit — as long as you already know what co-ordinates are! You have the choice of three levels of difficulty, based on the time limit you have to complete your search.

Though the idea behind the game is a good one, both the introduction and playability leave a lot to be desired. There isn't enough variety to hold a child's attention for long, and the graphics are nothing special.

A nice tune is played when a game is completed successfully, but I doubt if this is enough to encourage the repeated use and learning by repetition that should be the aim of the game.

P.F.

instructions	50%
playability	80%
graphics	55%
value for money	60%

★ ★

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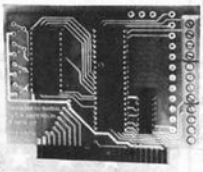

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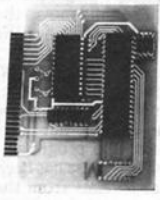

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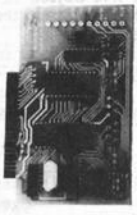

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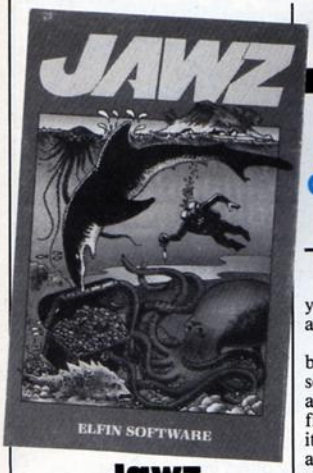

Jawz Spectrum £4.95

Elfin Software, Hudsons House, Battery Road, Great Yarmouth NR30 3NN

At first glance, Jawz looks like a variation on Invaders, but with the action transferred from the depths of space to the depths of the ocean.

You control a gun which rests on the sea bed. It can be moved left and right and fired at sharks swimming in mid-ocean.

Close to the surface are jelly fish which drop poison pellets. The sharks appear resistant to the poison, and swim on if hit, but if your gun is struck, you lose it. You get the usual total of three guns before the game ends.

The sharks look more like tiddlers as they swim randomly to-and-fro, doing harm to no-one. It seems a shame to blast them out of the water. But this you must do if you want to score any points.

And that's the hard part. For bullets don't fly straight up the screen: instead a 3-D effect is achieved. Two bullets fly out from either side of the gun, and it is only when they converge on a shark that a kill is made. The sharks' movements are fast enough to make that rather difficult.

The faster you kill, the higher your score rate. There is also a time limit (so watch your oxygen level), and three levels of difficulty.

Instructions appear on the screen in between games. They are very limited, and a couple of tries are needed to get used to Jawz.

There are five different keys to press. These are bunched together at the base of the keyboard — a little tricky for adult-sized fingers.

Nevertheless, a must for Invaders connoisseurs who want to try something a little different.

D.N.

instructions	40%
playability	80%
graphics	80%
value for money	90%

★★★★

Thro' the Wall and Scramble ZX 81 16K £4.95

Psion, 2 Huntsworth Mews, Gloucester Place, London NW1

I approached this tape reluctantly, suspecting that it might be very similar to many others I have tried. And so it was; on one side was a version of Breakout, and on the other side was Scramble, both arcade games that have been with us a long time.

However, not mine to reason why yet another of these should be offered, so I tried them out. **Thro' the Wall** proved to be a very basic Breakout game; you have three lives and each brick is worth 10 points. Three speeds are offered, but even 'superfast' is not very taxing.

Unlike some version of the game, the angle of the ball can vary wildly according to the angle at which it strikes the 'bat'. This is the only thing that is difficult to judge. But the display was smooth and I found no bugs.

Not so with Scramble. Maybe it was the demonstration tape, but I had trouble loading this.

Several times when I thought that it had loaded successfully I found that either it refused to respond to the keyboard at all, or went from the 'choose level of play' stage direct to the 'you have achieved the highest score' stage apparently missing out the game altogether!

However, when it did play correctly it was a simple game using either the keyboard or joysticks. Your airplane flies over enemy terrain; rockets and enemy craft attack you, and your aim is to shoot them down or avoid them. The display moves fast and the controls respond well, but I found the way the terrain was generated a bit flickery.

