

A Database Publication

electron

user

Vol. 6 No. 11 August 1989 £1.25

MICRO LAB

Turn your Electron
into a testing tool

FEATURES

*Kayleth mapped
Hardware explored
Repton Infinity solved*

REVIEWS

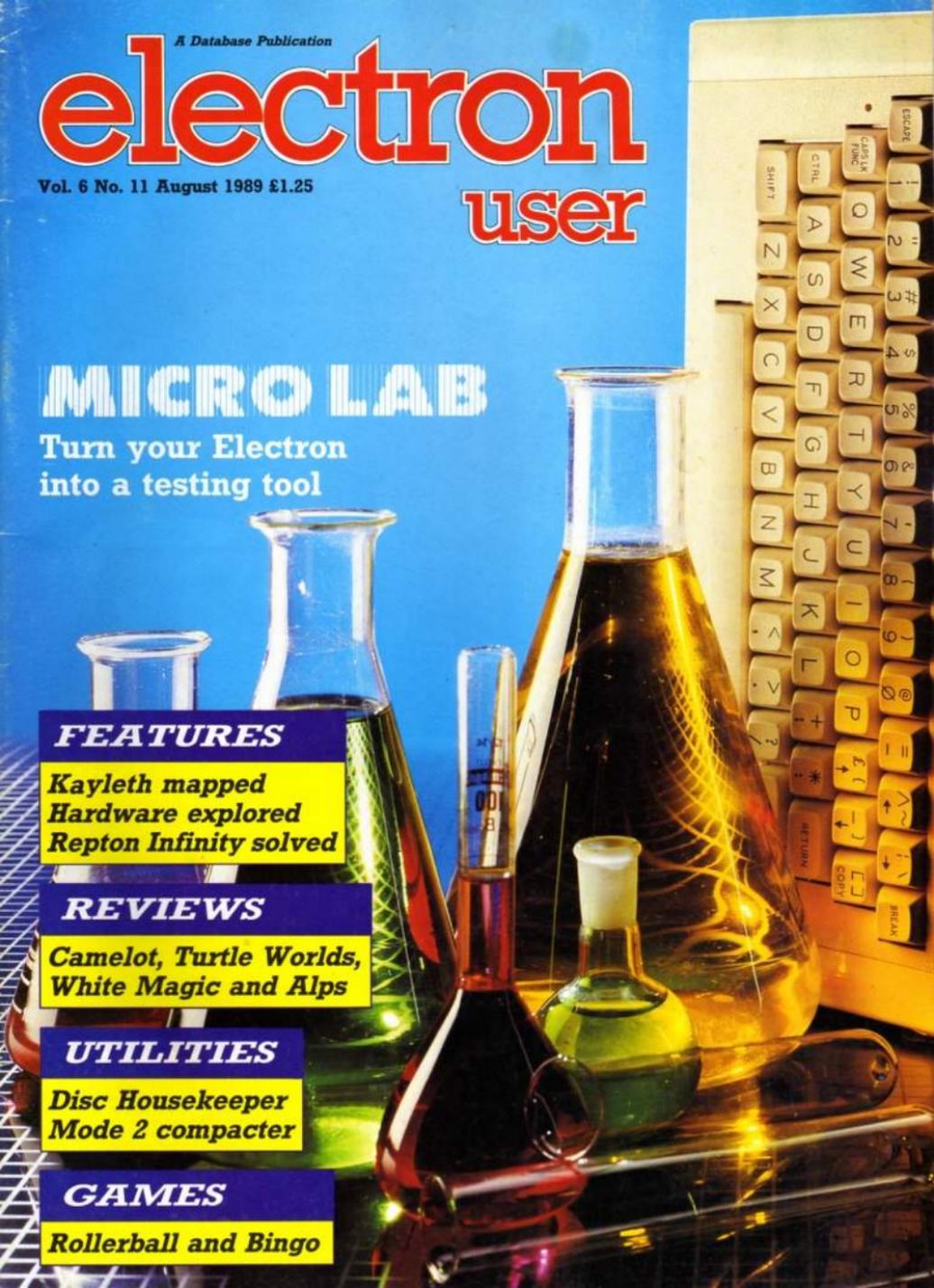
*Camelot, Turtle Worlds,
White Magic and Alps*

UTILITIES

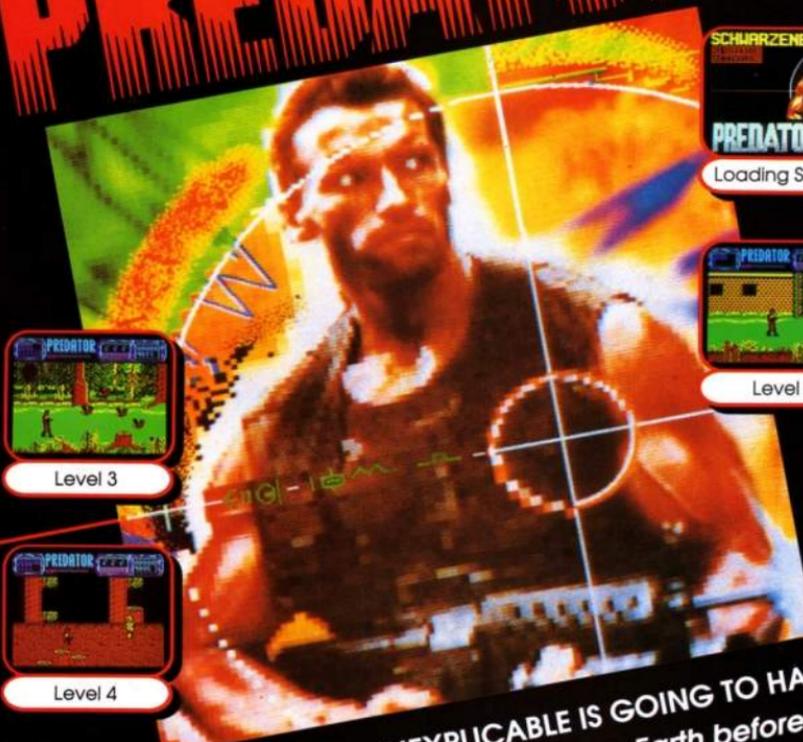
*Disc Housekeeper
Mode 2 compacter*

GAMES

Rollerball and Bingo



SCHWARZENEGGER PREDATOR



SOMETHING HORRIFYING AND INEXPLICABLE IS GOING TO HAPPEN.....
 Nothing like it has ever been on Earth before.
 It came for the thrill of the hunt.
 It picked the wrong person to hunt. YOU!

BBC Micro Cassette \$9.95 Acorn Electron Cassette \$9.95
 BBC Micro 5¼" Disc \$11.95 BBC Master Compact 3½" Disc \$14.95
(Compatible with the BBC B, B+ and Master Series computers)
 Please make cheques payable to "Superior Software Ltd".
 (The screen pictures show the BBC Micro version of the game.)

You've heard about PREDATOR, the Schwarzenegger film - now you can play the leading role. Take a crack commando unit into the South American jungle to rescue a bunch of trapped diplomats. Should be easy enough...so it would be, if it weren't for the mysterious alien who keeps on taking out your men. All the thrills and action have been captured by brilliant programming, using features such as parallax scrolling and dual-screen updating. Nothing like it has ever been seen before!

