

A Database Publication

electron

Vol. 5 No. 4 February 1988 £1.25

user

Design your own
animated
sprites

PLAY! Odd One Out,
Super Digga, Navigator

CREATE! Extra fonts,
dazzling graphic displays

LEARN! How to
program with View

Exclusive
preview of
Bug Byte's
Plan B2

Elixir



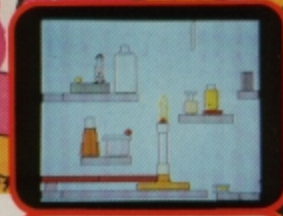
A FLASHBULB FLIES OVERHEAD



CLIMBING UP A STRAND OF COTTON



CLOCK-WATCHING



KEEP CLEAR OF THE BUNSEN BURNER FLAME

Help Poor Old Cyril to Find the Magic Elixir

Imagine the scene:

You are Cyril, a likeable old gentleman — the proprietor of a small but busy chemist's shop. One evening, after a hard day's work, you accidentally take a swig of a potent liquid: a strong reducing agent.

Within minutes you have shrunk down to the size of a bottle of aspirins. Frightened and alone, at first you panic... then you remember the magic elixir which is stored at the back of the shop on the top shelf.

The elixir just might restore you to your normal size... it's your only hope. But can you possibly reach it; you'll have to work out a suitable route by climbing up and down and across the shelves.

A fascinating, humorous game packed with strategical puzzles and problems. Keep clear of the lipstick missiles, leap over the exploding flash-bulbs, dodge the dripping acid, and watch out for the curious "circulasaurus" creature!

BBC Micro Cassette	£9.95	Acorn Electron Cassette	£9.95
BBC Micro 5¼" Disc	£11.95	Acorn Electron 5¼" Disc	£11.95
BBC Master Compact 3½" Disc	£14.95	Acorn Electron 3½" Disc	£14.95

(Compatible with the BBC B, B+ and Master Series computers).

The screen pictures show the BBC Micro version of the game. The graphics of other versions may vary.

PRIZE COMPETITION

If you complete Elixir (by restoring Cyril The Chemist to his normal size), you can enter our competition. Prizes include an impressive trophy, 10 chemistry sets, and signed certificates for runners-up.

Closing Date: 30th June, 1988.

SUPERIOR SOFTWARE
Limited

ACORNSOFT

Dept. EL3, Regent House, Skinner Lane, Leeds LS7 1AX, Telephone: 0532 459453

Please make all cheques payable to "Superior Software Ltd".



24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately. (This does not affect your statutory rights)

News

All the latest products and news from the ever-expanding world of the Acorn Electron.

5

Adventures

Hints and tips from Pendragon, plus your Top Twenty chart.

8

10 Liners

Another selection of programming marvels from our clever readers.

11

Software

Winter Olympiad, Plan B2, Bonecruncher, Star Wars, Trapper and Spitfire reviewed.

13

Arcade Corner

Climb to the top of the high score tables with our cheat modes for arcade game addicts.

19

Custom Characters

Design your own fonts with this friendly and flexible editor.

21

Rainbow

Create your own amazing graphics displays with this icon-driven art package.

25



Hardware Projects

Build a thermometer and use your Electron to measure temperature.

29

Sprites

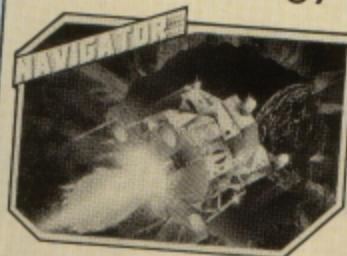
In the start of a new series we show you how to create multi-colour sprites with a powerful on-screen editor.

32

Navigator

Can you steer your spaceship through intricate caverns avoiding the asteroids?

37



Super Digga

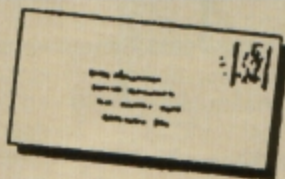
Hunt for buried treasure deep beneath the earth in this fast arcade game.

39

Printers

Give your printer a workout with our series of benchmark tests.

44



Micro Messages

The pages you write yourselves – a selection of letters from our bulging mailbag.

47

Custom Characters

Design your own fonts with this friendly and flexible editor.

21

Pascal

In the second instalment in our guide to Pascal we easily convert from Fahrenheit to Celsius.

55

View Programming

We show how to use View to write Basic and machine code programs.

57

Odd One Out

Improve your perception and knowledge with this educational game.

59

Bargains galore!

Don't miss our special offers on Pages 60-61

Published by Database Publications Ltd
Europa House, Adlington Park, Adlington, Macclesfield SK10 5NP.

Telephone: 0625 878888 (Editorial, Admin, Advertising). 0625 879940 (Subscriptions).
T/Gold Mailbox: 72:MAG001. Prestel: 614568383. Telex: 265871 MONREF G. Quoting Ref. 72:MAG001.

ABC 37.575 January-June 1986

News trade distribution:
Diamond-Europress Sales and Distribution, Unit 1, Burgess Road, Ivyhouse Lane, Hastings, East Sussex TN35 4NR. Tel: 0424 430422.
Printed by Carlisle Web Offset.
Electron User is an independent publication. Acorn Computers Ltd, manufacturers of the Electron, are not responsible for any of the articles in this issue or for any of the opinions expressed.

Electron User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

Subscription rates for 12 issues, post free:

£15 UK
£23 Europe & Eire
£38 Overseas

ISSN 0952-3057

© 1988 Database Publications Ltd. No material may be reproduced in whole or in part without written permission. While every care is taken, the publishers cannot be held legally responsible for any errors in articles or listings.

Managing Editor
Derek Meakin

Group Editor
Alan McLachlan

Features Editor
Roland Waddilove

Production Editor
Peter Glover

Reviews Coordinator
Pam Turnbull

Promotions Editor
Chris Payne

Advertising Sales
John Snowden
Peter Babbage

PRES

The company responsible for marketing and distribution of Advanced Computer Products

VIEW CARTRIDGE . . . the Acornsoft word processor for the Electron and Plus 1. Inc. full documentation. £14.95
VIEWSHEET CARTRIDGE . . . the Acornsoft spreadsheet for the Electron and Plus 1. Inc. full documentation. £14.95
VIEW & VIEWSHEET . . . both products as above *special price* £22.00
LISP CARTRIDGE . . . the Acornsoft language cartridge for the Electron and Plus 1. £9.99

ELECTRON ADVANCED USER GUIDE . . . further reading and information for the Electron user. £3.95
ELECTRON ASSEMBLY LANGUAGE . . . book by Bruce Smith containing many examples of how to program in assembler. £2.95
 Software on disc for the above 3.5" ADFS £3.50 - 5.25" DFS £2.50

ACCESSORIES
 Plus 3 2nd drive adaptor. £7.95
 3.5" Library box (holds 10 discs) £2.95
 3.5" Library box (holds 40 discs) £9.95

ADVANCED PLUS 6 . . . a fully buffered 6 ROM expansion module for the Electron user. AP6 is fitted inside the advanced Plus 1 or a modified Acorn Plus 1 (when used with the Acorn Plus 3, 5 ROM sockets are available). All sockets are designed to accept either ROM/EPROMS or RAM chips. A further feature is the optional AP7 upgrade . . . £33.00+VAT (£37.95)
UPGRADE SERVICE for the original Acorn Plus 1 to Advanced Plus 1 and AP6. This will provide all the benefits of AP6 and also includes the printer circuit modification for some modem printers. (AP6 can be fitted to original Plus 1 by users with soldering experience) for upgrade service add £7.00 + VAT to AP6 price ie £40.00+VAT (£46.00)
 This price includes modification, fitting AP6, testing and return postage. Address for returning your Plus 1.
 P.R.E.S. Service Department, PO Box 34, Bradford BD17 6DE

DISC DRIVES
 Cumana 5.25" dbl/sided 40/80 track, switchable, inc. psu. £149.00
 Cumana 5.25" sing/sided 40 track, inc. psu. £129.00
 Cumana 3.5" dbl/sided 80 track, inc. psu. £129.00
 PRES special 3.5" sing/sided 80 track, inc. psu. *ONLY* £59+VAT. (£67.85)

ADVANCED PLUS 1 . . . The plus 1 is the main expansion for the Electron. It provides the Centronics parallel printer, printer port, joyetick interface and 2 cartridge slots into which go ROM cartridges including View, Viewsheets, Pascal, Logo and our own popular AP4 disc upgrade. £49.95

DISCS
 3.5" 10 in plastic library box - ideal for Plus 3 users £19.95
 5.25" 10 dble/sided dble/dens. £12.99
 5.25" 10 sing/sided sing/dens. £8.99
 5.25" Twin Gift Pack £14.9

COMING SOON
ADVANCED PLUS 7 . . . upgrade for AP6 allows for 2 banks of 16k battery backed sideways ram which can be fully write protected.

HYBRID'S MUSIC 5000 . . . as widely used on the BBC computers has been fully versioned for the Electron & Plus 5.

NEW PRODUCT
ADFS E00 . . . at last regained memory used by ADFS suitable for AP4 or Plus 3 users with 32k of sideways ram supplied on disc with documentation 5.25" DFS £19.95
 3.5" ADFS £22.95

PRINTER
 Printer ideal for Electron Plus 1. Panasonic KX-P1081 Graphic Epson Compatible NLQ ready to connect including cable, delivery and VAT £179.00

PRICE BREAKTHROUGH

THE ADVANCED PLUS 3

Now you can turn your Electron (& +1) into a full disc system - no more waiting for tape loading or 'bad block'/'data ?' messages. A.P.3. gives you . . .

1. A 1770 interface
2. 80 track 3.5" disc drive (320k capacity)
3. Separate PSU
4. Acorn ADFS
5. Welcome disc
6. Utilities
7. Full documentation

All the advantages of the original Plus 3 PLUS extra ROM socket and possible upgrade to A.P.4. from ACP. All this without dramatically increasing the required desk space!

EXTRA BONUS

3 games on disc - SNAPPER - DRAUGHTS - REVERSI
COMPLETE PACKAGE ONLY £99+VAT (£113.85)
SPECIAL PACKAGE of Advanced Plus 1 & A.P.3. £149.95 inc.

NEW PRODUCT ADFS VERSION 1.1 FOR THE ELECTRON

Suitable for existing Plus 3 or A.P.4 users. This new version has the software fixes for Zsysshelp, write protect disable & compaction. Also Winchester code has been replaced with 'patches' for future enhancements! 16k ROM & full documentation. £19.95+VAT (£22.55)

Please send order to:-
 P.R.E.S. LTD.,
 6 Ava House, High Street,
 CHOBHAM, Surrey, England.
 GU24 8LZ. Tel: 0276 76545
 (Mail order only)
 All our prices include
 UK delivery & VAT



(in event of any query - please include your tel. no.)

	Product	Qty	@	Total
Name				
Address				
Postcode				
Tel:				
Credit Card No.:				
	I enclose payment for £			
	Exp date			(Ref E102)

electron user NEWS

Electron users are power-hungry

ELECTRON users are seeking much more power for their machines in ever-increasing numbers. A new survey has revealed that some 40 per cent have upgraded their machines over the last year.

Of these the majority have opted for compatibility with the BBC Micro, so opening up a vast new potential library of software.

In most cases, the Electron buffs have spent more on the power boosting add-ons than they have on the micros themselves.

With firms like Slogger and Advanced Computer Pro-

ducts offering a variety of machine-extending routes such as sophisticated disc drives, interfaces, expansion roms and ram boards, the future of the Electron now seems assured.

"If companies like this hadn't shown their concern, the Electron may well have become completely extinct by now", observed Derek Meakin, managing editor of *Electron User*.

"But the Electron has always been an excellent machine. It's just that thanks to the ingenuity of some of the firms in the market, it is

now that much better".

The run up to Christmas demonstrated clearly that people are not prepared to shelve their Electrons.

PRES, the company marketing the £99 Advanced Plus 3 disc upgrade for the machine, reported sales of 1,000 units a month.

"We just couldn't keep up with the demand", said a company spokesman. "We found ourselves working into the small hours trying to get them out.

"It seems to have really taken off as an ideal Christmas present".

ADVENTURE IS THE NAME OF THE GAME

DRAGON-slaying wizards, maidens in distress and the Spirit of Adventure group will travel through time to transform the next Electron & BBC Micro User Show into a fascinating world of adventuring.

Goblins, demons, and all manner of mythical creatures have been taken out of the micro chip games world and brought to life.

The Spirit of Adventure group, which regularly meets to act out medieval quests, will be at the Renold Building, UMIST, Manchester, from March 18 to 20 disguised as minotaurs, zombies, wizards and goblins.

Visitors will get a chance

to play the hero or heroine, battling against magical forces and monsters, under the guidance of some of Britain's top role-playing specialists.

The very latest in hardware and software will also be on display and, in keeping with the adventure theme, a treasure hunt is being held with prizes of the most popular fantasy games for the Electron.

An advice centre manned by experts will be

available to help find solutions to some of the more complicated problems.

The Spirit of Adventure Group regularly meets at unusual locations to create a realistic illusion of fantasy.

They have ranged from medieval banqueting halls to overgrown woodlands. Even an old steel mill has been transformed for their journey back in time.

According to Steve Gibson, one of the group's founders, the Renold Building at UMIST "will prove a bit of a challenge, but with a little imagination and a lot of stamina visitors will enjoy the adventure of a lifetime".

Support is still strong

A POLL of companies in the BBC Micro market has shown that some 55 per cent have given active consideration to producing products for the Electron.

In all cases those interviewed admitted they had been surprised by the interest that still surrounds the Electron.

"You cannot ignore the continuing popularity of this machine", said John Huddlestone of Advanced Computer Products whose firm is now synonymous with the Electron scene.

"It's a very nice little market" he said.

A record again

ELECTRON supplier Superior Software doubled its previous record sales figures last year. And the company also doubled its yearly turnover for the third year in succession.

"We're going to try and do it again this coming year", said Superior's general manager, Steve Botteril.

"About 40 per cent of our sales were due to the tremendous support of the Electron market. We are committed to continuing to supply quality software for the machine as long as there is a demand".

Four new games scheduled should have the same impact on the market as Elite, says the company.

Electrons move to the IT centre

STUDENTS learning information technology at Deyes High School in Merseyside have found the Electron a walkover.

In fact over 500 pupils completed a sponsored walk to raise the cash to buy 16 new machines and monitors.

The Electrons have now taken their place alongside a large collection of BBC Micros at the school's Information Technology centre.

To increase their flexibility the machines have been equipped with an ACP Plus 1 and an AP4 disc interface as standard.

"I have known for some time that the Electron was a great machine", said Russ Ellis, lecturer in Information Technology at Deyes High School.

"Having previously only used BBC Micros, some of the teachers were a bit apprehensive. But now they all agree that the Electron is an excellent computer to work with".

The machine has proved so popular that a number of children have bought their own in order to continue studies after school.

A large part of the IT course involves studies for the Cambridge information technology cer-

tificate. A thorough understanding of word processors, spreadsheets and databases is needed to qualify for the award.

All students also undertake a compulsory one-year course in computing. "The Electron is playing a vital part in equipping our pupils with the skills that they will need for a secure future", said Russ Ellis.

Red ruse

THE first computer game from Russia has infiltrated the UK via Hungary with help from Mirrorsoft agents.

Tetris is said to be easy to play, incredibly addictive – and almost impossible to explain.

Random shaped blocks appear in a box on the left of the screen, and you have to move and turn them to form a continuous line across the bottom of the screen in order to score points.

It may sound simple but if you are not fast enough the blocks on the left build up until they touch the top of the screen. When that happens the game ends.

Price £8.99 on cassette and £12.99 on disc from Mirrorsoft (01-377 4645).

Rhyming lessons

A CHILD-minding service has taken on six Electrons as members of staff.

The machines are being used to help look after youngsters under five years of age who attend centres run by the Birmingham Kiddy Care co-operative.

Marjorie Dixon, the director, bought the machines after she saw the *Electron User* Nursery Rhymes package.

"This was perfect for what we wanted," she said. "For it would not only keep the children happy but they would also learn at the same time.

"And the mothers who

leave their children here when they go off to work are delighted with it all".

The Nursery Rhymes software offers old favourites such as Humpty Dumpty and Jack and Jill as part of a learning environment.

"Since the computer arrived, my four-year-old's spelling has come on in leaps and bounds", reported one happy mum.

"I've always hated computers before – only thinking of them as things that screwed up monthly bills – but this has made me view them in a completely different light".

THE GALLUP CHART

TOP 10

ELECTRON SOFTWARE

THIS MONTH	LAST MONTH	TITLE (Software House)	PRICE
1	2	AROUND THE WORLD IN 40 SCREENS <i>Superior</i>	6.95
2	3	PAPERBOY <i>Elite</i>	9.95
3	1	SOCCER BOSS <i>Alternative</i>	1.99
4	•	LIFE OF REPTON <i>Superior</i>	6.95
5	5	SUPERIOR COLLECTION VOL 2 <i>Superior</i>	9.95
6	4	FOUR GREAT GAMES <i>Micro Value</i>	3.99
7	7	TRIPLE DECKER <i>Alternative</i>	1.99
8	6	CODENAME DROID <i>Superior</i>	9.95
9	•	SPELLBINDER <i>Superior</i>	9.95
10	•	MICROBALL <i>Alternative</i>	1.99

Compiled by Gallup/Microscope

There are three new entries in this month's chart – two new releases from Superior and another new one from Alternative. This means that two Repton games are in the Top Five – Around the World in 40 Screens and the new Life of Repton.

FREE MYSTERY GIFT WITH EVERY ORDER!

AMAZING OFFERS

VIEW ROM £20.95
(Word Processor) £14.95
VIEW SHEET ROM £20.95
(Spreadsheet) £14.95
ACORN PLUS 1 £50.95
now in stock £43.95

SCOOP PURCHASE
ELECTRON COMPUTERS IN STOCK NOW
Power Supply included
3 Months Warranty
£59.95

CUMANA DISC DRIVE INTERFACE
Only £64.95

PACKAGE 1
PLUS 1 VIEW VIEWSHEET £49.95
£14.95
£14.95
£79.85
OFFER PRICE £65.95

PACKAGE 2
ELECTRON COMPUTER PLUS 1 VIEW ROM £59.95
£49.95
£14.95
£124.85
OFFER PRICE £99.95

BRAND NEW SPECTRUM PLUS's 48k
only **£69.95**

* Comes with power supply, User Guide, introductory cass., T.V. aerial and 90 day warranty

ACORN ELECTRON POWER SUPPLY ONLY £9.95

PRIMARY EDUCATION

Sentence Sequence £6.99
Snapper £6.99
Boxer £6.99
Talk Back £6.99
Workshop £6.99
Chess £6.99

HOME INTEREST BUSINESS

Business Games £6.99
Desk Diary £6.99
Graphs & Charts £6.99
Theatre Quiz £14.95
Watch Your Weight £6.99
The Complete Cocktail Maker £6.99

VOLTMACE TWIN JOYSTICKS

for use with Plus One or BBC
Normally £19.95
Now Only £14.95

Big Value Compilations

Beau Jolly Five Star Games
Computer Hits 1,2,&3
Acornsoft Hits I & II
Superior Collection Vol III
Cass
Usually £9.95 Now Only £7.59

● **ANY FIVE FOR ONLY £7.95**

MICROPOWER GAMES

Felix in the Factory £7.95
Croaker £7.95
Bumble Bee £7.95
Gauntlet £7.95
Killer Gorilla £7.95
Rubble Trouble £7.95
Electron Invaders £7.95
Felix Fruit Monsters £7.95
Chess £7.95
Danger UXB £7.95
Frenzy £7.95
Felix meets the Evil Weevils £6.95
Classic Adventures £7.95

Stock Car £6.95
Swoop £7.95
Jetpower Jack £7.95
Cybertron Mission £7.95
Galactic Commander £7.95
Moonrider £7.95
Bandits at 3 O'Clock £6.95
Adventure £7.95
Swag £6.95
Escape from Moon Base £7.95
Ghouls £7.95
The Mine £7.95
Gyroscope £7.95

NEW GAMES
Codename Droid* £7.95
Strykers Run £7.95
Crazee Rider* £7.95
Palace of Magic* £7.95
Spitfire £7.95
Play it Again Sam* £7.95
Spellbinder £7.95
Bonecruncher £7.95
Cassette £9.95 £7.59!
3.5" Disc £14.95 £11.59!
*Available on 3.5" disc
The Life of Repton
Cassette £6.95 £5.59!
Phone for details of very latest releases!

Micropower Magic Compilations 1 & 2
Only £5.95 each!

Electron Joystick Interface and Software
£14.95

Quickshot II Turbo Joystick
£13.95

Buy Both for only £25.00!

● **ANY FIVE FOR ONLY £7.95**

EDUCATION SPECIALS

Linkword Spanish £14.95
Linkword Italian £14.95
Maths 'O' Level I £12.05
Maths 'O' Level II £12.05
Where? £6.95
Biology £12.05
English £12.05

BBC & ELECTRON AVAILABLE ANY TWO FOR £3.95

Free Mystery Gift With every order

ELECTRON LANGUAGES

Lisp Cassette £9.95 £2.95
Turtle Graphics Cassette £9.95 £2.95
Forth Cassette £7.95 £2.50

Fantastic Offer Now Available Brand New Ferguson 12" Green Screen Monitors (Model Number MM06) Only £59.95

Logo cartridge £59.95 £29.95
Lisp cartridge £29.95 £9.95
Elite £11.95 £9.95
Plus 3 Games Disc £19.95 £9.95
Superior Collection Vol III (plus 3 disc) £14.95 £11.95
Magic Mushrooms £12.95 £2.95
Me and My Micro £2.95 £1.00
Advanced User Guide £9.95 £2.95

Name _____
Address _____

I Claim my Mystery Gift

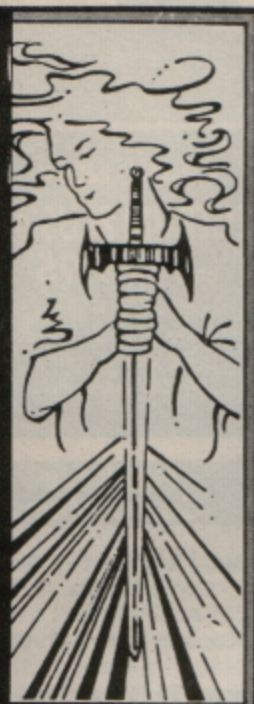
E2



SOFTWARE BARGAINS

A division of The Micropower Group
Dept E2, 8,8A Regent Street, Chapel Allerton, Leeds LS7 4PE
Tel: 0532-687735
Ansaphone out of hours

Please make cheques/P.O.'s payable to Software Bargains & add 95p P&P



By Pendragon

THIS month sees the re-release of some old adventures in new packaging and at bargain prices.

The US Gold collection of nine games on one disc or tape is an offer not to be missed. The adventures include Voodoo Castle, Pirate Adventure, Strange Odyssey, Temple of Terror and Buckaroo Banzai.

The package is made good with four old Ultimate arcade-adventures. Retailing at about £18 for the complete collection this

must be worth considering.

Meanwhile, Adventure Soft's Scoops, with four adventures packaged on one tape for only £7.95, is also an essential buy.

Those of you who have a Slogger Master Ram board and SEDS or an ACP Plus 4 fitted to your Electron may be interested to learn that Topologika has re-released revamped 5.25in disc versions of the Acornsoft greats, *Philosopher's Quest* and *Countdown to Doom*.

These classics have been given extra locations and atmosphere to make them worth looking at, even at £17 each.

In the final stages of preparation is Geoff Larsen's sixth adventure, *Hex*, which should be on general release very soon.

At Robico, Glen MacCauley is editing *Communion*, which is part two of *The Village of Lost Souls* trilogy, and promises to be an absolute blockbuster.

The new Elk Adventure Club release, *The Axe of*

Holt, is also due out this month. If it follows the tradition laid down by *Magnetic Moon* and *Starship Quest*, it will be an essential buy.

However, all is very quiet at Shards. I know many of us have been waiting for almost two years for the release of a sequel to *Woodbury End*. So how about writing to Steve Maltz letting him know that such a sequel would be greeted with shouts of glee from all corners of the Electron

our machine has never been higher, and this is borne out by the phenomenal array of top notch adventure games in the most recent top twenty.

Remember that these charts are compiled purely from your votes for your favourite adventure games.

It's good to see the two new Robico releases feature so prominently in the chart. I have received a lot of mail praising the quality of these two masterpieces, and

READERS' TOP TWENTY VOTES

1	The Hunt	Robico	93%
2	Village of Lost Souls	(Robico)	92%
3	The Lost Crystal	Epic	90%
4	Oxbridge	Tynesoft	86%
5	Dodgy Geezers	Melbourne House	84%
6	Myorem	Robico	83%
7	Kayleth	Adventure Soft UK	82%
8	Rick Hanson	Robico	81%
9	Wheel of Fortune	Epic	80%
10	The Ket Trilogy	Incentive	78%
11	Twin Kingdom Valley	Bug Byte	77%
12	The Puppet Man	Larsoft	76%
13	Woodbury End	Shards	74%
14	The Nine Dancers	Larsoft	71%
15	Philosopher's Quest	Acornsoft	70%
16	Quest for the Holy Grail	Epic	69%
17	Suds	Riverdale	68%
18	Terrormolinos	Melbourne House	67%
19	Magnetic Moon	Elk Adventure Club	66%
20	Project Thesis	Robico	63%

Adventurer's Glossary (continued from last month)

Dagger: A handy weapon, but usually with some limitations of use.

Dark: Always at some point in an adventure, so you will need a light source.

Desert: Features in many adventures, and often a maze. Be sure to have a plentiful supply of something to drink before you venture on.

Desk: Always worth examining, and try opening the odd drawer.

Diamond: Invariably a treasure.

Ditch: Often a trap, so beware. It may need crossing so look for a bridging point.

Doll: Unlikely to be ordinary, probably a voodoo doll.

Dragon: Kill it, but examine its corpse once it is dead.

Drink: Essential to survival. Water is usually safe, but avoid Ale and other potent or enticing liquors.

Dwarf: Almost always hostile; best to kill and ask questions afterwards.

software-buying public.

R. Forster of Hale is the first person to contact me to say he has discovered the word Pendragon at a hidden location in *Suds*.

I have forwarded his name and address to Riverdale Soft and he can expect to receive a complimentary copy of *American Suds* upon release.

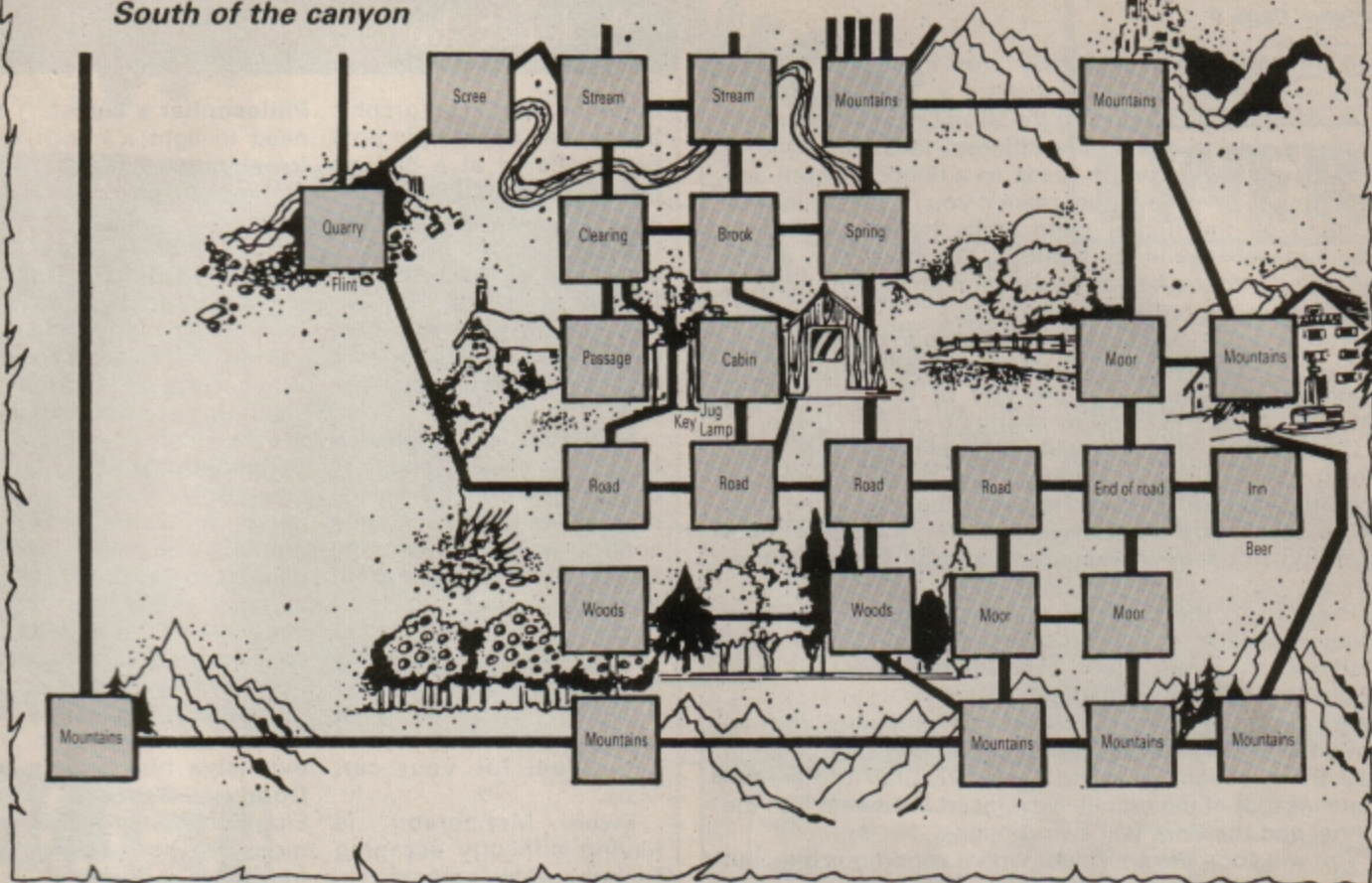
I mentioned last month that 1987 was an exceptional year for adventure releases for the Electron. The quality of software for

surely they are now the yardstick by which all other adventures must be judged.

It is also pleasing that small companies such as Larsoft and Riverdale are producing adventures which readers so obviously enjoy. This can only be healthy for the market in general and Electron users in particular.

With a flood of new releases due in the coming months, the next chart should present quite a different picture.

**Twin Kingdom Valley map 1:
South of the canyon**



Readers' Hall of Fame

The Puppet Man – Geoff Livesey (continued from last month)

Go East and talk to the muse, then S, S, W, enter the willow and talk to Pierrot. E, E, S, W, S, get the candle, N, E, E and enter manor. UP, N, get the glove, examine the shelf and read the note.

S, DOWN, LEAVE, go onto the stage and talk to the juggler. He will be distracted and drop one of his clubs. get it, jump down, W, S, S, S, W, S. A man will rush off to the west.

Now you can go W, W, W. Drop the club, setting off the trip wire. S, S, W, S, E, into the clown's house. Examine the fireplace, wear the glove and get the poker.

W, N, W, into the tavern. Examine the fire and poke the cinders. Still wearing the glove, get the black key. It will soon cool and you will no longer need to wear the glove.

E, S, E, and light the candle from the clown's fire. W, N, N, UP, enter the door, unlock Pierrot's desk and get his poem. ENTER DOORWAY, DOWN, S, E, N, N, E, E, N, E, N, N, N, E, and go onto the stage again. Give the poem to Columbine.

Now jump down, W, N, N, N. Erato will advise you to examine the stump. Get the marionette, S, S, S, S, E, into the Inn. Give the marionette to the Puppet-Man.

Kayleth – Robert Henderson (continued from last month)

Go to the shelf where you found the suit and get the bar and cube. Go and get the lenses and the pyramid which is on floor three.

Leave the building and continue until you are in the forest by the Mokki Ray, then spin the bar. Climb the tree, wear the lenses and flip the knot. Take the tablet and examine it, this will give you the AZAP CODE AKN. Go to the AZAP chamber and type AZAP CODE AKN.

Break the tablet which should leave you a rod. Go to

the Citadel and you will be surrounded by Zemps. Spin the rod to scare the Zemps. Once you enter the building, type GO SOCLE and a voice will reply, "To be with me, drop the silver three". Now drop the pyramid, cube and rod, and the Socle will descend.

Take the mortar and pod and GO SOCLE. Get the dime and go back to the AZAP chamber and type AZAP CODE ELY. Now you must go back to the city, pay Broznak with the dime and get the bottle of water.

Examine the furniture to find Yurek and give him the rod, then take him to the steel dome. Return to the AZAP chamber and type AZAP CODE EPO. Insert your plasma beam cartridge and fire the beam at the wall. Go back once again to the chamber and type AZAP CODE ELY.

Travel to floor 3 and INSERT YUREK INTO INDENTATION! You will now transform into Yurek. Get the ball and mortar and return to the AZAP chamber. Type AZAP CODE EPO, leave the chamber and go South.

Insert the ball into the icon and when you see the Atech technician, give him the mortar. He will give you a bulb. In the chamber, type AZAP CODE ELY. Get the water, plant the bulb in the compost and water it.

Wait for a few moves and a flower will grow. Take this and drop it in the mortar. You now have essence of tae which can be used to kill Kayleth.

In the AZAP chamber, type AZAP CODE DHT. You will be transported to the control room of Kayleth's starship. The code to open the door is an anagram of all the AZAP codes: ELY, ROO, AKN, EPO and DHT. You should decode this to OPEN KAYLETH DOOR.

To kill Kayleth and finish the game, drop the tae in the pool.

Entnar Seven – The Boss (continued from last month)

Equip yourself with the space helmet, oxygen cylinder, spherical sweet, pliers, hammer and torch, then set the teleport to take you to sector three. Once you enter you

Turn to Page 10 ▶

will find yourself in a confusing forest maze with illogical exits.

By careful mapping using the drop technique you will soon be able to chart nine different locations. One of these is a clearing which leads to a teleport booth and another will reveal a flipper plate if you move the leaves.

Stand on the flipper plate to be transported to an elevated walkway in the treetops. You must now attach the cylinder to the helmet and wear it unless you want to suffocate in the rarified atmosphere.

A quick reconnaissance will lead you to discover three chasms which appear at first to be uncrossable. However, the crevice at the end of the east bound catwalk can be traversed by swinging on the creeper.

On the other side you will find a plank of soft wood which can be used to bridge a gap on three separate occasions before it breaks. However, the drop at the edge of the west bound walkway can be safely jumped without resorting to using a bridge, and a large fan can be retrieved.

The gap to the north of the ramp must be bridged using the plank. At the other side a complicated manoeuvre is involved. If you examine the sweet you will discover it is 15cm in diameter.

The doorway to the tree has an ingenious locking device involving a funnel 9cm in diameter. You need to suck the sweet and examine it regularly until its diameter matches that of the funnel. Now insert the sweet into the funnel and the door will swing open.

You will soon meet a spider with a venomous bite, but don't worry it's only a nightmare.

Problems Solved

Superior Software's graphic adventure **Stranded**, now being offered at a bargain price, is being discovered anew by many other adventurers and consequently causing a number of familiar problems.

Robin Cornelius asks how to get through the air lock inner door. Simply pick the lock, Robin.

Mark Patterson is puzzled by the fuel capsule and time crystal. You must drop the crystal in the slot in the large control room. Similarly, the fuel must also be dropped in a slot.

Mark is also stuck in **Circus Adventure**. He has activated the generator, but doesn't know what to do next. I suggest you syphon some fuel for your car, Mark.

Ewan McPherson is having difficulty escaping from the whale's stomach in

Philosopher's Quest. You need to light a match and travel in the opposite direction to the smoke to find the exit.

Mark Hilton needs to follow the paved path off the old side street in Witherton to discover the cottage garden in **Project Thesis**. While Duggie MacDonald should strike a match to give the serpent heartburn in **Sphinx Adventure**.

I must thank Robert Henderson for a copy of **Eye of Zoltan**. It has enabled me to help Trevor Hicks and others to open a few doors. You need a bunch of keys and a password to establish the rights of way.

Finally I must thank James Mottram for his extensive hint sheets for **Dodgy Geezers** and Elizabeth White for the enormous help she has given so freely.

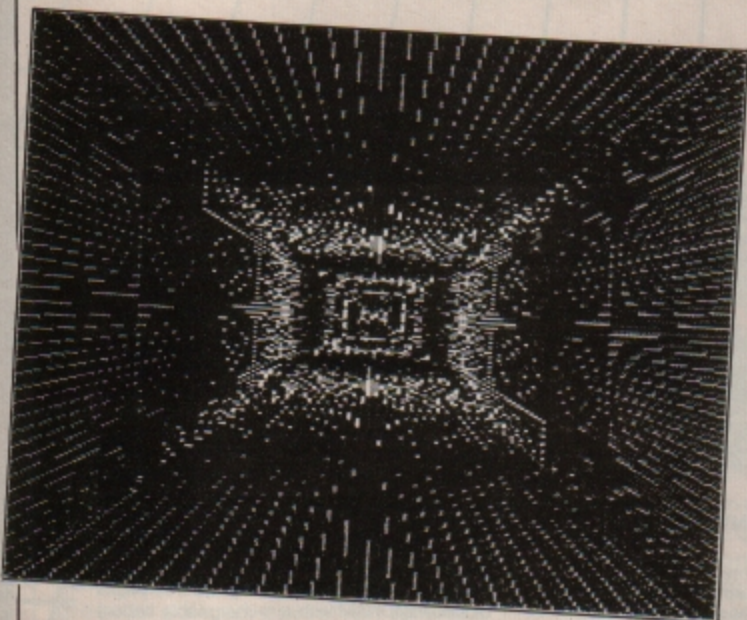
C & F ASSOCIATES BARGAIN PRICE ELECTRON SOFTWARE

ADDICTIVE	PRICE	DOMARK	PRICE	MIRRORSOFT	PRICE	SUPERIOR (continued)	PRICE
Football Manager	2.99	Star Wars	7.75	Strike Force Harrier	7.50	Acornsoft Hits 1	7.75
ALTERNATIVE		DR. SOFT		Spitfire 40	7.75	Acornsoft Hits 2	7.75
Mineshaft	1.99	Phantom Combat	7.50	1st Steps with Mr Men	6.95	Repton 3	7.75
Rik the Roadie	1.99	ELITE		Here and There with Mr Men	6.50	Ravenskull	7.75
Combat Lynx	1.99	Paper Boy	7.75	Star Seeker	7.50	Elite	10.95
A.S.L.		FIREBIRD		ROBICO		Citadel	7.50
Omega Orb	6.75	The Hacker	1.99	Rick Hanson	7.95	Death Star	2.99
Graham Gooch	7.75	HEWSON		Project Thesis	7.95	Overdrive	2.99
Ransack	7.75	Evening Star	7.75	Myorem	7.95	Tempest	2.99
Despatch Rider	7.20	IMAGINE		Rick Hanson Trilogy	18.95	Fruit Machine	2.99
Ziggy	7.20	Yie Ar Kung Fu 2	7.20	Village of Lost Souls	7.95	Invaders	2.99
Power Pack 2	7.75	INCENTIVE		The Hunt	7.95	Percy Penguin	2.99
Impact	7.95	Adventure Creator	12.95	SUPERIOR		Mr Wiz	2.99
ATLANTIS		Ket Trilogy	7.75	Elixir	7.75	Smash 'n' Grab	2.99
Creepy Cave	1.99	Confuzion	4.95	Elixir (+3 disc)	12.95	TYNESOFT	
Panik	1.99	LARSOFT		Spellbinder	7.75	Winter Olympiad 88	7.75
BEAU-JOLLY		Puppet Man	3.95	Bone Cruncher	7.75	Spy vs. Spy	7.75
10 Computer Hits 4	7.95	Nine Dancers	3.95	Life of Repton	5.95	Oxbridge	6.75
10 Computer Hits 3	7.75	Wychwood	3.95	Life of Repton (5.25 Disc)	6.95	Phantom	6.75
5 Star Games	7.75	Rising of Salandra	4.95	Play It Again Sam	7.75	The Big KO	6.75
5 Star Games 2	7.75	LOGOTRON		Play It Again Sam (+3 disc)	12.95	Future Shock	6.75
5 Star Games 3	7.95	Xor	7.75	Palace of Magic	7.75	Goal	6.75
BUG-BYTE		MELBOURNE		Palace of Magic (+3 disc)	12.95	Commonwealth Games	6.75
Dunjanz	2.95	Exploding Fist	7.50	Palace of Magic (5.25 disc)	10.95	Winter Olympics	6.50
Plan B	2.95	Dodgy Geezers	6.95	Crazee Rider	7.75	Micro Value (4 games)	3.95
Squeakaliser	2.95	Terrormolinos	6.50	Crazee Rider (+3 disc)	12.95	Micro Value 2	3.95
Templeton	2.95	DATABASE		Codename Droid	7.75	Micro Value Gold	3.95
CDS		French on the Run	7.75	Codename Droid (+3 disc)	12.95	US GOLD	
Colossus Chess 4	7.75	Mini Office	4.95	Around the World	5.95	Impossible Mission	7.20
Brian Clough Football	12.95	Orders normally despatched by First Class Post on day of receipt. But allow max. of seven days. All prices include VAT & P&P (Overseas orders add £1)		Superior Collection 3	7.75	Beach Head	6.95
DATABASE				Superior Collection 3 (+3 disc)	12.95		

Name	Title	Cost	Access orders accepted Make PO/Cheques payable to: C & F ASSOCIATES and send to: C & F ASSOCIATES CRANFORD HOUSE, WOOLSERY, BIDEFORD, N. DEVON EX39 5QW. Tel: (023 73) 619
Address			
Make of Computer		Total	

PALETTRONICS

LINERS



SPECIAL effects caused by changing the palette always prove popular, and this quickie from Arthur Stone is no exception.