I didn't find these games to be as good as other versions I have seen. Adequate, but no more.

C.C-R.

instructions	50%
playability	45%
graphics	60%
value for money	45%

★

Bumper 7 ZX81 £4.95

Axis, 71 Brookfield Avenue, Loughborough, Leics LE11 ELN

Seven games for the 1K ZX81, intended as an introduction to the capabilities of the computer.

Repeat 20 is a memory test similar to the electronic game Simon, but with numbers instead of colours. **Ski Slalom** and **Snowflake** attempt to demonstrate the use of moving graphics; in the former, you have to guide a skier from side to side so that he passes through slalom gates which scroll up the screen towards him.

The latter requires you to catch a falling snowflake in a bucket which moves right and left at the bottom of the screen.

Both these games have very minimal displays, however, and the player only uses left and right controls. I feel that even with limited memory more imaginative graphics could have been devised.

Paper, Stone & Knife is a computer version of an old favourite; you indicate your choice with a number and the ZX81 randomly generates its choice; scores are kept. **Patterns** is a non-interactive program which does just what you would guess — it generates patterns. If you don't like the result, the instructions tell you how to alter the program.

The last two games are the most interesting of the bunch. **Banco** is a simplified version of the card game Chemin de fer — your aim is to attain a total the last digit of which is nine, or close to it. The computer keeps both your and its own scores.

Sketch is rather like the child's game Etch-a-sketch. It allows you to draw pictures on screen (rubbing out mistakes if necessary) but your designs have to be limited to horizontal and vertical lines only.

Even allowing for the limitations of 1K, these are not terribly imaginative games. I have seen programs that manage to cram a surprising amount into the unexpanded memory.

C.C-R.

instructions	70%
playability	60%
graphics	40%
value for money	60%

★★

Four Challenging Games Jupiter Ace £5.50

Remsoft, 18 George Street, Brighton, BN2 1RH

This games compendium from the Remsoft stable genuinely lives up to its challenging claim. With the speed of Forth these games certainly do need real skill and their difficulty is increased by the gooey rubber keys of the Ace.

The games themselves are not exactly new, but if this is what you think Forth is for you'll enjoy mastering them and gradually improving your skill.

In **Saucer,** flying objects more like rockets than saucers appear in swift transit from left to right and you have nine chances to zap them. Sound and flashes crown your (rare!) successes.

Driver involves you in a mad ton-up attempt to keep your skidding car on the winding road, with penalty points piling up against you all the time, while **Maze** lets you steer an exponent sign much more sedately through its labyrinth in search of the almighty dollar.

Parachute is a Forth version of the Micrel game of the same name for the Spectrum, where you release a parachutist from a plane and guide him safely to earth in the dropping zone.

Instructions to all these games are clear and comprehensive, there are no loading problems and when your trigger finger gets tired you'll find it well worth your while to dissect the dictionary to see how they all run.

	G.M.
instructions	85%
playability	90%
graphics	95%
value for money	90%

★★★★★

Joker Spectrum £5.75

Flowchart, 62 High Street, Irthlingborough, Northants NN9 5TN

I know that humour is a very personal thing, but it's hard to imagine anyone wanting to sit in front of a screen for an hour reading jokes interspersed with coloured patterns. This, however, is what Joker offers.

Flowchart describes the program as "hundreds of rib-tickling puns and jokes coupled with mind-blowing graphics." In fact the jokes rarely rise above the level of "Why do traffic wardens have a yellow line on their hats? To stop people parking on their heads."

Timing is all-important in joke telling, with even a weak joke raising a laugh if well delivered, but this program's slow pace makes the humour ponderous at best.

As for the graphics, they're simply screen patterns acting as intervals between jokes, and I found they began to pall very soon.

Side A has several linked programs for the 16K Spectrum and Side B a single program for 48K. You can choose either 60 minutes of jokes with graphics, or 36 minutes of graphics alone.