SUPERIOR SOFTWARE
LIMITED

ACORNSOFT

ACTIVISION
©1987 Twentieth Century Fox Film Corp.
Licensed from Activision (UK) Ltd.

Available from
WHESMITH
and all major dealers



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.)

Activision is a registered trademark of Activision Computers Ltd. Superior Software Ltd is a registered user.
 Dept PRT 1, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: (0532) 459453



CONTENTS

Cover Story

24 Micro Lab

Don't waste your time washing test tubes, here are two educational programs to help brush up your laboratory techniques.

5 News

All the latest developments in the world of the Electron. Plus the latest Gallup chart.

8 Pendragon

This month our adventure wizard features a map of Kayleth and a review of Alpine's Alps adventure creator.

13 Turtle Worlds

We test an upgrade to Logo which adds a bright, cheerful and friendly user interface.

15 Software

Two new arcade adventures are tested by our panel of experts this month: White Magic and Camelot.

17 Disc Housekeeper

A handy utility to give your floppy discs a spring clean and tidy up your files.

21 Lifting the lid

Ever wondered what goes on inside your micro? We dispel some of the mysteries of the Electron's hardware.

26 10 Liners

More mini programming marvels from our talented readers, including a horse racing game and an alarm clock.

23 In Action

Cram more Mode 2 screens on to disc using our powerful compaction technique.

29 Rollerball

Inspired by the film of the same name, a great arcade game for two players.

31 Bingo!

This DIY Bingo construction kit enables you to print your own cards for family fun.

35 Micro Messages

A selection from the many informative and lively letters you've been sending us over the past few weeks.

38 Arcade Corner

Can you solve the cryptic hints and tips for Repton Infinity? They're almost as frustrating as the game.

42 Education

Fun School 2 is given a testing workout in the classroom. Find out here how it fared.

46 Book Review

We assess the value to an Electron user of a new general purpose micro manual.

Published by
Database
Publications Ltd
Europa House,
Adlington Park, Adlington,
Macclesfield SK10 4NP.

Editorial, Admin, Advertising:
Tel: 0625 878888
FAX: 0625 879966
Telex: 9312188888 DB
MicroLink: MAG001
Prestel: 614668383
Subscriptions:
051-357 2961

ABC

22.033 Jan-June 1988

Managing Editor
Derek Meakin

Features Editor
Roland Waddilove

Production Editor
Peter Glover

Reviews coordinator
Pam Turnbull

Promotions Editor
Christopher Payne

Advertising Sales
John Snowden
Peter Babbage

Newspaper distribution:
Diamond Europress Sales & Distribution, Unit 1, Burgess Road, hylhouse Lane, Hastings, East Sussex TN35 4NR. Tel: 0424 430422.

Printed by Carlisle Web Offset

Electron User is an independent publication. Acorn Computers Ltd. 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.

ISSN 0952-3057

© 1989 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.

Database Publications is a
division of Europress Ltd.

Back to
school

10 educational games for
the Electron for just

£5.95

Order on Page 45

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

TO ORDER PLEASE USE THE FORM ON PAGE 45



Software Bargains' Plus 1

Zooming in on art

IMPACT Software (0742 769950) has launched a new art package for the Electron which boasts a number of features promising to bring new artistic outlets for Electron owners.

Called The Art Studio, it is designed to help users produce top quality pictures with ease then save them to cassette or disc. These include zoom, copy, move, paint with 100 brush sizes, square, circle and rubberband.

The Art Studio comes with clear, comprehensive instructions in a sturdy box with attractive packaging showing the kind of pictures that can be produced. Electron cassette version costs £9.95.

More 3D golf links

THE Fourth Dimension (0742 700661) has bowed to popular demand and produced two more courses to add to its Holed Out 3D golf simulation.

Each package contains two complete 18 hole courses and as the original Holed Out main program is included, it is not necessary to own the original game to play them.

Holed Out received a glowing report when reviewed in the June issue of *Electron User* and the new courses are said to be just as good as the original.

"We've had a lot of requests for extra courses and here they are", said Steve Botterill of The Fourth Dimension. "They're a lot trickier than the original holes and call for a dab hand to get round anywhere near par".

The two sets are called Holed Out Extra Courses, Volumes 1 and 2. Electron cassette version costs £9.95.

Business boost for the Electron

TO give Electron users a chance to try Acornsoft's business packages View and Viewsheet, Software Bargains has brought out its own cheaper version of the Plus 1.

The board, which comes without casing, is being offered in three packs. A basic pack bundles the complete PCB with one cartridge port, plus word processing package View and spreadsheet Viewsheet, for £29.95.

An extended version includes

the PCB with one cartridge port and a printer port with View and Viewsheet for £36.95 and the full pack has two cartridge ports, enabling users to add a disc drive at a later date, a printer port plus View and Viewsheet for £39.95. Upgrades will be available for up to 12 months after the date of purchase. From basic to extended costs £15, from basic to full costs £20 and from extended to full costs £12.

"In essence, we are really trying to sell the benefits of View

and Viewsheet. The expansion board is merely a means to this end, but we feel we are breaking barriers in people's minds in terms of price", said Ruth Sutcliffe for Software Bargains.

"We are calling this an exclusive business/education offer for Electron owners because we've calculated that of the approximate 200,000 Electrons in the UK, perhaps as many as 150,000 owners have not yet been able to acquire or use View or Viewsheet.



Setting the seal to the new partnership between leading electronic mail company MicroLink and Britain's newest data communications giant Istel Inet are (left to right): David Bromley, sales director and David Underwood managing director, Istel Inet with Derek Meakin, chairman, and David Hirst, commercial director, MicroLink.

Growing partnership

MAJOR changes are being planned for MicroLink, the rapidly growing electronic mail service.

It will leave Telecom Gold and enter into a partnership with Istel Inet, the new telecommunications giant. Istel Inet is a part-

nership of two major international names in the field of data communications, Istel and Bell Canada Enterprises.

"We have long been faced with restrictions that have prevented us developing the service in the way we know our subscribers

would like", said MicroLink chairman Derek Meakin. "We feel that the time has come to break away from Telecom Gold and open new doors.

"The result will be a considerable expansion of services available to anyone with a computer, a modem and a telephone".

Many of the present facilities offered by MicroLink will be improved and the new service will also include news, sport and weather, a comprehensive financial section plus online shopping. Computer conferencing, a service long requested by MicroLink subscribers, will also be introduced.

Warning for pirates

ELECTRON games will soon bear a new symbol as a warning against copying. Taking the next step in its battle with piracy, FAST, the Federation Against Software Theft, is hoping to persuade software houses to use a common warning symbol. Liverpool-based Psynopsis has offered to design the symbol free of charge. It will feature the internationally recognised red circle with a diagonal slash and may include a picture of a pirate.