Apparently Arthur first wrote Palettronics for the Spectrum, but as the effects could only be achieved with

machine code he says it really came into its own after being re-written on the Electron - in Basic!

Get your sunglasses on before running it.

```

1 REM Palettronics
2 REM By Arthur Stone
3 REPEAT:MODE2:VDU23;820
2;0;0;0;:FOR Y%=0 TO 2:COLOUR 13
5:COLOUR 0:PRINT TAB(3,Y)STRINGS(14," ");NEXT:PRINT TAB(4,1)"PALETTRONICS":TX=0:FOR X%=0 TO 1279 STEP 8:GCOL 3,TX MOD 6+1:
MOVEX,X,0:DRAW 1279-X%,927:TX=TX+1:NEXT:FOR Y%=0 TO 927 STEP 4:GCOL 3,TX MOD 6+1
4 MOVE 0,Y,X:DRAW 1279,927-Y%:TX=TX+1:NEXT:REPEAT:FOR X%=0 TO 5:FOR Y%=1 TO 6:VDU 19,Y%,CX%+Y% MOD 6+1,0,0,0:NEXT:NEXT:UNTIL LINKEY(-99)
    
```

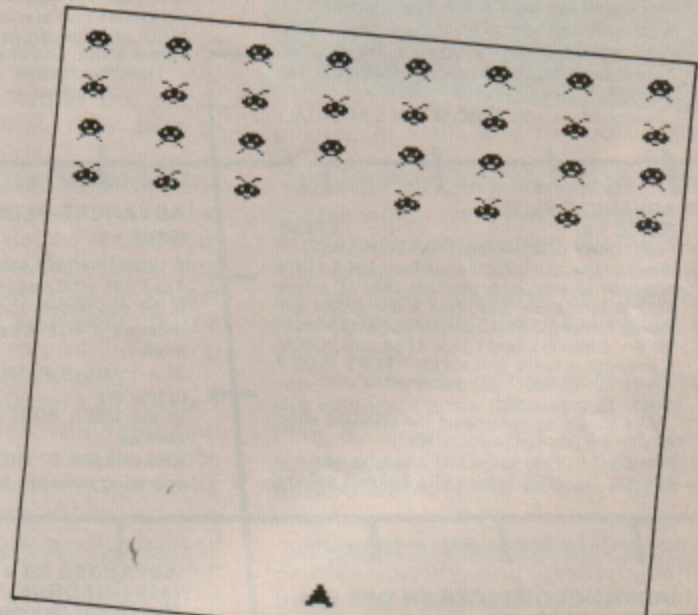
ALIEN INVASION

SPACE invaders in 10 lines? You bet. While looking a touch daunting at just over 1k of machine code, this great little program from Richard Evans really shows what can be done with the minimum of code.

Use Z and X to move your laser base left and right and Shift to fire. After you have lost a game, the Electron will pause and wait for the

spacebar to be pressed before starting a new one.

Type in the first line exactly as shown, complete with abbreviations, or it will not be accepted into the program. Unfortunately there was not enough space for a sophisticated checksum routine, but you will be told if there is a typing error in the data lines.



```

1MO.4:P.TAB(13,10)"PLEASE
E WAIT...";:STX=83000:CKX=0:
F.LX=0T08:READLS:F.L1X=1TOLE
NLS-1S.2:VX=EVAL("8"+MIDS(CLS
,L1X,2)):?STX=VX:CKX=CKX+STX
+VX:STX=STX+1:N.:N.:IF CKX<>
854024242 P."ERROR!" ELSE P
.TAB(10,10)"PRESS SPACE TO P
LAY":CALL&3000
2DATA 20D432A91F8DC50920
5A3020963020B031B008203F30B0
214C0E30A9EB8550A933855120E2
3218ADC509C93FF00569088DC509
20D4324C083020D4324C0330CECB
091015A9048DCB09A9080DC909AD
C809F0034C8C304C073160AEC509
8EC709A901908009BD2B339D0009
BD68339D4009CA10
3DATA ECA9008DCA098DC0809
A9138DC009A91F8DC109A9048DCB
09A9F28550A93285514CE232ADC5
098DC609AEC609BD8009F012BC40
09BDAB3348BD009AA20C7326820
EEFFCEC60910E160ADCA09F0034C
5431ADC5098DC609AEC609BD8009
F02EBC4009BD0009AA20C732A920
20EEFFAEC609DE00
4DATA 09BD0009D005A9018D
CA09BDAB3348BD0009AA20C73268
20EEFFCEC60910C51860ADCA09F0
034C5431ADC5098DC609AEC609BD
8009F030BC4009BD0009AA20C732
A92020EEFFAEC609FE0009BD0009
C927D005A9018DCAB09BDAB3348BD
0009AA20C7326820EEFFCEC60910
C31860A9014DC809
5DATA 8DC809A9008DCA09AD
C5098DC609AEC609BD8009F033BC
4009BD0009AA20C732A92020EEFF
AEC609FE4009BD4009C91FD005A9
018DC909BC4009BDAB3348BD0009
AA20C7326820EEFFCEC60910C0AD
C909D00218603860AEC009ACC109
20C732A9E220EEFFADCC009F02CA9
81A29EABFF20F4FF
6DATA E0FFD01FAEC009ACC1
0920C732A92020EEFFCEC009AEC0
0920C732A9E220EEFF4C1F32ADC0
09C926F029A981A2BDA0FF20F4FF
E0FFD01CAEC009ACC10920C732A9
2020EEFFCEC009AEC00920C732A9
E220EEFFADCC409D020A981A2FFA0
FF20F4FF0FF0021860ADCC0098D
C209ADC1098DC309
7DATA A9018DC409AEC209AC
C30920C732A92020EEFFCEC309AD
C309D007A9008DC4091860AEC209
ACC30920C732A9E320EEFFADCC509
8DC609AEC609BD8009F043ADC209
DD000903BADC309D04009D033A9
009D00098DC409BC4009BD0009AA
20C732A52020EEFFAEC209ACC309
20C732A92020EEFF
8DATA A90720EEFFCEC70910
0238601860CEC60910B01860A91F
20EEFF8A20EEFF984CEFFA981A2
9DA0FF20F4FF0FFD0F360A000B1
50C92AF00720EEFFC84CE4326016
0417E03C7EDBFF663C428117E1C3
24187EDBFF661817E218183C3C7E
7EFC317E3080808080808080817
000A2000000000000000
9DATA 00110011072A000306
090CDF1215000306090CDF121500
0306090CDF1215000306090CDF12
15000306090CDF1215000306090C
DF1215000306090CDF1215000306
090CDF121500000000000000002
0202020202020204040404040404
0406060606060606060606060606
080808080A0A0A0A0A
10DATA 0A0A0A0C0C0C0C0C0C
0C0C0E0E0E0E0E0E0E0E0E0E0E0E
0E0E0E0E1E1E1E1E1E1E1E1E1E0E0
E0E0E0E0E0E0E1E1E1E1E1E1E1E1
E0E0E0E0E0E0E0E0E1E1E1E1E1E1
E1E1E0E0E0E0E0E0E0E0E1E1E1E1
E1E1E1E11F0A0D11871100572045
204C204C20202044204F204E2045
20212A202044204F
    
```


Advanced Computer Products

ADVANCED DISC TOOLKIT

(01) /M/B/E/C £34.50
 Any Acorn user including Master, BBC B+, Electron, DFS, 1770 DFS, ADFS, 2nd. & co-processors A.C.P.'s BEST SELLING product containing over 30 commands inc.: powerful memory & disc editor, search memory/disc/basic, catalogue/unplug ROMs, load/run programs below page, automatic menu, file transfer (inc. locked cassette files), ADFS utils etc. etc. ("it's superb" ... Database Pubs. - "A top-class toolkit - I have no hesitation in recommending it ... Acorn User Nov. 86) (16K EPROM & FULL MANUAL)

ADVANCED CONTROL PANEL

(20) /M/B/E/C £34.50
 ACP is a front end control panel language providing a sophisticated yet friendly interface between user and computer for access to Languages, MOS functions and the users own file utility etc. Main features include pull down windows, simple to change MOS configure, floating point calculator, file manager, SW ROM's facilities. (16K EPROM & FULL MANUAL)
 "It's very easy to create an entire customised front end for your own use." - Acorn User, August 1987.
 "ACP is much better than any of the other front end systems I've seen." - Acorn User, August 1987.
 "I can recommend it to anyone who wants easy access to the Electron's functions." - Electron User, August 1987.
ACPs main features are:-
 * Pull down windows operate throughout
 * Users can create their own windows
 * Simple to change MOS-s configure options
 * Easy entry to other languages
 * Floating point calculator
 * File manager
 * Sideways ROMs utilities

ADVANCED ELECTRON DFS

(05) /E/ £24.15
 Electron & Plus 3 users ... gain BBC compatibility by adding the Advanced Electron DFS (1770 DFS) this is the same disc filing system supplied with the BBC B+. Now you can produce and access (compatible) BBC disc based software. A.C.P. also supplies 5 1/4" disc drives to add to your Plus 3 (inc. 2nd. drive adaptor). "ACP has produced another superb ROM for the Electron" ... Electron User Feb '86 (supplied on 16K EPROM + DFS MANUAL)

ADVANCED DISC INVESTIGATOR

(06) /M/B/E/C £28.75
 A very powerful Disc utility for standard & non-standard discs. Backup most protected discs, edit any type of non-standard disc, check & repair faulty tracks, create new disc formats, copy 40track discs to 80track discs, verify two non-standard discs. ("ADI features an extremely comprehensive sector editor, and one of the finest I've seen" ... Tubelink on Prestel) (supplied on 16K EPROM + manual)

ADVANCED BATTERY BACKED RAM

(18) M/E/+1 £39.99
 For Master and Electron users. A battery backed 32k RAM cartridge A.B.R. is a self contained cartridge containing two 16k pages of sideways RAM with a rechargeable battery back up. Each 16k page can be individually locked by software. Supplied with full software support, to include loading software, ROM save, advanced print buffer and a disc utility MAKEROM. "It's a superb Addon and a must for all serious Electron Users" - EU June

ADVANCED PLUS 4

(08) /E + 1/ £79.98
 "DISC DRIVE COMPATIBILITY AT LONG LAST" (Electron User June '86) this sums up AP4 & ACP's approach to producing products. AP4 is a fully ACORN compatible disc I/face & will accept any standard drive inc. PSU, runs 1770 DFS (as fitted in the B+ & Master), keeps page & Eae utils in ROM & provides a spare rom socket. "ACP's PLUS 4 comes out on top, I can recommend it to anyone" (E.U. June 86)
 AP4 should be considered the standard interface for the Electron (AU July '86)
 AP4 100 £199.00 (inc VAT & Securicor delivery)
 AP4 400 £229.00 (inc VAT & Securicor delivery)

ADVANCED PLUS 5

(09) /E + 1/ £66.70
 A triple interface cartridge providing...
 1) a TUBE i/face allowing a second processor to be connected, increasing BOTH speed & memory (PAGE & 8ae HIMEM & 8ae in all modes)
 2) a 1 MHz BUS for control applications & prommers
 3) the USER PORT for mouse and graphic devices.
 Also contains 2/3 ROM sockets and on board operating software for 2nd processor.

ADVANCED 1770 DFS

3 versions ADM/C(11) - ADB(12) ADE (13) £34.50
 ACP have totally re-written the Acorn 1770 DFS, enhancing existing features & adding new ones. The result is probably the fastest & most powerful disc filing system your computer could have. With the ability to operate in double density occupying both sides of a disc (640K). Automatic file relocation, improved file handling, 62 file catalogue and Sways RAM can be used as a fast RAM DISC. (16K EPROM + comprehensive manual)

ADVANCED ELECTRON DFS Eae

(14) /E+ASR/ £19.99
 An alternative to our AED(05) for Plus 3 and ASR users. This optional alternative DFS is designed for use in Sideways RAM (ASR) and allows the user to operate a disc filing system & Eae when using the Plus 3 (in ADFS page would normally be & 1Dee). The DFS is simply loaded using the software supplied with the ASR from disc. (optional upgrade for existing AED users £9.50 on return of original EPROM) (3 1/2" ADFS disc + manual)

ADVANCED QTR MEG RAM

(19) (M(ADM)/E+1(ADE) £79.95
 New Hi-tech cartridge (normal size) containing an incredible 256k of S.ways RAM although it could be used to store many pages of s.ways ROM images its primary and best use is as a RAM Disc supported by our advanced 1770DFS (Master/ADM or Electron ADE are now upgraded to access the 256k in AQR. Now databases (i.e. Viewstore) can perform at breathtaking speed (over twice as fast as some other 1 Meg Silicon Discs) and animation with up to 25 screens becomes a reality. Price must reflect real value for money and package prices for AQR and ADME are available at £99.95 (existing ROMs may be upgraded when purchasing AQR for £5)

ADVANCED PLUS 1

E £49.95
 The Plus 1 is the main expansion for the Electron. It provides the Centronics parallel printer port, joystick interface and 2 cartridge slots into which go ROM cartridges including View, Viewsheet, Pascal, logo and our own popular AP4 disc upgrade.

OTHER PRODUCTS AND SPECIAL OFFERS ARE NOW AVAILABLE THROUGH

P.R.E.S.

- SEE OUR SEPARATE ADVERT

Equipment codes /M/= Master /B/=BBC /E/=Electron /E+1/=Electron+Plus 1 /C/=Compact

Please send order to:
 Advanced Computer Products Ltd.
 6 Ava House, High Street,
 CHOBHAM, Surrey, England
 GU24 8LZ Tel. 0276 76545
 (mail order only)
 All our prices include
 UK delivery & VAT



(in event of any query - please include your tel. no.)

NAME	PROD NO	PRODUCT	QTY	@	TOTAL
ADDRESS					
POSTCODE					
TEL.					
CREDIT CARD No.					

I enclose payment for £.....
 Exp date (Ref E33)

Red-hot sequel

Product: Plan B2

Price: £1.95

Supplier: Bug-Byte, Victory House,
Leicester Place, LONDON WC2H 7NB
Tel: 01-439 0666



SEVEN months after *Electron User* awarded Plan B the title of Golden Game, Bug-Byte has released its red-hot sequel called, surprise, surprise, Plan B2. So what novelties are in store for hardened fans of the original game?

Well, at first sight not a lot seems to have changed. To my disappointment there is still no use of colour, but I hadn't really expected Bug-Byte to have been able to do this and keep all the different characters moving around at the same incredible speed.

The plot on the inlay card looked familiar – which wasn't surprising, as it is identical to that of its predecessor. As plots go, it still holds up as a fairly decent scenario.

You are in control of a single war drone. Your job is to explore the Togrian Computer Complex, find and destroy all of the computer's parts, and escape intact.

This objective is complicated by the fierce and persistent security robots which patrol the complex's many rooms. Nasty beasts, these – they can fire two dozen rounds of laser bolts quicker than you can say micro-processor.

Your drone is fully equipped with a rapid-fire laser, but your ammo is limited. Replacement stocks can be found in various locations, usually guarded by more security guards.

You have a shield, too. This will absorb quite a number of enemy laser bolts, and you can even ram the security robots, causing them to disintegrate in a most undignified manner. Be careful, though, as repair kits for your shield are difficult to find.

In your search through the

complex's many rooms careful thought is required to reach your objective. Some walls block your targets, making them appear seemingly unreachable. That is, until you realise that they will disintegrate under fire.

Not all walls are this obliging. Some have hidden weak spots which you must find quickly while the robot guards are doing their level best to vapourise your shields.

There are sliding doors which can't be opened by anything short of a key. The keys are found dotted about, usually in the most awkward places, and come in four different types. It is most frustrating to battle your way up to a strategic door only to find the wrong key is in your sweaty clutches.

Oilcans and spanners sprinkled around the complex will replenish your shields, although more than once I was needlessly obliterated while trying for an unnecessary top-up.

The security robots are the bane of your life. No sooner has a whole batch been satisfactorily polished off – to the accompaniment of some very good sound effects – than an even larger horde materialises, drenching your drone in shield-depleting rocket fire.

This makes your quest to destroy the complex become almost secondary to hunting down the elusive cans of re-vitalising oil and searching out the odd pain-relieving spanner.

Upon being vapourised at the end of a fruitless game, you may object to the message that "You appear to have snuffed it", which is painfully obvious. But it's fun, all the way through.

The controls are identical to the original Plan B, as has been everything described so far. So now to the differences:

Firstly, in the original game your drone could only wander over black backgrounds. In B2 a most amazing scenery-masking technique is employed, allowing you to drift over



BUG-BYTE BBC/ELECTRON

pillars, up walls and through certain floors.

Plan B had fairly nice-looking large sprites which were not animated. The sequel features extremely detailed lovingly-crafted beasts, all of which are animated in some fashion. They tend to be smaller though, to allow for more speed.

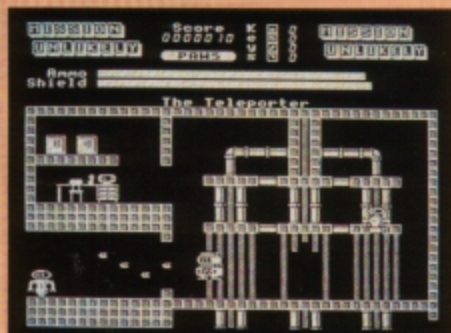
One annoying feature of Plan B was the bullets. These flickered at times. In Plan B2 however, not only is every single object 100 per cent flicker-free, but the whole game is faster than the original.

Although in black and white, Plan B2 exudes quality and craftsmanship, from the high-resolution metallic-looking sprites to the textured background of the computer complex.

Nothing seems to have been wasted here – every ounce of speed has been wrung out of the game, and at the expense of nothing whatsoever. I ran Plan B2 on both a BBC Micro and a Master 128, with neither being any faster at all than my Electron.

Generally, all sprite movement has been improved immensely. You can have no real idea of just what this means until you see the game in action. It is probably the best showcase of what your Electron can achieve that I have ever seen.

Chris Nixon



Sound.....	10
Graphics.....	10
Playability.....	10
Value.....	10
Overall.....	10

Good clean fun

Program: *Bonecruncher*
Price: £9.95 (cassette), £11.95 (5.25in disc), £14.95 (3.5in disc)
Supplier: Superior Software, Regent House, Skinner Lane, Leeds, LS7 1AX.
 Tel. 0532 459453

IN *Bonecruncher* you play the unlikely part of Bono, a cute little green dragon who lives in a castle by the sea. As an enterprising soul, you have set up Bono's Bathing Company making soap, a commodity prized by the monsters who bathe in the moat.

As everyone knows, real soap is made from bones. So to keep the customers happy you must collect the skeletons littered around the castle and boil them up in your cauldron. This turns them into luxurious skeleton soap.

However, the castle is anything but a safe place. There are trapdoors through which you can disappear without trace. On top of this, some of the skeletons are not yet skeletons – they're live and very deadly monsters, with an insatiable appetite for little green dragons.

A further hazard appears in the shape of giant spiders that rush around the walls biting any hapless dragons in their path. These will also eat any bones they find. You must

race the spiders to collect the skeletons before they do.

The castle is also inhabited by Glooks, large creatures who love the smell of soap. When you have climbed up a stairway to supply another customer with a bar of soap, they will – after a short delay – all move in the direction faced by this stairway. Although a Glook is not in itself harmful, it will crush you if you get in its way.

An added problem is that you may find yourself, or the way forward, blocked by Glooks if you are unfortunate enough to take a bar of soap up the wrong stairway. However, you can push them or take advantage of the direction in which they are trying to move to suffocate monsters and turn them into skeletons.

Fortunately, Bono's Bathing Company is not a one-man show. Your partner Fozzy, is the brawn of the operation, strong enough to hold monsters and spiders at bay. He's not very bright however, and you must keep an eye on him to make sure he is not trapped or wandering in circles.

Bonecruncher is similar in appearance to Superior's classic *Repton*, with smooth four-directional scrolling and fiendish puzzles. However, the two games are quite different.

The addition of Fozzy and the



Glooks brings an entirely new dimension to the game, not the least of which is that the *Glooks'* movement causes the layout of each chamber to change repeatedly around you.

The humour in *Bonecruncher* is probably its most appealing aspect. The skeletons grin at you and tap their feet expectantly, and if you stand still for more than a few seconds Bono will start to yawn and stamp his foot impatiently. The monsters are also beautifully animated, jumping up and down showing a mouthful of teeth.

Bonecruncher will delight game players of all ages – another sure-fire hit.

Hac-Man

Sound.....	9
Graphics.....	9
Playability.....	9
Value for money.....	9
Overall.....	9

Another brick in the wall

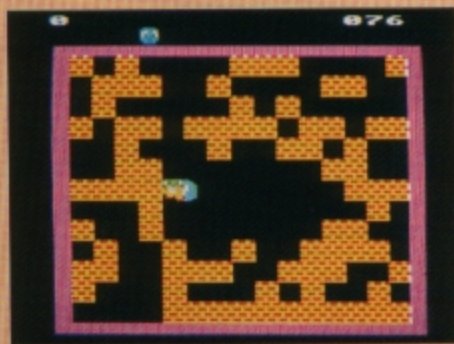
Product: *Trapper*
Price: £1.50 (cassette)
Supplier: Blue Ribbon Software, CDS House, Beckett Road, Doncaster DN2 4AD.
 Tel: 0302 21134

THE aim of this budget arcade game is to trap monsters by pushing brick walls around to box them in and finally to squash them.

The title screen is typical of *Blue Ribbon* – simple and quick to load. There isn't a demonstration mode, so the game flicks between a list of control keys and a high score table.

On starting you are asked to input the difficulty level from one to six. This controls the monster's speed. One is slow and six is fast. I found the slowest speed quite fast enough for me.

The screen consists of a pile of bricks enclosed in a large box. Inside the box are you and a monster, which obviously considers you to be a rather tasty tit-bit. Fortunately you are a strong chap and can push the bricks



around quite easily. The monster can't push the bricks, nor can it pass through them.

So by pushing them round and piling them up you can eventually trap it (if you're lucky and can avoid it for long enough). Having done this, you then push a brick into it and squash him flat.

Screen two is pretty much the same as screen one, except that you now have two monsters to contend with – double trouble. The game now starts to get a bit hectic as you try to trap

both. While you're concentrating on one, the other is sneaking up behind you.

Screen three brings three monsters, and four brings four. The final two rooms only have four monsters, but another is born immediately you trap and squash one.

On top of all this, there is also a time limit. A clock in the top-right corner of the screen slowly ticks away. If it reaches zero before you've trapped and squashed all the monsters you die and lose a life.

Although the game has a very simple theme, it is difficult, frustrating and challenging enough to make it highly addictive. The devilish grin on the faces of the monsters is a nice touch and it all adds up to a fun game that doesn't cost the earth. This is recommended.

Roland Waddilove

Sound.....	5
Graphics.....	6
Playability.....	9
Value for money.....	10
Overall.....	8

Use the force, Luke!

Product: Star Wars
Price: £9.95 (cassette)
Supplier: Domark, 204 Worple Road, London SW20 8PN.
Tel: 01-947 5622

SEVERAL years ago Atari released a coin-op arcade game based on that most famous of space adventure films, Star Wars. Employing fast moving vector graphics it was an instant success. Domark have now released a version for the Electron.

As in the original game, the action is divided into three scenarios – dogfight in space, through the towers and down the trench. These scenes are repeated with increasing difficulty as you proceed through the game.

Scene one is based on Luke's dogfight in space en route to the Death Star. The Empire's Tie-fighters zoom in at high speed, launch laser bolts, then veer away.

Using the four direction keys you steer the fighter's gunsights over the laser bolt and fire. The same tactics also work with the fighters, but the bolts must be your main priority. Each

hit you sustain destroys one of your shields – you begin the game with six. Lose every shield and the next hit will destroy your fighter.

If you survive the dogfight you are transported to the surface of the Death Star (though not on level one). Here you begin a strafing run through a forest of laser-firing defence towers.

I found this to be the easiest of the three scenes. By swinging your sights slowly left and right while pressing the fire button you can destroy all towers and laser bolts in your path without sustaining a hit.

The final scene is set in the trench. To destroy the Death Star you must travel its full length and accurately blast the exhaust port at the far end. Success is rewarded with an exploding Death Star.

On level one the only hazards in the trench are laser bolts – you can avoid these by flying high and left, only venturing down into the trench at the very end to zap the exhaust port.

Unfortunately these tactics don't work on the higher levels, where the trench is criss-crossed by barriers –



these must be flown over or under.

Unfortunately although Star Wars sounds attractive, the graphics are chunky (Mode 5), monochrome and at times, poorly defined. The gameplay is very sluggish and the controls are slow to respond. On top of this you have to sit through a 20k loading screen before the game starts to load.

All this adds up to a pretty dull, unexciting fare. I would advise you to try before you buy.

Nev Astley

Sound.....	3
Graphics.....	4
Playability.....	5
Value for money.....	5
Overall.....	5

High flyer

Product: Spitfire '40
Price: £9.95 (cassette)
Supplier: Mirrorsoft, Athene House, 66-73 Shoe Lane, London EC4P 4AB.
Tel: 01-377 4645

ALL you lovers of those old World War II films can now train to become top fighter pilots with Spitfire 40, a new flight (or should that be fight) simulator from Mirrorsoft. With plenty of practice, skill and just plain good luck, you can rise to the rank of Group Captain and be decorated with the VC, DSO and DFC.

On starting, you are presented with five pilots' names from which you must select one. A log book for the pilot is then shown. This displays his name and rank, the number of flying hours clocked up, the number of victories and any medals awarded. I was disappointed not to be allowed to enter my own name here.

Finally, a menu is printed which shows the three game option. The first is a practice run which enables you to concentrate on learning how to fly the Spitfire without the worry of being shot at by enemy planes.

A successful landing adds the flying hours to your log. Once you've clocked up enough hours and feel

fairly confident of your ability to fly you can try your hand at aerobatics in preparation for combat.

Combat practice places you in a situation where you can try out your technique. In this mode, crashing or being shot down does not count against you on your log.

Once you've had enough of this, you can move on to the real thing – air to air combat. First you are given your mission instructions. These tell you how many enemy planes there are and where they are situated in relation to the runway.

When airborne, you can have a map of the area you are currently flying over displayed on-screen. The enemy planes' positions and their heights are also indicated.

My favourite part of the game is the dogfight. I found it difficult to hit the enemy at first as it takes about a second for the shots to reach their mark.

Overall, the game is fairly easy apart from landing the Spitfire. The dogfights can be quite tense and the first time you shoot down an enemy aircraft you get a real feeling of achievement.

The instruction manual is clear and tells you all you need to know about the game. Not only that, it also gives



you a brief, but interesting, background history to the Spitfire and includes a small bibliography of books for anyone wishing to learn more about this great aircraft.

The one thing I found lacking was that almost undefinable something which makes a game addictive. I enjoyed playing it for short periods, but it isn't one of those I would automatically reach for when sitting down for a gaming session.

Desmond

Sound.....	6
Graphics.....	6
Playability.....	6
Value for money.....	6
Overall.....	6

Winter Warmer

Program: Winter Olympiad 88

Price: £9.95

Supplier: Tynesoft Computer Software,
Unit 3, Addison Industrial Estate,
Blaydon, Tyne & Wear NE21 4TE.

Tel: 091-414 4611

NOT so long ago the market seemed to be swamped with sports games of every description. But all of them had one thing in common – joystick or keyboard bashing to the point of destruction.

My first thought when I saw the cassette inlay for Winter Olympiad 88 was "Not again ...", but the sheer addictiveness of this game soon changed my mind.

The scene is set as soon as you open the box, with a four page introduction to the forthcoming Canadian winter olympics by TV presenter David Vine. It conjures up pictures of crisp, snow-covered and mist-shrouded mountains dotted with pine trees that rustle in the wind.

However, as the manual itself is only six pages long, all instructions, hints and tips for the six different events are squashed on to the last two pages in small, eye-straining print.

That aside, the first part of the game to load is the core, so called because it is the section of program which controls each event.

This takes rather a long time, but eventually a rotating scoreboard appears, which stops turning and asks for the number of participants and their names. A nice touch this, and the revolving scoreboard crops up again later after each event.

The first event – Bob Sled – is quite hard. Using only the Z and X keys to

apply left and right braking, you guide the bob-sled around each bend and curve of the icy channel, trying to squeeze as much speed as possible from the fragile-looking craft.

Banking too hard causes a heart-rending squeal of metal on ice, followed by the sled overturning, with the occupants falling out and ending up trapped underneath. It looks and sounds quite painful.

The scenery is animated quite well for an Electron game, with pine trees rushing – or creeping as some irreverent souls muttered – past to either side of your speeding toboggan.

Speed Skating is the next event and visually this is perhaps the best of all six. You are presented with two views of your player, one from the side and one from in front. These are synchronised quite well, with both heads bobbing together, and both sets of arms and legs swinging in unison.

I have to admit that pretty though it is, I'm not sure what purpose is served by splitting the display in this fashion. Nevertheless it looks good, even when the front view player banks sideways and his legs stop, while the side view player keeps his legs pumping steadfastly away!

Your controls for this event are the same as before, but this time an element of familiarity creeps in – you have to pump the keys alternately to gain speed and momentum.

There is an element of skill to this, however. Pressing the keys too quickly causes the skates to slip and you lose speed: Slow down and the speed needle starts to climb again.

The only niggle with this event – and with some of the later ones – is your inability to abandon the game if

you are fed up and want to move on to the next one.

Each event has three heats, and if there are four players participating with each heat lasting 1-2 minutes, it can take 15 minutes to move on to the next event.

Moving on to the Ski Jump, event three, you are greeted with a spectacular view of your player poised at the top of the jump. After the three beeps you are again pumping the Z and X keys for all you are worth.

This time, finger speed is vital if you are to gain enough momentum for a good jump.

As the man reaches the end of the slide, the scene switches to a side-on view of your player being catapulted into the air. Now the Z and X keys become alignment controls for the skis.

The skis tend to drift apart in flight, so you must keep them in line until landing. Otherwise not only could you lose points for bad style, but also you might end up unceremoniously sliding face-down in the snow.

I quickly tired of this event, as after a while the game turns into a monotonous frantic key bash, followed by a quick bit of ski-alignment. There isn't really enough skill in this one.

Event number four is the Giant Slalom, in which you rush downhill, guiding your skis between gates made of black and red poles.

This event was a lot more satisfying than the previous one, requiring lightning-fast reflexes to swing your player left and right through the gates.

These must be entered with the red pole to the player's left – your right – and in a panic this can easily be forgotten, resulting in doleful bongs from the computer's speaker as you accu-



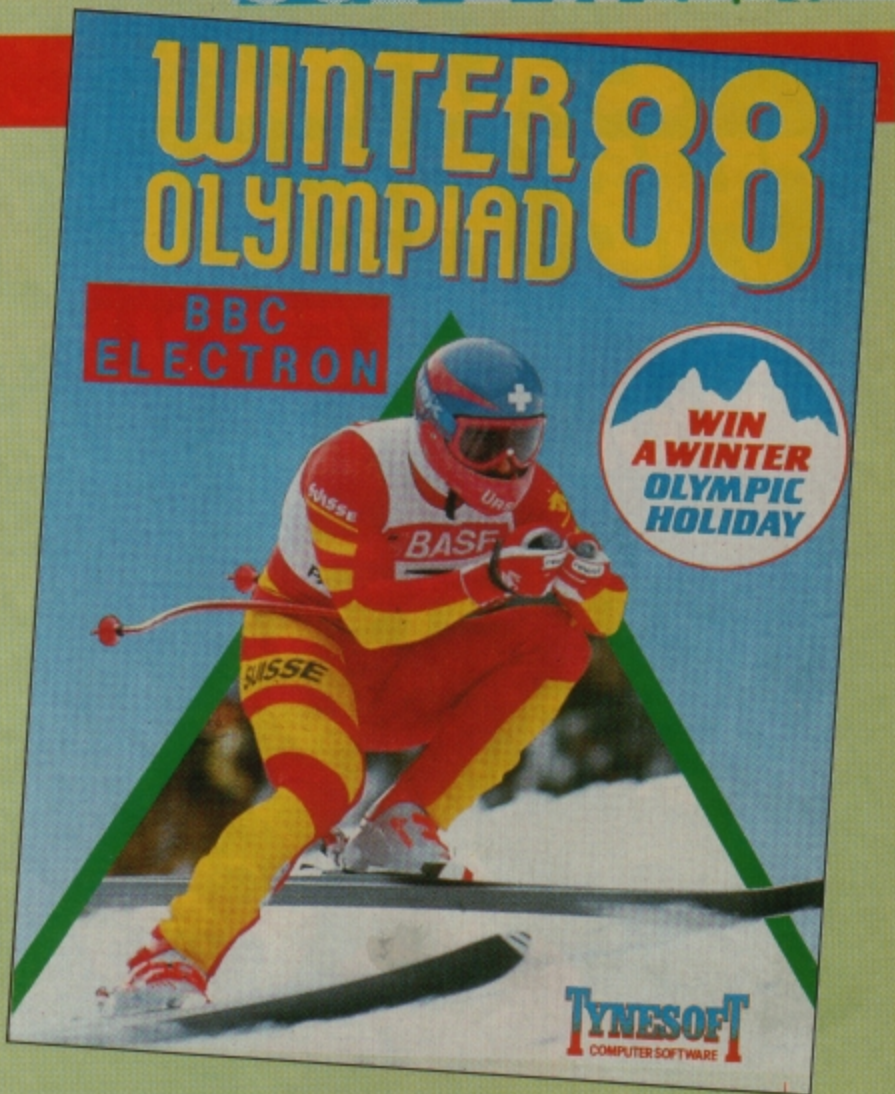
The biathlon



The downhill

WINTER OLYMPIAD 88

BBC ELECTRON



mutate penalties. At the end of each heat, any penalties add seconds to your score, and I can tell you that as a consequence mine was consistently worse than the other contestants.

The graphics for this event are very good indeed, accompanied by exhilarating whooshing noises as your skis cut swathes of snow at each turn.

The pole detection seemed very accurate, allowing some very tight squeezes to be accepted. But as soon as a pole is touched, it bends at an angle and you hear a warning tone – a highly addictive section of the game.

The Ski Slalom, event five, is next on the tape. This was quite good fun, and my favourite of the six events. Your viewpoint is from just behind and above your player's head as he plunges through the snow.

Gates appear to the left and right of you, leaving barely enough time to react and slam to one side or the other to clear the poles.

You really do need a lot of skill for this one, as the poles leave little margin for error. Sometimes the gates are so far to one side of you they can't be seen and a large blue arrow suddenly appears, suspended in mid air, which points to either left or right.

It's quite a feeling when you actually manage to respond to one of these warnings in time and shoot straight between the poles at an incredibly tight angle.

Again, good graphics. A mountain range scrolls from side to side in the distance as you manoeuvre. The warning arrows are a nice touch, but I challenge anyone to respond to all of them in time.

Moving on to event six you join the Biathlon. This is the final event on the tape, and as such it is quite a good finale for a very entertaining package. It is really two events in one. You first

have to speed-ski up to a row of five targets using the Z and X keys, where-upon the screen expands to show the targets as a rifle-range with five bullseyes to hit.

Your rifle is then cocked – another nice touch achieved by clicking the cassette relay on and then off – and a black cross-hair moves down the target.

Pressing the spacebar fires your gun, and if the cross-hair is exactly over the bull at the time, you are rewarded with a satisfying smacking sound and the bull is coloured black. If

you miss, you hear an off-key ding, and your miss is marked with a red cross.

This exercise is repeated for all five paper targets before you must again shoulder your rifle and speed off into the snow to find the next cluster of targets.

Overall, Winter Olympiad 88 is an entertaining package, marred only by the slight monotony of some events, and the inability to fast-forward to the section of your choice.

The sound effects are by nature limited, but there is a nice jingle at the end of each event which you may recognise from previous televised Winter Olympics.

As an Electron game, it holds up against even the BBC Micro – I ran the programs on both machines, with no noticeable change in speed.

At £9.95 Winter Olympiad 88 has got to be good value, as you are effectively getting six games for your money, and there is going to be something for everyone in each.

Chris Nixon



Speed skating



Sound.....	9
Graphics.....	10
Playability.....	10
Value for money.....	10
Overall.....	10

EXPERIENCE THE REAL THING!

WIN A WINTER OLYMPIC HOLIDAY WORTH MORE THAN £2000



WINTER OLYMPIAD '88

Winter Olympiad '88 is undoubtedly the best winter sports simulation to date. It features the classic winter olympic events; Ski Slalom, Giant Slalom, Two man bob, Ski-Jump, Biathlon and Speed Skating. These have been depicted in a way not seen on any home computer before. The result is a phenomenally realistic and spell-binding game.

Available on the following formats:

- CBM64, BBC/ELECTRON, ATARI £9.95
- SPECTRUM, AMSTRAD, C16/+4 £7.95
- DISK - BBC £14.95
- MASTER COMPACT £14.95
- ATARI 8 BIT £14.95
- ST. £19.95 ● AMIGA £19.95
- IBM £19.95



TYNESOFT

COMPUTER SOFTWARE

electron user

ARCADE CORNER

Compiled by MARTIN REED

MOST *Electron User* readers will know of the Slogger Master Ram board. Many, including Pendragon and I, are proud owners.

For a few months now, Pendragon has been bringing news of the many formerly BBC Micro-only adventures that now run on the Electron with the Master Ram Board, not to mention the new adventures that are being released specifically for the 64k Electron.

As yet, however, I don't know of any arcade games specifically designed for the expanded machine. Think of the amazing possibilities of a full 32k game with Mode 1 or 2 graphics. Such games would rival anything available for the BBC Micro or any other machine. What about two versions – one 32k and one 64k – on the same tape?