	D.J.
instructions	70%
playability	10%
graphics	40%
value for money	20%

★

Hangman BBC B £9.14

Micro-Aid, 25 Fore St, Cambourne, Cornwall TR14 0JX

This is really an international version of Hangman as it can be played in five languages; English, French, German, Italian and Spanish. You can also store your own Hangman words in the program.

There are two levels of difficulty — easy or hard. Each game starts by asking if you want a clue about the word to be guessed. The easy option shows dashes on the screen indicating the number of letters in the word to be found. The hard option doesn't. You have nine guesses, and the whole word can be guessed at the start or letter by letter.

If you fail to guess the word in nine goes, you are unceremoniously hung whilst the Death March plays.

If you enjoy a challenge as well as word games then this old and tried game is fair value for money — and might even improve your foreign languages.

	P.C.
instructions	75%
playability	90%
graphics	50%
value for money	70%

★★★★

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Squirm is a worm who crawls around your screen. You have to control him and stop him colliding with himself or with the screen border.

A growing worm needs feeding, however, and as he eats he grows. You score points for the numbers, from 1 to 10, that you eat. Control him with the cursor keys (5,6,7,8).

The number 10 counts as two single numbers — one and zero — but each time Squirm eats a number another appears, so 10 gives you two more numbers.

The program contains a few features which may easily be transplanted into other games and is written for maximum speed and economy.

As the position of the head will later be the tail, and is to be erased, every position of the body needs to be recorded.

For this an array of 600 units is used as this is the total size of the screen and therefore the maximum length. The array may be thought of as cylindrical in that it wraps round so that the 601st position is the first (the subscript is reduced mod. 600). The length is originally 2, so the score is the length minus 2.

The sub-routine at 8000 is a doodler.

While the computer waits for you to press a key after reading the instructions or to play a new game this routine inverts the screen square by square — an idling computer is so boring.

The part from 1010 to 1060 is an interesting way to indicate a collision and 270-310 converts a number so it can be read in inverse graphics.

On the whole the computer POKEs the display file rather than printing, as it is both faster and only requires one number to be stored, instead of storing the line number and column for each position.

It also makes it easier to determine whether a collision or a number is to be acted upon, which is done by POKEing the display file.

Variables

A(600) array storing addresses of each position in display file
I$ direction — 5, 6, 7, or 8
X points to position in A(600) of head
L length of Squirm
N, Q, U$ general workhorses

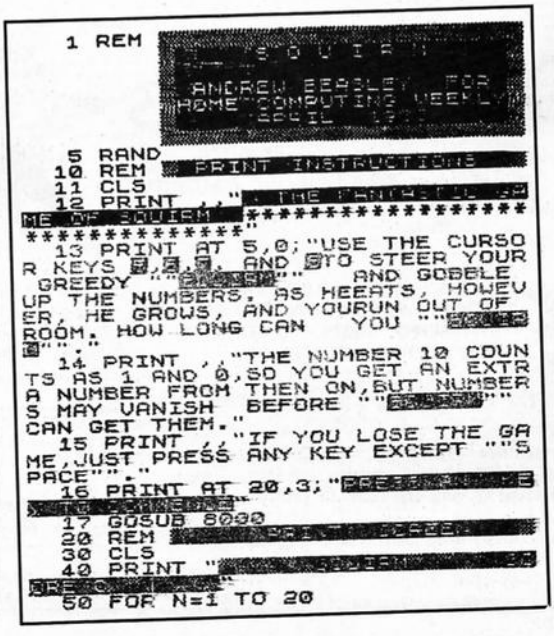
Hints on conversion

The program should convert easily. If you don't wish to use PEEK and POKE on your machine — if PRINTing is faster — then you will probably have to use two arrays, one for line number, and one for the column.

The display file on the ZX81 starts at the address stored as PEEK 16396 256 PEEK 16397. The first byte is a NEWLINE character, 118, which must not be altered. It is followed by 32 bytes for the first line, terminated by another NEWLINE. Then come the next 32 bytes, and so on.