Gallup Software Chart



| THIS MONTH | LAST MONTH | TITLE (Software House) | COMMENTS | PRICE |
|------------|------------|--|---|-------|
| 1 | 2 | FRAK! <i>Aardvark</i> | A good five years old now, this game from Orlando was one of the first for the Electron. Definitely a collector's piece. | 7.95 |
| 2 | 11 | LAST OF THE FREE <i>Audiogenic</i> | Yet another title which has not been in the charts for some years, but it still selling well even at full price. | 7.95 |
| 3 | 1 | STORMCYCLE <i>Atlantis</i> | Save the Earth from imminent invasion and disaster by finding five diodes, killing the enemy and beating the clock. | 1.99 |
| 4 | ● | CRAZEE RIDER <i>Blue Ribbon</i> | Enjoy the thrills and spills of high-speed motorbike racing. Fast, furious and originally a full-priced game from Superior Software. | 2.99 |
| 5 | 6 | JOE BLADE 2 <i>Players</i> | The graphics are good and the game is very playable. The puzzle screens are wicked and will keep you busy for hours. | 1.99 |
| 6 | ● | DEAD OR ALIVE <i>Alternative</i> | Prepare for a shoot out at the OK Corral. It's dusty and hot – can you survive and retain your position as town sheriff? | 1.99 |
| 7 | 12 | INDOOR SOCCER <i>Alternative</i> | A simple game at a budget price. Good value and well worth a look. Though nothing spectacular, it is competently executed. | 1.99 |
| 8 | 3 | COMMANDO <i>Encore</i> | A Rambo-style shoot-'em-up against the odds. Now on a budget label, but you can also buy it as part of Play it Again Sam 3. | 2.99 |
| 9 | ● | OLYMPIC SPECTACULAR <i>Alternative</i> | You have a couple of more years to wait for the next Olympics, so this could be just the time to get in some training. | 1.99 |
| 10 | 7 | GRAHAM GOOCH TEST CRICKET <i>Alternative</i> | Originally released by ASL, it is more suited to its budget price. Only recommended if you can't wait for the next Test. | 1.99 |
| 11 | ● | PLAY IT AGAIN SAM 9 <i>Superior</i> | A new arcade adventure called Camelot joins Spycat, Steve Davis and Repton in this superb compilation. | 9.95 |
| 12 | ● | CRAZY ERBERT <i>Alternative</i> | Bounce down a pyramid, painting as you go, but watch out for the gorilla's banana and unscrupulous snakes. | 1.99 |
| 13 | ● | THRUST <i>Firebird</i> | An old favourite which is deceptively simple. Thrust has been keeping people glued to their seats for years with its skillful gameplay. | 1.99 |
| 14 | ● | ZALAGA <i>Aardvark</i> | Looking like eratic bees, the aliens swoop towards you in formation. Winning is simple – destroy them before they destroy you. | 9.95 |
| 15 | ● | CITADEL <i>Blue Ribbon</i> | A great way to start a games collection if you are new to the Electron. Originally full-priced, it is a superb arcade adventure. | 2.99 |
| 16 | ● | TURF FORM <i>Blue Ribbon</i> | After the good weather at Royal Ascot you may feel lucky – if so, this one will test your skill. All you have to lose is £1.99. | 2.99 |
| 17 | ● | CROAKER <i>Micropower</i> | Similar to Frogger, Hopper and the rest – you must manipulate and manoeuvre your frog back to its home pond. Fast and tricky. | 2.99 |
| 18 | ● | GHOULS <i>Micropower</i> | Also available on Sam 7. Good use is made of sound and graphics in this simple levels game set in a mysterious mansion. | 9.95 |
| 19 | ● | KILLER GORILLA <i>Micropower</i> | There is little which can be said about this classic which hasn't been said before. If you haven't seen it – buy it. | 9.95 |
| 20 | ● | BUMBLE BEE <i>Program Power</i> | A variation on the Pac-Man theme. You collect pollen while being chased by spiders, but you can rearrange the maze to cut off their attack. | 1.99 |

COMPUTER SHOPPER SHOW '89

NOVEMBER 24 - 26, ALEXANDRA PALACE

INCORPORATING
THE WONDERFUL WORLD OF THE PC



Enter the brand new Acorn-backed Computer Shopper Show, the ultimate venue for a shopping spree for all BBC Micro and Electron users.

Designed to replace the Electron & BBC Micro User Show, many of the 250 stands will be selling Acorn products, making it the biggest-ever pre-Christmas computer event designed with BBC Micro and Electron buyers in mind.

For three days in November, Computer Shopper will transform London's Alexandra Palace into the world's largest hyper-market offering computer gifts.

The choice of Acorn products will never have been greater - nor will the number of special show offers.

There's only one show for BBC Micro and Electron owners in the run up to the festive season - that's the Computer Shopper Show. Order your tickets today by returning the coupon with your payment or telephone 051-357 2961 for credit card bookings.

The Great Hall,
Alexandra Palace,
Wood Green, London N22

10am - 6pm Friday, November 24
10am - 6pm Saturday, November 25
10am - 4pm Sunday, November 26

Sponsored by
Computer Shopper

Organised by
DATABASE EXHIBITIONS

Please supply:

- Adult tickets at £3 (save £1).....£.....
 Under 16s tickets at £2 (save £1).....£.....
 Family tickets at £9 (save £5).....£.....

Total £.....

- Cheque payable to Database Exhibitions
 Please debit my Access/Visa card no.

Expiry date: / / Admission at door: £4 (adults) £3 (under 16s) Advance ticket orders must be received by Wednesday, November 15

Name: _____

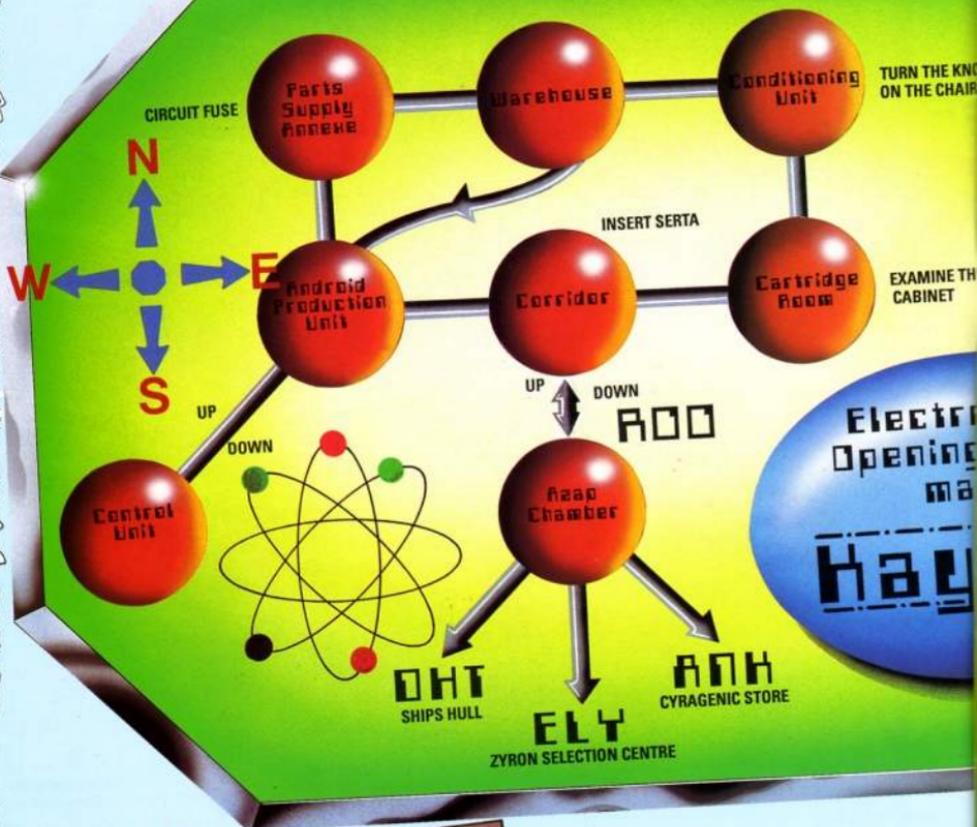
Address: _____

Postcode: _____ Signed: _____

PHONE ORDERS: RING Show Hotline: 051-357 2961
PRESTEL ORDERS: KEY *89, THEN 614566383
MICROLINK: 72-MAG001

Please quote credit card number and full address

POST TO: Computer Shopper Show Tickets, Database Exhibitions,
PO Box 2, Emswore Port, South Wirral L69 3EA.