This month's pokes come from Justin Tyas from Woodham Ferrers, Essex, Mark Richardson from Barking, Essex, Jason Hassam from Stepney, London, Paul Shackels from Southgate, London, and Troy Helm from Carmarthen, Dyfed.

Share your hints, tips, peeks and pokes with fellow *Electron User* arcade addicts – but please ensure they are all your own work. Send them to:

Arcade Corner
Electron User
Adlington Park
Adlington
Macclesfield
SK10 5NP

Gisburne's Castle – Martech/Mastertronic

Alistair Fisher has written in from Thorpe Bay, Essex, with a plea for help with Martech's arcade adventure, *Gisburne's Castle*. He cannot open the trapdoor or the rusty door or get into the dungeons.

Alistair says he has had the game for nearly two years and is getting desperate. I have hardly played the game myself – perhaps some of our talented readers may be able to help? With the recent re-release of the game on Mastertronic's Ricochet label, I think we may be seeing more of *Gisburne's Castle*.

Tarzan Boy – Alligata

Here's a simple tip for anyone who finds *Tarzan Boy* a bit slow – just press Break. This switches the sound off and causes the game to speed up. However, this only works once: if you press Break a second time the *Tarzan Boy* sprite will be corrupted, turning into a series of vertical lines. Be careful.

Spy vs Spy – Tynesoft

Nathan Edmunds has written in with a request for help with *Spy vs Spy*. He has collected all the objects, but does not know how to put them in the briefcase.

He also wants to know which of them are actually needed to finish

Omega Orb – Audi- genic

Omega Orb features a cheat mode: Logon to a computer and type GROVEL. This gives you an extra life and can be used any time.

Soccer Boss – Alterna- tive Software

If football management is not your strong point, here's a cheat for Alternative Software's *Soccer Boss*. After the game has loaded, press Break, then type:

```
OLD  
LIST 32
```

The value of your initial financial resources is held in CA%, and your starting division in DIV%. Change these values to obtain more cash or to start in a higher division.

Starship Command – Acornsoft

This short routine for Acornsoft's *Starship Command* doubles the rate at which your starship's shields are replenished.

```
10 PX=85700  
20 COPT 2:PHP:PHA  
30 LDA# rate:STA 834B5  
40 PLA:PLP:RTS: ]  
50 rate=24  
60 ?8220=0:?8221=857  
70 *FX 14,4
```

Snapper – Acornsoft

Here's an unusual tip – a cheat for the rom version of Acornsoft's *Snapper*! Insert the cartridge and switch the machine on. Wait for about a second and press Escape. You should then be able to list the game's Basic loader. Delete line 40 and enter the following line:

```
80 !889=RND(0)
```

Then type RUN to load the rest of the program.

You will find you are only pursued by the red monster, and that you will be credited with the points of the current bonus fruit every time you pass your starting position, regardless of whether the fruit is actually displayed at the time.

Also, if you eat a power pill and catch the red monster – sending it back to its den – it will not come back out until you begin a new sheet. This allows you to complete the current sheet at your leisure.

the game.

To put an object into the briefcase, you must put the briefcase into the cupboard, safe or filing cabinet and take the object.

Then put the object back where you found it and take the briefcase.

The object is now in the case.

Objects in the briefcase show up as flashing symbols on the trapulator. You only need four items – passport, key, plans and money – to leave the embassy and win the game.

PRESENTS A SELECTION OF HARDWARE, UTILITIES & SOFTWARE FOR THE ELECTRON

NEW BEAU JOLLY'S NEW 5 STAR GAMES Vol III
Southern Belle, W. of Exploding Fist, Thunderstruck, Frak, Caveman Capers, Strike Force Harrier & Project Thesius - Only £7.95
COMPUTER HITS IV
Death Star, The Mine, Thrust, Killer Gorilla, Psycastria, Repton, Blagga, Zalaga, Ghouls, Bug Eyes II & Galapagos & Karate Force - Only £7.95

XMAS RELEASES				
		Cass	5.25" Disc	+3" Disc
A.S.L.	Ransack	8.45		
	Despatch Rider	7.45		
Superior's	Elixir	7.95	10.45	12.95
	Spellbinder	7.95	10.45	
	Life of Repton	5.95	7.95	
	Bonecrusher	7.95	10.45	12.95
Tynesoft's	Winter Olympiad 88	7.95		
	Boulderdash	7.95		
	Indoor Games	7.95		
Domark's	Star Wars	7.95		

NEW THIS MONTHS SPECIALS SMASH & GRAB ONLY £4.95
QUICK THINKING PLUS ONLY £4.95
STAIRWAY TO HELL ONLY £7.95

MICRO POWER'S POWER PACK
3 Cassettes
Croaker, The Mine, Frenzy
All 3 for just £3.95 or £1.00 each title

SPECIAL OFFER 64k ELECTRONS ONLY £89.95
NEW NEW BUG BYTE'S PLAN B II Cass £2.99

OUR PRICE
A & F
Chukon Egg 3.90
Cylon Attack 3.90
ACORNSOFT
Elite 10.95
Forth 8.95
Lisp 4.95
Boxer 1.00
Business Games 2.99
Desk Diary 2.99
Snapper 1.99
View Rom (Cart) 13.95
Viewsheet Rom (Cart) 13.95
Hopper Rom (Cart) 8.95
ISO Pascal Rom (Cart) 54.80
ACORN/LINKWORD
Italian 8.95
Spanish 8.95
ATARI SOFT
Robotron 4.95
ATLANTIS SOFTWARE
League Challenge 2.99
BLUE RIBBON
Nightmare Maze 1.99
Castle Assault 1.99
Astro Plumber 1.99
Diamond Mine 1.99
Darts 1.99
Joey 1.99
Ravage 1.99
Bar Billiards 1.99
Condition Red 1.99
BEAU JOLLY
Computer Hits I 8.45
Computer Hits II 8.45
Computer Hits III 8.45
Five Star Games 8.45
Five Star Games II 8.45
BUG BYTE
Twin Kingdom Valley 2.99
Starforce 7 2.99
Tennis 2.99
Cricket 2.95
Jack Atac 2.95
Savage Pond 2.95
Skyhawk 2.99
Ice Hockey 2.99
Hunk Dory 2.99
Plan B 2.99
Dunjunz 2.99
Squeakaliser 2.99
Templeton 2.99
COMSOFT
Serpents Lair 3.95
Playbox 3.95
S.A.S. Commando 3.95
C.D.S.
Steve Davis Snooker 7.45
Birdie Barrage 6.95
Colossus Chess IV 8.45
Brian Clough's Fortunes 12.95
DR SOFT
747 Flight Sim. 6.95
Phantom Combat 8.45
DATABASE
Mini Office 4.95
Micro Olympics 4.95
Majic Sword 5.45
French on the Run 8.95

OUR PRICE
DURELL MARTECH
Gisburne's Castle 3.95
Tarzan 7.50
ELITE
Paperboy 7.75
EPIC SOFTWARE
The Lost Crystal 10.95
The Wheel of Fortune 7.45
Castle Frankenstein 5.95
The Quest of the Holy Grail 5.95
Kingdom of Klein 5.95
FIREBIRD
Star Drifter 2.95
GILSOFT
The Quill 15.45
GOLEM LTD
Education II 6.50
Fun with Words 6.50
Fun with Numbers 6.50
Jigsaw 6.50
GREMLIN GRAPHICS
Footballer of the Year 7.95
HEWSON
Heathrow A.T.C. 6.95
Evening Star 7.95
ASL SOFTWARE
Bug Eyes II 6.95
Frankenstein 2000 5.95
Caveman Capers 6.50
Psycastria 6.50
The Last of The Free 6.50
Electron Power Pack 8.65
Thunderstruck 6.75
Thunderstruck II 6.95
Sphere of Destiny 6.75
Omega Orb 6.75
Graham Gooch Test Cricket 7.75
Ziggy 6.75
Electron Power Pack II 7.95
IMAGINE
Mikie 7.45
Yie Ar Kung Fu II 7.45
INCENTIVE
Confuzion 5.00
Kei Trilogy 8.45
Adventure Creator 13.25
KOSMOS SOFTWARE
French Mistress A or B 7.95
German Master A or B 7.95
Spanish Tutor A or B 7.95
Italian A or B 7.95
Answer Back Jun. or Sen 8.95
Answer Back Sport 8.95
Identify Europe 6.95
FACTFILE SERIES (Used with Answer Back Series)
Arithmetic (8-11yrs) 4.25
Spelling (8-12 yrs) 4.25
Natural History (10+) 4.25
English Words (12+) 4.25
First Aid (12+) 4.25
General Science (14+) 4.25
Know England (12+) 4.25
Know Scotland (12+) 4.25
Supersport (14+) 4.25
20th Century History (12+) 4.25
Association Football (14+) 4.25

OUR PRICE
L.C.L.
Micro French ('O' Level) 21.50
Micro Maths (24 Progs 'O' Level) 21.50
Micro English (24 Progs 'O' Level) 21.50
Mega Maths ('A' Level) 21.50
LARSOFT
Puppet Man 3.65
The Rising of Salandra 4.55
Wychwood 3.65
The Nine Dancers 3.65
LOGOTRON
XOR 7.75
MELBOURNE HOUSE
Way of Exploding Fist 8.95
Dodgy Geezers 7.75
MICROPOWER
Micropower Magic II 6.95
Micropower Magic 6.95
Jet Power Jack 2.95
Poisitron 2.95
Swag 2.95
Gauntlet 2.95
Chess 2.95
Killer Gorilla 2.95
U.X.B. 2.95
Felix/Evil Weevils 2.95
Felix in Factory 2.35
Felix/Fruit Monsters 2.95
Stock Car 2.95
Rubble Trouble 2.95
Bumble Bee 2.95
MIRRORSOFT
Splittie 40 7.95
Harrier Strike Force 7.95
First Steps 7.95
Here/There with Mr Men 6.95
Quick Thinking Plus 5.95
ROBICO SOFTWARE
Rick Hanson 7.75
Project Thesius 7.75
Myorem 7.75
Enthar 7 (5.25") Disc 16.45
Note the above disc-AP4 VF only
The Hunt 7.95
Village of Lost Souls 7.95
SOFTWARE INVASION
3D Bomb Alley 2.95
Gunsplode 2.95
Blitzkrieg 2.95
Super Pool 2.95
Vortex 2.95
Chipbuster 5.95
SOFTWARE PROJECTS
Project Graphics 5.95
SQUIRELSOFT
Supergolf 6.50
Trafalgar 7.00
Cashcare 10.65
VAT Care 13.65
Building Soc. Care 8.95
Investment Care 12.95
T.V. Director 11.65
Squirrels Nuts Pack 7.95
ACORNSOFT AND SUPERIOR SOFTWARE
Smash and Grab 6.95
Overdrive 6.50
Repton 7.95
Death Star 7.95
Repton 2 7.95

OUR PRICE
Citadel 7.95
Karate Combat 7.45
Thrust 6.75
Galaforce 7.75
Ravenskull 7.75
Repton 3 7.75
Acornsoft Hits Vol I 7.75
Acornsoft Hits Vol II 7.75
Superior Hits Vol III Cass. 7.75
Superior Hits III Plus 3D 12.95
Around World 40 Screens 5.95
Stykers Run 7.75
Codename Droid 7.75
Crazy Rider 7.75
Crazy Rider (Disc) 12.75
Palace of Magic 7.75
Palace of Magic (Disc) 12.75
Play It Again Sam 7.75
TYNESOFT
Micro Value Gold 3.99
Spy vs Spy 7.75
Oxbridge 6.75
Phantom 6.75
Microvalue 3.49
The Big K.O 6.75
Futureshock 6.75
Jet Set Willie II 6.75
Goal 6.75
Commonwealth Games 6.50
US Drag Racing 5.95
Jet Set Willy 6.50
Tynesoft Starter Pack I 6.50
Ian Botham Test 6.50
Rig Attack 3.95
Winter Games 6.50
Mousetrap 6.50
Five-A-Side Socca 2.95
Pag Leg 2.95
Bouncing Bombs 2.95
Wet Zone 3.95
Stratobomber 2.95
Caterpillar 2.95
Hyperdrive 2.95
Super Hangman 2.95
3D Maze 2.95
U.K. P.M. 2.95
Invader (I.J.K.) 2.95
Bozo the Brave 2.95
Cylon Attack 2.95
Trek II 2.95
Space Caverns 2.95
Physics 'O' Level 2.95
Chemistry 'O' Level 2.95
Maths 'O' Level 2.95
U.S. GOLD
Impossible Mission 7.65
Crystal Castles 8.65
Rebel Planet (text adv) 6.95
Kayleth 6.95

UTILITIES AND HARDWARE SECTION CONTINUED
Advanced Disc Toolkit 32.20
Advanced Electron D.F.S. 22.15
A. R. Manager 13.65
A. Electron D.F.S. Eee 18.65
Advanced Rom Ad. 13.65
A.S. Ram 27.90
Advanced Disc Inv. 26.55
A.P.4. 75.98
A.P.5. 62.50
Plus I 47.95
AMS Mouse 65.95
FIRST BYTE
Quickshot Joystick & WFace 27.99
Quickshot II 9.99
Joystick Interface 18.25
BBQ/E Printer Cable £9.95
A1
Super Smooth Power Supply + 2yr guarantee + on/off switch 20.45
P.M.S.
E2P6502 85.00
SLOGGER
Rombox + 51.95
Joystick Interface 18.65
Electron Expansion 2.0 10.65
Starstore II 27.25
Elkman 9.95
Starman 9.95
Stargraph 9.95
Starword 18.65
Starword Cumana 18.65
Printer Rom 18.65
16K Sideways Ram 27.95
Trek 9.95
S.E.D.F.S. 22.95
T2P3 or T2CU or T2P4 22.95
T2SD or T2SEDFS 22.95
Master Ram Board 48.95
Turbo Driver 27.95
Rom Cartridge 11.65
S.E.D.I. (Int. + Manual) 70.95
VINE MICROS
Addcomm 26.00

PLUS 3 DISCS
ACORNSOFT'S
Database 18.65
BLUE RIBBON
Games Disc 1 8.95
C.D.S.
Steve Davis 8.95
Birdie Barrage 8.95
KOSMOS SOFTWARE
French A+B 18.65
German A+B 18.65
Italian A+B 18.65
Spanish A+B 18.65
Ans. Back Sen. 11.65
Ans. Back Jun. 11.65
Ans. Back Sport 11.65
Any Factfile 7.45
SUPERIOR SOFTWARE
Superior Hits III 12.75
Codename Droid 12.75
Crazeo Rider 12.75
Palace of Magic 12.75
Play It Again Sam 12.75

BOX OF TEN C20 COMPUTER CASSETTES £4.99 inc VAT & P&P

EDUCATIONAL & GOVERNMENT ORDERS WELCOME
ALL PRICES ARE INCLUSIVE OF VAT AND CARRIAGE
OVERSEAS ORDERS PLEASE ADD £1.00 PER ITEM, INCLUDES INSURANCE

Please send me: Cass Plus 3 Disc

Please make cheques payable to:
21st Software Ltd

Access No

Card holders name

Send Orders to:
21st SOFTWARE LTD. Dept EU
15 Bridgefield Avenue,
Wilmslow SK9 2JS
Tel: Wilmslow (0625) 528885

Name

Address

Post Code

Tel. No (STD)

1. £

2. £

3. £

4. £

TOTAL £

Character building

The first instalment of a new series by **ROBIN NIXON** on how to create your own character sets

OVER the next few months we'll be looking at ways of redefining the Electron's character set, seeing how to create new fonts for Epson-compatible printers and how to get a 40 character screen width in Modes 2 and 5, or even 80 characters in Mode 1.

This month we'll kick off with Program I, a font designer. It enables you to quickly and simply define and use complete character sets without having to type a single VDU 23 statement.

As you may know, to obtain more than 32 user-defined characters it is usually necessary to "explode" the character set by issuing a *FX20 command.

This can be a bit fiddly and results in the loss of 256 bytes per set of characters. As we need 96 characters to create a complete set, that makes a total 768 bytes of memory required.

There is, however, another way. On a disc-based system we can just about squeeze our character definitions in pages &9, &A and &C of memory.

Tape users will need to use page &B, the function key buffer, in place of &A as this is the cassette input buffer which will be used for loading in the character sets.

So long as we don't try to BPUT or BGET using the cassette filing system, or define more than four envelopes there will be no problems.

Now that we've found somewhere to put our character sets, we need to tell the computer where to find them. This is achieved by altering the locations in page &3 as shown in the panel on the next page.

However, we need only be interested in the following three fonts: 32-63, numbers and punctuation, 64-95, upper case letters and 96-127, lower case letters.

Numbers and punctuation can go in page &9, uppercase letters in page

&A (&B for tape users) and lowercase letters in page &C. So to set up the extra user-defined characters we have to change four bytes like this:

```
?&367=&70 (bits 4 5 and 6)
?&368=&9
?&369=&A (&B for tape)
?&36A=&C
```

The three bits set in location &367 tell the computer to take the selected fonts from the specified

pages in ram rather than the rom look up table. Ok so far, but we still have one problem - no user-defined characters.

Well, this bit's up to you. Using Program I define your three parts of the font and save each with a different filename, such as FONT-N, FONT-U and FONT-L, where N is numerical, U is upper case and L is lower case.

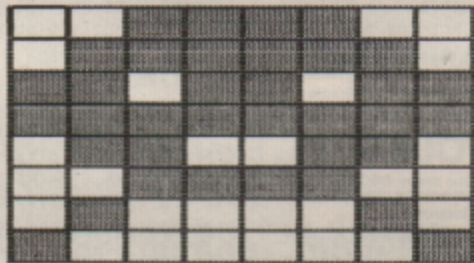
Then type in Program II, changing the filenames in lines 80-100 to those of your


new font. If you are using a tape system, don't forget to change the A00 in line 90 to B00 and the ?&369=&A in line 130 to ?&369=&B. You can now merge your programs on to the end with your new font replacing the Electron's standard one.

The character definer can also be used to create your own user-definable characters which need only be loaded in at &C00 saving

Turn to Page 22 ▶

Character Definer
R. Nixon 1988



224 

⊗ &A |

⊗ ⊠ ⊡ ⊢ ⊣ ⊤ ⊥

⊙ ⊚ ⊛ ⊜ ⊝ ⊞ ⊟ ⊠

Use the cursor keys to move.

The space bar sets and resets a point.

C clears the grid.

Press RETURN when you have finished.

Designing a character

Programming

◀ From Page 21

you typing VDU 23 statements and making your programs shorter.

● Next month we'll have a look at printing out the new

fonts on a Epson-compatible printer. In the meantime I'd be interested to receive any fonts you design: If there's room, I'll include a printout of the best one in a future article.

&900-&9FF Extra envelope storage area, envelopes 5-16.
Speech buffer.
RS423 output buffer.
Cassette output buffer.

&A00-&AFF Cassette input buffer.
RS423 input buffer.

&C00-&CFF User-defined characters 224-255.

&367 The font flag: This byte marks whether a particular set of 32 characters (font) is taken from rom or ram. If a bit is set the corresponding font is located in ram.

bit 6 characters 32-63
bit 5 characters 64-95
bit 4 characters 96-127
bit 3 characters 128-159
bit 2 characters 160-191
bit 1 characters 192-223
bit 0 characters 224-255

&368-&36E The font location bytes. These contain the high bytes for the location of each font. A font can only start at the beginning of a page so the low bytes are always 0.

The main areas of memory used

Program I

```
10 REM Character set
20 REM definer
30 REM
40 REM By Robin Nixon
50 REM (c) Electron User
60 REM
70 DIM CH% 8,AX(8,8),OS%
100:CCS=""
80 MODE 5:VDU23;8202;0;0;
;0;:RRX=12:SSX=5
90 VDU 19,1,4,0,0,0
100 VDU 19,2,1,0,0,0
110 ON ERROR GOTO 570
120 *FX 4,1
130 *FX 11,8
140 *FX 12,8
150 *FX 20
160 PROCgrid
170 *FX 20
180 PROCshowall
190 VDU 31,0,18:COLOUR 3:
PRINT "To save or load a"
file, press ESCAPE.":SPC 9'
:COLOUR 2:PRINT "To edit a
character"Select it using
the"cursor keys. Then"
press RETURN.":STRING$(80,"
"):COLOUR 1
200 PRINT "Which character
r?";
210 PROCselect
220 PCX=RRX-12+((SSX-5)/2
)*8+224
230 PROCgetinfo(PCX)
240 CLS:PROCgrid:PROCshow
all:PROCshowcharacter(0)
250 X%=1:Y%=1:VDU 31,3,16
:PRINT;PCX;
260 VDU 31,0,19:COLOUR 2:
PRINT "Use the cursor keys"
"to move.":COLOUR 1:PRINT
"The space bar sets"and r
esets a point.":COLOUR 2:P
RINT "C clears the grid.":
270 COLOUR 7:PRINT "Press
RETURN when"you have fin
ished."
280 REPEAT PROCcursor:*FX
15
```

```
290 REPEAT GX=GET:UNTIL G
X=13 OR GX=32 OR GX>135 OR
GX<140 OR GX=67:PROCcursor
300 IF GX=136 XX=X%-1:IF
XX=0 XX=8
310 IF GX=137 XX=X%+1:IFX
X=9 XX=1
320 IF GX=138 YX=YX+1:IFY
X=9 YX=1
330 IF GX=139 YX=YX-1:IFY
X=0 YX=8
340 IF GX=32 AX(YX,XX)=AX
(YX,XX) EOR 1:PROCset(YX,XX
)
350 IF GX=67 VDU 23,PCX,0
,0,0,0,0,0,0:X1X=X%:Y1Y=Y
X:PROCgetinfo(PCX):X%=X1X:Y
X=Y1X:PROCshowcharacter(1):
PROCshowall
360 UNTIL GX=13
370 VDU 23,PCX:FOR PX=1 T
O 8:QX%=0:FOR QX=1 TO 8:QX%
```

This is one of hundreds of programs available FREE for downloading on

MicroLink

In addition to these many BBC Micro programs in the MicroLink library will also run on the Electron.

```
=QX%+AX(PX,QX)*2*(8-QX):NEX
T:VDU QX%:NEXT
380 GOTO160
390 DEFPROCgetinfo(PCX):X
X=CH% MOD 8100:YX=CH% DIV 8
100:AX=10:?CH%=PCX:CALL &FF
F1:ENDPROC
400 DEFPROCgrid:VDU 31,2,
0:COLOUR 3:PRINT "Character
Definer":COLOUR 1:VDU 31,4
0L,0,2
410 FOR JX=1 TO 9
420 MOVE JX*72,896:DRAW J
X*72,608
430 MOVE 72,(JX+16)*36-4:
DRAW 648,(JX+16)*36-4
440 NEXT
450 ENDPROC
460 DEFPROCcursor:GCOL 3,
1:MOVE XX*72,(10-YX+16)*36-
4:DRAW (XX+1)*72,(10-YX+16)
```

```
*36-4:DRAW (XX+1)*72,(9-YX+
16)*36-4:DRAW XX*72,(9-YX+1
6)*36-4:DRAW XX*72,(10-YX+1
6)*36-4:ENDPROC
470 DEFPROCshowcharacter(
flag)
480 FOR JX=1 TO 8
490 FOR KX=1 TO 8
500 AX(JX,KX)=0:IF (CHX?J
X) AND (2*(8-KX)) AX(JX,KX)
=1:PROCset(JX,KX) ELSE IF f
lag PROCset(JX,KX)
510 NEXT
520 NEXT
530 ENDPROC
540 DEFPROCshowall:VDU 28
,12,13,19,5:CLS:COLOUR 3:FO
R JX=224 TO 255:VDU JX:IF J
X MOD 8=7 PRINT
550 NEXT:VDU 26,31,12,14:
COLOUR 7:COLOUR 129:PRINT C
S:COLOUR 128:ENDPROC
560 DEFPROCset(PX,QX):GCOL
L 0,AX(PX,QX):PLOT 4,QX*72+
8,(10-PX+16)*36-8:PLOT 4,(Q
X+1)*72-8,(10-PX+16)*36-8:P
LOT 85,QX*72+8,(10-(PX+1)+1
6)*36:PLOT 85,(QX+1)*72-8,(
10-(PX+1)+16)*36:PLOT 69,46
0+QX*8,476+(9-PX)*4:ENDPROC
570 *FX4
580 *FX 11,20
590 *FX 12,2
600 ON ERROR CLS:REPORT:P
RINT " at line ";ERL:END
610 MODE 6:PRINT "Do you
want to save this character
set";:PROCcyn:IF GS="N" OR
GS="n" GOTO640
620 PRINT "":*
630 INPUT "Enter file n
ame ? '$OS%:CCS=$OS%:$OS%="
*SAVE "+$OS%+" C00 D00":X%=
OS% MOD 8100:YX=OS% DIV 810
0:CALL &FFF7:GOTO 80
640 PRINT "Do you want
to load a character set";:P
ROCcyn:IF GS="N" OR GS="n"PR
INT "":END
650 PRINT "":*
660 INPUT "Enter file n
```

```
ame ? '$OS%:CCS=$OS%:$OS%="
*LOAD "+$OS%:X%=OS% MOD 810
0:YX=OS% DIV 8100:CALL &FFF
7:GOTO 80
670 DEFPROCcyn:REPEAT GS=G
ETS:UNTIL GS="Y" OR GS="y"
OR GS="N" OR GS="n":ENDPROC
680 DEFPROCselect
690 COLOUR 4:COLOUR 129:V
DU 31,RRX,SSX,RRX-12+((SSX-
5)/2)*8+224
700 REPEAT GGX=GET:COLOUR
3:COLOUR 128:VDU 31,RRX,SS
X,RRX-12+((SSX-5)/2)*8+224
710 IF GGX=136 RRX=RRX-1:
IF RRX=11 RRX=19:SSX=SSX-2:
IF SSX=3 SSX=11
720 IF GGX=137 RRX=RRX+1:
IF RRX=20 RRX=12:SSX=SSX+2:
IF SSX=13 SSX=5
730 IF GGX=138 SSX=SSX+2:
IF SSX=13 SSX=5
740 IF GGX=139 SSX=SSX-2:
IF SSX=3 SSX=11
750 COLOUR 4:COLOUR 129:V
DU 31,RRX,SSX,RRX-12+((SSX-
5)/2)*8+224
760 UNTIL GGX=13:COLOUR 1
28:ENDPROC
```

Program II

```
10 REM Character set
20 REM loader
30 REM
40 REM By Robin Nixon
50 REM (c) Electron User
60 REM
70 MODE 6
80 *LD. COMP-N 900
90 *LD. COMP-U A00
100 *LD. COMP-L C00
110 ?&367=&B70
120 ?&368=&B9
130 ?&369=&BA
140 ?&36A=&BC
```

This listing is included in this month's cassette tape offer. See order form on Page 53.

▶ **IMPACT POSTERS SUPERDEAL** ◀

SUPERIOR SOFTWARE GAMES

At LESS than 1/2 PRICE!

THE LATEST BEST SELLERS

Bonecruncher
Zarch
Spellbinder
The Life of Repton
etc.



At least **£5 off** all Superior Software's games!!

With EVERY 2 of the above 7 posters you buy, you may choose ANY 1 of the following Superior Software games at less than 1/2 the recommended price!

These immensely popular and colourful posters are 2 feet long by nearly 1 1/2 feet wide, and are yours for only **£1.95** each.

NEW ELITE
A truly classic poster of the world's most addictive and best selling game. A mindboggling space adventure.

BBC or Electron CASSETTES	BBC or Electron 5 1/4" DISCS	Master Compact or Electron 3 1/2" DISCS
<p>Only £1.95 (£6.95) each: The Life of Repton Repton Around the World</p>	<p>Only £2.95 (£7.95) each: The Life of Repton Repton Around The World (BBC only)</p>	<p>Only £3.95 (£9.95) each: The Life of Repton (MC only) Repton Around The World (MC only)</p>
<p>Only £3.95 (£9.95) each: Bonecruncher Spellbinder Play It Again Sam Elixir Palace of Magic Codename:Droid Crazee Rider Grand Prix Cons. Set (BBC only) Repton 3 Superior Coll. 1 or 2 (BBC only) Acornsoft Hits 1 or 2 Superior Coll. 3 (Elec. only)</p>	<p>Only £5.95 (£11.95) each: Bonecruncher Spellbinder Play It Again Sam Elixir Palace of Magic Codename:Droid Crazee Rider Grand Prix Cons. Set Repton 3 Superior Coll. 1 or 2 Acornsoft Hits 1 or 2</p> <p style="text-align: right;">} (BBC only)</p>	<p>Only £6.95 (£14.95) each: Bonecruncher Spellbinder Play It Again Sam Elixir Palace of Magic Codename:Droid Crazee Rider Grand Prix Cons. Set Repton 3 Superior Coll. 1 or 2 Acornsoft Hits 1 or 2 Superior Coll. 3 (Elec only)</p> <p style="text-align: right;">} (MC only)</p>
<p>Only £6.25 (£12.95) each: Elite Revs & Revs 4 Tracks (BBC only)</p>	<p>Only £6.95 (£14.95) each: Elite (BBC only) Revs & Revs 4 Tracks (BBC only)</p>	<p>Only £9.95 (£19.95) each: Elite (MC only) Revs & Revs 4 Tracks (MC only) ZARCH (Archimedes only)</p>

HOW TO ORDER

Simply fill in the coupon and send with a cheque or postal order to Impact Posters.

- GUARANTEED despatch within 48 hours
- FREE postage and packing (by 1st class post) (UK only. Overseas please add £2.50)
- Posters sent in strong postal tubes

To: Impact Posters, Neepsend House,
1 Percy Street, Sheffield, S3 8AU.

Please send me the following posters:—
(Tick or put quantity in relevant boxes)

- | | | | |
|----------------|--------------------------|-----------------------|--------------------------|
| Elite | <input type="checkbox"/> | (All only £1.95 each) | |
| Repton | <input type="checkbox"/> | Palace of Magic | <input type="checkbox"/> |
| Zarch | <input type="checkbox"/> | Ravenskull | <input type="checkbox"/> |
| Codename:Droid | <input type="checkbox"/> | Crazee Rider | <input type="checkbox"/> |

You may choose 1 game with EVERY 2 posters you buy:

Game	Format (Cassette etc)	Computer
.....
.....
.....

(BLOCK CAPITALS PLEASE)

Name

Address

.....

.....

Post Code

Cost of Posters £

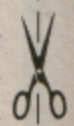
Cost of Game(s) £

I enclose a cheque/PO for £

(Cheques/POs payable to Impact Posters)



Impact Posters
Neepsend House
1 Percy Street
Sheffield
S3 8AU
Tel:(0742)769950



If you want to start doing more with your micro than just playing games, this package is your ideal introduction to the four most popular applications for professional computers. All the programs have been designed for simplicity, so even a child can use them. Yet they include advanced features not yet available on programs costing many times as much!

Finalist for the Home Software of the Year Award



Contains 32 page booklet giving clear, easy-to-follow instructions on all 4 programs

Word Processor: Ideal for writing letters and reports. There is a constant display of both time and word count, plus a words-per-minute display to encourage the budding typist! A unique feature is the double-size text option in both edit and printer mode – perfect for young children and people with poor vision.

Database: You use this for storing information, just like an office filing cabinet. Facts you have entered can be quickly retrieved by just keying in a word or part of a word. They can be sorted, replaced, saved for future use or printed out.

Spreadsheet: Enables you to use your micro for home accounts or pocket money records. It creates a display of numbers in rows and columns. Continuous updating is possible, and a changed figure can be instantly reflected throughout the rest of the spreadsheet. Your results can be saved, to be used for future updates, or can be fed into its associated program . . .

Graphics: Part of the spreadsheet section, it lets you draw bar charts, pie charts and histograms to give a graphic presentation of your statistics. Helps to give life and colour to the duller figures!

- ★ Word Processor
- ★ Spreadsheet
- ★ Database
- ★ Graphics

Now they're all together - in ONE simple package

Four full-scale programs for an incredible low, low price! **£5.95** cassette

RAINBOW is a powerful graphics program suitable for many drawing applications. It features advanced drag and rounding facilities to help take the rough edges off your designs.

The program works in Mode 5, thus giving four ink colours. It can draw lines, rectangles, circles and fill enclosed areas. It also provides several brush sizes and shapes and uses five drawing speeds.

After completing your work of art you can save your picture to disc or tape and later reload it.

In fact the only main feature it doesn't have is a screen dump to output the picture to the printer. This is because there are so many different printers and dumps that it was felt logical to leave dumping a saved screen up to you.

Rainbow has been made as easy to operate as possible. You only have to use the cursor keys and spacebar.

All functions are represented at the top and bottom of the screen as icons which can be accessed by moving the cursor to them and pressing the spacebar.

You can see these icons along with an explanation of their functions in Figure 1.

At start-up certain icons have been pre-selected: The



ROBIN NIXON introduces a colourful computer-aided design utility

ink is set to red, the drawing speed is one and the pen has been selected.

On the screen you will see a flashing square box. This is the nib of the pen, brush or other icon you are using.

If you press the spacebar the computer beeps and the ink is turned on. If you then move the cursor, the pen draws on the screen. If you press the spacebar again the computer beeps and the ink is turned off. Once you've typed in the program, try practising with the options.

There are 10 icons at the top of the screen. The first four control the colour of the ink and the next five control the nib's speed.

Speed five is quite slow and so is ideal for intricate design work, as any slips of the nib will result in minimal

errors. On the other hand speed one is very fast and is useful for drawing large objects.

The tenth icon is erase. To avoid accessing this function accidentally you must select it twice. When you've finished practising with the top set of icons try out erase.

Now for the bottom 10 icons. First is the pen - the one you have been using until now, unless you've selected another option.

The next icon is scatter. This works in the same way as the pen, but draws a pattern of scattered dots.

The next two icons are the small and large brushes. They work in a similar way to the pen except that the ink comes out in one of two larger sizes.

Icon five at the bottom is line draw. If you take a look at Figure 2 you'll see that line draw enables you to

beeps at a different pitch to tell you it has remembered the position of the nib.

As you move the pen about, a line is dragged until you press the spacebar again, whereupon the line is placed on the screen.

The next icon, rectangle draw, is similar to line draw except that you can drag rectangles around the screen. Figure 3 shows how this works

Looking at Figure 4 you will see that the seventh

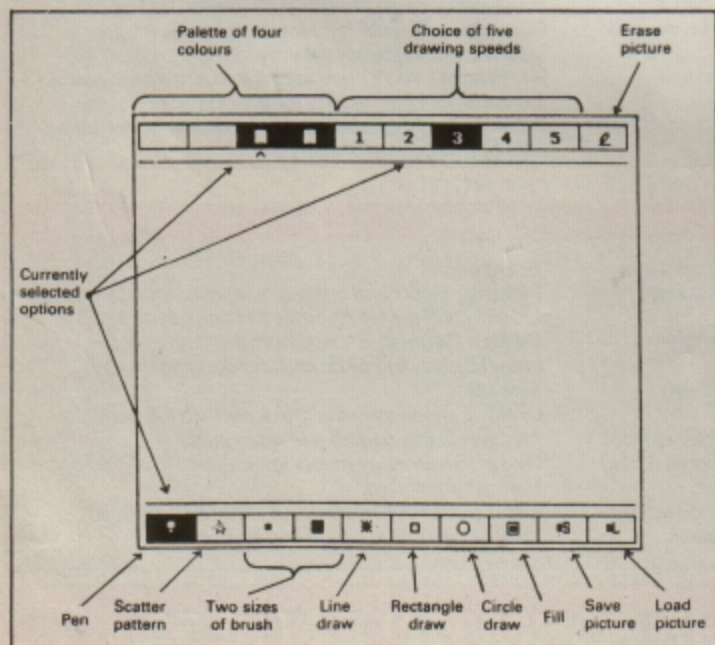


Figure 1: The screen icons

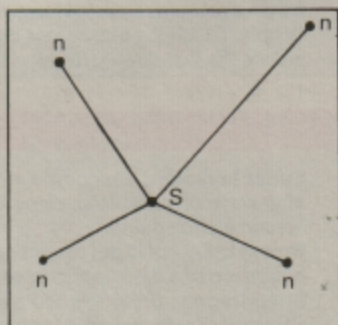


Figure 2: Using rubber-banding to drag lines from start position (S) to Nib position (n)

drag a line around until it is exactly where you want it before placing it on the screen.

When you press the spacebar the computer

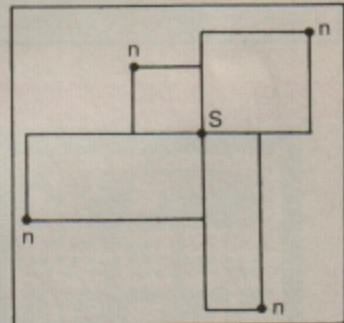


Figure 3: Dragging rectangles from start (S) to Nib position (n)

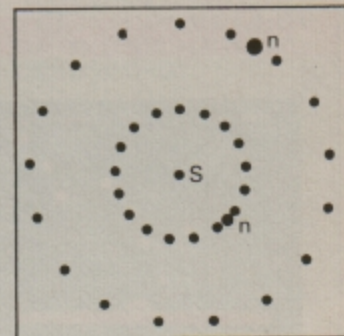


Figure 4: Dragging a circle's circumference from start position (S) to Nib position (n). Until the circle is drawn on the screen it is represented by a number of dots.

More great Electron games

This month we introduce a new volume in our Ten of the Best series – 10 more games to give you many hours of fun and entertainment.

These four packages are crammed with the best games from the last two years of Electron User. As an added bonus a previously unpublished game has been added to each one – stunning machine code masterpieces from our technical wizard, Roland Waddilove.

So give yourself a treat... with the most popular games compilations we've ever produced.



Volume 1

Jam Butty: Machine code simulation of high drama on a building site.
Golf: Play a round by yourself, or play against your pals
Haunted House: Fight against all the odds to get out alive.
Space Hike: Another classic, Help the spaceman avoid marauding monsters.
Parky's Peril: Help Parky through an invisible maze, racing against time.

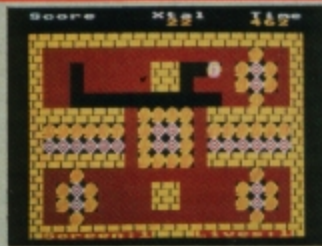
Rally Driver: All the thrills of high-speed driving with none of the risks.
Alphaswap: Your letters are in a twist. Can you put them in order.
Knockout: Fast and furious action as you batter down a brick wall.
Money Maze: Avoid ghosts and collect coins in an all-action arcade classic.
Lunar Lander: The traditional computer game specially written for the Electron.

Volume 2

Atom Smash: Machine code thrills as you help to save the world from destruction.
Bunny Blitz: Go egg collecting, but keep away from proliferating rabbits.
Castles of Sand: Build castles – but beware the rising tide and hungry sandworms.
Reaction Timer: Test your reactions with this traffic lights simulation.
Solitaire: The Electron version of the age-old game

of logic and patience.
Jumper: Jump for your life in this exciting arcade action game.
Break free: Test your wits and reflexes in this popular classic ball game.
Code breaker: Crack the code in a colourful if frustrating brainteaser.
Parachute: Save the plunging sky divers from a watery end.
Star fighter: Attack the bandit ships in this fast-moving 3D punch up.

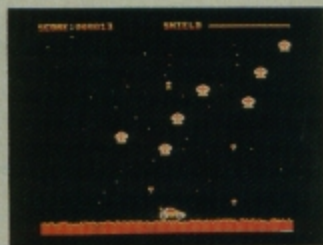
Volume 3



Rockfall: Come diamond mining in this fun packed game with its own screen designer.
Karate Warrior: Win your black belt in this gruelling test of karate skill.
Grand Prix: Battle your way into the lead in this tricky racing simulation.
Invasion Force: Can you survive wave after wave of relentlessly advancing aliens.
Grebit: Guide the frog across the busy road then across the fast-flowing river!