This game uses 22 lines of the screen. The position of the printing head in the display file is stored as PEEK 16398 256 PEEK 16399, and this is used in printing the random numbers.

The character set is such that the inverse of each character is the code of the character plus or minus 128 (see 8000 subroutine). Poking a negative number is interpreted as 256 minus the number. The logical function when used in the context 'A AND condition' means A if the condition is true (non-zero), zero if not. The rest should be self-explanatory.



To help you type in the game, I will explain the graphics characters in my block-by-block description of the program. Page 184 of the ZX81 manual shows the characters for the code numbers.

How it works

10-17 print instructions. Inverse: PRINT INSTRUCTIONS, THE FANTASTIC GAME OF SQUIRM, cursor key numbers, SQUIRM, SQUIRM, PRESS ANY KEY TO COMMENCE
20-80 set up screen border. 20: PRINT SCREEN; 40: SQUIRM and SCORE 0 are separated by pairs of characters 138 and 137; 80: 16 pairs of characters 138 and 137
100-196 initialise variables. 100: INITIALISE
200-250 advance the pointer to next position of head — which has already been calculated — to see what it is about to hit. 200: MAIN LOOP
260-320 eat a number, advance score and length. 260: EAT A NUMBER
340-360 print new head and erase old tail
380-430 change direction if one of the cursor keys is pressed, calculate new position of head, GOTO 200 for next cycle. 380: CHANGE DIRECTION
1000-1090 end of game. 1000: END OF GAME; 1080: PRESS ANY KEY FOR A NEW GAME
6000-6070 sub-routine: print a random number where there is a space on the screen. 6000: PRINT NEW NUMBER
8000-8060 sub-routine: slowly invert screen until a key is pressed. 8000: SCREEN INVERT