Adventures

By Pendragon

The hero with a creator

THIS month's column is something of a special, as I bring you a full review of Alpine's much awaited and excellent rom-based adventure creator Alps. This review has been prepared by Paul Waterman, long time correspondent and author of Reluctant Hero.

First let's catch up with the gossip which has flowed over the castle walls since last we spoke. Perhaps the biggest and most pleasant surprise was a scroll I received from that master adventure creator Steve Maltz. He wrote to say that despite the fact that Shards no longer produces text adventures, he still reads this column every month and wishes to send his best wishes to all

Electron adventurers.

He explains that Shards Software is now involved in producing interactive business training software for IBM PCs. Despite that, the back catalogue of Shards' excellent Electron adventures such as Pettigrew's Diary, Woodbury End and Operation Safiras are still available from mail order firms.

A letter from Steven Kelk also caught my attention. He queries the fact that in the past I mentioned that Geoff Larsen gave Hex its title

because it was his sixth adventure, and Hex is the Greek word for six.

Steven has apparently searched and can only uncover five adventures by Larsoft. So to put you out of your misery and help other folk who are searching, here is a full list of all Larsoft adventures:

- | | |
|--------------------------|---------------------|
| 1. The Prophecy | 4. The Nine Dancers |
| 2. Return of the Warrior | 5. The Puppet Man |
| 3. Wychwood | 6. Hex |

Climbing icy mountains

THE Electron version of Alps - Alpine's Adventure Language Programming System - has recently been converted from the original BBC Micro program. Alpine says: "Necessity being the mother of invention, we have actually squeezed in more features than the BBC Micro version has".

This adventure creator package includes a 16k rom, user guide, keypad and either disc or cassette of utilities and sample adventures. As Alps is a rom-based utility, you will need either a Plus 1 and blank rom cartridge or Rombox. To evaluate the system, I converted my Quilled adventure Reluctant Hero into Alps.

An adventure program created by Alps is made up of a list of rooms and objects, along with the program logic to handle them. The object and room descriptions and properties are stored in easy-to-use tables.

Up to 150 objects, and 255 verbs and synonyms can be defined. Each room and object has eight flags and a state value. Memory is set aside for them at the start, unlike the Quill, where the more objects or verbs you use the less memory there is available for the game.

Any object can be a light source and all or just some of the objects can be breakable, magnetic, heavy or sharp. The object's flags can be changed in the logic part of the program so that a blunt knife can be sharpened.

The object's state can be linked to messages so that a knife could be described as "A long jewelled knife with a sharp edge", "A long jewelled knife with a blunt edge" or "A long jewelled knife with a broken blade".

To save memory, the "A long jewelled knife with a" is the same in each instance, with the alternatives tagged on depending which switch is

Product: Alps, disc version
Price: £28.95
Supplier: Pres, PO Box 313, Lightwater, Surrey GU18 5PW
Tel: 0276 76545

Product: Alps, tape version
Price: £27.95
Supplier: Alpine Software, PO Box 25, Portadown, Craigavon BT63 5JT.

active in the object description. Another memory-saving device is the hash symbol. Whenever it appears a predefined message is placed at that point. Any number of hashes can be used to reduce the text.

The technique can be used for the 150 possible locations, and any room can be designated as airless, flooded, poisonous and so on. The room state can be used to alter the description.

Automatic text formatting ensures that words are not split over lines, so there aren't any worries about how messages appear.

Text compression must be done manually and I found this difficult to do effectively. Efficient automatic text compression is available on the extras disc or tape. It took about one minute to compress all the text in Reluctant Hero.

The optional extension disc allows you to produce large adventures by holding all the text on disc. Games can then have up to 255 locations. With the extras disc you can compress the text by up to 60 per cent.

Also, more predefined verbs such as GET ALL and DROP ALL are added, and a container is provided in which objects can be placed or removed. These verbs can be programmed using

Turn to Page 11 ►



Another missive from Kerry Kirwan should be of interest to all readers. She writes that a new adventure software company for the Electron has just been formed called Tiger Soft. It is currently developing a 300 location epic titled The Magic of Merlin. It is due for pre-Christmas release and I await a review copy with suitably baited breath.

Erstwhile contributor Barbara Gibb deserves mention and my thanks for her full solution to that adventure oldie, Seek. This is one game I never finished, so am most grateful for her help. Barbara also offers a unique playtesting map to Aussie Suds for which I would also be indebted.

I won't keep you from the Alps review much longer, but finally let's mention this month's featured map. It is of the opening scenario to Adventure Soft UK's Kayleth and ought to help many adventurers who are stuck at the outset of this excellent sci-fi jaunt.

Next month I continue this series with a guide to the openings to Epic's classic, Quest for the Holy Grail.

● That's it for this month, so until icicles form on the keyboard, happy adventuring.

New Educational Bundle

FUN SCHOOL!

For a limited period we are offering ALL THREE Fun School 1 AND Nursery Rhymes in a special educational bundle.

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

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

- Use your BBC Micro 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.

RRP £20.80
OUR PRICE
£9.95

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

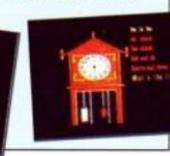
NURSERY RHYMES

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.



Send for your collection today using the form on Page 45

◀ From Page 9

Alps, but the Extras disc does it more efficiently.

A special starter program provides verbs like TAKE, DROP INVENTORY and the directions.

Standard movement is N, S, E, W, UP and DOWN, though you can program the game to accept any other direction, but at a cost – the more non-standard directions used the more memory will be needed to program them.

A useful feature is that each room has an exit routine for each standard direction, allowing you to have a conditional exit like a locked door or secret passage.

Before the player is moved the exit is checked to see if there is a special routine for it, and if so whether it allows movement at that time. If it doesn't the player isn't allowed to proceed and a message can be given explaining why.

Automatic exit reporting is enhanced compared to the BBC Micro version. Every time a room is described Alps looks at every connecting room and reports that "There are exits north to MSG and south to MSG" where MSG is the text in the room data table.

There are only 50 integer variables, compared to 64 in The Quill, but there are also eight On/Off flags and one state with a value of up to 255 for each object and room.

This leads to one of the problems of Alps – trying to debug the logic. With The Quill the game can be run with all of the flag values displayed, but Alps would have to display 2,700, which is not feasible.

Most of the familiar adventure keywords are



present, but sometimes different words are used. Some common keywords are missing, among them are CLS, DROP, GET, and PAUSE. However, DROP and GET are defined in the special Starter file, which means you can redefine how they react to a particular situation. Instead of printing OK you could have different messages for each object – memory permitting of course.