Fruit Worm: Steer the worm towards the fruit while avoiding rocks and its ever-growing tail.
Manic Mole: Watch out for melting platforms and conveyor belts in your quest for jewels.
Skramble: Fly your fighter fast and low over the landscape to penetrate enemy territory.
Mr. Freeze: You'll need speed and strategy to reach the ice blocks before they melt away.
Paint Roller: Steer a speeding roller, run over paint pots but keep clear of the rocks.

Volume 4



Lunar Invasion: Defend the moon from wave after wave of marauding aliens in this superb multi-screen arcade game.
Howzat: Try not to get caught out in this vivid recreation of a day's test cricket.
Snapdragon: Enjoy this two-player micro version of the familiar card game.
Day at the Races: Fancy a flutter? You can bet your shirt in safety in this two-player horse racing game.
Reversi: Combine cunning and chance as you try to out-think your Electron at this classic

board game.
Fishing: Relax and enjoy a quiet afternoon by a shady brook. You'll regret if you let this one get away.
Cavern Capers: Escape from the depths of the planet by blasting oil drums and dodging deadly fireballs.
Craal: Escape from the maxe and win the beautiful princess in this superb text adventure.
Oxo: High strategy meets low cunning in a logic game to strain your brain.
Missile Attack Defend your city from a missile invasion and save it from certain doom.



TO ORDER PLEASE USE THE FORM ON PAGE 53

icon, circle, is slightly different from the previous ones.

Once you've pressed the spacebar to register the centre of a circle you will see a series of dots appear in a ring. These spread out as you move the cursor.

The circumference of the circle represented by the dots lies exactly on your new nib position. The dots are used because drawing circles in Basic takes a long time and you would not be able to achieve the real time dragging effect.

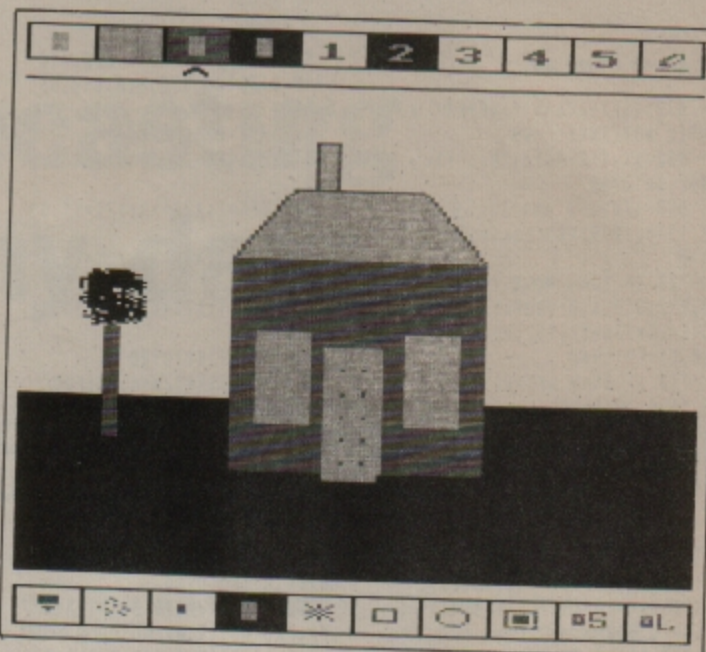
The fill icon is a partial fill routine. When you press the spacebar with the fill icon

selected, the area underneath is filled in with the current ink.

As this is only a partial fill it may take three or four goes to fill an object entirely.

The last two icons are to save and load pictures. As their names suggest, these options either save or load the picture to or from disc or tape. The picture is saved under the filename PICTURE.

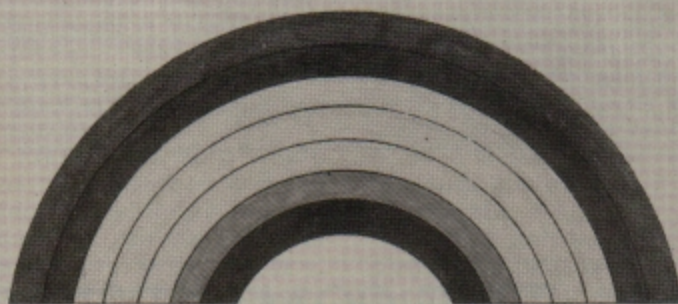
If you are using a tape recorder make sure you have wound the cassette to the correct place when saving or loading as none of the normal messages will be displayed.



```

10 REM RAINBOW
20 REM
30 REM By Robin Nixon
40 REM (c) Electron User
50 REM
60 MODE5:VDU 23;8202;0;0
;0
70 PROCinitcircle:*OPT 1
,0
80 PX=640:QX=512:*FX16
90 VDU 28,0,1,39,0
100 VDU 19,0,4,0,0,0
110 VDU 23,245,255,129,18
120 VDU 19,2,1,0,0,0
130 VDU 19,3,2,0,0,0
140 VDU 23,240,73,42,20,1
07,20,42,73,0
150 VDU 23,241,0,126,66,6
6,66,66,126,0
160 VDU 23,242,60,66,129,
129,129,129,66,60
170 VDU 23,245,255,129,18
9,189,189,189,129,255
180 VDU 23,244,14,26,50,1
00,104,112,0,255
190 VDU 23,245,15,233,232
,175,225,233,15,0
200 VDU 23,246,8,232,232,
168,232,233,15,0
210 VDU 23,249,62,62,62,6
2,0,28,8,0
220 VDU 23,250,16,8,34,8,
130,33,20,34
230 VDU 23,251,0,0,24,24,
24,24,0,0
240 VDU 23,252,60,60,60,6
0,60,60,60,60
250 VDU 23,253,0,0,0,24,2
4,0,0,0
260 VDU 23,254,255,195,16
5,153,153,165,195,255
270 VDU 23,255,62,34,34,4
2,34,34,62,0
280 VDU 24,0;96;1279;927;
:GCOL0,129:CL6:VDU 26
290 GCOL0,3:MOVE 0,1023:D
RAW 1279,1023:DRAW 1279,963
:DRAW 0,963

```



```

300 MOVE 0,0:DRAW 1279,0:
DRAW 1279,64:DRAW 0,64:MOVE
0,92:DRAW 1279,92
310 MOVE 0,931:DRAW 1279,
931
320 FORX%=0TO1279STEP128:
MOVE X%,1023:DRAW X%,963:MO
VE X%,0:DRAW X%,64:NEXT
330 VDU5:FORX%=0TO3:MOVEX
%*128+4,1019:PROCbox(0,X%):
GCOL0,1
340 MOVE X%+128+32,1004:V
DU252:NEXT:GCOL0,2
350 FORX%=1T05:MOVEX%+128
+420,1000:VDUXX+48:NEXT:MOV
E 1184,1000:VDU244
360 GCOL0,2:FORX%=1T04:MO
VEX%+128-96,48:VDUXX+248:NE
XT
370 FORX%=1T04:MOVEX%+128
+416,48:VDUXX+239:NEXT:FORX
%=1T02:MOVEX%+128+934,48:VD
UXX+244:NEXT:CRX=255
380 X%=640:Y%=512:X1X=640
:Y1X=512:X2X=640:Y2X=512:GC
OL3,2:PLOT4,X%-32,Y%+12
390 VDU255:GCOL0,3:Y1X=51
2:NX=2:F1X=1:RX=4:CX=2:BRX=0
:BFX=0:EFX=0
400 EF1X=0:SF1X=0:SF1X=0:C
FX=0:CF1X=0:CF2X=0:BBX=0:FF
X=0:WFX=0:HX=40
410 MOVE BBX*128+4,60:X3X
=0:Y3X=0:PROCbox(4,0)

```

```

420 X5X=X%:MOVE (NX/2+3)*
128+4,1019:PROCbox(4,0):MOV
E CX*128+32,952:GCOL4,0:VDU
94:GCOL0,CX
430 REPEAT:OSCLI('FX178,2
55'):IF INKEY -122 PX=PX+HX
:IF PX>1279 PX=1279
440 IF INKEY -26 PX=PX-HX
:IF PX<0 PX=0
450 IF NOT INKEY -42 GOTO
470 ELSE QX=QX-HX:IF QX<50
QX=50
460 IF QX<992 AND YX=992
QX=915:YX=QX
470 IF NOT INKEY -58 GOTO
490 ELSE QX=QX+HX:IF QX>10
00 QX=1000
480 IF QX>36 AND YX=36 QX
=112:YX=QX
490 IF INKEY -99 PROConof
f
500 OSCLI('FX178'):AX=PX-
XN:BX=QX-YX
510 GCOL3,2:PLOT4,X1X-32,
Y1X+12:VDU CRX:GCOL0,CX:MOV
E X%,YX:XX=X%+AX/NX:YX=YX+B
X/NX:IF YX>915 YX=992:XX=(P
X+128) DIV 128+128-64:RX=4
520 IF YX<112 YX=36:XX=(P
X+128) DIV 128+128-64:RX=4
530 IF YX=992 OR YX=36 CR
X=254 ELSE CRX=255
540 IF EF1X=1 AND Y2X<990
AND Y2X>64 AND RX=5 EF1X=1

```

```

550 IF (Y2X<990 AND YX>99
0) AND EF1X=1 GCOL4,0:DRAW X
2X,Y2X:PLOT69,X2X,Y2X:GCOL0
,CX:EF1X=0
560 IF (Y2X>64 AND YX<64)
AND EF1X=1 GCOL4,0:DRAW X2X
,Y2X:PLOT69,X2X,Y2X:GCOL0,C
X:EF1X=0
570 IF EF1X=1 GCOL4,0:DRA
WX2X,Y2X:DRAW X%,YX:GCOL0,C
X:GOTO650
580 IF SF1X=1 AND Y2X<990
AND YX>64 AND RX=5 SF1X=1 E
LSE IF (Y2X<990 AND YX>990)
OR (Y2X>64 AND YX<64) AND
SF1X=0
590 IF SF1X=1 GCOL4,0:MOV
E X%,YX:DRAWXX,Y2X:DRAW X2X
,Y2X:DRAWX2X,YX:DRAW X%,YX:
DRAWXX,Y2X:DRAW X2X,Y2X:DRA
WX2X,YX:DRAW X%,YX:GCOL0,CX
:GOTO650
600 IFBFX=1 AND RX=5 MOVE
X%-32,YX+12:VDUBRX:GOTO650
610 IF CF1X=1 AND Y2X<990
AND Y2X>64 AND RX=5 CF1X=1
ELSE IF (Y2X<990 AND YX>990
) OR (Y2X>64 AND YX<64) AND
CF1X=1 CF1X=0
620 IF CF1X=1 GCOL4,0:LX=
SQR(ABS(XX-X2X)*ABS(XX-X2X)
+ABS(YX-Y2X)*ABS(YX-Y2X)):F
OR JX=0 TO 1:FOR KX=0 TO 30
STEP 4:PLOT 69,X2X+LX*AX(K
X,0)/100,Y2X+LX*AX(KX,1)/10
0:NEXT KX,JX:GCOL0,CX:GOTO6
50
630 IF FF1X=1 AND YX>64 AN
D YX<990 AND RX=5 PROCfill:
GOTO650
640 PLOTXX,X%,YX:Y2X=YX:X
2X=X%
650 GCOL3,2:PLOT4,X%-32,Y
X+12:VDUCRX:GCOL0,CX:X1X=X%
:Y1X=YX
660 UNTIL 0

```

Turn to Page 28 ▶

Utility

◀ From Page 27

```

670 DEFPROConoff:REPEAT U
NTIL NOT INKEY -99
680 SX=(XN-64)/128:IFYX<>
992 GOTO750
690 IFWFX>0 AND SX<>9 MOV
E 1156,1019:PROCB0X(4,0):WF
X=0
700 IF SX<4 MOVE CX+128+3
2,952:GC0L4,0:VDU94:CN=SX:M
OVE CX+128+32,952:VDU94:GC0
L0,CX:GOTO960
710 IF SX=9 WFX=WFX+1:MOV
E 1156,1019:PROCB0X(4,0):SO
UND1,-15,120,1:IF WFX=2 WFX
=0:VDU24,0;96;1279;927;:GC0
L0,129:CLS:VDU26
720 IF SX=9 GOTO960
730 MOVE (NX/2+3)*128+4,1
019:PROCB0X(4,0):NX=(SX-3)*
2:MOVE (NX/2+3)*128+4,1019:
PROCB0X(4,0):HX=(5-(SX-4))*
8:GOTO 960
740 GOTO960
750 IFWFX>0 MOVE 1156,101
9:PROCB0X(4,0):WFX=0
760 IFYX<>36 GOTO910
770 IF SX<8 MOVE BBX*128+
4,60:PROCB0X(4,0) ELSE SOUN
D1,-15,120,1
780 IF SX<8 EFX=0:SF1X=0:C
FX=0:BF1X=0:FFX=0

```

```

790 ON SX+1 GOTO 800,810
,810,810,820,830,840,850,86
0,880
800 BF1X=0:GOTO900
810 BR1X=SX+249:BF1X=1:GOTO
900
820 EFX=1:X2X=XX:Y2X=YX:G
OTO900
830 SF1X=1:X2X=XX:Y2X=YX:G
OTO900
840 CF1X=1:X2X=XX:Y2X=YX:G
OTO900
850 FF1X=1:GOTO900
860 MOVE SX*128+4,60:PRO
CB0X(4,0):*SAVE PICTURE 5BC0
7C40
870 MOVE SX*128+4,60:PRO
CB0X(4,0):GOTO960
880 MOVE SX*128+4,60:PRO
CB0X(4,0):*LOAD PICTURE 5BC0
890 MOVE SX*128+4,60:PRO
CB0X(4,0):GOTO960
900 BBX=SX:MOVE BBX*128+4
,60:PROCB0X(4,0):GOTO960
910 IF EF1X=1 GC0L3,2:PLO
T4,X1X-32,Y1X+12:VDUCRX:GC0
L0,CX:MOVE X2X,Y2X:DRAW XX,
YX:GC0L3,2:PLOT4,XX-32,YX+1
2:VDUCRX:GC0L0,CX:X2X=XX:Y2
X=YX:GOTO960 ELSE IF EFX=1
RX=5:GOTO960
920 IF SF1X=1 GC0L3,2:PLO
T4,X1X-32,Y1X+12:VDUCRX:GC0

```

```

L0,CX:MOVE XX,YX:DRAW XX,Y2
X:DRAW X2X,Y2X:DRAW X2X,YX:
DRAW XX,YX:X2X=XX:Y2X=YX:GC
OL3,2:PLOT4,XX-32,YX+12:VDU
CRX:GC0L0,CX:RX=4:SF1X=0:GO
TO960 ELSE IF SF1X=1 RX=5:GO
TO960
930 IF CF1X=1 SOUND1,-15,

```

```

,108,0:PLOT81,-108,-54:PLOT
0,8,0:PLOT0,100,0:PLOT81,0,
50:ENDPROC
980 DEFPROCinitcircle:DIM
AX(32,1):X%=0:FOR A=PI TO P
I+3 STEP PI/16:AX(X%,0)=SIN
(A)+100:AX(X%,1)=COS(A)+100
:X%=X%+1:NEXT:ENDPROC
990 DEFPROCTILL:Y4X=YX:BC
X=POINT(XX,YX):IF BCX=CN EN
DPROC
1000 GC0L0,BCX+128:PROCMid
dle(4):PROCMiddle(-4):MOVE
XX,YX:RX=4:SOUND1,-15,120,1
:ENDPROC
1010 DEFPROCmiddle(DPX):Y4
X=YX:PLOT77,XX,YX:Z1X=!&314
MOD &10000*8:Z2X=!&310 MOD
&10000
1020 REPEATX4X=Z1X+(Z2X-Z1
X)/2:MOVE X4X,Y4X:PLOT77,X4
X,Y4X:Z1X=!&314 MOD &10000*
8:Z2X=!&310 MOD &10000:Y4X=
Y4X+DX
1030 UNTILPOINT(X4X,Y4X)<>
BCX OR Y4X>927 OR Y4X<96:EN
DPROC

```

This is one of hundreds of programs now available FREE for downloading on

MicroLink

In addition to these many BBC Micro programs will also run on the Electron.

```

50,1:GC0L3,2:PLOT4,X1X-32,Y
1X+12:VDUCRX:GC0L0,CX:VDU24
,0;96;1279;927;:MOVE X2X+LX
*AX(31,0)/100,Y2X+LX*AX(31,
1)/100:FOR JX=0 TO 31:DRAW
X2X+LX*AX(JX,0)/100,Y2X+LX*
AX(JX,1)/100:NEXT:CF2X=1
940 IF CF2X=1 VDU26:X2X=X
X:Y2X=YX:RX=4:CF1X=0:GC0L3,
2:PLOT4,X1X-32,Y1X+12:VDUCR
X:GC0L0,CX:CF2X=0:ENDPROC
950 IF RX=5 RX=4:FX=1:GOT
0960 ELSE RX=5:FX=0
960 SOUND1,-15,100*RX-450
,1:ENDPROC
970 DEFPROCB0X(BCX,CCX):P
LOT 0,8,0:GC0LBCX,CCX:PLOT0

```

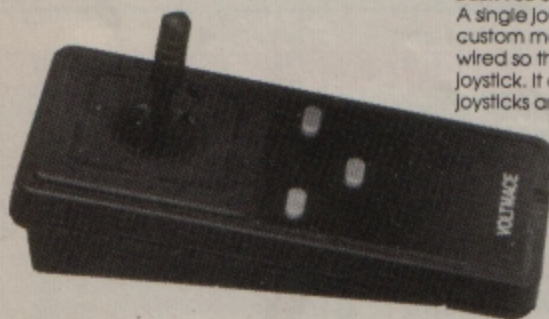
This listing is included in this month's cassette tape offer. See order form on Page 53.

JOYSTICKS—THE COMPLETE SOLUTION

DELTA 3B SINGLE—BBC B or ELECTRON PLUS 1

£12.95

A single joystick that in some ways can act as two. The custom made special 'low noise' potentiometers are wired so that it will work as a left hand or right hand joystick. It can even run some programs written for two joysticks and has the fire buttons of both.



DELTA 3B TWIN—BBC B or ELECTRON PLUS 1

£19.95

A direct but improved alternative for the original ACORN joysticks, with 2 joysticks wired to one plug. As with all our joysticks they have the fast action sprung to centre return of the steel shafted nylon covered joystick. The light action makes them ideal to hold and the 3 fire buttons allow left or right-handed use.



DELTA 3S SINGLE—MASTER COMPACT or ELECTRON FIRST BYTE INTERFACE

£12.95

The same light, hand-held, fast, light action of a 3B but fitted with switches for use with a switched joystick interface, such as a First Byte.

FIRST BYTE INTERFACE

£19.95

PLUS 1 INTERFACE

£49.95

SLOGGER JOYSTICK INTERFACE

£19.95

To run a Delta 3S switched joystick on a Plus 1 which runs many of the new Acorn compatible joystick programs.

SPECIAL OFFERS

Buy a DELTA 3S and a FIRST BYTE INTERFACE together for **£29.95**

Buy a DELTA 3B SINGLE and PLUS 1 INTERFACE together for **£59.95**

Buy a DELTA 3S and SLOGGER JOYSTICK INTERFACE together for **£29.95**

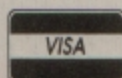
NEW III DELTA 350 SINGLE—MASTER COMPACT or ELECTRON FIRST BYTE INTERFACE

£19.95

Optical Feed Back. The joystick is fitted with 5 coloured lights to show you exactly when a switch has operated, so you need only move the joystick a minimum amount, and can be certain that you have given a true diagonal signal to the computer.



Available from your dealer or direct from us



Voltmace

Unit 9
Bondor Business Centre
London Road
Baldock
Herts SG7 4NG
Telephone: (0462) 894410

WE have seen recently that even the professional weather forecasters with all their super computers can't always forecast the weather properly.

In my household, the cat will accurately tell us what the weather's like. If he won't stir from his chair to go outside, the chances are it's cold, wet or both.

Seriously though, this month we start on some interfaces that will allow us to monitor certain aspects of the weather, so you'll be able to keep a record of weather conditions.

Future articles will detail software, and also a bit of general information about the weather. You'll also find that the circuits we consider will be of use in other applications as well, so even if you're not a budding meteorologist, read on.

The first circuit we'll build is for a thermometer – an instrument that not only allows us to measure the current temperature, but with suitable software will also give us a maximum and minimum. It will automatically record the highest and lowest temperatures recorded since the computer was turned on.

The temperature sensor circuit is based upon the differential amplifier we looked at last month. I used a silicon diode for the temperature sensor, and the

circuit is shown in Figure 1.

The preset resistor VR1, is a bit like the potentiometer we first met in part four of this series. It's a component whose electrical resistance we can vary, though for a preset resistor we use a screwdriver or something similar to adjust the resistance.

Presets are used where we need to adjust a circuit very infrequently. In this case, we use the preset to adjust the zero degrees C reading for each thermometer to be the same.

The amplifier used is the useful little CA3140. As we mentioned last month, unlike most operational amplifiers, the 3140 is quite happy to run off +5V, without a -5 volt supply. This means we can power

the circuit directly from the Plus 1.

It doesn't take very much current, so we won't be in danger of overloading the Electron's power supply.

In this circuit the resistor values used are quite important as they set the gain, and hence the behaviour, of the circuit. Stick to the values given, and use five per cent tolerance components if at all possible.

Ok, let's start building. A piece of stripboard is used, and in addition to the parts on the circuit diagram you'll need a socket for the operational amplifier.

Apart from cutting out the risk of damage while soldering, it allows you to get the op amp out of the board and use it for other projects if you need to.

The socket required is called an 8-pin DIL socket and is available from most electronic component stockists. In addition, you'll need a 3.5mm jack plug and socket for the temperature probe. (Figure 2.)

Eventually we'll be putting all the weather monitoring circuits into one box, so for the time being we'll leave them uncased.

The layout of the stripboard is shown in Figure 3, where as usual, X marks the tracks which need to be cut.

Solder in the wire links first, followed by the DIL socket, then the resistors.

Now check everything, especially the track breaks and the soldering below the socket. It's surprisingly easy

to put a blob of solder across two tracks.

Finally, build the temperature sensor. Take care to get the diode the right way around. If you're quite sure all is well, you can plug in the operational amplifier.

Turn off the Electron and connect the circuit to the Plus 1 analogue port.

The circuit is connected to a terminal block by wires which are pushed into the terminal block holes and then the screws tightened up. At this point, we can plug in the temperature sensor.

Turn on the Electron. If all is well the computer will behave normally. Put your finger on the operational amplifier chip. It shouldn't be hot. If it is, turn the micro off and check your wiring.

Now for the fun part. Using Program 1, adjust the preset until a value of about 150 is displayed on the screen:

```

5 REM Program 1
10 REPEAT
20 PRINTTAB(10,10) " ;FN
adval;"
30 UNTIL FALSE
40 :
50 DEFFNadval:=INT(ADVAL(1
)/256)

```

Now hold the diode end of the temperature probe between your fingers. The reading should gradually increase as the temperature of the probe rises.

Then let the diode cool down – or help it by putting it in the fridge or freezer.

Turn to Page 30 ►

Forecasting sunny days

JOE PRITCHARD introduces the **Electron User weather station**

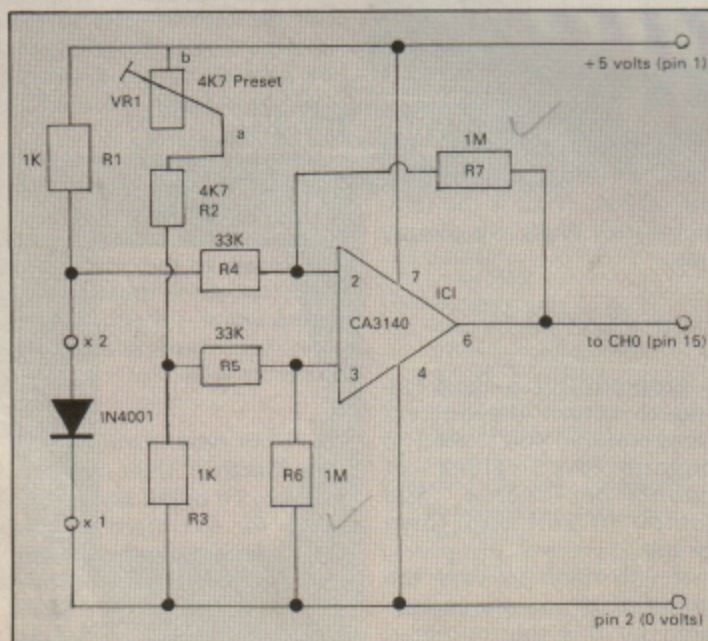


Figure 1: The temperature sensing circuit

Hardware Projects

◀ From Page 29

You should see the reading fall.

If this occurs, congratulations, you have a working thermometer. If not, check the wiring.

The easiest mistake to make is the diode connection. Check it's the right way round. If it is, check that the operational amplifier is in the socket the right way around, and check all your connections again.

I decided that we should try and cover a temperature range from a little below zero degrees Celcius to around 40 degrees. This will cover most situations, assuming Britain doesn't suddenly go tropical or start an ice age.

The first point to mark is the zero point. Keep the program running and mix some ice cubes and cold water. Let them stand for a while, and while there is still solid ice in the water pop the temperature probe in (waterproof it first with tape!).

Give it a quick stir, then leave it for five minutes to allow the probe to get to the surrounding water temperature.

Adjust the preset to get a reading of about 10 and record this somewhere. Call this value *temp0*.

You can use either a small screwdriver to adjust the preset or a filed-down knitting needle or piece of plastic rod.

The advantages of using plastic or any other non-conductor to adjust this component are that no variation of the signal due to the

electrical field picked up by your body is noted.

If you use a jeweller's screwdriver, the value returned by FNadval will flicker until you remove your hand.

This adjustment should be made carefully, as a small movement on the preset causes a relatively large change on the reading returned.

Now you'll need a normal thermometer and some warm water from the tap. Put the probe in the warm water – which should be around 35 degrees C – and again allow it to reach the water temperature.

Now record the reading taken on the thermometer, calling this value *temp*, and the reading displayed on the micro, call this *temp40*.

If the value displayed is above 255 either cool the water slightly or decrease the sensitivity of the thermometer.

Because the diode responds to temperature changes in a predictable fashion, we can now write a function to convert the reading returned by FNadval to a temperature.

What we need to do now is work out the relationship between the displayed value – between zero and 255 – and the temperature. So, first of all, calculate the following:

$$\text{counts per degree} = \text{temp} / (\text{temp40} - \text{temp0})$$

Here we're simply using the difference between the readings obtained at zero and *temp* degrees C to

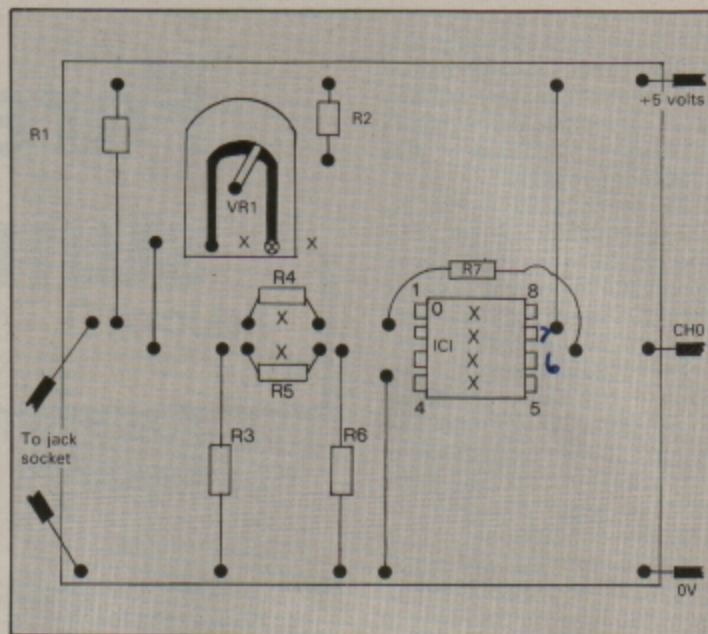


Figure III: Layout of the circuit

calculate the number of ADC counts returned by FNadval for a single degree.

Now, we can use this to convert any reading from FNadval in the range zero to 255 into a temperature in degrees C. The formula is:

$$\text{temperature} = (\text{reading} - \text{temp0}) / \text{counts per degree}$$

We need to subtract *temp0* from the FNadval reading returned because the circuit wasn't set to return a value of zero for zero degrees C.

As a worked example, one of my prototypes was set to record eight at zero. At 38 degrees a value of 252 was returned. Therefore:

$$\text{counts per degree} = (252 - 8) / 38 = 6.4$$

Assume now, that we have a reading from FNadval of 200. What is the temperature? Well, we simply say:

$$\begin{aligned} \text{temp} &= (200 - 8) / 6.4 \\ \text{temp} &= 30 \end{aligned}$$

Program II is a short listing to return the correct temperature. You'll need to change the values of *counts-per-degree* and *temp0* to suit your own circuit.

If you need to vary the range of temperatures covered by this thermometer, then decrease the values of

the 33k resistors connected to pins 2 and 3 of the CA3140.

```

SREM PROGRAM II
10 @%=820209
20 REPEAT
30 PRINTTAB(10,10) " ;F
  Ntemperature;" "C"
40 UNTIL FALSE
50 :
60 DEFFNadval
70 =INT(ADVAL(1)/256)
80 DEFFNtemperature
90 counts_per_degree=6.4
100 temp0=17
110 =(FNadval-temp0)/counts_per_degree
  
```

This will decrease the gain of the amplifier and so increase the range of temperature covered, by virtue of the fact that a larger change in temperature will be needed to get a similar change in value returned by FNadval.

Calibration is just the same. If you want to experiment, try a value of 47k for each resistor. However, it's important to remember that both resistors must be the same value – if you change one, you must change the other as well.

● In the next instalment of the Electron User weather station, I'll detail some software for the thermometer, and also outline suitable housings for the diode probe in the garden. We'll also look at ways of measuring humidity.

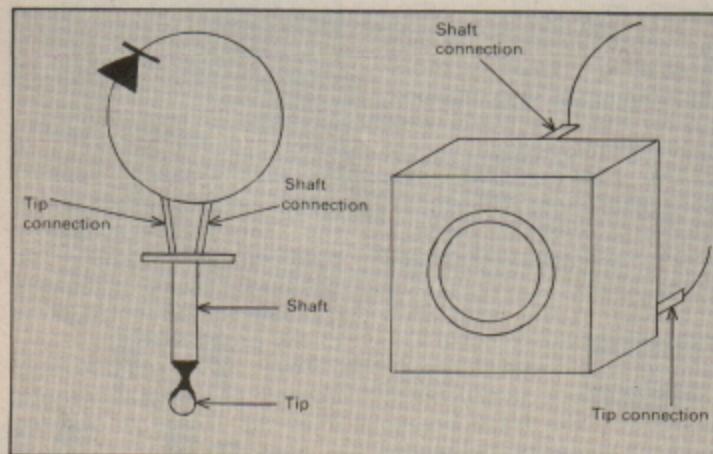


Figure II: 3.5mm jack socket

Experience the thrills of real-life adventuring



...at the Renold Building, UMIST,
Sackville Street, Manchester

10am-6pm Friday March 18
10am-6pm Saturday March 19
10am-4pm Sunday March 20

Of course you'll find the very latest software and peripherals for the complete Acorn range at the Electron & BBC Micro User Show. But there'll also be an exciting bonus:

Your personal passport to the fascinating world of adventuring!

- ★ Take part in real-life adventures and fight sequences under the expert guidance of Britain's top role-playing specialists.
- ★ Join in a tantalising treasure hunt for the young and young at heart.
- ★ Find solutions to all those vexing puzzles at our Adventure Advice Centre.
- ★ Take home prizes of the most popular adventure games for the BBC Micro and Electron.

It all adds up to a fantastic
day-out for all the family!



**IT'S SO
EASY
TO GET
THERE!**

BY CAR... AA signposting and ample car parking space nearby

BY COACH... Chorlton Street Station only a short walk away

BY RAIL... 300 yards from Piccadilly railway station

...and every advance ticket comes complete with a detailed map.

YOUR ADVANCE TICKET ORDER

Admission at door:
£3 (adults),
£2 (under 16s)

Please supply:

- Adult tickets at £2 (save £1)
(Order four adult tickets,
get the fifth FREE!)
- Under 16s tickets at £1 (save £1)
(Order four under-16s tickets,
get the fifth FREE!)

I enclose a cheque made payable to Database Exhibitions

Please debit my Access/Visa card no:

Signed: _____

Advance ticket orders must
be received by Wednesday,
March 9, 1988.

£ _____

£ _____

Total £ _____

Expiry date: /



Renold Building
Sackville Street
Manchester
March 18-20, 1988

Post to: Electron & BBC Micro User Show Tickets,
Europa House, Adlington Park, Adlington,
Macclesfield, Cheshire SK10 5NP.

Name _____

Address _____

Postcode _____

PHONE ORDERS: Ring Show Hotline: 0625 879920

PRESTEL ORDERS: Key *89 then 614568383

MICROLINK ORDERS: Mailbox 72:MAG001

Please quote credit card
number and full address MU2.88

A267

**Avoid the
queues!
Get your
ticket in
advance
— and
SAVE £1
A HEAD!**

LOOKING at the latest arcade games released by the software houses, you may wonder how they produce such amazing animated sprite-like characters.

The days of designing sprites on scraps of paper have long gone, and now all graphic artists and programmers have an array of tools and utilities they can call on to make the process much easier.

I first introduced the subject of sprites two and a half years ago in the July 1985 issue of *Electron User*. Since then we have had many requests for more information on this complex programming task.

In this article I'll present a sprite designer and next month we'll see how to print, move and animate our sprites on the screen.

Your first task is to enter and save the designer – the listing accompanying this article. Once this is done you can create some sprites

for next month's machine code routines to manipulate.

When the designer is run you'll be presented with the working screen. This shows the sprites you are working on, the current pen colour, pen status, sprite number and large, magnified copy of the current sprite. Figure 1 shows what the screen looks like during an editing session and clearly indicates the position of all the sprites, along with the designer's status.

When you first run the program you won't have any sprites on the screen, so let's create some.

All your drawing is carried out on the large magnified sprite in the centre of the screen. You can move the cursor using the cursor keys, set a pixel by pressing Copy and delete one by pressing Delete.

At the moment the pen is up, so you can freely move the cursor round the screen without drawing anything.

Let's bring your screen to life

Create animated characters with **ROLAND WADDILOVE'S** easy-to-use sprite designer

Press P to put the pen down and move the cursor around – you'll see that it now leaves a trail in the current pen colour.

This mode is useful for painting large areas of the

sprite. One point to watch out for though – you can't delete anything by pressing Delete with the pen down as it draws the point again immediately you've deleted it. Either lift the pen up by pressing P again or select the background colour for the pen.

The currently selected pen colour can be changed by tapping the C key. All subsequent plotting with Copy or drawing with the pen down will be in the colour indicated.

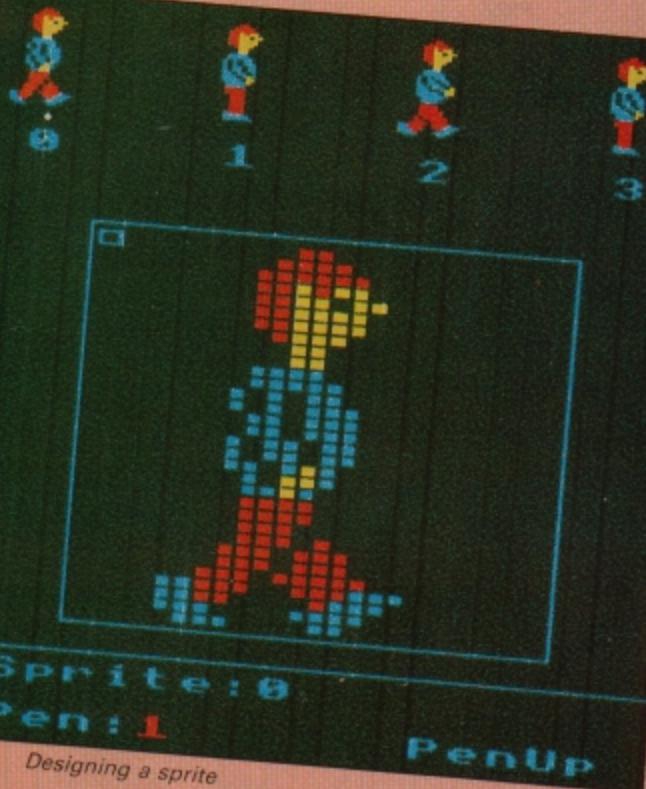
You can fill the four available pens with different inks – equivalent to VDU 19 in Basic – by pressing I. You'll first be asked to input the pen number, followed by the new ink, 0-15.

If you've been experimenting with the commands so far you'll have noticed that whatever you draw in the large editing box is also repeated on a small scale in the top left corner of the screen. This is the sprite you are designing real-size.

You can work on up to four at any one time so let's leave sprite zero, the default one, and create sprite one. Press number 1 and after a slight delay you'll be presented with a clean editing box.

Now design a new sprite.





Designing a sprite

At any time you can press 0 to go back to the first sprite and 1 again to edit the second one.

When designing animated sprites with say, four frame animation, the frames are often very similar and usually there are just one or two changes each time.

To save time and effort, the current sprite you are working on can be copied to any other sprite by pressing Shift+0-4. If you are still working on sprite one press Shift+2 and it will be copied to sprite two. Don't forget you are still working on sprite one - if you want to work on this new sprite frame you'll have to press 2.

If at any time, you wish to completely erase a sprite and start all over again press N - New. Once this is done you can't get it back again so take care. Remember though, you can copy the current sprite to another one for safekeeping before erasing it.

All that remains is loading and saving. Press S to save the current sprite. Now use the cursor keys to enclose the portion of the sprite you wish to save - you don't need to save all of it. Press Return to confirm and then

enter the filename at the prompt.

It's always best to position the sprite in the top left corner of the editing box before saving it, otherwise you'll also be saving a lot of empty space. So before pressing S, (in fact, you can position it at any time) you can move it using <, >, * and ? to scroll it around the editing box.

Loading is much simpler - all you need to do is press L and enter the filename.

These commands always act on just the currently selected sprite, so first press 0-3 to select the one to load or save before pressing S or L.

Take care when inputting the filename as an error may cause the program to stop and display an error message, all you're work will then be lost. You can abort the command by just pressing Return when prompted for the filename.

● *That just about covers all the designer's commands. Table 1 gives a brief summary. Your task now is to create four sprites for next month, when I'll present a machine code sprite print routine.*

Cursor keys	Move the cursor.
0-3	Select a sprite.
Shift+0-3	Copy the current sprite to 0-3.
AZ<>	Scroll the sprite up, down, left and right.
P	Pen up or down.
Copy	Set a pixel.
Delete	Delete a pixel.
S	Save current sprite.
L	Load current sprite.
C	Select pen colour.
I	Select ink (VDU 19).
N	New sprite.