Ideas for further development: While the game is complete, more can be done to suit your taste. High scores could be introduced, the numbers could disappear after a given time, and mystery objects could appear with a random score. To further complicate matters, poison objects could be used. ▶

```
  60 PRINT AT N,0;"▓";AT N,31;"▓
"
  70 NEXT N
  80 PRINT "▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓
▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓
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No, mine's the best . . .

I am the proud owner of a *"/@£__&'()? personal home computer and am writing to complain because

a You have not mentioned my computer in your magazine for at least two weeks

or

b You have mentioned it, but in what I sense to be a subtly disparaging manner

c You have allowed someone to extol the virtues of his own rotten computer while slagging mine in comparison.

I love my *"/@£&'()?. It was delivered 28 days before I ordered it, has 350 colours, 42 sound modes, 632 user defined functions, a built-in printer and disc drive, fits into a matchbox, and runs to meet me at the door with my slippers. At £4.25 (including VAT) it is vastly superior to all other makes in the under-£200 range and only a cretin would buy anything else.

Observing that four out of the five letters in your May 10/16 issue were from owners of inferior computers, attempting to praise their own at the expense of equally pitiful makes, may I hope that my letter can now provide the final and conclusive word on this boring, boring correspondence.

Dorene Cox, Dagenham, Essex

Postal problems

A word of warning when buying software by post. Recently my teenage son ordered a QSave from Personal Software Services of Coventry and it eventually arrived. He was unable to get it to work and told me he needed a different lead. I telephoned the company and was told a lead would be posted.

It was sent but the letter was not stamped, so we incurred 22p excess surcharge by the Post Office. The item still did not work and a further telephone call to Coventry established that it was not compatible with my son's tape recorder. The person to whom I spoke at PSS said they would refund the money together with postage but when the refund arrived it was only for the amount of the QSave.

Despite a letter detailing the postal surcharge, cost of 36p for a padded envelope and more than 80p to return the item, all my son received back was his initial outlay of £15.95.

Send your letters to Letters, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE. Don't forget to name your computer — the best letter could win £5 worth of software. Queries cannot be answered on this page

This is, of course not counting the cost of two telephone calls to the firm.

There must be other times when software is not compatible with certain tape recorders and I feel this should either be clearly stated in advertisements or postage should be refunded if the item has to be returned. When youngsters have saved for some months to buy a particular piece of software, it is very hard to have their money store diminished by more than £1 if they have to return the goods.

Joy Myers, Stanmore, Middlesex

Sandra Dicioccio of PSS said: "There seems to have been some sort of mix-up. Our normal practice in cases like this is to find out the problem if we can, and if not to send a complimentary tape instead. We do normally refund postage if a customer requests it. On the whole, our service is very good — we get quite a few letters complimenting us on our quick service and good products."

Software's liberating potential

Catherine Clunies-Ross made some very interesting and relevant points regarding women and their attitudes to home-computers (HCW May 10-16). Most women are socialised from their earliest years to direct their interest towards the home. Unlike boys, they are not directed towards technological pursuits, and it is probably this which inculcates a fear of computer hardware and the jargon which surrounds it.

The computer manufacturers have directed their marketing almost exclusively at men. It appears in the esoteric language of the hardware industry, and the home market is saturated with endless permutations of often aggressive arcade games.

Many adventure games have as their final objective the rescue of a helpless maiden in distress. The occasional appearance of computerised recipe or telephone book software is unlikely to encourage women to embrace the new technology.

My own disinterest in home computers was confirmed when my husband, a doctor, bought a 48K Sinclair Spectrum and started burning the midnight oil. My interest was rapidly awakened when I challenged him to devise a program of relevance to women, which might also enable me to lose my inhibitions towards the new technology.

This resulted in unique software package which exemplifies the approach which I believe is necessary to introduce women to the potential of the home-computer. Cycle Planner allows women to compute and record all the important events occuring in their monthly menstrual cycle, and Growth Tracker allows easy access to useful information on growth and development before and after birth, as well as the childhood illnesses.

Ms Clunies-Ross has focussed attention on the problems of interesting women in home-computers and allaying their anxieties. Manufacturers and programmers out there take note; it is appropriate software which will provide the liberating experience for women.

June Epstein, Medidata, London NW9 9BW

Bury the hatchet, micro owners

Once again the inevitable has happened. A new magazine is published and in no time at all the letters page is full of praises and knock-downs from readers claiming that their particular make of computer is better than any other readers' computers.

If it's not a war between the Spectrum and the BBC, it's a slanging match between the Atari, Texas and the VIC-20.

All this bickering is doing nothing for the budding computer owner. He/she will read these letters and, because there are so many cases for and against a particular computer, that person will not bother with buying one since (s)he will be left confused and frustrated.

Every comuter magazine's letters page seems to have the same comments from readers. Now HCW is beginning to show the same symptoms, although with different computers, and it will not be long before this excellent mag is festooned with all sorts of criticisms.

I ask all computer owners to call it a day, bury the hatchet and start helping the novice — after all, we were all novices once, looking for help. Just be glad that you can actually afford a computer — some people can't afford the price of living!

R. Ould, Selly Oak, Birmingham

My problems with a tricky Lynx

While programming on my LYNX micro, I came across a very strange quirk, in connection with using string functions while concatenating strings in BASIC.

The following program causes the end digit of J to be placed at the beginning i.e. on running the program. J changes from 123456 to 612345, which is the correct answer.

```
10 LET J = 123456, A$=STR$(I)
11 LET B$ =RIGHT$(A$,1)
12 LET C$ = LEFT$ (A$,LEN(AS)-1)
13 LET J = VAL(B$+C$)
```

Looking at lines 11, 12 and 13, it should be possible to combine them to the following:

```
11 LET J = VAL(RIGHT$(A$,1)+LEFT$(A$,LEN(A$)-1)
```

When run, this gives a final incorrect J value of 112345. Now try listing the program. You will notice that the end of line 11 has started duplicating itself. The computer will crash if you now try to edit this line. Why it does this I do not know, but it is something to be aware of, especially the incorrect result, when writing programs.

Clive Newton, Sutton Coldfield, W Midlands

Improving on Munch Maze

With reference to HCW no. 9 — thanks for that marvellous game Munch Maze by Simon Scott. It's the first program from any magazine that I've got to run properly.

I did encounter a few problems, which were easily solved:

Line 65 was too long, so I shortened it, putting the surplus into line 66.

In line 54 I changed the END command to GOTO 95. Then I added a line 95 which read: 95 FOR C = 1 TO 600: NEXT: SYS64802: END. This made the program automatically clear itself after it had run.

My computer found an error in line 41, so I took out TI$ = "000000". I also took out all of line 514.

Line 57 should be: IF AS = 198 THEN 200.

Finally, I added a clear screen command at the beginning of each part, since the screen wasn't clearing properly.

Munch Maze is great fun to play, and I'm looking forward to your next VIC-20 game.

M.L. Cox, Deal, Kent

A woman's place is by her micro

I now read your publication each week and find it makes a nice change from reading about the dish of the day and other "women's" articles.

I was particularly interested in Catherine Clunies-Ross's One Woman's View (HCW May 10-16), because until recently I was one of those women who felt computers were "above" them.

My husband is a computer specialist, so over the years I have acquired enough computer knowledge to get by in social evening and demonstrations where the sole topic of conversation was computers, but I never really knew what they were all on about.

Then one evening we were invited round for dinner with some of his computing friends, and I went reluctantly, expecting a boring evening.

My husband and friend were busy when I was asked out of the blue, "which out of this list would you use to open a cell door?" I found they were playing an adventure game — until then I had thought computer games consisted of Space Invades and Pacman. My suggestion worked, and after that I was consulted on every more. By the end of the evening I was hooked.

When my husband and I got home we talked about it into the early hours, and at my suggestion we bought a computer.

Now my housework is got out of the way, or I dash home from my part-time job, and instead of watching TV for the hour or so before picking my daughter up from school, I am using my brain in my latest adventure game. Even the coffee mornings at our house are different. Most of my friends are now hooked too, and my neighbour is trying to get her husband to buy her a micro.

I am also using our Dragon 32 to its full potential, and instead of buying that new set of pans I wanted, have sent for a typing course and am learning Basic programming in the evenings. Believe me, ladies, it isn't as hard as you think. You just need logic, and every woman has that — remember when you were trying to get your two-year-old to do something you wanted them to do!