PAUSE can be programmed by using procedures. The delay is easily set by making the program loop a number of times. I found the loss of CLS to be irksome, but as I became more used to Alps I found I didn't miss it as much.

All the flags can be set to zero or one wherever you are, so an action in one room or on one object can change the flag in another room or object. The state of an object or room can be incremented or decremented so allowing progressive changes.

Whole sentences can be typed by the player and either the first recognised verb and object can be acted on, or by extra programming, the whole sentence can be analysed and acted upon.

The on screen editor used in entering the logic part of the program is only a simple line editor rather than a full screen version. The function keys are used to enter the object, room and text editor as well as for inserting/deleting lines and text compression.

The utilities allow you to create stand-alone games that can be run without the Alps rom, printing room and object data lists and the text.

You can also examine two sample adventures, one small one with seven rooms and six objects, and a larger one with 50 rooms and 90 objects. You can play both of the games and access the data files so that you can see how they have been constructed.

The user guide is a 38 page booklet which is, for the most part, easy to understand, though I felt the section dealing with writing the logic part of the adventure was not basic enough. The rest of the sections were well explained, particularly the one on sentence analysis.

Alps is superb value for money and well supported by Alpex whom I found very helpful whenever I stumbled.

Paul Waterman

NEW! for the Electron

KEYWORD

The dynamic word finder for home and business use

Now you need never be stuck for a word again because Keyword contains dozens of synonyms for over 12,000 words.

And it's so easy to use. Just type in a word and straight away you'll be offered a huge list of alternatives. Then, using the cursor keys you can select the word that's nearest to your liking. Or if it's not exactly the one you're looking for, just press return to home in on another, more closely, related set of words – and so on.

With Keyword you'll be able to quickly and effectively make use of the complete wealth of the English language, and once you've used it you'll wonder how you ever managed without it.

And the best news of all is the price. Just £19.95, plus you get a FREE calculator watch!

- Easy to use
- Over 12,000 synonyms and antonyms
- Nearly 1,000 main subject headings
- Extra rapid word search
- Can select over 70 words at a time
- Simple operation
- Flexible 'room' facility
- Can be used as a Thesaurus

Watch offer extended – for one month only

Special Introductory Offer

SAVE £4.95

We will send one of these superb calculator watches, worth £4.95, to the sender of every order for Keyword we receive before 31st August, 1989



In case of high demand we reserve the right to replace this watch with one of equal or better value

ORDER FORM

Please send me a copy of Keyword for the Electron (3.5" disc) for £19.95. I enclose a cheque/Euro cheque/PO made payable to SWIFT SOFTWARE.

Name

Address

Post Code Tel:

Swift Software, EUS,
347 London Road,
Hazel Grove,
Stockport,
SK7 6AA.
Tel: 061-456 0926

LIST
DICTIONARY
THESSAURUS
BIBLIOGRAPHY
CANTALOGUE
CHECK LIST
DICTIONARY
GLOSSARY
INDEX
INVENTORY
LEXICON
LIST REGISTER
ROLLE
ROSTER
SCHEDULE
ROTOR
TABLE
THESAURUS
CHECK



KEYWORD
A WAY WITH WORDS™

The Dynamic Word Finder
for home and business use

USER GUIDE



VOLUME 3
AVAILABLE
NOW

Only
£2.99
each volume

Programs available
only on cassette

Just about all the games in your collection can now be cracked – using Cheat it Again, Joe!

Each tape contains a massive 20 cheats and they're so easy to use. Just load the cheat before you run the game and you're away – with infinite lives, extra speed, more credits, invulnerability and so on.

Now you can complete those games that have been frustrating you for months.

And for only £2.99 this is the ideal way to bring your games collection back to life.

Volume 1

| | | | |
|-----------|-----------------|------------------|------------------|
| Elite | Region 1 | Bonecrusher | Starship Command |
| Clash | Region 2 | Killer Gorilla | Academics |
| Ravenhill | Star Wars | Eizer | Kourtyard |
| Thrust | Quest | Living Daylights | Despatch Rider |
| Plan B | Thunderstruck 2 | Deathstar | Phantom |

Volume 2

| | | | |
|------------------|-------------|-----------------|--------------------|
| Region 3 | Combat Lynx | Place of Magic | Ransack |
| Around the World | Paperboy | Isaris | Imogen |
| Life of Repton | Saigon | Impact | Uridium |
| Plan B2 | Soycat | Magic Mushrooms | Karate Combat |
| Codename Droid | Spellbinder | Planetoid | Repton 3 passwords |

Volume 3

| | | | |
|------------------|-------------------|--------------|-------------------|
| Region This Time | Anarchy Zone | Spyfire 40 | Sphere of Destiny |
| Shark | Frankenstein 2000 | Zippy | 3D Doty |
| Barbarian | Pyrcastia | The Big KO | Meteors |
| Skirmish | Round Ones | Omega Orb | Thunderstruck |
| Breakthrough | Overdrive | Future Shock | Creepy Cave |

TO ORDER, PLEASE USE THE FORM ON PAGE 45



IMPACT Software

BBC B/Master
5 1/4" Disc

Only
£4.95

£4.95 each

Here's your chance to get your hands on Impact's best selling games, for just £4.95 each on cassette. That's right, we are offering Zenon, Clogger and Orbital for the incredible price of only £4.95 each!



IMPACT Software

BBC RAM

TO ORDER PLEASE USE THE FORM ON PAGE 45

An add-on software package designed to improve Logo's rather unfriendly interface is given a thorough classroom workout by Roger Frost

be displayed in the colours they were originally painted in.

- RESET sets all colours back to their default values.
- PANIC will regain work space at the expense of defined procedures. This could be a life saver for Logo users.

The other two features are designed to make the user interface easier to manage. The first, simple method is to define function keys with the more frequently used Logo

involves the car park plan. One suggested idea is to move the turtle along roadways to an empty parking lot and then to construct a simple plan view of a car.

Changing the colour of items on screen – a satisfying process – will require the turtle to be placed inside the object. Distances and angles will need to be estimated here. A particularly popular idea is to colour the fruit so that it looks bad.

A pity the printer option is for black and

A smile on the face of the turtle

ONE of the main problems experienced by teachers when trying to encourage pupils to enthuse over Logo is the language's decidedly unfriendly startup prompt. The Logotron version – which is now the standard – simply presents a question mark as a prompt, which can be a stumbling block for some pupils who then don't know what to do next.

For them, Turtle Worlds – the company and the product have the same name – may well provide the answer. It runs on the Electron providing you have an AP4 disc interface.

Logo, a very powerful computer programming language, is set to form part of the national curriculum for many schools. The Logotron version has many in-built extensions like control and music, but many teachers are alarmed about how their pupils will cope with any variant on the basic Logo theme.

Now Turtle Worlds transforms the appearance of the language into something bright and colourful by allowing users to work on screens loaded as backgrounds.

The package consists of two discs and a very well written manual. The aim of authors Richard Parker and Chris Morley is to make Logo accessible and easy to use. All that is needed is to insert the main disc, press Shift+Break and let the software set itself up. After a short wait a very pleasing Turtle screen loads, followed by the main program.

The menu displays a list of the ready made screens provided on the disc. These pictures are based on a supermarket theme, with a plan view of the car park, the front of the shop, a plan of the inside, shelves, tins of peas, some fruit and a final picture of loading the car with shopping.