Table 1: A summary of the commands

```

10 REM Sprite Designer
20 REM By R.A.Waddilove
30 REM (c) Electron User
40 ON ERROR OSCLI"FX178,2
55:OSCLI"FX4":REPORT:PRINT
" at line ";ERL:OSCLI"FX12,4
":END
50 MODE 5
60 PROCinitialise
70 PROCscreen
80 PROCedit
90
100 DEF PROCinitialise
110 *FX16
120 *FX4,1
130 *FX12,7
140 VDU 19,15,7;0;
150 VDU 23,255,248,136,136
,136,248;0;
160 VDU 23,254;112,112,112
,0;0;
170 VDU 23;8202;0;0;0;
180 ENDPROC
190
200 DEF PROCscreen
210 DRAW 0,140:DRAW 1278,1
40:DRAW 1278,0:DRAW 0,0
220 MOVE 190,712:DRAW 990,
712:DRAW 990,180:DRAW 190,18
0:DRAW 190,712
230 COLOUR 15:PRINT TAB(1,
6)*0 1 2 3:TAB(12,3
0)"PenUp"TAB(1,28)"Sprite:0"
TAB(1,30)"Pen:":COLOUR 1:PR
INT;1
240 x%=0:y%=0:s%=0:o%=0:c%
=1:p%=0
250 ENDPROC
260
270 DEF PROCedit
280 opt$=" @!"#0123SLNPC1
,.,/:"
290 REPEAT k$=INKEY$9:PROC
cursor(0)
300 K%=INSTR(opt$,k$):IF K
%>1 THEN ON K%-1 GOSUB 1040,
1040,1040,1040,420,420,420,4
20,690,910,550,600,400,1130,
1190,1280,1380,1470
310 K%=ASC k$:IF K%=127 PR
OCplot(0)
320 IF K%=136 x%=x%+(x%>0)
ELSE IF K%=137 x%=x%-(x%<23
) ELSE IF K%=139 y%=y%+(y%>0
) ELSE IF K%=138 y%=y%-(y%<3
1)
330 PROCcursor(15):IF P% 0
R K%=135 PROCplot(C%)
340 UNTIL FALSE
350 ENDPROC
360
370 DEF PROCcursor(C%):GCO
L0,C%:MOVE 200+x%+32,700-y%*
16:VDU5,255,4:ENDPROC
380
390 REM ***** Colour *****
400 C%=(C%+1)MOD4:COLOUR C
%:PRINT TAB(5,30);C%:" :RET
URN
410
420 REM *** New Sprite ***
430 S%=VAL k$:COLOUR 15:PR
INT TAB(8,28)k$
440 REM ** Print Sprite **
450 O%=S%+1280DIV4:*FX178
460 VDU 26,24,192;184;980;
710;16;26
470 FOR x%=0 TO 23
480 FOR y%=0 TO 31
490 Z%=POINT(O%+x%*8,991-y
%*4):IF Z% PROCplot(Z%)
500 NEXT
510 NEXT
520 x%=0:y%=0:*FX178,255
530 RETURN
540
550 REM ***** New *****
560 FOR I%=1 TO 4:PRINT TA
B(S%+5,I%)" :NEXT
570 VDU 26,24,192;184;980;
710;16;26
580 RETURN
590
600 REM ***** Pen *****
610 P%=NOT P%:COLOUR 15
620 PRINT TAB(15,30);:IF P
% PRINT"Down" ELSE PRINT"Up
"
630 RETURN
640
650 DEF PROCplot(C%)
660 GCOL 0,C%:PLOT 69,0%+x

```

Turn to Page 35 ▶

The Life Of Repton



REPTON AS A BABY



REPTON AT SCHOOL



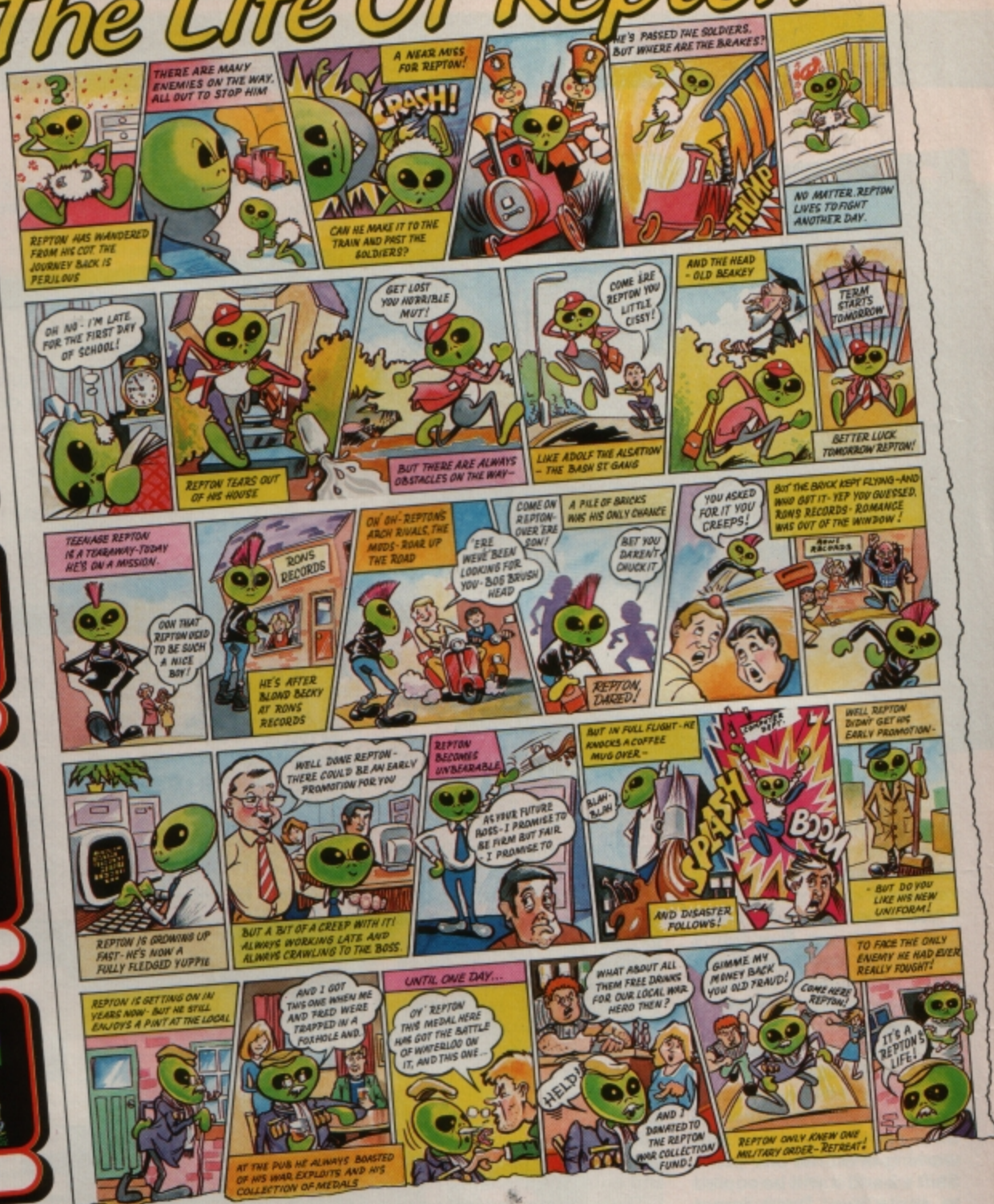
REPTON AS A TEENAGER



REPTON AT WORK



REPTON AS AN OLD MAN



Repton fans have begged, cajoled and pleaded with us to release another set of screens for our Repton 3 game. How could we refuse? Our lovable hero returns again to star in 40 new screens that vividly depict Repton's life-story.

The Five Ages of Repton:— At first we see Repton as a baby: a mewling infant surrounded by teddy-bears, humpty-dumptys, and aggressive clockwork toy-soldiers. Then Repton is a whining school-boy, creeping like snail unwillingly to school, with his pens, his calculator, and a bundle of homework. And then Repton during his teenage years becomes a spikey-haired punk armed with a ghetto-blaster and a collection of records. Then Repton goes to work: we see a harried office-manager amidst computers, photocopiers, and endless cups of coffee. Last scene of all, that ends this strange eventful history, is Repton as an old-age pensioner searching for his false-teeth, his spectacles, his "pint of stout", and his well-polished war-medals.



THE SCREEN EDITOR



THE CHARACTER EDITOR

Each copy of The Life Of Repton includes:

- the Repton 3 main program
- the Repton 3 editor and
- the 40 new game screens

BBC Micro Cassette £6.95
 BBC Micro 5¼" Disc £7.95
 BBC Master Compact 3½" Disc £9.95

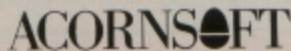
(Compatible with the BBC B, B+ and Master Series computers).
 The screen pictures show the BBC Micro version of the game.

Acorn Electron Cassette £6.95
 Acorn Electron 5¼" Disc £7.95

PRIZE COMPETITION

If you complete all 40 screens of The Life Of Repton, you can enter our competition. Prizes include £200 in cash, with Repton mugs, badges, pens and certificates for runners-up.

Closing Date: 30th June 1988.



Please make all cheques payable to 'Superior Software Ltd'.



24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately. (This does not affect your statutory rights).

◀ From Page 33

```
%*8,991-y%*4:MOVE 200+x%*32,
700-y%*16:VDU5,254,4
670 ENDPROC
680
690 REM ***** Save *****
700 AX=&5940+S%*80
710 x%=0:y%=0
720 GCOL 3,15
730 REPEAT
740 MOVE 200,700-(y%+1)*16
:DRAW 200+(x%+1)*32,700-(y%+
1)*16:DRAW 200+(x%+1)*32,700
750 K%=GET:*FX21
760 MOVE 200,700-(y%+1)*16
:DRAW 200+(x%+1)*32,700-(y%+
1)*16:DRAW 200+(x%+1)*32,700
770 x%=x%+(K%=136 AND x%>0
)-(K%=137 AND x%<23):y%=y%+(
K%=139 AND y%>0)-(K%=138 AND
y%<31)
780 UNTIL K%=13 AND x%+y%>
0
790 IF x% x%=x% DIV4
800 BX=&B02:??&B00=x%:??&B01
=y%
810 FOR XX=0 TO x%
820 FOR YX=0 TO y%
830 ?BX=? (AX+XX*8+&140*(YX
DIV8)+Y%MOD8)
840 BX=B%+1
850 NEXT
```

```
860 NEXT
870 PROCinput('Save:'):IF
name$="" THEN RETURN
880 OSCLI"SAVE "+name$+" B
00 "+STR$(BX-&B00)
890 RETURN
900
910 REM ***** Load *****
920 AX=&5940+S%*80
930 PROCinput('Load:'):IF
name$="" THEN RETURN
940 OSCLI"LOAD "+name$+" B
00"
950 BX=&B02
960 FOR XX=0 TO ?&B00
970 FOR YX=0 TO ?&B01
980 ? (AX+XX*8+&140*(YXDIV8
)+Y%MOD8)=?BX
990 BX=B%+1
1000 NEXT
1010 NEXT
1020 GOTO 440
1030
1040 REM ***** Copy *****
1050 AX=&5940+S%*80:BX=&594
0+(K%-2)*80
1060 FOR YX=0 TO 3
1070 FOR XX=0 TO 44 STEP 4
1080 ! (BX+XX+YX*&140)=!(AX+
XX+YX*&140)
1090 NEXT
1100 NEXT
1110 RETURN
```

```
1120
1130 REM ***** VDU 19 *****
1140 PROCinput('Pen:'):A%=V
AL name$
1150 PROCinput('New ink:'):
BX=VAL name$
1160 VDU 19,A%,B%;0;
1170 RETURN
1180
1190 REM ** Left Scroll **
1200 *FX178,0,0
1210 FOR XX=1 TO 24
1220 FOR YX=0 TO 31
1230 GCOL 0,POINT(XX*8+0%,9
91-YX*4):PLOT 65,-8,0
1240 NEXT
1250 NEXT
1260 GOTO 440
1270
1280 REM ** Right Scroll **
1290 *FX178,0,0
1300 FOR XX=22 TO 0 STEP -1
1310 FOR YX=0 TO 31
1320 GCOL 0,POINT(XX*8+0%,9
91-YX*4):PLOT 65,8,0
1330 NEXT
1340 NEXT
1350 GCOL0,0:MOVE 0%,991:DR
AW 0%,991-31*4
1360 GOTO 440
1370
1380 REM *** Up Scroll ****
1390 *FX178
```

```
1400 FOR YX=1 TO 32
1410 FOR XX=0 TO 23
1420 GCOL 0,POINT(XX*8+0%,9
91-YX*4):PLOT 65,0,4
1430 NEXT
1440 NEXT
1450 GOTO 440
1460
1470 REM ** Down Scroll **
1480 *FX178
1490 FOR YX=30 TO -1 STEP-1
1500 FOR XX=0 TO 23
1510 GCOL 0,POINT(XX*8+0%,9
91-YX*4):PLOT 65,0,-4
1520 NEXT
1530 NEXT
1540 GOTO 440
1550
1560 DEF PROCinput(prompt$)
1570 VDU23,1,1;0;0;0;
1580 COLOUR143:COLOUR0:PRIN
TTAB(0,8)SPC19:CHRS13:prompt
$:INPUT" name$
1590 VDU 23;0;0;0;0;0;
1600 COLOUR128:COLOUR15:PRI
NTTAB(0,8)SPC20
1610 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 53.

QUAL-SOFT

WORLD OF SOCCER

Sports simulations

ARE YOU A POTENTIAL 1st DIVISION MANAGER?
ARE YOU A POTENTIAL ENGLAND MANAGER?

Football management is not a mental arithmetic exercise. Deciding whether a skill level of 6 is a better choice than a skill level of 4 has nothing to do with a knowledge of soccer. Football management is about judgement; YOUR JUDGEMENT! Judgement about a players skills. Judgement of how skills combine to make a successful team. And judgement of the performance of the team on the field of play. Our "WORLD OF SOCCER" games are not so much computer games as computer SIMULATIONS of the world of the soccer manager.

DARE YOU TEST YOURSELF?

SOCCER SUPREMO

A LEAGUE MANAGEMENT SIMULATION

TAPE 1
6 Seasons
League Division 1
The F.A. Cup

TAPE 2
European Cup
U.E.F.A. Cup
Cup Winners Cup

MEXICO '86

A WORLD CUP MANAGEMENT SIMULATION

TAPE 1
Friendlies
World Cup
Qualifiers

TAPE 2
World Cup Finals
Phase 1 (groups of 4)
Phase 2 (last 16 knockout)

STILL THE ONLY ELECTRON SOCCER MANAGEMENT GAMES WITH GRAPHICS!

***SPECIAL OFFER: Soccer Supremo & Mexico '86 (4 tapes and 2 manuals packaged as 2 games) £14.95**

Both games are sent by return post, 1st class. Access authorisation accepted over the 'phone

QUAL-SOFT Tel: 0438
Dept. EU, 721936
18 Hazlemere Road
Stevenage SG2 8RX

Please supply:
Soccer Supremo £9.95
Mexico '86 £9.95
SS & M'86 £14.95

Name: _____
Address: _____
Access No. (if applicable) _____

SOFTWARE AT BARGAIN PRICES

SPECIAL PURCHASE

Plus I Interface
with View Wordprocessor

£53.95

Plus I only

£44.95

GP3	£7
Chess	
Boxer	
Hopper	
Snapper	
Sphinx Adv	
Swoop	
Stock Cars	

GP4	£7
Arcadians	
Starship Command	
Boxer	
Tarzan	
Brian Jacks Challenge	

INT 2	£5
Me & My Micro	
Business Games	
Cocktail Maker	
Sphinx Adv	
Boxer	
Watch your Weight	

INT 4	£5
Turtle Graphics	
Cocktail Maker	
Hopper	
Me & My Micro	
Josse Plan	
Desk Diary	

SUPERIOR BUDGET AT £1.99

- Fruit Machine
- Invaders
- Draughts
- Reversi
- Stranded
- Mr Wiz
- Chess
- Smash and Grand
- Percy Penguin
- World Geography
- Alien Dropout
- Centibug
- Zany Kong Jnr
- Overdrive
- Tempest
- Deathstar
- Repton 1

ACORNSOFT TITLES

Sphinx Adventure	£1.00
Starship Command	£1.00
Hopper	£1.00
Chess	£1.00
Arcadians	£1.00
Desk Diary	£1.00
Business Games	£1.00
Boxer	£1.00
Me and My Micro	£1.00
Snapper	£1.00
Complete Cocktail Maker	£1.00
Watch Your Weight	£1.00
Linkword Italian	£2.25
Linkword Spanish	£2.25
Turtle Graphics	£2.25
Advanced User Guide	£3.25

IVAN BERG SERIES

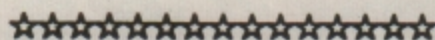
English CSE/GCE	£2.00
Biology CSE/GCE	£2.00
Maths 1 CSE/GCE	£2.00
Maths 2 CSE/GCE	£2.00

ROM CARTRIDGES

View (Wordprocessing)	£11.95
Viewsheet	£11.95
Lisp	£7.75
Logo	£28.50

ATLANTIS

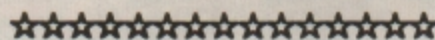
League Challenge	£2.99
Survivors	£2.99
Panic	£1.99
Cops and Robbers	£1.99
Creepy Cave	£1.99



BUGBYTE

AT £2.45 EACH

Uranians	Hunkydory
Tennis	Plan B
Savage Pond	Cricket
Starforce	Ice Hockey
Twin Kingdom Valley	Jack Attack
Temptation	Dunjunz
Squeakalizer	Sky Hawk



BUDGET TITLES

Warehouse	£2.99
Suds	£3.99
Peter Scott Trilogy	£2.99
Cascade (50 Games)	£2.99
Daredevil Dennis	£1.99
Snooker (Visions)	£1.99
Millionaire	£1.99
Bird Strike	£1.99
Licence to Kill	£1.99
Tarzan (Martech)	£2.99
Football Manager	£2.99
Last of the free	£3.99
Hercules	£1.99
XOR	£4.99
Micro Value (4 games)	£3.99

CURRENT TITLES

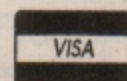
Life of Repton	£5.50
Spellbinder	£7.50
Elixir	£7.50
Bone Cruncher	£7.50
Omega Orb	£6.25
Dispatch Rider	£6.95
Ransack	£7.50
Ziggy	£6.95
Impact	£7.50
Graham Gooch Cricket	£7.50
Thunderstruck II	£6.95
Powerpack II (7 Games)	£7.50
Play it again Sam	£7.50
Palace of Magic	£7.50
Codename Droid	£7.50
Crazee Rider	£7.50
Collosus 4 Chess	£7.50
Psycastralia	£6.50
Sphere of Destiny	£6.50
Superior Hits Vol 3	£7.50
Elite	£10.50
Around World 40 Screens	£5.50
Repton 3	£7.50
Paper Boy	£7.50
The Lost Crystal	£9.95
The Hunt	£7.50
Village of Lost Souls	£7.50
Wheel of Fortune	£4.95
Castle Frankenstein	£4.95
Quest for Holy Grail	£4.95
Spitfire 40	£7.50
Spy v Spy	£7.50
Brian Clough Football	£12.50
Five Star Games Vol 1	£7.50
Five Star Games Vol 2	£7.50
10 Computer Hits Vol 1	£7.50
10 Computer Hits Vol 2	£7.50
10 Computer Hits Vol 3	£7.50
Phantom	£7.50
Evening Star	£7.50
Winter Olympiad '88	£7.50
Star Wars	£7.50

TOWERHILL COMPUTERS LTD

1 Hockcliffe Road
Leighton Buzzard

Telephone: Leighton Buzzard (0525) 385329

ALL PRICES INCLUDE V.A.T. AND P&P. OVERSEAS ORDERS ADD £1.00





EXPLORE the reaches of unknown space in this superb arcade simulation of galactic flight.

Beyond the depths of the Crab nebula, in the darkness of Teinazures gate, lie the Straits of Magellan – an uncharted region of space spanning an unknown distance.

In the ancient scriptures of your planet it is written that a rich and profitable trading route once spanned the length of the strait, joining the moons of Andromeda with the shoulder of Orion.

Many thousands of years ago however, during a terrible war, an entire planet was destroyed and now leaves a legacy of deadly asteroids floating in the narrow passageway of the strait.

The supreme council assembles and calls in you, Sebastian Jones, their finest star pilot and navigator extraordinaire.

His eminence, the Katarn explains that a priceless religious artefact, the Orb of Wisdom, has been stolen from the great temple.

The traitor has escaped along the Straits of Magellan, presumed to be heading for Rigel.

Although you've never held much store by an-

MATHEW O'DONNELL presents a clever game of navigation in deepest space

tiquities in the past, the offer of a hefty purse and instant fame appeals to you immediately.

Dare you venture into the most treacherous region of space to recover the Orb? Only you will know as you play Navigator.

The object of the game is to get from the top left of each screen to the exit gate at the bottom right. This is

achieved by moving left and right through the obstacles using the thrust key (Shift) to control your speed.

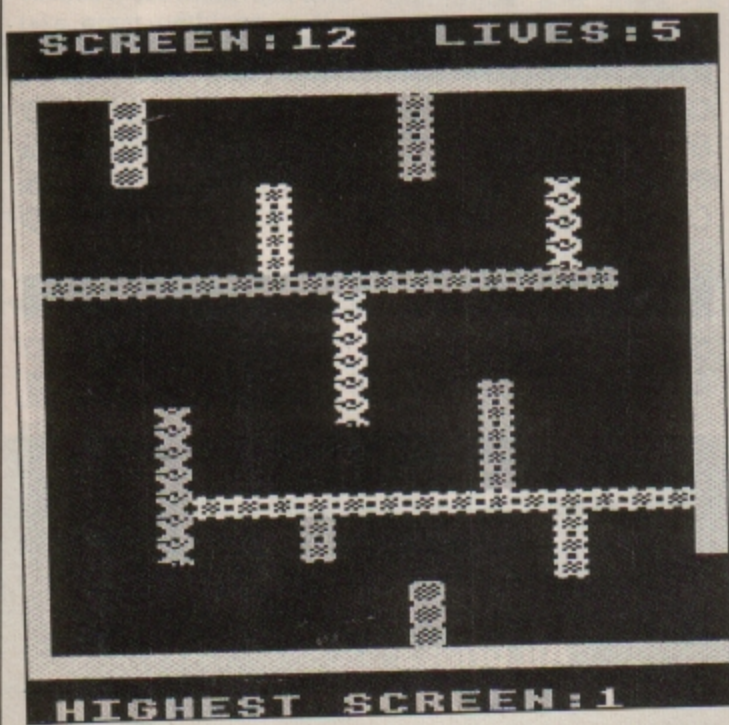
Be careful not to thrust in any direction for too long, because due to inertia the spacecraft keeps moving for a long time.

Crashing into the walls of the Straits or the asteroids is fatal, and you only have five lives.

And even though Navigator is less than 2.5k long it has no less than six mazes and a virtually infinite number of asteroid-infested screens.

Mazes appear on the even numbered levels up to level 12, each more challenging than the last.

This remarkable game demonstrates the real power of Electron Basic. ■



PROCEDURES

init Initialise game
instruct Display instructions

VARIABLES

L% Lives remaining
V% True if game paused
S% Current screen
H% Highest screen reached
X% X position of ship
Y% Y position of ship

```

10 REM Navigator
20 REM by Mathew O'Donnell
30 REM (c) Electron User ...
40 PROCinit
50 REPEAT
60 MODE5
70 PROCinstruct
80 REPEAT
90 X%=64:Y%=892
100 FOR P=0 TO 999:NEXT
110 VDU 12,19,2,3;0;
120 VDU 17,1,17,130
130 FOR P=3 TO 29
140 VDU 31,0,P,225
150 VDU 31,19,P,225
160 IF P=3 OR P=29 PRINTA
B(1,P)STRING$(18,CHR$(225)):NE
XT ELSE NEXT
170 VDU 17,128,31,1,1
180 PRINT"SCREEN: LIVES
: ";TAB(1,31)"HIGHEST SCREEN:
";
190 VDU 17,2,31,8,1
200 PRINT;S%;TAB(18,1);L%;
TAB(16,31);H%;
210 IF INT(S%/2)<>S%/2 OR
S%>12 FOR PX=1 TO (S%+3)+2:C
OLOURRND(2):PRINTTAB(RND(16)
+1,RND(25)+3)CHR$(RND(3)+225
):NEXT:GOTO 350
220 RESTORE
    
```

Turn to Page 38 ▶

Game

◀ From Page 37

```

230 REPEAT
240 READ a%,b%,c%
250 UNTIL a%=S%+50
260 REPEAT READ a%,b%,c%
270 COLOUR RND(2)
280 PRINT TAB(a%,b%)STRING
$(c%,CHRS(RND(3)+225))
290 UNTIL c%=0
300 REPEAT
310 READ a%,b%,c%
320 COLOUR RND(2)
330 PRINT TAB(a%,b%)STRING
$(c%,CHRS(RND(3)+225)+CHRS10
+CHRS8)
340 UNTIL c%=0
350 PRINT TAB(19,25)STRING
$(4,CHRS32+CHRS8+CHRS10)
360 VDU 5,10,3,3
370 VDU 25,4,X%;Y%;224
380 EX=0:T%=1:K%=0:G%=0
390 REPEAT
400 NX=XX:M%=Y%
410 K%=K%+((INKEY(-98)AND
K%>-32)-(INKEY(-67)AND K%>-32
)))+4
420 G%=G%+((G%<28)*2)
430 XX=K%+K%:Y%=Y%-G%
440 IF INKEY(-1):IF G%>-30
:G%=G%-4
450 Q%=POINT(XX+16,Y%)
460 R%=POINT(XX+40,Y%)
470 I%=POINT(XX,Y%-12)

```

```

480 O%=POINT(XX+56,Y%-12)
490 A%=POINT(XX+8,Y%-28)
500 DX=POINT(XX+48,Y%-28)
510 IF Q%=1 OR Q%=2 OR R%=
1 OR R%=2 DR%=1 OR I%=2 OR
O%=1 OR O%=2 OR A%=1 OR A%=2
OR DX=1 OR DX=2:EX=-1:T%=0:
SOUND0,-15,4,17
520 VX=INKEY(-56)
530 REPEAT
540 UNTIL VX=0 OR INKEY(-5
2)
550 MOVE NX,M%:VDU224
560 MOVE XX,Y%:VDU224
570 UNTIL XX>1260 OR EX=-1
580 VDU4
590 LX=LX+EX:S%=S%+TX
600 J%=(S%>HX)
610 H%=-S%*J%-(H%*NOTJ%)
620 UNTIL LX=0
630 VDU 17,3,28,1,16,18,14
,12
640 PRINT" G A M E O V E
R"
650 FOR P=0 TO 3000:NEXT
660 UNTILO
670 :
680 DEF PROCinit
690 VDU23,224,102,255,102,
255,126,219,153,66
700 VDU 23,226,126,235,213
,171,213,171,215,126
710 VDU 23,225,170,85,170,
85,170,85,170,85

```

```

720 VDU 23,227,102,255,235
,86,106,215,255,102
730 VDU 23,228,219,231,126
,60,60,126,231,21
740 H%=1
750 ENDPROC
760 :
770 DEF PROCinstruct
780 VDU 23;8202;0;0;0;0;
790 VDU 19,3,6;0;
800 VDU 19,1,5;0;
810 VDU 31,5,6
820 PRINT"NAVIGATOR"
830 VDU 17,2
840 PRINT"SPC7Z - Left"
"SPC7X - Right""SPC3'Shif
t - Thrust""SPC7P - Pause"
"SPC7R - Resume"
850 ?&212=&06
860 ?&213=&F1
870 ?&2AC=0
880 *FX16
890 *FX15
900 VDU 17,1,31,3,22
910 PRINT " Hit any key"
920 REPEAT UNTIL GET
930 CLS:S%=1:L%=5
940 ENDPROC
950 :
960 DATA 52,0,0,1,12,5
970 DATA 10,11,4,4,18,6
980 DATA 14,22,5,6,26,4
990 DATA 0,0,0,0,0,56
1000 DATA 0,0,4,11,10,0

```

```

1010 DATA 0,0,3,4,20,7
1020 DATA 17,12,13,12,12
1030 DATA 16,20,9,0,0,0
1040 DATA 58,0,0,1,19,5
1050 DATA 4,13,4,4,24,4
1060 DATA 7,8,3,12,11,4
1070 DATA 15,16,4,12,23
1080 DATA 4,0,0,0,3,4,10
1090 DATA 8,13,12,11,8
1100 DATA 21,0,0,0,60,0
1110 DATA 0,1,8,15,4,13
1120 DATA 15,1,18,15,4
1130 DATA 23,15,0,0,0,6
1140 DATA 24,1,12,24,1,9
1150 DATA 28,1,15,28,1,0
1160 DATA 0,0,62,0,0,1
1170 DATA 12,16,4,22,15
1180 DATA 0,0,0,4,18,7,3
1190 DATA 4,4,7,8,4,11,4
1200 DATA 4,15,8,4,9,13
1210 DATA 6,13,17,5,8,23
1220 DATA 2,11,26,3,15
1230 DATA 23,3,0,0,0,54
1240 DATA 0,0,0,0,0,3,11
1250 DATA 5,6,5,7,8,18,6
1260 DATA 11,10,6,13,20
1270 DATA 9,4,22,7,16,12
1280 DATA 7,0,0,0

```

This listing is included in this month's cassette tape offer. See order form on Page 53.

'2' NEW PRODUCTS
for the **ELECTRON**

NEW

PLUSCIOM
A UTILITY ROM

40 commands on a 16k rom—a command for everyone from error extension to character designer... PRICE >> **£14.95**

SOUND EXPANSION

THE 4 CHANNEL SOUND CARTRIDGE

at last... bbc sound command capabilities... plugs into the plus1 — limited offer... **SPEECH!** worth £9.99—FREE PRICE >> **£39.95**

ALSO:

USER PORT inc ROM socket	£29.95	all prices inclusive of post, etc
EPROM Programmer	£34.95	

5% OFF SLOGGER PRODUCTS!

PROJECT EXPANSIONS

5 Teal Close, Fareham, Hampshire, PO16 8HG (0329) 221109

Special Purchase

MONITORS

12" Green Screen Ferguson, with Electron or BBC Cable	£59.95
14" Colour high res Acorn	£239.95

PRINTERS

Citizen 120D	£179.95
Star NL10	£209.95
Panasonic 1081	£179.95
Olivetti Spark Jet	£69.95

BLANK DISCS

3.5" DS 135tpi — box of 10	£12.90
5.25" DS DD — box of 10	£4.99

THE COMPUTER DEPOT

205 Buchanan Street
Glasgow, G1 2JZ
Tel: 041-332 3944

All prices include VAT and delivery

SUPER DIGGA

Get your spade arm into action with STEVEN MARTIN's super maze game



THE forces of evil have once more transported an unwitting mortal down to their fiendish underground maze to satisfy some terrible purpose.

You are that mortal, and before you can escape to breathe fresh air again, your intellect, speed and endurance will be stretched to breaking point.

In this all-action machine code game, you are faced with the task of collecting every diamond buried in the maze with you before ascending to the next highest cave, and – hopefully – eventual freedom.

This is no simple task, as you are surrounded by vicious maze munchers who take great umbrage at the thought of their precious booty being lifted from under their yellow noses.

To make matters worse, the maze is full of magic mushrooms just itching to brush their fungal feelers

against you and sting you into oblivion.

And as if that weren't enough, some joker has poured a truckful of rocks down the cave. Negotiating your way past these while being pursued by a frenzied monster certainly raises the blood pressure.

It's not all plain sailing for the monsters, though, as you can decide at the start how fast you want everything to move through the maze.

You control your small figure from the keyboard and can pause the action at any time by pressing P.

Your score, together with the number of remaining diamonds and lives, is shown below the maze. Each new cave contains more diamonds than the last – and the monsters get smarter.

Turn to Page 43 ►

PROCEDURES

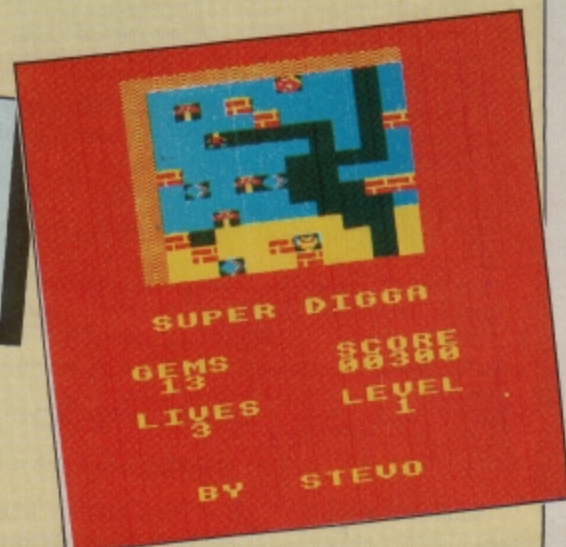
assem	Poke in the machine code
initmaze	Set up screen map
initgame	Set up memory locations
left	Scroll window left
right	Scroll window right
up	Scroll window up
down	Scroll window down
dia	Update diamonds left
dead	Update lives left
maestro	Print title screen
welldone	Play fanfare

VARIABLES

score%	Current score
lives%	Number of lives remaining
level%	Current level
dia%	Number of diamonds left
hi%	High score
man%	Location of man

CONTROLS

Z	Left
X	Right
*	Up
?	Down
P	Pause





SLOGGER

WHAT PRICE QUALITY? WHAT PRICE COMPATIBILITY?

To quote a well known phrase, "You only get what you pay for"

This we feel sums up SLOGGERS pricing policy. Our goods may not always be the cheapest, but the products are most certainly the best.

THE PEGASUS 400 DISK DRIVE SYSTEM

Using only top quality components, the system comprises of:

The SLOGGER 40/80 Track double sided 5.25" Disk Drive which maintains

- * 400k storage per disk, built in power supply.
- * Manufacturers (NEC/TEAC) 1 year guarantee.
- * Internal Power Supply unit (built to BS 415).
- * Compatibility with the inexpensive (yet most reliable) 5.25" disks.
- * Reliability at 3 m/s step rate (four times faster than some drives).

The SLOGGER PEGASUS Disk Interface which boasts

- * Excellent Computer Aided Design (CAD) production
- * Acorn approved design and standard WD1770 floppy disk controller
- * NEW Type-Ahead facility when used with Master RAM Board
- * READ/WRITE Shadow Screen when used with Master RAM Board
- * 90 page documentation usually provided as a separate purchase
- * Compatibility with the ACP ADFS Version 1.1, which offers a total 640k when used with SLOGGERS 5.25" Disk Drive

The SLOGGER SEDFS ROM, about which the Electron User magazine enthused

"I can recommend SEDFS unreservedly"
 "Anyone considering upgrading to disk"
 "SEDFS is the logical choice"

The quality of SEDFS speaks for itself, unlike other filing systems it offers

- * No loss of Electron memory, PAGE=&E00 (not &1D00)
- Full Acorn DFS (BBC Model B and MASTER SERIES) compatibility
- * All utilities built in, requires no additional menacing utility disk

PEGASUS 400 (Including Interface)£149.50 (inc VAT)
PEGASUS INTERFACE (Only)£74.95 (inc VAT)

MASTER RAM BOARD

**Upgrade your Electron to a
64K Machine using
32K of STATIC RAM**

- * Fits inside the Acorn Electron, uses no cartridge ports.
- * Compatible with ALL reliable Electron hardware (except TURBO DRIVER).
- * Compatible with ALL Electron software, switching between 64K mode, TURBO mode (yes... the TURBO DRIVER IS BUILT IN), and normal mode.
- * For correctly written software, HIMEM is ALWAYS AT 8000 in 64K mode so leaving 28000 bytes for BASIC or WORD PROCESSING in ALL screen modes.
- * Doubles the speed of Word Processing.
- * Upto 300% speed increase for games.
- * Additional 12K for use as Printer Buffer with Expansion ROM 2.0.
- * Installation Service (See Details below) for those not confident of desoldering the 6502 Microprocessor

NEW FEATURES

- * 64K Mode fully compatible with 98% of Level 9 BBC Adventure games.
- * NEW OS 2.1 - PLAY ACORNSOFT'S ELITE WITH SLOGGERS JOYSTICK INTERFACE.

"I can thoroughly recommend it"

Electron User 1987

Master RAM Board Kit - code MR2 - Now Only £49.95

INSTALLATION SERVICE

Driver AND RETURN IT WITHIN 7 DAYS OF RECEIPT.

- * Includes Postage paid BOTH WAYS (using FREEPOST) and 1 YEARS GUARANTEE.

Order MR1 - Master RAM Board Installed - only £59.95
 or TD1 - Elk Turbo Driver Installed - only £39.95

Please note... if you own a PLUS 1, please send it with your Electron to be tested to ensure reliability at high speed.

Parcel Post
Amount of
postage to be
paid by licensee

Postage Forward Parcel
Service
Licence no GJC 1

No postage
stamp necessary
unless posted in
Channel Islands
Isle of Man or
Republic of
Ireland

Date Stamp

P

SLOGGER LTD
107 RICHMOND ROAD
GILLINGHAM
KENT
ME7 1BR

ROMBOX PLUS

SLOGGER's answer to the PLUS 1

Q. Why not buy the Acorn Plus 1?

A. Because "Excellent though the Plus 1 is, I think there is still room for improvement" said the Electron User Magazine.

The ROMBOX PLUS has this improved specification:

1. Four ROM/RAM sockets to free the cartridge slots for more important add-ons. Each socket can take the usual 8K/16K ROMs but can also take 16K RAMS offering a staggering 64K SIDEWAYS RAM
2. The PLUS1 Cartridge slots.
3. The PLUS1 centronics printer port.
4. The Expansion ROM 2.0
5. Switched Joystick interface available.
6. Analogue Joystick interface under development.

Still Only £54.95

64k ACORN ELECTRONS

THESE ELECTRONS ARE FITTED WITH THE MASTER RAMBOARD AND ARE FULLY TESTED AND GUARANTEED WHEN PURCHASED DIRECT FROM SLOGGER

64k ELECTRON
(Switchable)
£99.00

EXPANSION ROM 2.0

for ROMBOX PLUS or PLUS 1

- * Supports Printer Buffer with 8K/16K sideways RAM or 12K with MASTER RAM BOARD.
 - * RSAVE command to save ROM images to tape or disc.
 - * RLOAD command to load Sideways RAM with a ROM image.
 - * ROMS command to display ROM/RAM in system.
 - * JOYSTICK command for the SLOGGER Joystick Interface
 - * Allows cassette loading in high resolution.
 - * Supports all standard functions (Printer, ADC, RS423)
 - * Simply fits into internal ROM socket.
- "There is room for improvement in the operating system. No doubt this was the idea behind Expansion 2"

Only £11.95

(£5 if purchased with 32K SIDEWAYS RAM or JOYSTICK INTERFACE)

Electron User, July 87

TAPE TO DISK ROMS VERSION 2

- * Transfer the majority of Tape programs to disk
 - * Acornsoft, Superior and Micropower no problem
 - * Compatible with programs copied using Version 1
 - * More successful than ever before
- T2P3 for the Acorn Plus 3
T2CU for the Cumana DFS
T2P4 for AP4 and EOO DFS
T2SD for the Solidisk DFS
T2SEDFS for the SEDFS
T2PEG400 for Pegasus 400

ONLY £24.95

- * Upgrade 1-2 only £5 with original ROM

JOYSTICK INTERFACE

for ROMBOX PLUS or ACORN PLUS 1

- * Uses inexpensive ATARI-type joysticks
- * Compatible with ALL Tape and Disk systems.
- * Emulation of keys by Expansion ROM 2.0
- * Can be used with well written games either WITH OR WITHOUT A JOYSTICK OPTION

"The ultimate Joystick Interface"

A&B July 87

"Well worth saving up for, I can recommend it to all Arcade Addicts"

Electron User May 87

Only £14.95

- * Requires Electron Expansion 2.0
- Only £5 with this unit

JOYSTICKS

Switched Joysticks for the Slogger Joystick Interface

Quickshot I £4.00
Quickshot II £6.00

32K SIDEWAYS RAM CARTRIDGE

for ROMBOX PLUS or PLUS 1

- * Ever popular on the BBC
 - * Best used with EXP ROM 2.0
- (1) Save ROM backups for loading into Sideways Ram.
(2) Set up a 16k Print Buffer
- * Splits as 2x16k pages
 - * VIEW and VIEWSHEET in one slot!!!
 - * Write protect option . . . prevents corruption of software.

"A very powerful piece of hardware"

Electron User July 87

ONLY £34.50

(£39.50 with EXP ROM 2.0)

SLOGGER EPROM CARTRIDGE

- * Carries TWO 8K/16K ROM/EPROM software
- * Compatible with PLUS 1, ROMBOX PLUS and BBC Master.
- * Simply plugs into cartridge slot

£10.00 for a limited period

ROM SOFTWARE

STARSTORE 2 £29.95
SEDFS upgrade ROM for CUMANA owners £24.95

* BARGAIN CORNER *

STARWORD Word Processor £19.95
STARSTORE Database £9.95
STARGRAPH Graphic Utilities £9.95
ELKMAN ROM/RAM Manager £9.95
STARMON Machine code Monitor £9.95
PRINTER ROM Simplified Printer Control £9.95
STAR TREK Machine code disassembler £9.95
PDG Printer Driver £9.95

PRESTEL/MICRONET ON THE ELECTRON

Link up to Prestel, Micronet, Telecom Gold and a multitude of very exciting Bulletin Boards using the Slogger Communications Package

Phone for further details
(ask for Phil) 0634 52303

COMMS 1
RS423 Interface
Commstar Software
Modem
£85.00

COMMS 2
RS423 Interface
Commstar Software
£59.00

COMMS 3
Modem Only
£30.00

SLOGGER'S AUTHORISED DEALERS

Aberdeen Micro Logic	0569 66233
Birmingham Allen James Computers	021 778 5737
Bristol Avon Computer Exchange	0272 637981
Broxbourne Bradstreet Computers	01 207 4210
Burnley Atomic Computer Systems	0262 54299
Byfleet Calancraft	0932 342137
Cardiff Computer Exchange	0222 483069
Cardigan Cardigan Electronics	0239 614483
Chesham Reeds Photo & Computing	0494 783373
Crawley Computer Centre	0293 37842
Croydon Computer Centre	01 683 2646
Fareham Project Expansions	0329 221109
Farnham Farnham Computers	0252 723107
Glasgow Computer Depot	041 332 3944
Leicester DA Computers	0533 549407
London Computace	01 580 0181
Market Harborough Harborough Computers	0858 63056
Merseyside Compshop	051 639 3041
Newbury M&S Associates	0635 45774
Oldham Home And Business	061-633 1608
Sheerness Swaletek Systems	0795 665530
Stockport Dram Electronics	061 429 0626
Telford A1 Computer Supplies	0952 502737
Trowbridge West Wilts Micros	02214 62759
Warrington Cheshire Micros	0925 414109
Netherlands Velobyte Computers Rotterdam	010 4138197

Mail Order Only

Stockport 21st Software 0625 528895

All prices include VAT P&P UK Mainland only

SEND FOR THEM TODAY

Cheques payable to
SLOGGER LTD

Access No

Visa

Name

Address

Expiry Date

PLEASE SUPPLY

Cost

1 _____ £ _____
2 _____ £ _____
3 _____ £ _____
4 _____ £ _____
5 _____ £ _____

Total £ _____

Please send orders to SLOGGER LTD, 107 RICHMOND ROAD, GILLINGHAM, KENT

Get knitting on your micro with *Knitwear Designer*

Now you can use your BBC Micro or Electron to design perfectly-fitting knitwear – then print out the complete pattern.

It's the biggest development since the home knitting machine – and it's so simple to use. Now anyone can use a computer to design knitwear to individual measurements and then produce row-by-row knitting instructions on the printer.

YOU CAN:

- Work with any yarn, from fine cottons to chunky wools
- Enter your natural tension and the pattern adjusts to the way you knit
- Select from three preset patterns – Raglan sleeve, drop and square shoulder
- Use the Freehand program to produce custom designs

Say goodbye to badly-fitting home knitting. With one of the five programs included in the package, and using the clearly written manual, you can produce perfect results every time.

The program itself produces a plain knit, leaving you to use your own favourite stitch pattern, such as the Fair Isle design featured here.

£8.95
Cassette

Also available on disc for use on the Advanced Plus 4 and Slogger SEDFS.

£9.95
5 1/4" disc

DATABASE PUBLICATIONS



To order please turn to the form on Page 53

◀ From Page 39