Now I actively enjoy going to the Micro Club meeting with my husband, and I am often asked about tricky computer problems, which isn't half good for the ego!

Jean Symonds, Southend-on-Sea, Essex

Software by the book

In connection with his One Man's View on software piracy, there are eight points that Geoffrey Williams should remember:

1. If the 'buy and try' shops are offering such a good deal and people aren't copying their material, why don't they go into the business of producing software themselves and let people 'buy and try' the ones that they produce?

2. Not only does computer games software cost from £4.95 to £30, but ordinary hardback books also cost that much.

3. Books have been around for a little while, and there are existing distribution systems and established publishers. For software, most of the selling is done through magazines such as Home Computing Weekly.

4. Mr Williams should remember that if these ads did not exist and such prices were not charged, Home Computing Weekly would probably not exist and he would not have the opportunity to put his opinions forward.

5. If Mr Williams went into producing software, he would himself realise what the costs are. In order to sell software packages, distribution, promotion, and indeed, advertising and handling needs to be covered.

6. Now, sadly, books are not advertised as widely as used to be the case. There are now 16 computer magazines (weekly and monthly) and all of them prosper from the software houses that advertise in their pages.

7. Most of the money this is being made in this business is money that gets ploughed back into new products. I do not see software company executives driving around in status-ful cars. By and large, they drive around in station wagons so that they can go, like itinerant gypsies, from one computer fair to the next selling their wares, since the established distribution system into bookshops and other outlets does not yet exist.

8. What would Mr Williams think if I wrote a letter to The Bookseller, encouraging people to photostat books from the library, and not buy a £4.95 hardback from him, because I felt the price of books was too high?

Incidentally, Radala & Associates do not sell or trade in software.

Prince Radala, Radala & Associates, London NW3

Play the game, Commodore

I recently sent to Commodore UK for a copy of their software catalogue, and received a copy of **Vicsoft**, a quarterly publication which CBM plan to distribute to all VIC 20 owners.

I would like to express my concern about the Commodore Challenge Software Writing Competition, details of which are given in this booklet. CBM are looking for programs and say: "Should yours reach the high standard set by Commodore... we will offer to sell it worldwide — with a royalty payment to you."

All very attractive no doubt, but here comes the nasty bit: "all entries become the property of Commodore Business Machine on submission".

This appalling postscript means programmes have no copyright over their work, once dispatched — CBM can do with it what they like, with or without the agreement of the author.