These screens are only the beginning, as it is easy to create your own and add them to a Turtle Worlds Library disc. User friendly utilities are provided to convert raw screens to Turtle Worlds format.

There are three other main features, the first being the extra Logo Keywords provided:

- SETCOL allows screen colours to be altered and is equivalent to the Basic VDU 19 command, but much easier to manage. This is required to allow Turtle World screens to

keywords. The second technique is to set up a Concept keyboard.

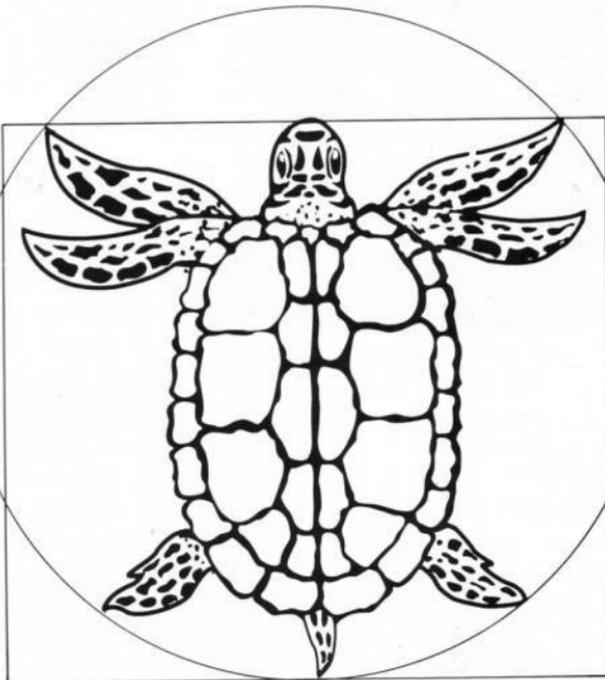
An A4 sized overlay is provided with the pack. It can easily be photocopied and enlarged for A3 size keyboards.

The best part of Turtle Worlds is the section in the manual devoted to ideas for its use. Although simple, they will set youngsters thinking about geometry without realising it as they perform some other task. An example

white Epson-compatible devices.

Turtle Worlds could be the way to bring any school's Logotron Logo to life. It is thorough, very user friendly and an absolute snip at £12. Recommended.

Product: Turtle Worlds
Price: £12.00
Supplier: Turtle Worlds, 7, Springwood Road,
Leeds LS8 2SA.



Upgrading to 16 bit?

Whether you're about to buy an Atari ST, an Amiga or a PC, we've got just the magazine for you.

Atari ST User, Amiga Computing and PCA are THE three top magazines dedicated to 16 bit micros. Written in the easy-to-read Database style, each magazine is the ideal companion for the micro it covers.



£1.95

The biggest and fastest growing magazine for users of the Atari ST.

It's packed with all the information you need to make the most of your ST, including a pull-out section which grows into a complete reference guide, interviews with top ST programmers and exclusive previews of the latest business and games software.



£1.95

Britain's newest and brightest magazine for Amiga Users.

In each issue are reviews of all the latest software, ranging from games, art packages and business programs, to video titling systems, music creators and languages.

Learn about the Amiga's incredible sound and graphics capabilities, and how to write your own games, utilities and business software.



£1.95

The most up-to-date, fact-filled magazine devoted to the IBM PC, Amstrad PC and compatibles.

Each month it includes a free 5.25in disc, packed with the latest software, handy utilities, fast-action games, music programs and much, much more. There are thorough evaluations of all software and hardware, beginner's tutorials and language workshops, plus unbeatable special offers.

Save*

An annual subscription to any of these magazines is £24.95. But as a reader of this magazine if you subscribe to them using the form below, we'll give you a £5 reduction.

So send off your subscription today. Ensure you get your copies delivered straight to your door - before they appear in the newsagents - and save money too!



ORDER FORM

Please send me the next 12 issues of.

Atari ST User 9100 Amiga Computing 9632 PCA 5437

Please tick your selection and payment method. *UK only

Cheque for £19.95 per subscription made payable to Database Publications

Access/Visa account number:

Expiry date

Signed _____

Name _____

Address _____

Post Code _____

Daytime telephone number _____

Send to:

Database Direct, FREEPOST
Ellesmere Port, South Wirral L65 3EB.

EU8

EVERYTHING YOU NEED TO KNOW ABOUT DESKTOP PUBLISHING

ONLY
£9.95

The Desktop Publishing Yearbook 1989 is an invaluable buyer's guide containing the most detailed survey available of hardware, software and services in the electronic publishing field.

And there are clearly-written "how-to" articles for both the newcomer to Desktop Publishing and the experienced user.

Articles cover single-user and multi-user publishing systems, publishing software, laser and other electronic printers, matrix printers, digitisers and scanners, computer typesetting, magazine and newspaper composition, documents and forms creation, bureau services, word processors, and many other key topics.

Whether you're a beginner or professional and would like to find out more about the exciting possibilities of DTP, then this book has all the information you need. Send for your copy today!

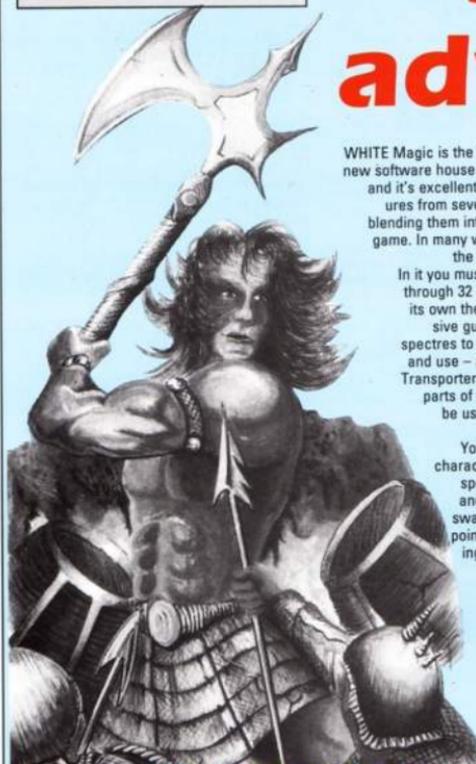


TO ORDER YOUR COPY,
PLEASE USE THE FORM ON
PAGE 45

Product: White Magic
 Price: £9.95 (Tape)
 Supplier: The Fourth Dimension, PO Box 4444,
 Sheffield.
 Tel: 0742 700661



High adventure



WHITE Magic is the latest release from the new software house The Fourth Dimension, and it's excellent. It takes the best features from several arcade adventures blending them into one blockbuster of a game. In many ways it's reminiscent of the arcade game Gauntlet.

In it you must survive and progress through 32 game levels, each with its own theme. There are aggressive guards, trolls, ghosts and spectres to destroy, objects to find and use – and some to avoid, too. Transporters whizz you to different parts of the screen and have to be used correctly in order to complete the level.

You have a choice of four characters, each with its own special powers, strengths and weaknesses, and can swap between them at any point in the game by pressing the keys 1 to 4 to deal with each danger and puzzle.

Kaldor the leprechaun can run very quickly – sometimes the best defence is to beat a hasty retreat – and can climb over tree trunks that block your route. Chesul the titan is a

powerful axe-wielding barbarian who slays all in his path. He can also push objects aside.