```

10 REM Super Digga
20 REM BY Steven Martin
30 REM (c) Electron User
40 REM
50 MODE5:PROCassem:INPUT
AB(3,5);"SPEED 0-10:";S:IF S
<0 OR S>10 THEN 50 ELSE=(1
0-S)*10:CALLstevo2:PRINTTAB
(1,5);"FABULOUS SONICS?":AS=
GETS:CALLstevo2:IF AS='N' OR
AS='n':*FX210,10
60 VDU23,1,0;0;0;19,3,6
;0;:hiX=1000:ENVELOPE1,129,-
122,-54,-94,97,22,21,126,0,0
,-126,126,126:ENVELOPE2,129,
15,-123,110,233,84,48,126,0,
0,-126,126,126:ENVELOPE3,129
,-84,42,-70,247,230,156,126,
0,0,-126,126,126
70 PROCmaestro:?&7E=0:sco
reX=0:livesX=3:levelX=1
80 PROCinitmaze:PROCgraph
ics
90 PROCinitvari:PROCinitg
ame:CALLstevo:PROCscreen:PRO
Cgame:END
100 DEFPROCassem:DIM QX 12
00:FORT=0T02STEP2:PX=QX:COPT
T
110 .mainloop:LDX#&C8:LDA#
&81:LDY#&FF:JSR&FFF4:TYA:BNE
pause:JSRghosties:JSRrocks:J
SRwindow:RTS:.pause:LDA#21:L
DX#0:JSR&FFF4:JSR&FFE0:JMPma
inloop
120 .window:LDX#12:.row:JS
Rstart:CLC:LDA#70:ADC#&90:ST
A#70:LDA#71:ADC#0:STA#71:LDA
#74:CLC:ADC#20:STA#74:LDA#75
:ADC#0:STA#75:DEX:BPLow:RTS
130 .start:LDY#10:.fill:ST
Y#8F:LDA#74,Y:CMPI#55:BNE1:
JMPbord:.S1:CMPI#52:BNE2:JM
Pman:.S2:CMPI#51:BNE3:JMProc
k:.S3:CMPI#50:BNE4:JMPtoad:.
S4:CMPI#49:BNE5:JMPdia:.S5:C
MPI#56:BNE6:JMPearth1:.S6:CM
PI#57:BNE7:JMPearth2:.S7:CM
PI#53:BNE8
140 JMPalien:.S8:CMPI#54:BN
ES9:JMPbrick:.S9:JMPspace:r
et:LDY#8F:DEY:BPLfill:RTS
150 .earth1:LDA#&FF:LDY#15
:.elp1:STA#70,Y:DEY:BPLelp
1:JSRinc:JMPret:.earth2:LDA#
&8F:LDY#15:.elp2:STA#70,Y:
DEY:BPLelp2:JSRinc:JMPret
160 .brick:LDA#&90:STA#72:
LDA#&8A:STA#73:JSRpaint:JSRi
nc:JMPret:.man:LDA#&8B:STA#7
2:LDA#&8A:STA#73:JSRpaint:JS
Rinc:JMPret:.dia:LDA#&80:STA
#72:LDA#&8A:STA#73:JSRpaint:
JSRinc:JMPret
170 .toad:LDA#&C0:STA#72:L
DA#&8A:STA#73:JSRpaint:JSRi
nc:JMPret:.bord:LDA#&F0:STA#7
2:LDA#&8A:STA#73:JSRpaint:JS
Rinc:JMPret
180 .alien:LDA#&E0:STA#72:
LDA#&8A:STA#73:JSRpaint:JSRi
nc:JMPret:.rock:LDA#&D0:STA#7
2:LDA#&8A:STA#73:JSRpaint:J
SRinc:JMPret:.space:LDY#15:.
loop2:LDA#0:STA#70,Y:DEY:B
PLloop2:JSRinc:JMPret
190 .paint:LDY#15:.loop:LD
A#72,Y:STA#70,Y:DEY:BPLl
oop:RTS:.inc:LDA#70:CLC:ADC#

```

```

16:STA#70:LDA#71:ADC#0:STA#7
1:RTS
200 .moveghost:LDY#0:LDA#8
2:STA#800,Y:JSR&AF51:LDA#8A
:CMPI#50:BCSsmall:JSR&AF51:L
DA#82A:STA#83:.small:LDA#83:CM
PI#200:BCCover:JSRup:.over:CM
PI#150:BCCover1:JSRdown:.over
1:CMPI#100:BCCover2:JSRleft:.
over2
210 CMP#50:BCcheck:JSRrig
ht:.check:LDY#0:LDA#800,Y:C
MPI#52:BEQbri:CMPI#48:BEQnegat
ive:CMPI#56:BEQnegative:CMPI#5
7:BEQnegative:JSRchangedirec
:JMPnegative:.bri:LDA#1:STA#
7E:RTS
220 .negative:LDY#0:LDA#80
0,Y:STA#82:LDA#53:LDY#0:STA
#800,Y:RTS
230 .changedirec:LDA#83:CM
PI#200:BCSdown:CMPI#150:BCSup
:CMPI#100:BCSright:CMPI#50:BCS
left:JSR&AF51:LDA#82A:STA#83:R
TS:.up:SEC:LDA#80:SBC#20:STA
#80:LDA#81:SBC#0:STA#81:RTS
240 .down:CLC:LDA#80:ADC#2
0:STA#80:LDA#81:ADC#0:STA#81
:RTS:.right:CLC:LDA#80:ADC#1
:STA#80:LDA#81:ADC#0:STA#81:
RTS:.left:SEC:LDA#80:SBC#1:S
TA#80:LDA#81:SBC#0:STA#81:RT
S
250 .ghosties:LDY#2:.gip:L
DA#D01,Y:STA#80:LDA#D04,Y:ST
A#81:LDA#D07,Y:STA#82:LDA#D0
A,Y:STA#83:STY#84:JSRmovegho
st:LDY#84:LDA#80:STA#D01,Y:L
DA#81:STA#D04,Y:LDA#82:STA#D
07,Y:LDA#83:STA#D0A,Y:DEY:BP
Lgip:RTS
260 .stevo:LDY#2:.club:TYA
:STA#80:STY#81:JSRc:LDY#81:I
NY:CMPI#7:BNEclub:LDA#&8F:STA
#80:JSRc:RTS:.c:LDA#&85:STA#
71:LDY#0:STA#80:STA#70:LDA#
80:.cl:STA#70,Y:INY:BNEcl:
INC#71:BPLcl:RTS
270 .rocks:LDX#5:.rockloop
:LDA#D0D,X:STA#80:LDA#D13,X:
STA#81:JSRrockcheck:LDA#80:S
TA#D0D,X:LDA#81:STA#D13,X:DE
Y:BPLrockloop:RTS
280 .rockcheck:LDA#80:CLC:
ADC#20:STA#85:LDA#81:ADC#0:S
TA#86:LDY#0:LDA#85,Y:CMPI#4
8:BEQfalling:.rockend:LDA#51
:LDY#0:STA#80,Y:RTS:.falli
ng:LDA#48:LDY#0:STA#80,Y:L
DA#85:STA#80:LDA#86:STA#81
290 LDA#85:CLC:ADC#20:STA#
85:LDA#86:ADC#0:STA#86:LDY#0
:LDA#85,Y:CMPI#52:BNEalive:
LDA#1:STA#7E:.alive:JMProcke
nd
300 .stevo2:LDA#254:STAm
sk:.inloop:JSRpixfz:LDA#mask:
LSRA:STAmask:CMPI#0:BNEinloop
:RTS:.pixfz:LDA#&5B:STA#71:
LDY#0:LDA#&80:STA#70:.pixlp:
LDA#70,Y:ANDmask:STA#70,Y:
INY:BNEpixlp:INC#71:BPLpix
lp:RTS:.mask
310 RTS:J:NEXT:ENDPROC
320 DEFPROCinitmaze:FORTX=
&900T0(&900+200):?TX=56:(TX
+190)=57:NEXT:FORTX=&900T0(&
900+20):?TX=55:(TX+380)=55:
NEXT:FORTX=&900T0(&900+380)S
TEP20:?TX=55:(TX-1)=55:NEXT
:diaX=0:poX=0:FORTX=1T020

```

```

330 poX=RND(300):IF poX=21
7 OR poX=268 OR poX=336 THEN
330
340 IF?(poX+&900)=57 OR?(
poX+&900)=56 THEN diaX=diaX
+1:(poX+&900)=49
350 poX=RND(300):IF?(poX+
&900)=57 OR?(poX+&900)=56 T
HEN?(poX+&900)=54
360 NEXT
370 TX=0:REPEAT:poX=RND(30
0):IF?(poX+&900)=57 OR?(po
X+&900)=56 THEN?(poX+&900)=
50
380 TX=TX+1:UNTIL TX=10
390 TX=0:REPEAT
400 poX=RND(300):IF?(poX+
&900)=57 OR?(poX+&900)=56 T
HEN?(poX+&900)=51:poX=poX+&
900:TX?&D0D=poX MOD 256:TX?&
D13=poX DIV 256
410 TX=TX+1:UNTIL TX=5:END
PROC
420 DEFPROCgraphics:RESTOR
E#50:FORTX=&A90T0&AFF:READ$
:D$=EVAL("B+$"):?TX=D$:NEXT
430 RESTORE#40:FORT=0T02
440 READLX:?&D01=LX MOD 2
56:T?&D04=LX DIV 256:T?&D07=
RND(255):IF?LX=53 OR?LX=52:
GOTO440 ELSE:T?&D0A=?LX:NEXT
:ENDPROC
450 DEFPROCinitvari:locX=&
907:manX=&91E:X#X=13:Y#Y=2:xm
axX=19:xminX=12:ymaxX=8:yminX
=3:ENDPROC
460 DEFPROCinitgame:#&70=&
80:#&71=&85A:#&74=&8C:#&75=&85
A:ENDPROC
470 DEFPROCgame:REPEAT:FOR
T=1T05:NEXT:CALLQX:IF?&7E=1:
PROCdead
480 IFINKEY=98:PROCleft:GO
T0520
490 IFINKEY=67:PROCright:G
O520
500 IFINKEY=73:PROCup:GOTO
520
510 IFINKEY=105:PROCdown
520 ?&74=locX MOD 256:#&75
=locX DIV 256:#&70=&8C:#&71=
&85A:#manX=52:UNTIL FALSE
530 DEFPROCleft:IF?(manX+1
)=55 OR?(manX+1)=51 OR?(ma
nX+1)=54:ENDPROC
540 IF?(manX+1)=49:PROCdia
550 IF?(manX+1)=50 OR?(ma
nX+1)=53:PROCdead
560 IFX#<xminX:#manX=48:ma
nX=manX+1:X#X=1:xminX=xmin
X-1:xmaxX=xmaxX-1:ENDPROC
570 ?manX=48:manX=manX+1:L
ocX=locX+1:X#X=1:ENDPROC
580 DEFPROCright:IF?(manX-
1)=55 OR?(manX-1)=51 OR?(m
anX-1)=54:ENDPROC
590 IF?(manX-1)=49:PROCdia
600 IF?(manX-1)=50 OR?(ma
nX-1)=53:PROCdead
610 IFX#>xmaxX:#manX=48:ma
nX=manX-1:X#X=1:xmaxX=xmax
X+1:xminX=xminX+1:ENDPROC
620 ?manX=48:manX=manX-1:L
ocX=locX-1:X#X=1:ENDPROC
630 DEFPROCup:IF?(manX-20)
=55 OR?(manX-20)=51 OR?(ma
nX-20)=54:ENDPROC
640 IF?(manX-20)=49:PROCdi
a
650 IF?(manX-20)=50 OR?(m
anX-20)=53:PROCdead

```

```

660 IFY#<yminX:#manX=48:ma
nX=manX-20:Y#Y=1:yminX=ymin
X-1:ymaxX=ymaxX-1:ENDPROC
670 ?manX=48:manX=manX-20:
locX=locX-20:Y#Y=1:ENDPROC
680 DEFPROCdown:IF?(manX+2
0)=55 OR?(manX+20)=51 OR?(
manX+20)=54:ENDPROC
690 IF?(manX+20)=49:PROCdi
a
700 IF?(manX+20)=50 OR?(m
anX+20)=53:PROCdead
710 IFY#>ymaxX:#manX=48:ma
nX=manX+20:yminX=yminX+1:yma
xX=ymaxX+1:Y#Y=1:ENDPROC
720 ?manX=48:manX=manX+20:
locX=locX+20:Y#Y=1:ENDPROC
730 DEFPROCscreen:COLOUR12
9:CLS:PRINTTAB(4,17)"SUPER D
IGGA";TAB(3,20);"GEMS";SPC(4
);"SCORE";TAB(4,21);diaX;TAB
(11,21);"0000";TAB(3,23)"LI
VES";SPC(3);"LEVEL";TAB(5,24
);livesX;SPC(7);levelX;TAB(5
,28);"BY STEVO":LX=LEN(STR$(
scoreX))
740 PRINTTAB(16-LX,21);sco
reX:ENDPROC
750 DEFPROCdia:SOUND#11,1,
255,5:diaX=diaX-1:scoreX=sco
reX+100:IFdiaX=0:PROCweldon
e
760 LX=LEN(STR$(scoreX)):P
RINTTAB(4,21);SPC(2);TAB(4,2
1);diaX;TAB(16-LX,21);scoreX
:ENDPROC
770 DEFPROCdead:SOUND#11,3
,255,5:#manX=48:livesX=lives
X-1:PRINTTAB(5,24);SPC(2);T
AB(5,24);livesX:IFlivesX=0THE
N790
780 ?&7E=0:GOTO90
790 PRINTTAB(4,8);SPC(11);
TAB(4,9);"GAME OVER";TAB(4
,10);SPC(11):FORT=1T0800:NE
XT:IFscoreX>hiX THEN hiX=sco
reX
800 GOTO70
810 DEFPROCmaestro:CLS:COL
OUR2:PRINTTAB(4,3);"SUPER DI
GGA":COLOUR3:PRINTTAB(4,9);"
2 - LEFT";TAB(4,11);"X -
RIGHT";TAB(4,13);": - UP";
TAB(4,15);"/ - DOWN";TAB(
4,17);"P - PAUSE";TAB(2,21
);"HIGH SCORE:";hiX:COLOUR2
820 PRINTTAB(2,26);"ANY KE
Y TO START:OSCLI('FX21,0')":
A=GET:CALLstevo2:ENDPROC
830 DEFPROCweldon:SOUND#
11,2,255,25:CALLstevo:COLOUR
3:PRINTTAB(1,10)"LEVEL";lev
elX;"COMPLETED";TAB(5,17)"E
NTERING";TAB(4,19)"NEXT STAG
E":FORT=1T01000:NEXT:levelX=
levelX+1:GOTO80
840 DATA2521,2572,2640
850 DATA#0,#0,#0,#0,#0,20,
20,20,#0,20,20,20,#0,#0,#0,
#0,10,10,03,41,01,02,66,00,80
,80,0C,28,08,04,66,00,11,33,
77,FF,FF,77,33,11,88,4C,AE,0
F,DF,AE,4C,88,03,27,4F,1F,10
,10,10,10,0C,8E,4F,0F,80,80,
80,80
860 DATA#3,36,0F,4F,1F,0F,
27,03,C0,68,3C,1E,87,8F,0E,0
C,88,B9,DA,C8,F8,34,21,10,11
,09,B5,3D,F1,C2,48,80,5A,AS,
5A,AS,5A,AS,5A,AS,5A,AS,5
A,AS,5A,AS,5A

```


Exploring printers Part 2

Printing in overdrive

JULIA FORESTER runs a set of benchtests in Part 2 of her printer series for beginners

NO ONE could accuse a modern printer of being slow, yet in days not-so long past, when daisy-wheels and golf balls were more common, printing was a slow and laborious task.

And before monitors became commonplace it used to be the only form of display. Unbelievable as it may now seem, computer programmers and operators had to work from paper printouts.

Thankfully, the days of the rattling teletype are little more than a faded memory – now we have to make do with luxuries like televisions, high-resolution colour monitors and so on.

Even so, there are still times when a hard copy of our work is required: The obvious instance is when we're sending a letter.

The document is prepared and edited in the computer, but unless we're able to use electronic mail it will have to be typed out on paper and sent by normal means: This involves using a printer.

Another case is listing programs. The monitor can only display a few lines at a time, 32 being the maximum on the Electron. However, when debugging our own programs we may need to look at areas many tens of lines apart.

This is where the hard copy is extremely useful. It's much easier to thumb through a few sheets of paper than to wade through line after line of screen output.

The Electron can transfer data at very high speed, but printers can only output it considerably more slowly. So, when the printer is busy, the computer has to wait before it sends more information – in effect the computer has to stop and wait for the printer to catch up.

To help overcome this, the Electron has a printer

buffer built in. This is organised as a FIFO queue – take a look at the accompanying panel for an explanation.

Characters wait in the buffer until the printer sends a signal to inform the computer it's ready to receive more data. On the standard Electron the buffer is 63 characters long. However, there are add-ons such as ACP's 256k ram packs which can be configured as partial printer buffers.

Some printers have their own, modestly sized buffers and larger capacity external devices are available. One, the MicroStuffer, reviewed in the September 1987 issue of *Electron User*, provides a massive 64k buffer.

Such units store characters from the parallel port as fast as the computer can send them, leaving the computer free to carry on very

quickly, and characters are output to the printer at the printer's speed. The problem with all such devices is that they don't come cheap.

In the final reckoning though, the speed of the printout is governed by the speed of the printer itself. Individual models vary considerably in how fast they operate. Manufacturers provide a lot of impressive sounding figures, but these can rarely be easily compared.

In fact, a lot of things govern how fast a printer is, not just the speed of its printing. For instance, there's the carriage speed – how fast the print head travels, and line feed – how fast the paper moves through the printer.

To compare speeds of a selection of printers I have devised a few simple

benchtests. These programs produced the results shown in Table 1. Rather than optimising the programs for a particular printer, all were run under the same conditions.

Program 1 is the most useful test. It gives the

```

10 REM Program 1
20 REM Test in draft pica
30 *FX 3 10
40 TIME=0:FOR N=1 TO 11:P
PRINT STRINGS(80,"*"):NEXT:S%
=TIME
50 *FX 3
60 PRINT "Stop clock when
printer stops":INPUT "Enter
time in seconds "T
70 PRINT "Run time: ";S%/1
00;" seconds"
80 Lps=11/T:Lph=3600*Lps:
PRINT "Lines per minute: ";Lp
s*60
90 PRINT "Characters per s
econd: ";INT((80*11)/T)"Fanf
old pages per hour: ";INT(Lph/
66)
    
```

Printer type	CPS draft/NLQ	LPM draft/NLQ	PPH draft/NLQ	Line feed in seconds	Head speed inches/sec	Price
Precision MH-4010	97/58	73/44	66/40	0.076	0.114	£424.35
Epson EX-800	80/40	60/30	54/27	0.076	0.125	£550
Panasonic KX-P1081	80/20	60/15	54/12	0.091	0.114	£178.25
Epson FX-80	58	44	40	0.152	0.159	N/a
Amstrad DMP-3000	55	41	37	0.197	0.17	£159

Table 1: Five dot matrix printers compared

overall printing speed in pages per hour (PPH) lines per minute (LPM) and characters per second (CPS).

Program II is used to test

```

10 REM Program II
20 REM Test Line feed spe
ed
30 @X=&20309
40 VDU 2:TIME=0:FOR N=1 T
0 66:VDU 1,10:NEXT:VDU 3
50 PRINT "Stop clock when
printer stops":INPUT "Enter
time in seconds "T
60 feed=T/66
70 PRINT"Line feed speed=
'feed;' seconds"
80 @X=&90A
    
```

the speed of the line feed, and Program III to test the head travel speed – this determines how fast a prin-

```

10 REM Program III
20 REM Test head speed
30 @X=&20309
40 *FX 3,10
50 TIME=0:FOR N=1 TO 11:P
RINT ".;STRINGS(78," ");"
:NEXT:SX=TIME
60 *FX 3
70 PRINT "Stop clock when
printer stops":INPUT "Enter
time in seconds "T
80 PRINT "Run time:;S%/1
00;" seconds"
90 PRINT "Head speed=";(T
/11)/8;" inches per second"
    
```

ter can perform carriage returns.

Although not all printers had an NLQ feature, whenever possible Programs I and II were modified as appropriate and tested in this mode.

To use any of the the programs to test your own printer, type RUN, press Return and start timing simultaneously. Enter the time in seconds when prompted.

The results clearly show that you only get what you pay for. The fastest model proved to be the semi-professional Precision unit, which owes a lot to its four print heads.

Similarly Epson's EX-800 unit is fast, but very expensive although it does have a colour option. Of the

cheaper units, the Panasonic provides excellent performance at a reasonable price.

Although none of the printers appear to have achieved their quoted speeds, it has to be remembered these figures are relative and not absolute.

For instance, the timings for CPS have not taken into account the extra time taken for line feeds. In spite of this, we feel these figures are the ones most likely to be duplicated in normal use.

● *In the next article we'll continue our investigation into the complexities of printers, examining graphics and bit image mode.*



The Epson EX-800 colour printer

Buffers, queues and stacks

The terms buffer, queue and stack are used very frequently in computing, but what do they actually mean?

Very often when computer devices talk to each other, one will send information faster than the other can process it. This is true for everything from the keyboard to the cassette interface.

A buffer is an area of memory controlled by the computer to act as a cushion. Characters wait in a buffer until they are required.

The argument for a buffer can be likened to a machine producing pies faster than the packer can remove them from the conveyor belt. Very soon, there'll be a disaster

with all the pies ending up on the floor.

So the packer must have some way to stop this happening. He will tell the machine to stop making pies every time his hands are full. Similarly, a device can tell the computer when it's busy.

Since the packer can only hold one pie, the machine will spend a long time waiting for him to catch up.

Obviously this would not be very satisfactory, and one way to solve the problem would be to store the pies temporarily on a series of shelves – a buffer.

The machine could then make large batches of pies without having to

wait. The larger the shelves – the bigger the buffer – the more pies can be made at a time.

Queues and stacks are two forms of a buffer. The queue is a FIFO or first in, first out buffer. The example above is a queue. A stack, on the other hand is a LIFO or last in, first out buffer.

A dustbin is probably the simplest example of a stack buffer. As you throw your litter away it enters the bin and goes to the top of the pile.

The pile gets higher until the dustbin is full. When the bin is emptied, the last item to enter it is the first to be removed and vice versa.

NEW LOW PRICES!

5.25" BULK PACKED - TOP QUALITY	10	25	50	100	150	250
Single Sided 48T.P.I.	£5.49	£10.50	£18.50	£32.50	£41.50	£60.50
Single Sided 96T.P.I.	£5.95	£10.75	£19.00	£33.50	£43.00	£63.00
Double Sided 48T.P.I.	£5.95	£11.00	£19.50	£34.50	£45.00	£66.00
Double Sided 96T.P.I.	£6.95	£11.50	£20.50	£36.00	£46.50	£69.50
Double Sided Coloured 96T.P.I.	£7.95	£13.75	£25.75	£48.50	£67.50	£99.75
Double Sided Reversible 96T.P.I.	£7.95	£15.00	£28.50	£50.50	£65.50	£102.50
Coloured & Reversible 48T.P.I.	£8.95	£17.25	£32.75	£63.25	£86.25	£129.75
Coloured & Reversible 96T.P.I.	£9.95	£18.75	£34.50	£65.50	£94.75	£143.75

Packs of 10 5.25" Disks come with Free Plastic Library Case (worth £1.49!)

Coloured Disks come in five colours (Red, Blue, White, Yellow, Green)

Reversible disks have two index holes and two notches!

Coloured and reversible disks come in five colours and have two holes and notches. All Centec disks are packed with a protective jacket (envelope) and come with a full user set, including a label and a write protect tab. The disks are manufactured to top international standards and have a hub ring for added protection. All disks carry our no quibble replacement guarantee and are certified 100% error free



Storage Boxes

3.00" Lockable - Holds 25	£7.49
3.00" Lockable - Holds 60	£8.49
3.50" Lockable - Holds 40	£7.49
3.50" Lockable - Holds 80	£8.49
5.25" Lockable - Holds 50	£7.49
5.25" Lockable - Holds 100	£8.49
5.25" Lockable - Holds 120	£10.95

3.5" Cleaning Disc	£4.99
5.25" Cleaning Disc	£3.99
Disk Notcher	£3.49
IBM Printer Cable	£7.95

Printer Stand



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments i.e. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

80 Col	£29.95
132 Col	£34.95

MONITORS FOR ELECTRON

CM8852 - 14" RGB professional medium resolution colour monitor

- Electron compatible
- Black matrix 0.39mm dotted picture tube.
- Resolution: horizontal 700 dots x 285 lines vertical

£299.95

Free cable and delivery

CM8833 - 14" CVBS & RGB medium resolution colour monitor

- Electron compatible
- Fastblanking to enable superimposing.
- Stereo audio
- Earphone socket
- Resolution: horizontal 600 dots x 285 lines vertical

£269.95

Free cable and delivery

ALL MONITORS ARE DELIVERED FREE BY CARRIER

3.5" TOP QUALITY BULK PACKED DISKS

	10	25	50	100	150	250
Single Sided 135T.P.I.	£12.49	£23.95	£46.95	£81.95	£128.95	£168.95
Double Sided 135T.P.I.	£14.49	£26.95	£52.95	£98.95	£145.95	£189.95

Rainbow Pack of five colours - New product!

Single Sided 135T.P.I.	£17.95	£35.95	£62.95	£119.95	£169.95	£219.95
Double Sided 135T.P.I.	£19.95	£39.95	£75.95	£145.95	£214.95	£279.95

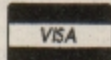
Packs of 10 3.5" Disks come with Free Plastic Library Case (worth £1.49!)

All discs are supplied with labels and are certified 100% error free

CENTEC ELECTRONIC SYSTEMS LTD



UNIT 3, THE METRO CENTRE,
BRIDGE ROAD, ORPINGTON,
KENT BR5 2BE



TEL: (0689) 35353 (6Lines) (24 Hours)
Fax: 0689 77737

Remember - all prices include VAT and delivery!
There are no hidden extras to pay!

MITHRAS SOFTWARE

Best selling software for your Electron at Bargain prices

New titles available from day of release

	RRP	Ours		RRP	Ours
Bonecruncher	9.95	7.50	The Lost Crystal	11.95	10.50
Spellbinder	9.95	7.50	The Hunt	9.95	7.50
Elvir	9.95	7.50	Village of Lost Souls	9.95	7.50
The Life of Ration	6.95	5.50	Rick Hanson Trilogy	23.95	18.95
10 Computer Hits Vol. 4	9.95	7.50	The Quill	16.95	12.95
Five Star Games Vol. 3	9.95	7.50	French on the Run	9.95	7.50
Winter Olympiad '88	9.95	7.50	Oxbridge	7.95	6.50
Indoor Sports	9.95	7.50	Kel Trilogy	9.95	7.50
Ransack	9.95	7.50	Dodgy Geezers	8.95	6.95
Ziggy	8.95	6.95	Project Thesis	9.95	7.95
Despatch Rider	8.95	6.95	Myorem	9.95	7.95
Play it Again Sam	9.95	7.50	Wheel of Fortune	5.95	5.25
Palace of Magic	9.95	7.50	Castle Frankenstein	4.95	4.50
Craze Rider	9.95	7.50	Quest for Holy Grail	4.95	4.50
Codename: Droid	9.95	7.50	Kingdom of Klein	4.95	4.50
Spriffle 40	9.95	7.75	Rising of Salandra	-	4.50
Evening Star	9.95	7.50	The Nine Dancers	-	3.65
Superior Collection Vol 3	9.95	7.50	Wychwood	-	3.65
Around World 40 Screens	6.95	5.50	The Puppet Man	-	3.65
Acornsoft Hits Vol 1	9.95	7.50	Arrow of Death	-	2.75
Acornsoft Hits Vol 2	9.95	7.50	Circus	-	2.75
Spy vs Spy	9.95	7.50	Escape from Pulsar 7	-	2.75
XOR	9.95	7.50	The Golden Baton	-	2.75
Paper Boy	9.95	7.50	Perseus and Andromeda	-	2.75
Graham Gooch Test Cricket	9.95	7.50	The Time Machine	-	2.75
Power Pack 2	9.95	7.75	Ten Little Indians	-	2.75
Impact	9.95	7.50	Wazworks	-	2.75
Star Wars	9.95	7.50	The Wizard Akryz	-	2.75
Boulderdash	9.95	7.50	DISCS	5.25"	3.5"
5 Computer Hits	6.95	3.50	Bonecruncher	9.95	-
Micropower Magic 2	7.95	6.50	Spellbinder	9.95	12.50
Micro Value (4 games)	3.99	3.65	Elvir	9.95	12.50
Colossus Chess	9.95	7.75	Life of Ration	6.50	-
Impossible Mission	8.95	6.95	Play it Again Sam	9.95	12.50
Soccer Boss	-	1.99	Palace of Magic	9.95	12.50
Dunjuz	-	2.95	Craze Rider	-	12.50
Forth	-	2.75	Codename: Droid	-	12.50
Lisp	-	2.75	Superior Collection Vol 3	-	12.50

A full list of our Electron titles is sent with each order

ALL PRICES INCLUDE VAT & P&P IN UK. ORDER NORMALLY DESPATCHED WITHIN

24 HOURS OF RECEIPT BY FIRST CLASS POST BUT PLEASE ALLOW 7 DAYS

(Orders to Europe and Eire add 50p for each item. Worldwide add £1 for 1st and 50p for each other item. Please send cheque payable through a UK bank or give full details of your MasterCard or Eurocard).

Please Quote Electron (A BBC list is available on request) and send cheque, P.O., Access or Visa number and cardholder's name to:



MITHRAS SOFTWARE

PO Box 151, Maulden, Bedford, MK45 2YH

Tel: (0525) 402630



DELTA COMPUTERS

BBC MASTER SERIES

Archimedes	Ring for price
Master 128	£395.00
Master Turbo Module	£115.00
Master Compact Entry System	£349.00

OPUS DISC DRIVES

5802 400K DS DD	
40/80T	£104.95
5802DB Dual 800K	
40/80T	£204.95
5802D as 5802DB+PSU	£234.95
Opus DDOS (With a drive)	£40.00

PRINTERS (inc lead)

Epson P-40	£49.95
Citizen 120D	£179.00
Star NL-10	£237.00
Panasonic KX-P1081	£169.00
Amstrad DMP3000	£169.00
Amstrad DMP3160	£189.00
Brother HRS	£69.99

PRINTER RIBBONS

Brother M1009	£3.25
Canon PC1080A	£3.25
Epson FX,MX,RX 80	£2.70
Epson LX80, LX86	£2.70
Epson FX, MX, RX 100	£3.35
Panasonic KX-P1081	£3.99
Citizen 120D/LSP10	£4.60
Citizen MSP10,20	£2.70
Citizen MSP15,25	£3.25
Kaga 810	£3.25
M Tally MT80	£3.50
Seikosha GP100/250	£2.65
Shinwa CP80	£3.50

SPECIAL OFFER

Electron	£49.99
Electron + Rombox	
+ Starword	£89.00
Electron + Rombox + Starword	
+ Joystick Interface	£99.00
Tatung Col Monitor	£169.00

All orders over £100 receive free Touchpad for BBC B worth £49.95 (while stocks last).

MINIMUM ORDER £10.00

All Slogger products stocked - Ring for prices -

All prices include VAT

Please add £5 carriage on orders over £100

Mail Order only at this address

Trade and Educational enquiries welcome

85 Union Street Oldham Lancs

061-626 3841



MICRO MESSAGES

Preaching to the converted

WHEN I first bought your magazine and read the Micro Messages section, I saw letter after letter starting with "I must congratulate you on having a fantastic magazine ...", and "What a brilliant magazine Electron User is ...".

At first I thought this was just a way of getting your letter printed, but after buying it for some months, I now realise that all the comments are true.

After typing in the Joystick Converter in the November 1987 issue, I found that it worked marvelously with Acornsoft's Magic Mushrooms and Meteors, Tynesoft's Phantom and Alligator's Blogger.

And there are probably many more games that can be introduced to the world of joystick control.

Finally, can you tell me how I can get the Electron's power socket fixed, as the computer keeps turning on and off while I am playing games? — **Richard Smith, Chelmsford, Essex.**

● Letters are published because of their own merit and not because the flattery goes to the editor's head! The joystick converter

proved very popular and we would like to hear from other readers who have found games which will work with it.

Fixing your power socket should be fairly simple. Check both wires for dry joints or fractured strands. Re-solder if necessary, but if the socket itself has worn out you can buy a replacement quite cheaply from most electrical spares shops.

Santa's slip up

CONCERNING the listing for Santa On The Tiles in the December 1987 issue of Electron User, I have double checked my programming, but still keep getting No such variable at line 810. If there is a mistake could you give me a correction?

Also, is there any

significance in the fact that lines 1450 and 1460 are reversed, or is this a printing error? — **Trevor R. Vaughan, Wood Green, London.**

● As we have said in the past, all listings published in Electron User are taken straight from working programs on disc and fed direct into the typesetting machine. Any errors likely to fall through the net are usually very obscure ones which even the author may not have come across after hours of play.

Please check the whole program as a typing error elsewhere might not be reported until line 810 is executed. No such variable means you've accidentally spelt something wrong somewhere.

However, you are quite right about lines 1450 and 1460. But even if entered in the order shown, they would still execute correctly as the function key would

not be fetched from the buffer and executed until after the program ends at line 1460.

Fun with codes

I AM presently writing a spreadsheet program to suit my own requirements, but I don't know how to generate Ascii codes with Shift+Func and Shift+Control+Func, which can then be detected with GET or GET\$.

The codes I require are from 150 upwards, and I have used *FX226, *FX227 and *FX228 which should change the base values for these function key combinations, but to no avail. — **Andrew Wilson, Airth, Falkirk.**

● Unfortunately, the Electron's keyboard is completely different from the BBC Micro's, and the *FX calls you mention are implemented differently on the BBC's little cousin.

Instead of Shift+Function, use Func plus the keys A to P. For Control+Function use Func plus the keys Q to Z. There is no equivalent of Shift+Control+function.

These key combinations on the Electron are referred to as firm keys, and to set their bases to return the Ascii codes 150 upwards you should use *FX226 and *FX227 as on the BBC Micro, but note that *FX228

Turn to Page 48 ▶

Starword or View — which is the best?

I HAVE a couple of small problems which you may be able to solve. First, which is the better word processor — Slogger's Starword or View?

Second, when I stop work I often save my View file as DOC, and when I return I begin the next part and save it as DOC1. How can I load both DOC and DOC1 into the computer and save them as one file? — **Andrew Wing, Hockley, Birmingham.**

● Answering your first question is rather difficult. Both word processors have their own merits, so it's up to you to decide which suits you best. Slogger's version is easier to get to grips with, while View tends to offer more advanced facilities, once you have spent time mastering it.

As to your second problem, we're not quite sure why you continue your work with a separate file. You

could load in DOC, continue adding to it, and resave it as DOC again.

However, the solution to tacking two or more View files together is simple. Load in the first file — in your case DOC — and then type READ DOC1. View will then load DOC1 into memory at the end of the text already present.

This can be done for as many files as your computer has memory for.

◀ From Page 47

is not implemented. Type in the following:

```
10 *FX 226,150 .
20 G=GET:PRINT G
```

Now run it and press Func+A. You should have 150 stored in G and also printed on the screen.

Accuracy not lost

AARRGH! Joe Pritchard does it again. I thought someone might have put him right after his Hardware Projects article in the May 1987 issue of Electron User where he states: "FX 190,n allows us to speed up the conversion time from 10mS to around 5 to 6mS. We do, however, lose a little accuracy..."

**FX 190,8 does not lose any accuracy - you cannot lose what isn't there. The Plus 1 contains an eight-bit A/D converter, a National Semiconductor ADC0844 to be precise, a fact which is clearly stated in the Plus 1 User Guide on pages 1, 6 and 8.*

Another misconception is from Chris Nixon who says that his excellent BOS editor (Electron User October 1986) cannot reside in pages 9 and 10 on tape based machines since it would be corrupted by the next SAVE or LOAD.

*Not so. This area is not used by SAVE and LOAD, but by *SPOOL and *EXEC, as well as any operations involving opening cassette files.*

I am sorry to sound carping, but people do rely on Electron User for information, so I believe you should get it correct. Incidentally, Roland Waddilove's Mandelbrot program (May 1987) can be speeded up 10 per cent or more by adding the lines:

```
625 SEI
1385 CLI
```

which disable interrupts during the calculation. - Phillip A. Bender, Sunderland.

● Thanks for pointing out both Joe's and Chris's

ALL programs printed in this issue are exact reproduction of listings taken from running programs which have been thoroughly tested.

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program

they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

misconceptions. However, Chris was working using the information contained in the Advanced User Guide, which is unclear.

As for Roland's Mandelbrot program, he was surprised that he forgot to disable interrupts - normally a hardened habit of his.

He adds that as the Mandelbrot set is symmetrical about the horizontal axis, plotting could be speeded up by 50 per cent by just calculating the top half and duplicating a mirror image for the bottom: This will cut the time taken from around two hours to one hour.

This was only realised after the program had been published and it was too late to modify it. Perhaps you would like to modify it yourself? It shouldn't be too difficult.

Basic guide

DURING the past month I have been trying very hard to get hold of the Advanced Basic Rom User Guide for

IN answer to Lee Harland's letter in the November 1987 issue: Yes, there is a free software library which is advertised in Electron User each month. It is the online database called MicroLink.

Connecting to this service has the added advantage of not having to laboriously type in the program listings each month.

the Electron and BBC Micro. I have tried my local computer store, bookshop, and Watford Electronics without success, and I don't know who the publisher is. Can you help?

I buy your magazine monthly, and I think it is good value for money. - C. Grant, Birmingham.

● If you mean the Basic Rom User Guide by Mark Plumley and published by Adder, Watford Electronics most certainly does stock it. There is also another Basic Rom User Guide by Colin Pharo, published by The Cambridge Microcomputer Center, 153-154 East Road, Cambridge.

Electron users only

IN the December 1987 issue of Electron User, you included a routine to speed up the cassette filing system, by shortening the gaps between data blocks.

As a BBC Micro user, I

But how do you connect to MicroLink? In fact, how do you attach a modem and communication package to the Electron? - Andrew Pickles, Brentwood, Essex.

● Pace Miracle Technology offers a modem, RS423 interface and Commstar - everything you need to log on to MicroLink. You'll need a Plus 1 if you haven't

took the magazine home and typed it in. Apart from the warning "Electron OS 1.00 only", the utility seemed to work until I tried saving a program and received the message Data? 00 and so on.

This utility seems such a useful one to me, and I would really find it helpful if you could publish a conversion for the BBC Micro. - Jon Breen, Taunton, Somerset.

● The warning message is there for a very good reason.

Although the Electron and BBC Micro are very similar, you just can't expect a complex routine like this one to run on what is essentially different hardware.

The Turbo Loader is a very accurately timed piece of code, and as such would need a complete rewrite for the BBC Micro.

Although many Electron User games and utilities run on the BBC Micro, this is one of the rare ones that doesn't.

Get rich quick!

I WOULD be grateful for information concerning payment for programs accepted by Electron User, and for hints on the required format of submitted listings and articles. - Haydn Griffiths, Gt. Yarmouth, Norfolk.

● We generally pay by the word. The actual amount can vary according to both the article and program quality, and the amount of editing needed to get the program and text up to scratch.

Programs would have to

Free software galore!

already got one, and the price is £148.58. Contact Pace at: Pace Miracle Technology, Juniper View, Allerton Road, Bradford BD15 7AG, or telephone 0274 488211.

Alternatively, Slogger offers an RS423 and Commstar software. You'll need to add a modem to this.

be very good indeed to justify the top rate, so the average payment would be slightly less than this.

Send your articles in on disc if possible, otherwise tape will do.

And use a word processor such as Mini Office, View or Starword. However, if you can't, don't worry - send it on paper.

It is the programs themselves that must be supplied on tape or disc, with the format clearly marked on the cassette or disc itself. We can't type in listings.

Always mark all parts of a submission clearly with your name, address and telephone number if possible.

We can then get in touch to either return the work with suggested improvements, or post the payment.

Payment is always upon publication.

Locked out

I HAVE been reading your excellent magazine for some time now, and I wonder if you could help me with some problems I am having with my Electron?

How do you lock files? I have a short program to load in locked files, but am having trouble saving my own.