I would strongly advise prospective submitters to hold on to their work until CBM change their rules. After all, since CBM cannot claim that they undercharge for their software, they must be made to treat those who write it for them in a fair and proper way.

While the British software industry is strugling to establish codes of practise and generally-accepted guidelines for the protection of software writers, it is disturbing to see this large foreign concern behaving in what may be interpreted as a devious and exploitative way. I call on CBM publically to change this policy!

Thomas Donald, London NW6

Why I stopped watching BBC's micro series

I was amazed to read Ian McNaught-Davies' views of home-computer language. With his attitude, he strikes me as entirely the wrong person to be presenting the BBC's series.

I gave up watching it some time ago because programmes seemed designed to confuse and mystify rather than the reverse.

I do agree that there is a lot of hype churned out by the industry, but I can't see that the Beeb has done much to help people see through it. Indeed, when you look at the ads for their machines it's apparent that they're playing the same game as everybody else.

In any case, television is the wrong medium for that kind of computer programme.

It would be more sensible to have it on the radio, so computerists could have their tellies plugged in to their computers while listening. Also, this is one area where the Beeb should give up its terror of naming products — for a computer programme to be of any value at all it is essential that the listener knows which machine is being referred to.

Nick Godwin, Eyemouth, Berwicks

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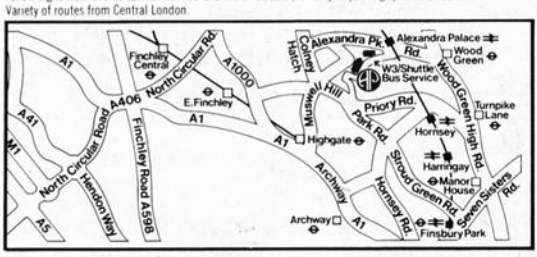

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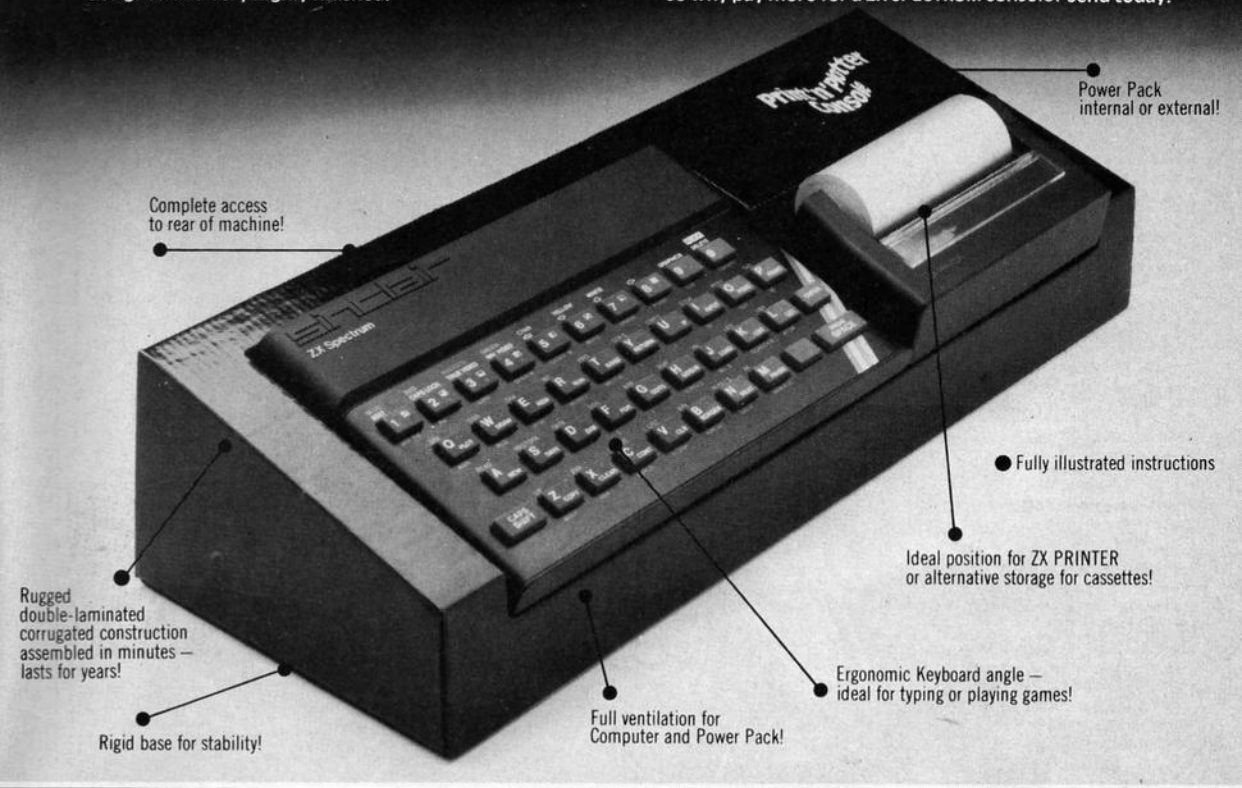

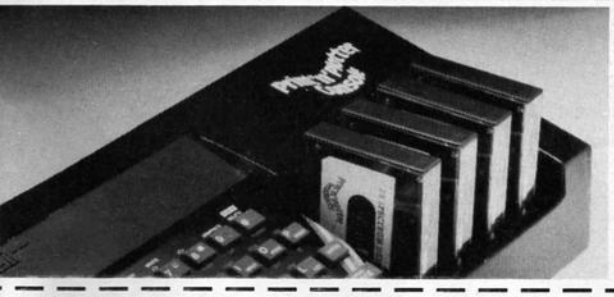

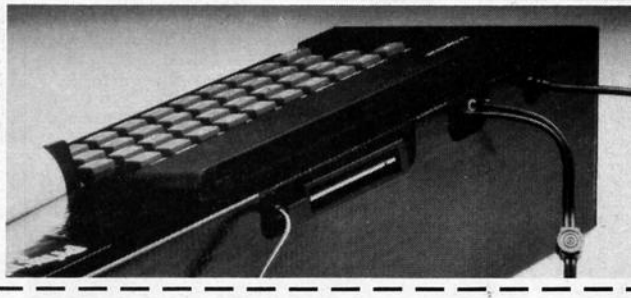

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Author: **David Shea**

ASTRO BLASTER
Arcade action
Features: Full attract mode, 5 attack waves, 15 levels of difficulty, rapid fire, meteor storms, changing aliens, plasma bolts, killer bombs, full colour hi-res graphics, full sound.
Author: **John Edwards**
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Fast m/c action, will drive QS sound and character boards, responsive controls, high score tables.
Author: **C. K. Tame**
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3D BLACK STAR
Arcade action
Features: Fast 3D graphics, fast scoring, four types of target. Eight instrument displays, warp drive, resurging aliens, time limit, 17 levels of progressive difficulty, high score table.
Author: **M. Sudworth**
ZX81 with 16K RAM

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Arcade action
Features: Fast action, 5 dampers increase to 6 on later phases, 3 lives plus bonus lives, ever increasing speed, high score, stall frame features, spiral clear at end of games, bonus phase worth 5000 pts., high score save and display.
Author: **P. Crane**
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PIONEER TRAIL
A western adventure
Features: 20 levels of play. "Mind Game" plus shooting rifle speed uses all keys and is measured against the players personal average response. This game is based on historical data.
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