Moriana the warrior lacks Chesul's great strength, but makes up for it with body armour, a shield and razor sharp sword. Mandrake the enchanter is endowed with magical powers and is able to use potions to weaken and dispose of his assailants.

Each character has its own armour rating, weapon strength, magical power and health, attributes which are constantly displayed onscreen to the left and right of the central playing area.

As you explore each level you'll come across objects that can be put to good use in your quest. Some increase a character's strength, others add to Mandrake's supply of potions, shields build up your armour, swords aid your combat ability and so on.

The game closely resembles Superior's Ravenskull, but unlike that arcade adventure, here the action comes thick and fast and the emphasis is on battling adversaries and solving puzzles.

The action takes place in a window occupying about half the screen. You can only see a small portion of the total playing area. As you move to the edge of the screen it flicks rapidly to the next – not scrolling like Ravenskull. This means you can't see what objects or assailants lie just off screen, waiting for you to step into their trap.

The graphics are superb, but the sound effects are minimal. However, this doesn't detract too much from the otherwise excellent gameplay. If you are on the lookout for a new arcade adventure challenge White Magic fits the bill nicely.

Janice Murray

| | |
|-----------------|----|
| Sound | 5 |
| Graphics | 10 |
| Playability | 10 |
| Value for money | 9 |
| Overall | 9 |

Second Opinion

Arcade adventures are being released thick and fast, and all are top quality offerings. White Magic, is no exception and soon had me hooked.

With its unusual feature of multiple characters, puzzles, variety of foes and action-packed gameplay it will take quite some time to master. An absolute winner.
 Roland Waddilove





PLAY it again Sam 9 could probably be best described as the Superior collection for the more sedentary gamer. Consisting of three arcade adventure games and a snooker simulation, it is hardly the most exhilarating of compilations.

First is **Spycat**, a tongue-in-cheek tale of espionage and intrigue in the corridors of power. After 50 years' loyal service Spycat hears rumours concerning his forthcoming retirement - due to government cut-backs his comfortable pension is to be slashed. Angered by the thought of impending poverty, Spycat decides to take out a little insurance in the form of three top secret research documents.

Your mission is to help Spycat to locate the documents, copy them to microfilm, obtain all of the relevant travel papers to escape to Greenland, fly there and write his memoirs and probably have them banned by the government.

Despite limiting himself to four colour Mode 5 the programmer has managed to create an impressive series of cartoon-like characters and backdrops - Spycat is a superb Paddington Bear lookalike with a penchant for flashing when ignored for a few minutes. The game was a most enjoyable romp the first time around, and now constitutes a worthy addition to the ever expanding Sam series.

Snooker is a game that has yet to be realistically implemented on the computer screen and **Steve Davis' Snooker** is the epitome of all that is wrong with this type of simulation. The balls are too small to allow for the accurate judgement of angles. Also, the micro is unable to keep track of such a large number of moving balls and as a result the speed varies according to the amount of onscreen activity.

It is played in complete silence and the micro-operated opponent manages the most impossible of shots with uncanny accuracy.

Why anyone would want Sam to play it again I don't know.

The third game involves that mainstay of the Superior stable, **Repton**. No compilation seems complete without it these days. Starting in his autobiography - The Life of Repton - our green-skinned reptilian buddy must negotiate 40 testing screens of fiendish action.

Based around the classic Repton 3 program, the new collection of screens calls upon the different stages of Repton's life as

Cool hand Sam

Product: *Play it Again Sam 9*
 Price: £9.95 (tape)
 Supplier: *Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.*
 Tel: 0532 459453

a source of inspiration. The traumas of infancy form the basis of the first eight. In his search for missing teddy bears baby Repton is hounded by monster dogs and is likely to be crushed by the tumbling Humpty Dumpties.

Many lives will be lost in your first few attempts due to a lack of familiarity with the new game characters. To assist you Superior has thoughtfully provided a character comparison chart, with which you can determine which of the new characters corresponds to the eggs, diamonds, boulders and so on before you do something silly.

The subsequent stages of Repton's life story include school days, teenage traumas, work and his twilight years as an ageing reptile. The game's strength has always been its strategic content: Each screen conceals unknown terrors for the player. You are always aware that a single misplaced boulder can render a screen completely unplayable.

The Life of Repton is by far the best program in this latest compilation - it even includes the screen designer utility.

Sam's final offering is the classy, colourful

and previously unknown arcade adventure called **Camelot**. Your quest as King Arthur in this mythological tale is to search for Excalibur and use it to defeat a fiery dragon. You are hampered by the imposition of a time limit and the fact that nobody appears to respect you any more, the castle being overrun with witches, devils and enemy knights.

You have a single life, the duration of which is determined by the state of your energy level. Physical hazards such as fire, water and banks of vicious pointed spears place a tremendous strain on your wellbeing.

You are able to wipe out most of your enemies, with your trusty zapper until, that is, you run out of zap. The meagre 50 rounds you begin with are soon expended and new supplies are hard to locate. On the positive side your rapidly diminishing energy reserves can be replenished by opening one of the strategically placed treasure chests. First rate graphics and difficult gameplay make Camelot a suitable challenge for even the most accomplished arcade adventurers.

If you are looking for a compilation that gets away from the frenetic keyboard bashing of the Firstrack and Galaforce variety then get yourself a copy of Sam volume 9. With the exception of Mr Davis' contribution, good old Sam's done it again.

Jon Revis

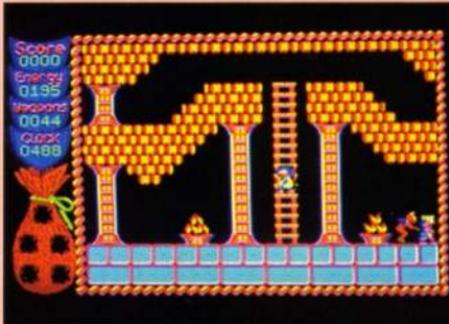
| | |
|-----------------|---|
| Sound | 5 |
| Graphics | 8 |
| Playability | 8 |
| Value for money | 8 |
| Overall | 8 |

Second Opinion

Sam's now playing it for the ninth time in this excellent compilation of hit games. The weakest is Steve Davis' Snooker, and the most outstanding Camelot - a new and challenging arcade adventure that's sure to have you hooked.

Forget the other games - they can be considered freebies - the main attraction is Camelot. I loved it.

Roland Waddilove



Camelot is an arcade adventure in the style of Citadel



Try your luck against the mighty Steve Davis

DISC Housekeeper is a menu-driven machine code program which brings together all the most used disc filing system commands into one easy-to-use utility. It enables you to delete files from any directory, change a file's access status, change directories and compact the disc, rounding up any free space. During this the catalogue or free space map is constantly updated and displayed on-screen.

Every disc user will have seen the dreaded error messages *Directory full* and *Compaction required*. It means, among other things, that it is about time you got around to removing all those unwanted files and sorted your disc out.

Although both the ADFS and DFS have commands which enable you to do this, it is a tedious and repetitive job which always seems to be put off until another day. Disc Housekeeper makes it quick and easy to keep your discs tidy.

Although designed primarily for the ADFS, the utility will reconfigure itself for use with the DFS. It works quite happily with the Pres E00 DFS and the Plus 3. It will also work with other DFS systems having *MAP and *FREE commands. The Pegasus DFS uses *STAT in place of *FREE, but substituting this in the listing will ensure compatibility here too.