```
10 MODE 1:FOR N=0 TO 50
20 DRAW RND(1200),RND(102
4):NEXT
30 y=80:x=0:z=1
40 PROCa(x,y):REPEAT
50 UNTIL GET:GOTO 30
60 DEFPROCa(x,y):FOR X=x
TO y STEP z:R1=80-X:R2=98-((
X/80)*49)+6:R3=32-((X/80)*32
):R4=34-((X/80)*17)
70 VDU23;1,R1;0;0;0,23;2,
R2;0;0;0,23;6,R3;0;0;0,23;7,
R4;0;0;0
80 NEXT:ENDPROC
```

And can you explain why this Mode 1 screen shrinking program works perfectly well on the BBC Micro, yet does nothing what so ever on the Electron. Why is this? - Richard Moore, Blyth, Northumberland.

● You just can't lock cassette files that easily. To explain here how to do it would enable a lot more people to write their own versions of your dubious file unlocker. Basically, just

The hare and the tortoise

THE BBC Micro and Acorn Electron computers both use the same 6502A micro-processor, but for some reason the BBC Micro is twice as fast as the Electron. Why is this? - Andrew Bury, Kingswinford, West Midlands.

● There are several reasons why the Electron is slower than its BBC Micro cousin. The first and most important, is that the BBC Micro uses many dedicated chips, like the 6845 CRTC video chip to refresh its screen ram. The Electron, on the

other hand, leaves this work to the overburdened 6502 and ULA.

This means that in the higher screen memory modes - especially 0-2 - more processing time is wasted on this task, which can drop the overall processing speed by nearly 25 per cent.

To make matters worse, the 6502 can only access ram four bits at a time. This effectively slows all ram access from 2mHz to 1mHz - a drop of 50 per cent - leaving the Electron chug-

ging away at roughly one third the speed of the BBC Micro in modes 0-2.

However, there are several ways around this problem. The easiest is to buy the superb Turbo board from Slogger, which jacks the Electron up to within a few per cent of the BBC Micro's speed.

Software techniques can help a great deal as well, for instance disabling interrupts from machine code when keyboard access is not required (see Philip Bender's letter opposite).

reverse the operation of your unlocker.

Your screen-squashing program relies on the presence of the BBC Micro's 6845 CRTC video chip. This is not present on the Electron, as the screen is driven by one Acorn custom ULA chip so the program won't work.

DFS exposed

I WISH to inquire if Mark Smiddy's very useful ADFS Exposed program in the November 1987 issue of Electron User could be adapted for use with ACP's E00 1770 DFS.

I have a number of discs now with all sorts of games and utilities requiring PAGE at &E00, and it would be very useful if I could check the disc status on those as well as my ADFS discs.

My configuration is an Electron and Slogger 64k/Turbo board, Plus 1 with ACP ASR (in which the E00 DFS is fitted), Plus 3, and PMS second processor. - John D. Mosby, Glenfield, Leicester.

● It is not possible to adapt the program easily as the DFS works in a completely different way to the ADFS.

However, *FREE will tell you the total free space in figures, and if you need to see where the spaces lie then *INFO.* will help you.

As a DFS disc holds less information than an ADFS disc, and its layout is gene-

rally more comprehensible to the prying eye, a utility such as Mark's could be a slight case of overkill.

Garbled graphics

I RECENTLY bought an Epson P-40 printer and a First Byte printer interface. However, I don't seem able to understand how to get the printer to output in bit image mode.

I have experimented using VDU 1,27,75 which is ESC "K", but it seems to wait until the printer buffer is full before doing anything, and then it is printed all jumbled up.

Also, I have your Mini Office tape which I bought from your magazine and would like to say what a brilliant package it is.

Thanks are also due to Slogger, whose advice enabled me to get my P-40 - which has no printer buffer - to work with the Plus 1. - Brian Westgate, Barnhill, Dundee.

● You are quite correct in choosing ESC "K", but you must give two parameters saying how much bit image data is being sent, low byte followed by high byte, followed by the data itself.

Furthermore, each byte in a VDU string must be preceded by a one, which means send the next VDU

code only to the printer. Try the following example, which should print 30 space invaders on your P-40:

```
10 MODE6:VDU2
20 FOR S%=1 TO 30
30 VDU1,27,1,75,1,8,1,0
40 RESTORE:FOR L%=0 TO 7
50 READ B%:VDU1,B%
60 NEXT:VDU1,32
70 NEXT:VDU1,13,3:END
80 DATA 49,122,220,244,244,2
20,122,49
```

Snapshot taped

I AM having some problems trying to use the Snapshot utility in the September 1987 issue of Electron User. It works fine with View, but when I try to use it with games loaded via Slogger's T2P4 rom, the system switches over to tape and saves the screens to tape.

Can you tell me how to get it to work as it should? There are no typing errors in the program, as I am using the listing from the October tape. - James Hymes, Millwall, London.

● The T2P4 rom is designed to copy software from tape to disc. However, the cassette filing system will always be switched in while T2P4 is active. In addition to this, Snapshot is unlikely to work with commercial software: It will, however, work with your own and magazine listings.

Learning CAN be fun

- Use your Electron to teach and amuse your children at the same time.
- Three packages crammed full of educational programs – and so easy to use!
- Each program has been educationally approved after extensive testing in the classroom.

ONLY
£4.95 tape
£5.95
3 1/2" disc



Ages 2-5

- Alphabet
- Colours
- Counting
- House
- Magic Garden
- Matchmaker
- Numbers
- Pelican
- Seaside
- Snap



PELICAN
Teach your children to cross the road safely at a Pelican crossing



HOUSE
Select the colours to draw a house – hours of creative entertainment

Ages 5-8

- Balance
- Castle
- Derrick
- Fred's Words
- Hilo
- Maths Test
- Mouser
- Number Signs
- Seawall
- Super Spell



NUMBER SIGNS
Provide the correct arithmetic sign and aim to score ten out of ten



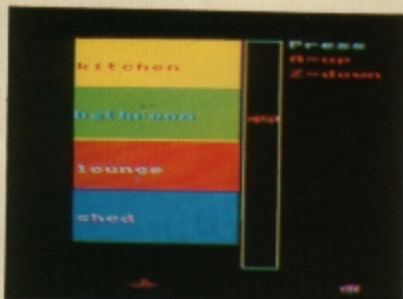
BALANCE
Learn maths the fun way. Type in the answer to balance the scales

Ages 8-12

- Anagram
- Codebreaker
- Dog Duck Corn
- Guessing
- Hangman
- Maths Hike
- Nim
- Odd Man Out
- Pelmanism
- Towers of Hanoi



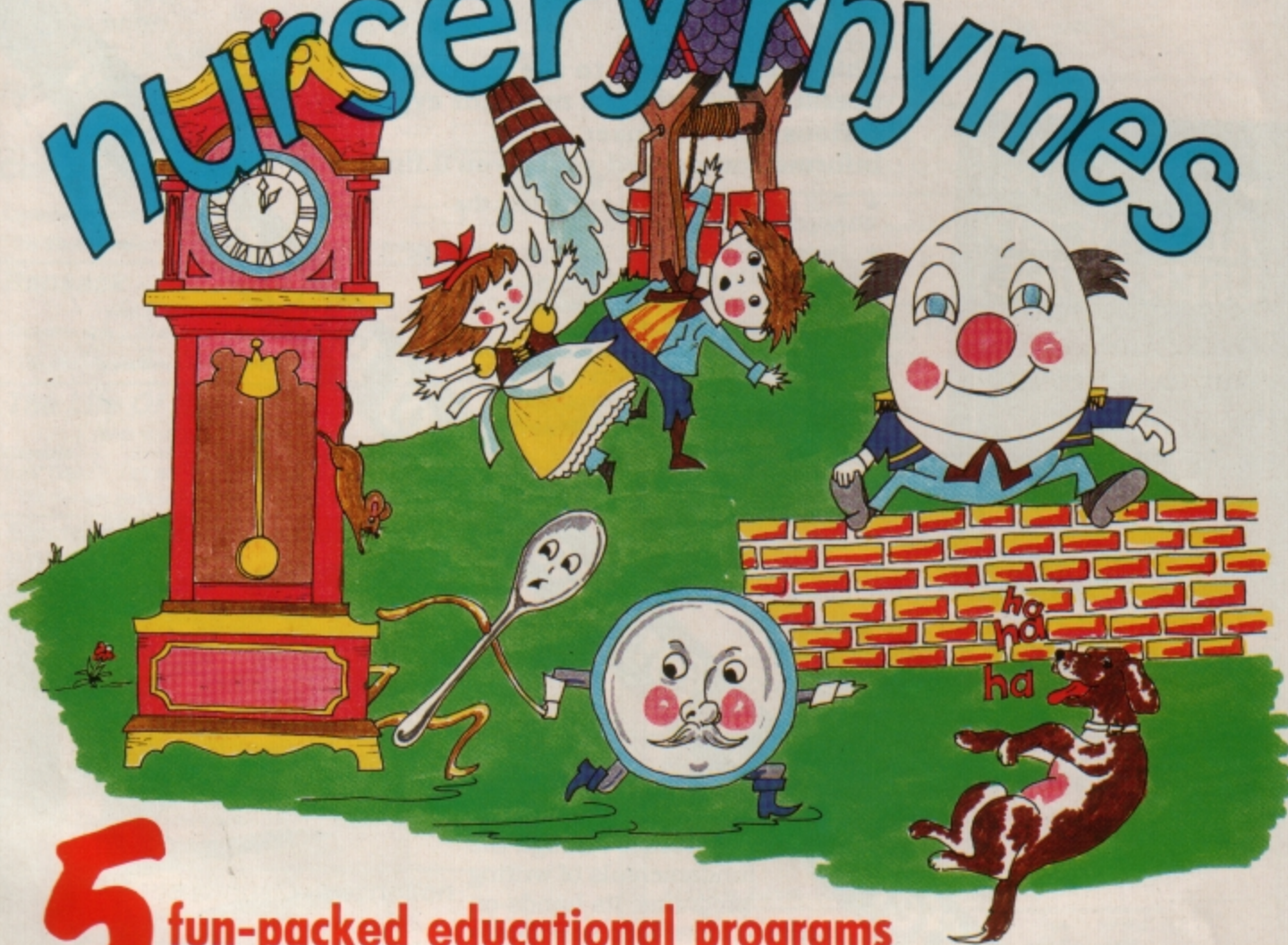
HANGMAN
Improve your child's spelling with this fun version of the popular game



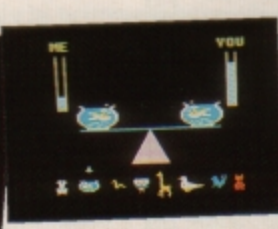
ODD MAN OUT
Find the word that does not fit – before your time runs out

TO ORDER PLEASE USE THE FORM ON PAGE 53

nursery rhymes



5 fun-packed educational programs
... for young children everywhere



This delightful collection of programs is based around children's favourite Nursery Rhymes. There's plenty of sparkling colour, sound and captivating animation to keep them riveted – and as they play they'll be learning all the way.

- ★ Tell the time with Hickory Dickory Dock.
- ★ Assemble the jigsaw in Humpty Dumpty.
- ★ Learn to spell with Jack and Jill.
- ★ Match the animals in See Saw Marjory Daw.
- ★ Play an exciting game in Hey Diddle Diddle.

Children from two to nine will be entertained for hours with these interactive programs. Don't miss out on this beautiful gift for your family – and at a very special price.

ONLY £5.95 (cassette)

£6.95 (3½" disc)

Suitable for any Acorn Electron

TO ORDER PLEASE USE THE FORM ON PAGE 53

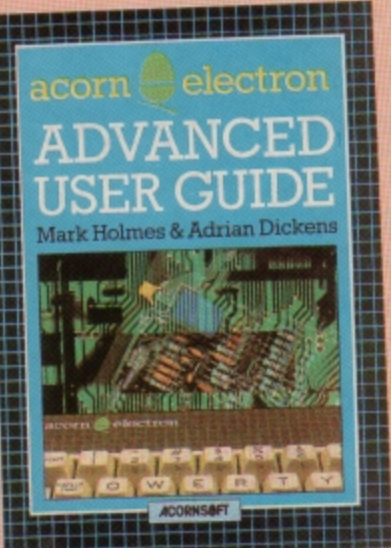
This is THE ultimate guide to the Electron!

This detailed guide to the Electron's operating system is a must for every serious Electron user. In its information packed pages you'll find:

- ★ Full details of how to implement the powerful *FX/OSBYTE calls.
- ★ Page ROMs revealed: The way they work and how to write your own.
- ★ Programming the ULA - all you need to know.
- ★ Full coverage of memory allocation and usage - make every byte count.
- ★ Complete circuit diagram: How to use the expansion capabilities Electron's exciting to the full.

and much, much more . . .

Save **£3** on this classic book!



Quite simply, the *Electron Advanced User Guide* is THE essential handbook that will allow you to exploit the full potential of the Electron.

Don't miss this money-saving offer!

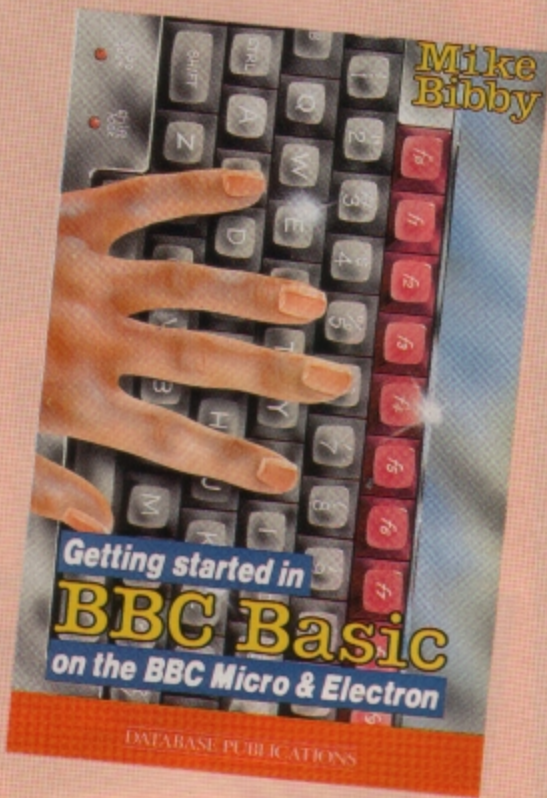
Only £3.45 (inc. P&P)

SAVE a massive £6!

(Normal price £9.45)

Exclusive offers ONLY for readers of Electron User

This best-selling book takes the reader through the fundamentals of writing programs. Its hands-on approach has been specifically designed to teach the absolute novice not only the formal rules of Basic but also that elusive quality - good programming style. By working through its many examples, the reader will gain a clear insight into structured programming and will quickly acquire the ability to use structured techniques in creating his own programs.



Was **£5.95** **NOW £2.95**

ONLY £3.95



Your Electron needs protecting!

Protect your Electron with our luxury dust cover made of soft pliable water-resistant vinyl, bound with strong cotton and decorated with the Electron User logo.

Keep your copies neat and clean!

This handsome binder is bound in attractive red pvc with the Electron User logo in gold blocking on the spine. It will hold 12 magazines firmly secured in place by metal rods.

ONLY £3.95



All prices include postage, packing and VAT

Overseas orders sent exclusively by Air Mail

£ p

Electron User subscription

UK £15	3001	<input type="checkbox"/>
Europe & Eire £23	3003	<input type="checkbox"/>
Overseas £38	3004	<input type="checkbox"/>

Commence with _____ issue

Renewal

UK £15	3002	<input type="checkbox"/>
Europe & Eire £23	3476	<input type="checkbox"/>
Overseas £38	3477	<input type="checkbox"/>

Computer Hits 4 **NEW**

With sub* Without sub

Cassette only £3.95 £6.95 3032/3033

Ransack **NEW**

With sub* Without sub

Cassette only £3.95 £6.95 3038/3039

The Life Of Repton **NEW**

With sub* Without sub

Cassette £2.95 £5.45 3034/3035

5.25" Disc £3.95 £5.95 3036/3037

Electron User back issues

£1.75 UK	January 1987	3210	<input type="checkbox"/>
£2.75 Europe	February 1987	3211	<input type="checkbox"/>
£3.75 Overseas	March 1987	3212	<input type="checkbox"/>
	April 1987	3213	<input type="checkbox"/>
	May 1987	3214	<input type="checkbox"/>
	June 1987	3215	<input type="checkbox"/>
	July 1987	3216	<input type="checkbox"/>
	August 1987	3217	<input type="checkbox"/>
	September 1987	3218	<input type="checkbox"/>
	October 1987	3219	<input type="checkbox"/>
	November 1987	3220	<input type="checkbox"/>
	December 1987	3221	<input type="checkbox"/>
	January 1988	3222	<input type="checkbox"/>

Back issue bundle (see page 56)

April 86-Dec 86 (9 complete issues) £6.80 3017

Add £2 for Europe inc Eire/£10 Overseas

Cassette tape annual subscription

UK £35	3005	<input type="checkbox"/>
Europe/Overseas £45		

Commence with _____ issue

Renewal

UK £35	3006	<input type="checkbox"/>
Europe/Overseas £45		

Electron User tapes/discs

Tape £3.95, Discs £4.75. Add £1 for Europe/Overseas

		Tape	3.5" Disc
Grid Warrior	Jan 1987	3310	3410
Maze	Feb 1987	3311	3411
Super Boss	Mar 1987	3312	3412
Dragons Doom	Apr 1987	3313	3413
Hectic Henry	May 1987	3314	3414
Hungry Harry	June 1987	3315	3415
Mazebugs	July 1987	3316	3416
Arena	Aug 1987	3317	3417
Mr Miner	Sept 1987	3318	3418
Witchcraft	Oct 1987	3319	3419
Fawkes' Run	Nov 1987	3320	3420
Santa on the Tiles	Dec 1987	3321	3421
Cosmic Guerrillas	Jan 1988	3322	3422
Super Digga	Feb 1988	3323	3423

Readers in Europe (inc Eire) add £2. Overseas add £5 per item unless otherwise indicated

Send to: Database Publications, FREEPOST, Europa House, Adlington Park, Adlington, Macclesfield, Cheshire SK10 5NP
(No stamp needed if posted in UK) Please allow 28 days for delivery

Order at any time of the day or night

Telephone Orders: 0625 879920	Orders by Prestel: Key *89, then 614568383	MicroLink/Telecom Gold 72:MAG001
----------------------------------	---	-------------------------------------

Fax Orders: 0625 879966

Don't forget to give your name, address and credit card number

ENQUIRIES ONLY: 0625 879940 9am-5pm

Valid to February 29, 1988

Please enter number required in box £ p

The Sound Master

£14.99	3000	<input type="checkbox"/>
--------	------	--------------------------

Add £2 for Europe (inc. Eire)/£7 for Overseas

Knitwear Designer (see page 42)

Tape £8.95	3128	<input type="checkbox"/>
5.25" Disc £9.95	3129	<input type="checkbox"/>

Add £2 for Europe (inc Eire); £5 for Overseas

Nursery Rhymes (see page 51)

Tape	3.5" Disc
£5.95	£6.95

3018/3019

Add £1 for Europe/Overseas

Education Special Vol. 2

Classroom Computing on the Electron

Magazine + Electron Cassette	£3.95	3007	<input type="checkbox"/>
Magazine + Electron 3.5" Disc	£4.95	3008	<input type="checkbox"/>

Add £2 for Europe (inc Eire); £4 for Overseas

Fun School (see page 50)

Tape	3.5" Disc
£4.95	£5.95

Ages 2-5 3080/3108

Ages 5-8 3081/3109

Ages 8-12 3082/3110

Add £1 for Europe/Overseas

Getting Started in BBC Basic (see page 52)

£2.95 3100

Advanced User Guide (see page 52)

£3.45 3072

Mini Office (see page 31)

Tape £5.95	3062	<input type="checkbox"/>
------------	------	--------------------------

Add £1 for Europe/Overseas

Magic Sword

Tape	3.5" Disc
£5.95	£6.95

3065/3105

Add £2 for Europe (inc Eire); £5 for Overseas

Ten of the Best (see page 26)

Tape	3.5" Disc
£5.95	£6.95

Volume 1 3068/3111

Volume 2 3069/3112

Volume 3 3070/3113

Volume 4 3120/3121

Add £1 for Europe/Overseas

French on the Run

Tape £9.95	3115	<input type="checkbox"/>
------------	------	--------------------------

Add £1 for Europe/Overseas

Classic Card and Board Games

No. 1	Tape	£5.95	3090	<input type="checkbox"/>
	3.5" Disc	£7.95	3092	<input type="checkbox"/>
No. 2	Tape	£5.95	3091	<input type="checkbox"/>
	3.5" Disc	£7.95	3093	<input type="checkbox"/>

Add £1 for Europe/Overseas

Electron Dust cover

£3.95	3058	<input type="checkbox"/>
-------	------	--------------------------

Add £1 for Europe/Overseas

Magazine Binder

£3.95	3059	<input type="checkbox"/>
-------	------	--------------------------

Add £3 for Europe (inc Eire); £7 for Overseas

TOTAL

Payment: please indicate method (✓)

Access/Mastercard/Eurocard/Barclaycard/Visa

Expiry Date

No.

Cheque/Eurocheque made payable to Database Publications Ltd.

Name Signed

Address

Post Code

Tel EU2

CONVERTING from one form of measurement to another is awkward when you can't remember the conversion factor and can't find it.

This short utility provides you with a high-powered conversion program at your fingertips. It is easy to use and accurate. Type it in and save it, then run it - you should get a display like the one shown here.

When you run it you are presented with the different conversion units, metric on the left, imperial on the right. Arrows indicate the current selection, and at the bottom is the current conversion factor. At the top of each column block is a window - these are the data input and output areas.

The spacebar alters the unit selection, the S key swaps columns and the < and > keys specify the direction of conversion.

For instance, to convert from grams to pounds first

Measuring up

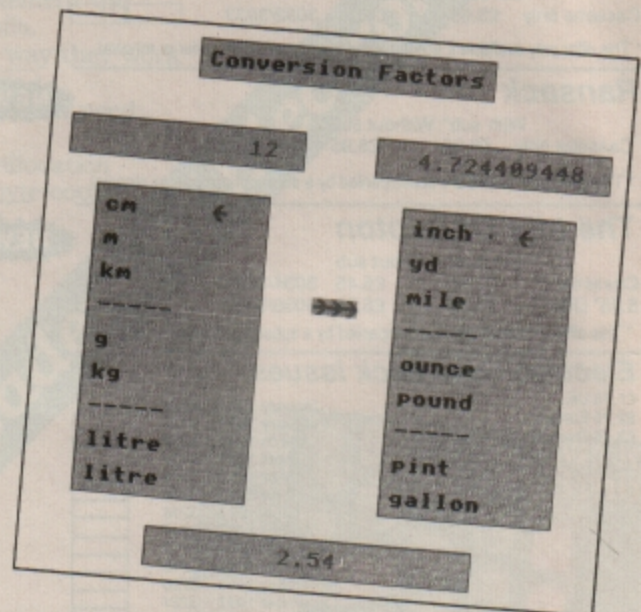
BARRY WOOD shows how to get converted

select the right-hand units with S and press the spacebar to move the pointer to pounds.

Press S to select the left-hand column and spacebar again to point to grams. Type in a number and press Return.

Now press > to indicate the direction of conversion and then the Copy key to find out the result. The value in pounds will be printed in the top window.

Note that some conversions are impossible - like litres to inches. These are indicated by an error message in the conversion factor box at the bottom of the screen.



```

10 REM In Action
20 REM Conversion Factors
30 REM by Barry Wood
40 REM (c) Electron User
50 ON ERROR MODE6:PROCerr
:END
60 MODE1:INX=&20205:PROCOF
f:=FX4,1
70 VDU&E017;&B381C;&FF70;&
70FF;&1C38;
80 VDU&E117;&1C38;&FF0E;&
0EFF;&B381C;
90 PROCbx('Conversion Fac
tors',1)
100 FORXX=5T025STEP20:PRO
b(XX,10,10,17)
110 PROCb(XX-2,6,14,1):NEX
T:DIM f(9,9)
120 PROCbx(STRING$(20,"")
,30)
130 FORYX=1 TO 9:READa$,b$
140 PRINTTAB(5,YX*2+8)a$TA
B(25,YX*2+8)b$
150 NEXT:FORXX=1T09:FORYX=
1T09:READ a$
160 IF a$="*" f(XX,YX)=-1:
ELSE f(XX,YX)=VALa$
170 NEXT:NEXT:ZX=TRUE:QX=0
180 LYX=1:RYX=1:NL=0:NR=0
190 REPEAT COLOUR 2:COLOUR
129
200 VDU31,19,15,225+QX225+
QX225+QX
210 PRINTTAB(4,6)FNf(NL);T
AB(24,6)FNf(NR);
220 f=f(LYX,RYX):IF QX f=1
/f
230 IF f<0 f$=FNs(">>Error
<<") ELSE f$=FNs(STR$f)
240 PRINTTAB(10,30)f$;:PRO
Cp(224):GX=GET:PROCP(32)
250 IX=INSTR('<,>','CHRSGX
):IF IX<1 ELSE QX=IX<3
260 IF GX=83 ZX=NOTZX
270 IF GX<>32 ELSEIF ZX RY
X=FNic(RYX) ELSE LYX=FNic(LY
X)
280 IF GX>82F IF GX<83A PR
OCnum
290 IF GX<>87 ELSEIF f=-1
ELSEIF QX NL=NR/f ELSE NR=N
L/f
300 UNTIL FALSE:END
310 DEF PROCP(CX):VDU31,12
,LYX*2+8,CX
320 VDU31,32,RYX*2+8,CX:EN
DPROC
330 DEF FNic(YX)REPEATYX=Y
X+1:IFYX=10YX=1
340 UNTIL YX<4 AND YX<7:
=YX
350 DEF PROCnum:LOCAL XX,Y
X,VX,N
360 YX=6:IF ZX XX=4 ELSE X
X=24
370 REPEAT N=N*10+(GXAND15
)
380 PRINTTAB(XX,YX)FNf(N);
390 REPEAT PROCon:GX=GET:P
ROCOFF
400 UNTIL GX=13 OR GX=46 O
R (GX>82F AND GX<83A)
410 UNTIL GX=13 OR GX=46:I
F ZX NL=N ELSE NR=N
420 IF GX=13 ENDPROC ELSE
VX=10
430 REPEAT PROCon:GX=GET:P
ROCOFF
440 UNTIL GX=13 OR (GX>82F
AND GX<83A)
450 IF GX=13 ENDPROC
460 REPEAT N=N+(GXAND15)/V
X:VX=VX*10
470 PRINTTAB(XX,YX)FNf(N);
480 REPEAT PROCon:GX=GET:P
ROCOFF
490 UNTIL GX=13 OR (GX>82F
AND GX<83A)
500 UNTIL GX=13:IF ZX NL=N
ELSE NR=N
510 ENDPROC
520 DEF FNf(N)=RIGHTS(STRIN
GS(12,"")+STRN,12)
530 DATA cm,inch,m,yd,km,m
ile,-----
540 DATA g,ounce,kg,pound,
-----
550 DATA litre,pint,litre,
gallon
560 DATA 2.54,91.44,160934
.4,*,*,*,*,*
570 DATA .0254,.9144,1609.
344,*,*,*,*,*
580 DATA .0000254,.00091,1
.61,*,*,*,*,*
590 DATA *,*,*,*,*,*,*,*
600 DATA *,*,*,*,*,*,*,*
610 DATA *,*,*,*,*.02835,.4
5,*,*,*
620 DATA *,*,*,*,*,*,*,*
630 DATA *,*,*,*,*,*,*,*.0.5
7,4.55
640 DATA *,*,*,*,*,*,*.0.5
7,4.55
650 DEF FNs(t$):LOCAL LX
660 t$=STRING$(8,"")+t$+S
TRINGS(10," ")
670 LX=LENTSDIV2:=MID$(t$,
LX-10,20)
680 DEFPROCbx(t$,YX):LOCAL
LX,XX
690 LX=LENTS:XX=20-LXDIV2
700 PROCb(XX,YX,LX,1):COLO
UR 129
710 PRINTTAB(XX,YX)t$;:END
PROC
720 DEFPROCb(XX,YX,LX,DX):
LOCAL UX,VX
730 UX=(XX+LX)*32:VX=(32-Y
X-DX)*32
740 XX=XX*32:YX=(32-YX)*32
750 PROCg(2,XX,VX,UX,YX,20
)
760 PROCg(1,XX,VX,UX,YX,16
):ENDPROC
770 DEFPROCg(CX,QX,RX,SX,T
X,OX)
780 VDU24,QX-OX;RX-OX;SX+O
X;TX+OX;
790 GCOL0,128+CX:CLG:ENDPR
OC
800 DEFPROCon:LOCALBX:BX=1
810 DEFPROCOFF:LOCALBX:BX=
0
820 VDU23,1,BX;0;0;0;0;:EN
DPROC
830 DEFPROCerr:@X=10:PROCO
n:REPORT
840 PRINT" at line ";ERL:E
NDPROC

```


IN this short series of articles we are examining the popular programming language Pascal, invented around 1970 by Niklaus Wirth.

There are two different packages available on the Electron - ISO-Pascal, a rom-based version supplied on a cartridge ready to be plugged into a Plus 1 or Rombox, and S-Pascal, a cassette-based version.

The rom cartridge is the full implementation of the language (to the ISO standard), while S-Pascal is a much simpler, cut down (and cut-price) version. All the programs this month were written using S-Pascal, but they will also run under ISO-Pascal.

Last month Mike Plummer introduced the language, revealing a little of its history and basic structure. Essentially it was designed to teach good programming practice to students studying computer science and it is a highly structured language as we'll see.

It is a popular language, and although rarely seen on home micros, is in widespread use by professional programmers on much larger and powerful computers than our Electron.

This article is devoted to just one program - a short routine that will convert a temperature in degrees Fahrenheit to one in degrees Celsius. This shows quite clearly the beautiful structure of Pascal programs.

We'll write it in several different ways to show the wide range of commands available and their syntax. Program I shows it in its simplest form.

Notice that it starts with:

```
program temp(input,output);
```

This is the hallmark of all Pascal programs. It contains the program name, *temp*, and tells Pascal that information will be input and output - we are going to type a temperature in, convert it and print out the result. Most Pascal programs input and output information - if they sat there doing nothing they

would be very dull indeed!

The next line is a list of the variables used in the program and their type. We are going to use *f* to hold the Fahrenheit temperature and *c* to store the Celsius temperature. They are both integers.

```
program temp(input,output);
var f, c : integer;
begin
  write('Enter temp:');
  readln(f);
  c:=5*(f-32) div 9;
  writeln('Celsius=',c)
end.
```

Program I

Logically, the labels *begin* and *end*. mark where the program begins and ends. The first thing it does is write "Enter temp:" on the

screen. It then reads a number from the keyboard into the variable *f* using *readln(f)*. We could have used *read(f)* here, but *readln(f)* is better as it moves to a new line after the input.

The conversion from Fahrenheit to Celsius is carried out by:

```
c:=5*(f-32) div 9;
```

Notice that we use *:=* to set a variable equal to a value, whereas in Basic we would use just an equals sign on its own. Also note that all statements except the last end with a semi-colon. This is the statement separator and acts rather like Basic's colon.

Finally the new temperature is written to the

screen and the program stops when it hits the *end*. on the last line.

Now we'll alter the program slightly, taking out the calculation from the main loop and placing it in a procedure called *ftoc*. This is called from within the main *begin - end*. structure:

```
program temp(input,output);
var f, c : integer;
procedure ftoc;
begin
  c:=5*(f-32) div 9
end;
begin
  write('Enter temp:');
  readln(f);
  ftoc;
  writeln('Celsius=',c)
end.
```

Program II

As you can see the procedure has been placed after the variables, but before the main *begin - end*. program loop. Procedures always come before the start of the program, unlike Basic which insists on them being placed at the end.

Pascal will skip all procedure definitions at the beginning of a program and will always start execution at the main *begin*.

Notice that the procedure

Turn to Page 56 ▶

... Pascal is in widespread use by professionals on much larger computers than our Electron

Programming

◀ From Page 55

has its own *begin - end*; loop indicating where it starts and ends. It could also have its own variable list as well. It is called quite simply from the main loop by entering its name - *ftoc*.

Like Basic, we can pass parameters into procedures. Program II can be modified

```
program temp(input,output);
var f, c : integer;
procedure ftoc(d:integer);
begin
  c:=5*(d-32) div 9
end;
begin
  write('Enter temp:');
  readln(f);
  ftoc(f);
  writeln('Celsius=',c)
end.
```

Program III

to produce Program III.

Here we are passing the Fahrenheit temperature in *f* to the procedure *ftoc*. Inside the procedure the local variable *d* is used.

Notice that in the procedure definition we must specify the type of the parameter passed. Pascal is very strict about variable types and ranges.

We have been using our procedure *ftoc* to calculate and return a single value, so why not use a function instead? Program IV shows how this may be done.

As a function returns a value, Pascal insists that we specify its type in the definition. In this case it is an integer. The value is returned by equating its name to the result of the calculation in the main body of the definition.

Apart from these two points, the program is no different from the last one.

```
program temp(input,output);
var f, c : integer;
function ftoc(d:integer):integer;
begin
  ftoc:=5*(d-32) div 9
end;
begin
  write('Enter temp:');
  readln(f);
  c:=ftoc(f);
  writeln('Celsius=',c)
end.
```

Program IV

```
program temp(input,output);
var f : integer;
function ftoc(d:integer):integer;
begin
  ftoc:=5*(d-32) div 9
end;
begin
  write('Enter temp:');
  readln(f);
  writeln('Celsius=',ftoc(f))
end.
```

Program V

However, it allows us to use the function call wherever we could use a number or variable. This enables us to shorten the last program.

The variable *c* in the last *writeln* has been replaced by the function call *ftoc*.

As these short programs show, Pascal is a highly structured programming

language, forcing you to lay out your listings in a clear and easy-to-read manner. It encourages good programming practices.

● We'll continue to look at this fascinating language next month when Mike Plummer will be back with some more complex examples.

electron
user

MAIL ORDER OFFERS

electron
user

MAIL ORDER OFFERS

SALE!

This could be your last chance to build up a library of fun and knowledge from our back issues!

The nine complete issues, April to December 1986:

Games: Invasion Force, Missile Jammer, Fishing, Snap, Cricket, Cavern Capers, Horse Racing and Santa's Sleigh. **Machine code:** Osword calls, *CODE and *LINE explained, text editor and Basic compiler. **Discs:** Recover lost files, random access filing and extra commands. **Education:** Music tutor, Crocodile Tears, Maths Fun, Company Count and Yule Spell. **Graphics:** Screen dumps, Draw Writer and all Basic commands explained.

Only £6.90

Need a binder for your magazines? We'll send one for £3.95

* Price includes p&p (UK only)

TO ORDER TURN TO THE FORM ON PAGE 53

VIEWING YOUR BASIC LISTINGS

ROLAND WADDILOVE shows disc drive owners how to edit programs using View

MOST people tend to regard a word processor like Acornsoft's View as simply a tool for writing letters, documents and reports. While this is true, it is far more flexible than many people think, and there are a lot of other uses.

In this article we'll look at how programmers can use View to create and edit Basic and assembly language programs - probably something they may not have thought possible.

In fact, using View in preference to Basic's built-in editor has many advantages, as we will see.

To show how flexible View is let's start by entering a short program just as we would a letter or document.

First enter View either by pressing Control+Break or typing *WORD. We must tell View not to try to format or justify the program we are about to write, so enter:

```
SETUP I
```

to set just insert mode. Now press Escape to enter edit mode and type in the following short listing:

```
*BASIC
AUTO
REM Strip
MODE 6
PRINT
INPUT "Filename:"a$
AX=OPENIN a$
BX=OPENOUT "Listing"
REPEAT
CX=BGET#AX
BPUT#BX,CX
IF CX=13 IF NOT EOF#AX FOR
IX=1 TO 5:CX=BGET#AX:NEXT
UNTILEOF#AX
CLOSE#B
PRINT "Finished"
```

Notice that I haven't used any line numbers - they aren't needed. This is where structured programmers have a big advantage over spaghetti programmers using lots of GOTOs.

Using View to write programs isn't really advisable if you use GOTOs to jump here, there and everywhere. And GOSUBs should be avoided if at all possible - they are just as awkward to

cope with. Also notice that in this listing the first line is *BASIC and the second is AUTO.

What we're going to do is save the file to disc then *EXEC it back - while we're still within View.

The *BASIC command selects Basic and the AUTO generates the line numbers. To see this in action, enter command mode and type:

```
SAVE TEST
*EXEC TEST
```

and you'll see the program load and the line numbers automatically added. Press Escape when it has finished loading. You've now got the listing into Basic.

This is now a normal Basic program and you can edit it, run it, save it and so on, just as with any other Basic program.

If you need to make further changes you can either make them from Basic using the program in memory, or edit the file on disc using

View. The advantage of having a View file is that you can easily modify it in ways not possible in Basic.

For instance, you can use View's search and replace functions to change variable names, block move whole sections of Basic programs, and so on.

Go back into View and re-load the program with:

```
*WORD
SETUP I
LOAD TEST
```

Now change the variable A% to *infile%* throughout the program with:

```
FOLD OFF
CHANGE AX infile%
```

The FOLD OFF command tells View not to match the case of the first item - A%. If you try this with FOLD ON, *infile%* will become *Infile%* as View changes the case of the i to I to match A.

You can save this modified program and

*EXEC it back in as before. As you can imagine, changing the name of a variable throughout a long program could literally take hours in Basic, but in View it is a matter of seconds - an enormous saving in time and effort.

Why would you want to change the name of a variable? Well, it often helps to use long descriptive variable names when developing a complex program - they aid readability and help with debugging. These however, slow down program execution and greatly add to the length of the listing causing problems.

By writing the program in View you gain the advantage of long variable names, but can shorten them all with a handful of CHANGE commands before *EXEC-ing it into Basic and running it. So you gain the best of both worlds - readable listings, but fast compact programs.

Converting a View file into Basic is easy, as we have seen. The reverse process of converting a Basic listing into a View file isn't quite so simple.

We need a Basic program in memory so *EXEC TEST into Basic, pressing Escape when it has finished loading. Now we'll try to convert it back to View - enter:

```
*SPOOL STRIP
LIST
*SPOOL
```

Now go into View, and load

```
FJ :.....*.....*.....*.....*.<
```

```
*BASIC
AUTO
REM Simple machine code program
DIM code% 100
oswrch=&FFEE
FOR pass=0 TO 2 STEP 2
P%=code%
[ OPT pass
LDX #33
.loop
TXA
JSR oswrch
INX
CPX #127
BNE loop
RTS
]
NEXT
CALL code%
END
```

```
*****
```

Editing an assembler program using View

Turn to Page 58 ▶

Feature

◀ From Page 57

the *SPOOLED file with:

```
*WORD
SETUP I
READ STRIP
```

This is how the program will look in edit mode:

```
>LIST
10REM Strip
20MODE 6
30PRINT
40INPUT "Filename:"a$
50AX=OPENIN a$
60BX=OPENOUT "Listing"
70REPEAT
80CX=BGET#AX
81BPUT#BX,CX
90IF CX=13 IF NOT EOF#AX
FOR IX=1 TO 5:CX=BGET#AX:NEXT
110UNTILEOF#AX
120CLOSE#0
130PRINT "Finished"
>*SPOOL
```

You'll see it starts with the prompt > then LIST, and is followed by the program, complete with line numbers. Finally, >*SPOOL follows at the end. To get back to the

original listing in View we need to tidy this listing up a little.

The >LIST and >*SPOOL are easily deleted with Func+8 (delete line), but the line numbers are impossible to remove. You can't search for and replace them.

This is where the program Strip we have been experimenting with comes in. It's job is to strip the line numbers from a SPOOLED Basic program.

You've got it on disc, so *EXEC TEST to load it into Basic. Now run it.

You'll first be prompted for a filename, so enter STRIP the file you just spooled. The disc drive will start up and after a short while the message "Finished" will be printed on the screen.

Strip will still be there on the disc, but in addition there will also be a file called Listing - this is Strip with the line numbers removed.

```
*BASIC
AUTO
REM Machine Code
oswrch=&FFEE
FOR pass=0 TO 2 STEP 2
P%=&C00
[ OPT pass
LDX #32 \ASCII" *
.loop
TXA
JSR oswrch \print char
INX \next one
CPX #127 \done all?
BNE loop
RTS
]
NEXT
```

Go into View as before and read it in. Chop off the >LIST and OL at the start and finish and you are left with your original program in View.

So far we've seen how to write Basic programs in View. Well, it is just as easy to write machine code files as well. Enter the following short assembly language listing above into View:

Save it with the name MCODE then *EXEC it into Basic. Press Escape when it has finished loading and run it. Now execute the machine code with CALL &C00 and

you should hear a beep if all is well.

Although I have only discussed Basic and assembly language here, the technique applies equally well to other languages - particularly to Lisp which hasn't got any form of editor. It is far easier to write in View and *EXEC the file into Lisp.

As we've seen, View is more than just a simple word processor - it is a powerful program editor and development tool as well.

Try it, and you'll never go back to Basic's editor.

PMS MULTI-FONT NTQ

Near Text Quality Typesetting Software

NEW ELECTRON VERSION

"Quite simply the best font software available for the BBC" - NTQ users say it - the reviewers agree -

If you want to produce quality worksheets, newsletters, OHP slides, menus, leaflets, concert programmes and tickets, exam papers, reports, invoices or just add style to your personal letters - NTQ's for you.

Use NTQ with VIEW, WORDWISE, WORDPOWER or BASIC with ANY EPSON compatible printer (MX and FX).

FONT LIBRARY CONTAINS OVER 50 HIGH QUALITY FONTS - standard typefaces + foreign languages + maths/science symbols + fancy styles.

Write or phone for leaflet, full list of fonts and sample printout.

MIX FONTS. HEIGHTS WIDTHS AND PITCHES IN ONE LINE OF TEXT - just like this:

MULTI-HEIGHT
MULTI-FONT

MULTI-WIDTH
MULTI-PITCH

BACKGROUNDS

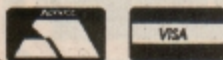
INVERSE

ΑάΑÆÇεàòδùöïè α±÷×√≡≡≡≡~≈≈♫

ONLY £24.95 inc VAT (add £1 carriage)
NTQ is 2 roms + disk + user guide

PMS

Permanent Memory Systems
38 MOUNT CAMERON DRIVE
EAST KILBRIDE G74 2ES
SCOTLAND
03552-32796 (24 Hour)



LIGHTSPEED SOFTWARE

Dept EU
31A BROADWEIR BRISTOL BS1
TELEPHONE: 0272-225604
Please Note New Address

**24 HOUR ANSWER PHONE
FOR ALL QUERIES**

New titles available on release day

TITLE	OUR PRICE	TITLE	OUR PRICE
ACORNSOFT HITS 1	7.75	PALACE OF MAGIC (3.5" disc)	12.50
ACORNSOFT HITS 2	7.75	PAPERBOY	7.75
ADVENTURE CREATOR	12.50	PHANTOM	6.90
BONECRUNCHER	7.75	PHANTOM COMBAT	7.75
CODE NAME DROID	7.75	PSYCASTRIA	6.90
CODE NAME DROID (3.5"disc)	12.50	RAVENSKULL	7.75
COLOSSUS CHESS 4.0	7.75	REPTON 3	7.75
COMPUTER HIT 10 V3	7.75	ROUND WORLD 80 SCRIN	6.75
COMPUTER HIT 5	5.90	SPITFIRE 40	7.75
CRAZEE RIDER	7.75	STAR WARS	7.75
ELITE	10.50	STEVE DAVIS SNOOKER	7.25
ELIXIR	7.75	STRIKE FORCE HARRIER	7.75
FIVE STAR GAMES 2	7.75	SUPERIOR COL V3 DISC	12.50
GRAHAM GOOCH	7.75	SUPERIOR COL VOL 3	7.75
IMPACT	7.75	THE HUNT	7.75
MICROPOWER MAGIC II	6.75	THE VILLAGE OF LOST SOULS	7.75
MINI OFFICE	4.90	WINTER OLYMPICS	6.75
MOUSETRAP	6.75	XOR	7.75
OXBRIDGE	6.75	YIE AR KUNG FU II	7.50
PALACE OF MAGIC	7.65		
PALACE OF MAGIC (5.25" disc)	10.80		

ALL PRICES ARE INCLUSIVE OF VAT AND DELIVERY
INSIDE THE UK.

PLEASE MAKE CHEQUES P.O.s PAYABLE TO

"LIGHTSPEED SOFTWARE"

ALL ORDERS DESPATCHED WITHIN 24 HOURS, BUT
PLEASE ALLOW 7 DAYS

ODD ONE OUT



Improve your child's perception with **CHRIS NIXON's** educational game

ODD One Out is a game which can help children learn to group similar objects together, and reject any which don't match the group in a specific way.

Teaching your children to group together objects that have something in common

is a slow task, and is often aided by the use of games, puzzles and other easily followed teaching tools. But in order to avoid loss of interest, all such devices must have the added attraction of being fun.

The use of computers in

homes and primary schools is enabling some of these educational tools to be converted into colourful, interesting programs which can be used in the home or classroom unsupervised – to an extent – by the parent or teacher.

The Electron has long been established in primary schools throughout the country, and was therefore an ideal vehicle for Odd One Out. Two players are required for this game, which will help stimulate discussion over the questions posed. There are only 30 questions, but the program only just squeezes into the Electron's memory as it is, and the use of colour – which helps to retain interest – and 40 column text would be lost if a higher-memory mode had been chosen at the outset.

Each player is first asked for their name – always important in children's games. Large letters are used here, and extensively throughout the game to aid with reading the messages.

The players can then sit

back and wait while the playing board is drawn on the screen. This consists of two winnometers, which are wide horizontal bars, one above the other.

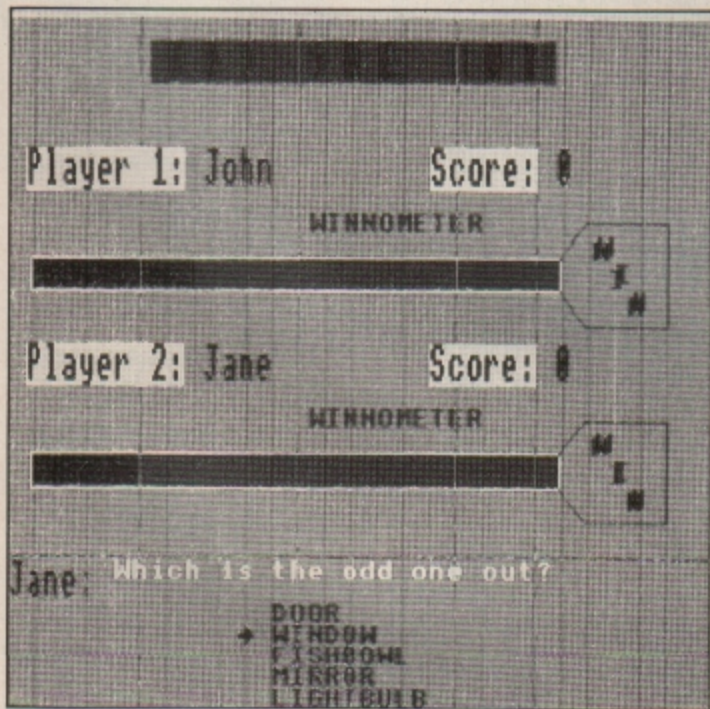
These gradually fill with yellow each time a player's question is answered correctly, and the player who reaches his win marker first is awarded one point, and both winnometers are then reset for the start of the next game.

Each question takes the form "Freddy, which is the odd one out?" followed by a list of five objects. A pointer slowly moves down the list, and selection is made by pressing the spacebar while the pointer is over one of the choices. This is so children with limited coordination can participate in the game.

The 30 questions are held in data statements at the end of the program, and if you want to change them, the format is straightforward.

Four words or phrases which have something in common are separated by commas, with a fifth word or phrase which is the odd one out inserted anywhere among them.

Then another comma and a sentence explaining what the other four have in common, and finally another comma and a number between 0 and 4 identifying which of the five items is the correct choice.



PROCEDURES

setup Set up arrays
title Display title page
drbd Draw playing board
ask Ask a question
qu Fetch a question
yes Player got it right
no Player got it wrong
sc Update winnometer
big Print double-height text

VARIABLES

P1% Player one's score
P2% Player two's score
sc1% Games won by player one
sc2% Games won by player two
qu\$(30,5) Array of questions
ans\$(30) Array of answers
maxq% Number of questions
Q% Current question

Turn to Page 60 ▶

Education

◀ From Page 59

```

10 REM *****
20 REM *   ODD ONE OUT *
30 REM * By Chris Nixon *
40 REM * (c) Electron *
45 REM *   User 1987 *
50 REM *****
60 REM
70 IF PAGE=8E00 THEN 120
80 *FX21,0
90 *K.0 *T.MFORIX=0TO(TO
P-PAGE)STEP4:IX!&E00=IX!PAGE
:NEXTMPAGE=8E00MOLDRUNM
100 *FX130,0,128
110 END
120 MODE1:*FX16
130 PROCsetup:REPEAT:PROct
itle
140 MODE1:VDU28,1,20,38,1,
23,226,0,12,14,255,255,14,12
,8,19,0,4,0,0,0,23;8202;0;0;
0;:PROCDrbd:REPEAT:PROcask:U
NTILwin%1:PROcsc:UNTIL0:UNT
IL0
150 DEFPROCsetup:maxq%30:
P1%0:P2%0:sc1%0:sc2%0:pt
r%0:lv%0:P1%8:ENVELOPE1,1
28,1,1,1,65,65,65,0,0,0,0,0,
0:DIMqu$(maxq%,5),ans$(maxq%
),done%(15):RESTORE:FORLX=1T
Omaxq%:FORLX=0TO5:READqu$(L
X,LX):NEXT:READans$(LX)
160 NEXT:ENDPROC
170 DEFPROCtitle:CLS:COLO
UR129:COLOUR2:FORX=2TO5:VDU3
1,6,YX:PRINTSPC28:NEXT:VDU31
,7,3:PROcbig("E L E C T R O
N   U S E R"):VDU31,12,10:C
OLOUR128:COLOUR2:PROcbig("P
R E S E N T S")
180 VDU31,9,16:COLOUR3:PRO
Cbig("O D D O N E O U
T"):COLOUR128:COLOUR3:VDU3
1,13,22:COLOUR1:COLOUR131:PR
OCbig("By Chris Nixon"):VDU3
1,11,29:COLOUR128:COLOUR2:PR
INT"Press SPACE bar...":REP
EAT UNTILINKEY(-99):*FX21,0
190 VDU28,1,30,38,1:CLS:CO
LOUR131:COLOUR1:PROcbig("Pla
yer 1"):COLOUR128:COLOUR2:IN
PUT" What is your name ",P
1S:IF LENP1S>12 P1S=LEFTS(P1
S,12)
200 PRINT":COLOUR131:COLO
UR1:PROcbig("Player 2"):COLO
UR128:COLOUR2:INPUT" What
is your name ",P2S:IF LENP2S
>12 P2S=LEFTS(P2S,12)
210 ENDPROC
220 DEFPROCbig(B$):LOCAL L
X,MX,XX,YX:FORMX=1TOLENB$S:XX
=0:YX=&B:Y&B00=ASC(MID$(B$,M
X,1)):AX=10:CALL&FFF1:LX=1:F
ORX%224TO225:VDU23,XX:FORX%
=0TO3:VDU?(&B00+LX):VDU?(&B0
0+LX):LX=LX+1:NEXT:NEXT:VDU2
24,8,10,225,11:NEXT:ENDPROC
230 DEFPROCdrbd:CLS:VDU31,
7,0:COLOUR129:COLOUR2:PROcbi
g("O D D O N E O U T ")
240 COLOUR131:COLOUR1:VDU3
1,0,5:PROcbig("Player 1"):C
OLOUR128:COLOUR2:PROcbig("
+P1S):COLOUR131:COLOUR1:VDU3
1,23,5:PROcbig("Score"):COL
OUR128:COLOUR2:PROcbig("S
TR$sc1X")
250 COLOUR131:COLOUR1:VDU3

```



```

1,0,14:PROcbig("Player 2"):
COLOUR128:COLOUR2:PROcbig("
+P2S"):COLOUR131:COLOUR1:VDU
31,23,14:PROcbig("Score"):C
OLOUR128:COLOUR2:PROcbig("
+STR$sc2X")
260 COLOUR1:PRINTTAB(16,8)
"WINMETER"TAB(16,17)"WINNO
METER":GCOL0,3:MOVE40,670:DR
AW1000,670:DRAW1000,620:DRAW
40,620:DRAW40,670:GCOL0,1:MO
VE44,666:DRAW996,666:PLOT 85
,44,624:PLOT 85,996,624
270 GCOL0,3:MOVE40,380:DR
AW1000,380:DRAW1000,330:DRAW4
0,330:DRAW40,380:GCOL0,1:MOV
E44,376:DRAW998,376:PLOT 85,
44,334:PLOT85,998,334:MOVE10
00,670:DRAW1050,720:DRAW1200
,720:DRAW1200,570:DRAW1050,5
70:DRAW1000,620
280 MOVE1000,380:DRAW1050,
430:DRAW1200,430:DRAW1200,28
0:DRAW1050,280:DRAW1000,330
290 PROCshd("WIN",1070,700
,0):PROCshd("WIN",1070,410,0
):GCOL0,2:MOVE0,230:DRAW1279
,230:VDU28,0,31,39,25:ENDPRO
C
300 DEFPROCshd(SS,XB%,YB%,
EX):VDU5:FORLX=1TO2:XX=XB%:Y
X=YB%:GCOL0,LX:FORCX=1TOLEN
SS:MOVEXX,YX:PRINTMID$(SS,CX
,1):XX=XX+32:YX=YX+40:NEXT:X
B%=XB%-8:YB%=YB%-6:NEXT:VDU4
:ENDPROC
310 DEFPROCask:COLOUR128:C
LS:COLOUR2:PROcbig("P1S*"):
COLOUR3:VDU9:PRINT"Which is
the odd one out?":PROcqu:PRO
Cip(1):IFrt% P1S=P1X+1:IFP1X
=10 win%1:ENDPROC
320 COLOUR128:CLS:COLOUR2:
PROcbig("P2S*"):COLOUR3:VDU
9:PRINT"Which is the odd one
out?":PROcqu:PROcip(2):IFrt
% P2S=P2X+1:IFP2X=10 win%1:
ENDPROC
330 win%0:ENDPROC
340 DEFPROCqu:COLOUR2:PRO
vd:FORLX=0TO4:PRINTTAB(15,2+
LX)qu$(QX,LX):NEXT:ENDPROC
350 DEFPROCvd:IFptr%0 QX=
RND(maxq%):PROckeep:ENDPROC
360 REPEAT:QX=RND(maxq%):F
X%0:FORLX=0TOptr%:IF QX=done
X(LX) FX%1
370 NEXT:UNTIL FX%0:PROcke
ep:ENDPROC
380 DEFPROCkeep:done%(ptr%
)=QX:ptr%=ptr%+1:done%(ptr%
)=0:IF ptr%=maxq% ptr%=0

```

```

390 ENDPROC
400 DEFPROCip(P%):AX=0:XX=
13:YX=2:REPEAT:VDU31,XX,YX,2
26:TIME=0:REPEAT:AX=INKEY(-9
9):UNTILAX OR TIME>100:IF AX
THEN 410 ELSE VDU31,XX,YX,3
2:YX=YX+1:IF YX=7 YX=2
410 UNTILAX:IF PX=2 THEN 4
30 ELSE RX=YX-2:IF RX=ans%(Q
X) rt%=TRUE:PROcyes(1) ELSE
rt%=FALSE:PROcno
420 ENDPROC
430 RX=YX-2:IF RX=ans%(QX)
rt%=TRUE:PROcyes(2) ELSE rt
%=FALSE:PROcno
440 ENDPROC
450 DEFPROCyes(P%):CLS:COL
OUR129:COLOUR2:VDU31,12,3:PR
OCbig("C o r r e c t !"):F
ORLX=50TO150STEP5:SOUND1,-10
,LX,1:NEXT:IF PX=2 THEN 460
ELSE GCOL0,2:MOVE44+P1X+95,6
24:DRAW44+P1X+95,666:PLOT85,
44+P1X+95+95,624:PLOT85,44+P
1X+95+95,666:ENDPROC
460 GCOL0,2:MOVE44+P2X+95,
334:DRAW44+P2X+95,376:PLOT85
,44+P2X+95+95,334:PLOT85,44+
P2X+95+95,376:ENDPROC
470 DEFPROCno:CLS:COLOUR13
0:COLOUR1:VDU31,14,0:PROcbig
("W r o n g !"):FORLX=150T
050STEP-5:SOUND1,-10,LX,1:NE
XT
480 COLOUR129:COLOUR2:PRIN
T"qu$(QX,ans%(QX)):COLOUR
128:COLOUR3:PRINT" was the o
dd one out,"
490 COLOUR128:COLOUR3:PRIN
T"because the others ";qu$(Q
X,5);":COLOUR2:PRINT"Pres
s SPACE bar...":REPEATUNTIL
INKEY(-99):ENDPROC
500 DEFPROCsc:IF P1X=10 sc
1X=sc1X+1:FORLX=1TO4:SOUND1,
1,1,20:NEXT:FORSDX=1TO14:PRO
Cshd("WIN",1070,700,3):NEXT
ELSEsc2X=sc2X+1:FORLX=1TO4:S
OUND1,1,1,20:NEXT:FORSDX=1TO
14:PROcshd("WIN",1070,410,3)
:NEXT
510 P1X=0:P2X=0:ENDPROC
520 DATA DOG,CAT,MOUSE,PEN
CIL,WHALE,"are animals",3
530 DATA "OAK TREE","COUNT
RY","ASH TREE","CHERRY TREE"
,"CEDAR TREE","are trees",1
540 DATA RED,GREEN,BLUE,YE
LLOW,HOT,"are colours",4
550 DATA TABLE,CHAIR,BED,D
OG,WINDOW,"are furniture",3
560 DATA BOOK,ROSE,TULIP,D

```

```

AFFODIL,MARIGOLD,"are flower
s",0
570 DATA POTATO,CARROT,TRE
E,SWEDE,TURNIP,"are vegetabl
es",2
580 DATA ARM,LEG,HEAD,FOOT
,SHIRT,"are parts of a body"
,4
590 DATA SOCKS,ARM,TROUSER
S,SHIRT,JUMPER,"are clothes"
,1
600 DATA APPLE,PEAR,ORANGE
,CHOCOLATE,GRAPE,"are fruit"
,3
610 DATA JOHN,PETER,JANE,S
ALLY,DOOR,"are people's name
s",4
620 DATA FLY,ANT,FOOTBALL,
WASP,BEE,"are insects",2
630 DATA LAKE,HEDGE,SEA,RI
VER,STREAM,"are made of wate
r",1
640 DATA GOOSE,HEN,SWAN,FO
OT,DUCK,"are birds",3
650 DATA COD,SHARK,SALMON,
GOLDFISH,BOWL,"are fish",4
660 DATA TABLE,TEA,COFFEE,
ORANGE,BEER,"are drinks",0
670 DATA BIG,LITTLE,GREEN,
TALL,SMALL,"are about size",
2
680 DATA SPOON,FORK,PLATE,
KNIFE,KETTLE,"help with eati
ng",4
690 DATA GARDEN,BEDROOM,LO
UNGE,KITCHEN,"DINING ROOM",
"are rooms in a house",0
700 DATA METRE,MILE,CENTIM
ETRE,LITRE,KILOMETRE,"are me
tric units",1
710 DATA BUCKET,TANK,HOSE,
TAP,RADIO,"are water users",
4
720 DATA DOOR,WINDOW,FISHB
OWL,MIRROR,LIGHTBULB,"are ma
de of glass",0
730 DATA RADIO,CLOCK,TELEV
ISION,LAMP,TELEPHONE,"use el
ectricity",1
740 DATA BARREL,BOX,CHAIR,
SUITCASE,BAG,"can hold objec
ts",2
750 DATA PENCIL,BIRO,RULER
,QUILL,FELT-TIP,"you can wri
te with",2
760 DATA CHEDDAR,BACON,STI
LTON,CHESHIRE,EDAM,"are all
cheeses",1
770 DATA IRON,STEEL,PLASTI
C,BRONZE,COPPER,"are metals"
,2
780 DATA CUP,SAUCER,MUG,GL
ASS,TUMBLER,"are drunk out o
f",1
790 DATA HUT,BUNGALOW,COTT
AGE,SHOP,FLAT,"are places to
live",3
800 DATA SHOES,SANDALS,SLI
PPERS,TRAINERS,GLOVES,"are f
ootwear",4
810 DATA LONDON,ENGLAND,FR
ANCE,ITALY,SPAIN,"are countr
ies",0

```

This listing is included in this month's cassette tape offer. See order form on Page 53.

"Play It Again, Sam"

FEATURING:
Four Number 1 Hits



THE BEST COMPILATION EVER for the BBC Micro and Acorn Electron

Sam, an ardent fan of Superior Software's games, is always ready for a challenge... and the tougher the better! Here's four games that, as time goes by, he returns to again and again.

Citadel, a fascinating arcade-adventure, features over 100 beautifully detailed screens of action. Computer Gamer reported: "The game is extremely good. Well worth the cash."

Thrust is simple and fun-to-play, yet incredibly realistic and highly addictive.

"This game has class... try it!" urged Computer & Video Games.

Stryker's Run is a challenging action-packed combat game.

"This game will impress you... the graphics are stunning... this should be in every collection," A & B Computing remarked.

Ravenskull is a massive arcade-adventure game, full of puzzles and problems to be solved.

Acorn User commented: "Ravenskull is a very good game and is destined to become another Superior classic."

BBC Micro Dual Cassette	£9.95	Acorn Electron Dual Cassette	£9.95
BBC Micro 5¼" Disc	£11.95	Acorn Electron 5¼" Disc	£11.95
BBC Master Compact 3½" Disc	£14.95	Acorn Electron 3½" Disc	£14.95

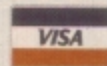
(Compatible with the BBC B, B+ and Master Series computers).

SUPERIOR SOFTWARE
Limited

ACORNSOFT

Dept. PS2, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: 0532 459453

Please make all cheques payable to "Superior Software Ltd".



24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
 - Postage and packing is free.
 - Faulty cassettes and discs will be replaced immediately.
- (This does not affect your statutory rights)

BBC/ELECTRON 'IMAGE' V.2

'IMAGE' was the ultimate tape back up system,
now, it's even better

You can be completely assured that this is the best and most able program of its type available. It can deal with:

- Locked programs
- Programs of any length
- 300t and 1200 BAUD
- Files
- ?s (Ctrl codes) in Filename
- Multiple back ups
- False or trick block info.
- Changing Filename†
- Continuous data stream†
- Locking and unlocking programs

It is VERY IMPORTANT INDEED purchasers take note that 'IMAGE' is for use strictly for making BACK-UPS of your own software for your own use, for protecting your own programs, or as an aid to putting software on disk (by removing locks from tape software). Any person found using the program for illegal purposes runs the risk of being prosecuted.

To receive your copy of 'Image' send a cheque or P.O. for the sum of
An Astounding £5.80 to:

**Peter Donn, Dept. EU, 18 Tyrone Road,
Thorpe Bay, Essex SS1 3HF**

Please state BBC or Electron version. V1 owners can obtain V2 by sending £1.50 + V1

AA269 without case † BBC version only

budgetsoft

£1 95	£2 95	DALACTIC COMMANDER NEW	MILIONAIRE	HEATHROW ATC
START DRIFTER	WORKSHOP	MOORRAIDER NEW	CENTRIBUG	MRESHAFT
WAKE A FACE	STARSHIP COMMAND	FING A DICE SOCCER	ALLEN DROP OUT	ZARY KING JAR
KINDER RECOMP	GRAPHS AND CHARTS	GUNSHORE	INVADERS	TEMPERIT
SOFTWRITER PACK 1	BUSINESS GAMES	SUPER POOL	FRUIT MACHINE	OVERDRIVE
EMPIRE	TALKBACK	STRATO SCAMER	PERCY PENGUIN	SMASH/TERMS
SMAPPER	30 MAZE	HYPER DRIVE	STRANDED	MICRO OLYMPICS
ROGER	PROLOG	CATERPILLA	ORALIGHTS	ZALUCA
DESA DIARY	SUPER HANGMAN	INVADERS	REVERSI	MICRO KLUENEGAMES
WIS AND MY MICRO	RIG ATTACK	30 ROOMS KELLY	CHESS	CHOCICE EGG
GOLF	ALPHATRON	BUFFINING	WAR WIZ	30 GAMES
D LEVEL PHYSICS	USPW	FIRST MOVES (CHESS)	POW GAMES COLLECTION	1800 HANSHUTTS/TWELVE NEW
D LEVEL CHEMISTRY	BOUNDED BONNS	TRINO	ROBOTRON	NEW
D LEVEL MATHS	KILLAPEE	CHOKLS	ELECTION KISS COURSE	£9 95
D LEVEL BIOLOGY	ADVENTURE LAND	CROWDER	FOOTBALL MANAGER	£5 95
ESCAPE FROM PULSAR 7	BUNBLE BEE	DALMLET	NEW WHIRE	
TIME MACHINE	CYBERTRON WISSON	FLORIN GORILLA	BANDITS AT 3 O'CLOCK NEW	
ARROW OF DEATH	ELECTRON INVADERS	SMOOP	NEW	
WAK WORKS	TELU & FRUIT MONSTERS	CHES	NEW	
GOLDEN BATON	THE MINE	STOCK CAR	NEW	
PERSEUS AND ANDROMEDA	DANGER LIXE	CYCLON INVADON	NEW	
CIRCUS	ESCAPE MOORHASE ALPA	TRIK'S	NEW	
TEN LITTLE ADKAMS	RUBBLE TROUBLE	SPACE CAVERS	NEW	
WIZARD OF AZKABZ	FRENKY	BOOD THE BRAKS	NEW	
STOLEN LAMP	JET POWER JACK	GREAT WALL	NEW	
ROBERT BAYON	POBTRON	WOKS	NEW	
LUP				
SMACKER				
HERCULES				
SM				

Post and packing: 1-3 titles 75p, 4 or more £1. Overseas £1.30 per title.
PERIPHERALS: £1 per item. Overseas £1.80
Please send cheques/P.O.'s to: Budgetsoft, Dept EU 33 Little Breach,
Chichester, W Sussex, PO19 4TY.

ADVERTISERS' INDEX

21st Software	20
A1 Computer Services	62
Advanced Computer Products	12
Budget Software	62
C&F Associates	10
Centec	46
Database Software	24
Delta Computers	46
Electron & BBC Micro User Show	31
Impact Posters	23
Kosmos	62
Lightspeed Software	58
Mithras Software	46
Peter Donn	62
Pres	4
Project Expansions	38
Qualsoft	35
RODH Designs	62
Slogger	40,41
Software Bargains	7
Superior Software	2,34,61,63,64
The Computer Depot	38
Touchline Computers	62
Towerhill	36
Tynesoft	18
Voltmace	28

*** DISC SOFTWARE FOR THE ACORN ELECTRON & ADFS ***

SUPREME TEAM - Simply the best football manager ever produced

A whole new dimension in play provided by over 100k of programs and files on one three-and-a-half inch disc making use of the ADFS's best features
JUST A FEW OF THE FEATURES:-

* 60 player data-base * Yellow and red cards (sendings off) * named goalscorers and * leading scorers chart * capped players * two substitutes * contract negotiation * penalty shoot-outs * classified check (both divisions) * full 64-team cup-draw listings * man of the match * sacking * form-guide * line graphs * in-depth status report * end of season big prize money * fixture list * stadium capacities and * admission prices setting * data-change utilities * compaction utility

Included is a comprehensive 32 page play-guide

SUPREME TEAM is ONLY £9.95 (all inclusive)

INFORMATION DISPLAY SYSTEM (3.5" disc & ADFS)

FEATURED IN THIS MONTH'S ELECTRON USER

A business utility which simulates view-data systems such as CEEFAX and ORACLE. Allows you to create and store up to 700 pages of information and display these pages in news-real fashion. Included are page editing, cataloguing and deletion programs - all "MENU" operated.

Also, create and display your own user-defined graphics and use them in your pages. Pages can be printed making this package immensely useful in EDUCATION and RETAIL for customer information purposes etc. . .

INFORMATION DISPLAY SYSTEM is ONLY £7.95 (all inclusive)

Cheques/postal orders should be made payable to PETER REYNOLDS and sent with name and address to:
TOUCHLINE COMPUTERS,

2 ASHE ROAD, STOCKINGFORD, NUNEATON, WARWICKSHIRE CV10 8PR

KOSMOS SOFTWARE

Whatever your subject...

French, First Aid, Football, Spelling, Science, Spanish, Sport, Scotland, England, English Words, German, General Knowledge, Geography, Italian, Arithmetic, Natural History.

Let your computer help you learn

Write or phone for a FREE 20 page illustrated catalogue of our Leisure and Educational Software

KOSMOS SOFTWARE LIMITED

FREEPOST (no stamp needed)

DUNSTABLE, Beds. LU5 6BR

Tel: 05255 3942 or 5406

A1 COMPUTER SERVICES

For your Computer Repairs and Supplies

We are an Authorised Slogger Dealer and also an authorised Microvitec Service Centre. Used Equipment bought and sold.

**9 PADDOCK MOUNT, DAWLEY,
TELFORD, SHROPSHIRE. TF4 3PR
Tel: 0952-502737**

ROM/RAM EXPANSION BOARD 2 for the PLUS 1

will hold 7 ROMS or 6 ROMS plus 16k RAM

- .fits inside the plus 1 .easy to fit yourself .clear instructions given
- .write protect switch .only five leads to solder on, connector to board
- .plugs into plus 1 rom socket .ours working with 64k Electron & dual discs
- .options: with 16k ram (2x6264) £37-50 .without ram £30-95

1MHz BUS & ROM BOARD

- .plugs into any cartridge slot .2 rom sockets
- .standard idc bus connector (as BBC)
- .£17-95 .gold plated edge contacts
- all prices incl. no more to pay (UK)
- enquiries tel. 0703-260900 (best after 3pm)
- 36 Sarum Road, EASTLEIGH, HANTS, SO5 2AN.

R.O.D.H. Designs

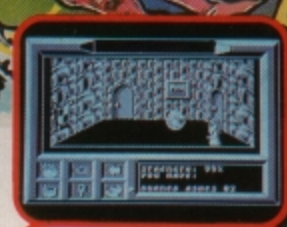
Spellbinder



SEARCHING A ROOM



A DEATHMONK APPROACHES



ANOTHER NASTY CONFRONTATION



WANDERING THROUGH WOODLAND

Leg of Toad, and Golden Fruit, Mix with Ashes and Nightshade Root.

At the end of the thirteenth century, there lived in the land of Lorraine ten wise and powerful Magelords. Each of them had studied sorcery and enchantment from childhood days, and each knew how to evoke potent spells capable of causing metamorphosis and devastation.

You play the role of one such Magelord named Eldon The Spellbinder. Your task is to find the evil Zorn, who has deserted the Magelord brotherhood and fled to the Castle of Lorraine.

Then, by collecting the correct ingredients, you must mix the Ultimate Spell, cast it at Zorn and banish him for good.

A captivating 3D arcade-adventure full of problems to be solved by magical means. Only the appropriate ingredients mixed in the correct order will produce all the powerful spells which you need to complete your mission of destiny.

BBC Micro Cassette	£9.95	Acorn Electron Cassette	£9.95
BBC Micro 5 1/4" Disc	£11.95	Acorn Electron 5 1/4" Disc	£11.95
BBC Master Compact 3 1/2" Disc	£14.95	Acorn Electron 3 1/2" Disc	£14.95

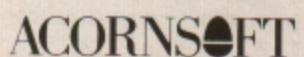
(Compatible with the BBC B, B+ and Master Series computers).

The screen pictures show the BBC Micro version of the game. The graphics of other versions may vary.

PRIZE COMPETITION

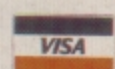
If you complete the Spellbinder mission (by killing the evil Zorn), you can enter our competition. Prizes include a superb engraved trophy, with Spellbinder T-shirts and signed certificates for runners-up.

Closing Date: 30th June, 1988.



Dept. SPR3, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: 0532 459453

Please make all cheques payable to "Superior Software Ltd".



24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately. (This does not affect your statutory rights)

BONE CRUNCHER



Bono takes the skeletons to a cauldron



Bono's partner Fozzy restrains a monster

A PRIZE FOR EVERYONE WHO COMPLETES THE GAME

Buy Bonecruncher and see if you can complete all the game screens!

All successful players will receive a superb portable radio with headphones (illustrated on the right), a colourful Bono's Bathing Co. badge, and a signed certificate.

Closing Date: 30th April, 1988



• Full of Strategic Puzzles and Problems

• Over 20 Increasingly Difficult Caverns

• Password Feature helps you to Progress

• Prize Competition for Skilled Players

• Humorous, Witty, a Barrel of Laughs

Bono The Dragon and his Flourishing Business

You are Bono, a friendly dragon residing in a picturesque sea-castle. As a shrewd business-dragon, keen on "nice little earners", you make your living by selling soap to the giant monsters who bathe in the sea surrounding the castle.

With the aid of your business partner, named Fozzy, you produce the soap by collecting skeletons amongst the castle caverns and then boiling the bones in a cauldron.

However, the castle caverns are fraught with danger: there are monsters who will kill you, spiders who will eat you alive, and glocks who will block your path. It will pay you dividends to also avoid the perilous trapdoors and hidden volcanoes.

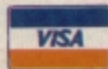
A soap-opera not to be missed!

COMMODORE 64/H28 • COMMODORE AMIGA
BBC MICRO • ACORN ELECTRON

Cassettes: \$9.95 (C64, BBC, Electron)
5 1/4" Discs: \$11.95 (C64, BBC, Electron)
3 1/2" Discs: \$14.95 (Amiga, BBC Master Compact)

SUPERIOR SOFTWARE
Limited

Dept. BC6, Regent House, Skinner Lane,
Leeds LS7 1AX.
Telephone: (0532) 459453



24-HOUR TELEPHONE
ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately. (This does not affect your statutory rights).