If you have a disc toolkit rom you may find that it may have to be disabled before using the program. The ADT rom from Pres, for example, causes the code to crash during DFS - but not ADFS - compaction unless it is first switched off.

Type in the program and save the assembler source code before running it. Once assembled, the machine code will be saved on disc automatically with the filename HK. A short name like this can be quickly called up from your utilities disc with a star command like *HK.

Once Disc Housekeeper is running you will see the main menu offering three options: New disc, Delete files and Compact disc. Pressing Escape at any time, except during compaction, always returns you to this screen.

When used with the ADFS, the first option will *MOUNT a disc. This isn't necessary with the DFS, so nothing will happen.

On selecting the second option, to delete files, the currently selected directory (CSD) will be displayed together with a sub-menu offering three further options.

If the directory is full, the disc title and the first few files will scroll out of the text window. Holding down Control+Shift prevents this.

The three sub-menu options are: Delete from CSD, Change directory and Change access. When you select the second or third options a flashing cursor prompts you to enter the relevant data. Pressing Return then executes the command. A maximum of 14 characters may be entered, with Delete having its normal function of correcting mistakes.

Selecting the first option - Delete from CSD - will enable you to delete files from the currently selected directory. You will see the prompt: *Delete Y/N?* followed by the filename. Press Y to delete it or N to leave it. Continue deleting files or return to the main menu by

pressing the Escape key.

It is easy to move around directories deleting files as you go. Locked or empty directories can have their access status changed with option three - Change access - ready for deletion.

Once you have finished deleting, return to the main menu by pressing Escape and select Compact disc. The free space map and the number of bytes free will be displayed. Press Y to compact or N to abort.

An updated free space map will be displayed after compaction. If there is still more than one entry you may need to compact again. Press Escape to go to the main menu and then select option three - Compact - again.

If you try to delete a locked file or a directory with files in it an error will be generated. To prevent a crash Disc Housekeeper has a built-in error trapping routine. This first dis-

plays the source of the error and then waits for Escape to be pressed before returning to the main menu.

Press the Break key to exit the program. The assembly listing should be easy to follow as it is liberally sprinkled with meaningful labels and is written in a structured manner. All the filing system commands are performed using oscil.

To ensure compatibility between the ADFS and DFS the *COMPACT command is altered as the syntax is different for each one. The machine code is stored in memory from &880 to &CF7.

You should find Disc Housekeeper very useful, as it combines all the most used disc filing system commands into one easy-to-use utility. You no longer have any excuse for not keeping your discs in order.

Turn to Page 18 ▶

Disc spring clean

All the most used ADFS
disc utilities are now
available in a single
package courtesy of
Leslie Goodridge's
Disc Housekeeper

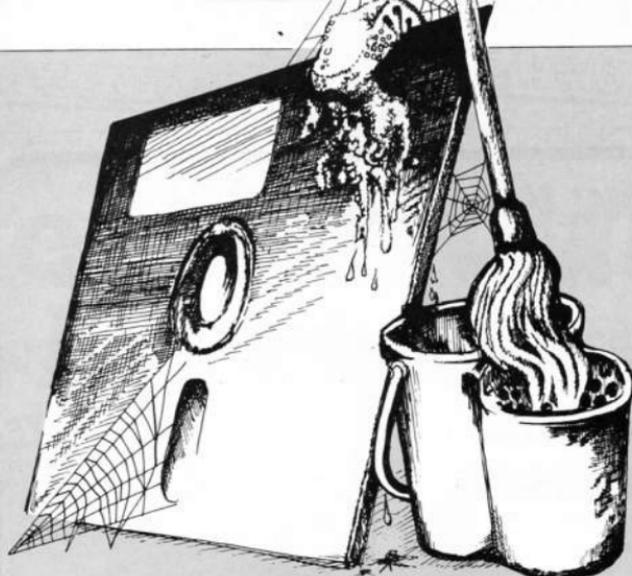


◀ From Page 17

```

10 REM Disc Housekeeper
20 REM By L J Goodridge
30 REM (c) Electron User
40 :
50 brkvec=&202
60 osrdch=&FFED
70 osgbpb=&FFD1
80 osargs=&FFDA
90 osnewl=&FFFE
100 osbyte=&FFF4
110 oswrch=&FFEE
120 oscli=&FFFF
130 commandstring=&70:REM &70-&
82
140 temp=&83:REM temp=1=&84
150 block=&85:REM &85-&91
160 address%=&880
170 :
180 FOR pass=0T03STEP3
190 P$=address%
200 IOP1 pass
210 .setmode4
220 LDA #22:JSR oswrch
230 LDA #4:JSR oswrch
240 :
250 .disablescape
260 LDX #&FF:LDA #229
270 JSR osbyte
280 :
290 .cursorkeyoff
300 LDX #1:LDA #4
310 JSR osbyte
320 :
330 .setuperrorcode
340 LDA #errorroutine MOD 256
350 STA brkvec
360 LDA #errorroutine DIV 256
370 STA brkvec+1
380 :
390 .setfordfs
400 LDY #0:TYA
410 JSR osargs
420 CMP #4:BNE notdfs
430 LDA #13:STA discompact+4
440 .notdfs
450 :
460 LDA #title MOD 256
470 STA &F8
480 LDA #title DIV 256
490 STA &F9
500 JSR print
510 JMP menuretry
520 :
530 .newdisc
540 JSR window0
550 LDA #newdiscmess MOD 256
560 STA &F8
570 LDA #newdiscmess DIV 256
580 STA &F9
590 JSR print
600 .getreturn
610 JSR osrdch
620 .checkesc
630 CMP #27:BEQ menuretry
640 CMP #13:BNE getreturn
650 .checkifdfs
660 LDY #0:TYA
670 JSR osargs
680 CMP #4:BEQ menuretry
690 .ads
700 JSR mountdisc
710 :
720 .menuretry
730 LDY #0:JSR cursoroff
740 JSR window0
750 LDA #menu MOD 256:STA &F8
760 LDA #menu DIV 256:STA &F9
770 JSR print
780 .getchoice
790 LDX #0:LDA #21
800 JSR osbyte
810 JSR osrdch
820 CMP #ASC"1":BEQ newdisc
830 CMP #ASC"2":BEQ deletefiles
840 CMP #ASC"3":BEQ compact
850 JMP getchoice
860 :
870 .deletefiles
880 LDY #0:JSR cursoroff
890 JSR window1
900 JSR catdisc
910 JSR window2
920 LDA #deletemess MOD 256
930 STA &F8
940 LDA #deletemess DIV 256
950 STA &F9
960 JSR print
970 .checkey
980 LDX #0:LDA #21
990 JSR osbyte
1000 JSR osrdch
1010 .checkesc
1020 CMP #27:BEQ menuretry
1030 CMP #ASC"1":BEQ deletecsd
1040 CMP #ASC"2":BEQ dirchange
1050 CMP #ASC"3":BEQ accesschang
e
1060 JMP checkey
1070 :
1080 .dirchange
1090 JMP changedir
1100 :
1110 .accesschange
1120 JMP changeaccess
1130 :
1140 .deletecsd
1150 JSR window3
1160 LDA #deleteornot MOD 256
1170 STA &F8
1180 LDA #deleteornot DIV 256
1190 STA &F9
1200 JSR print
1210 JSR window4
1220 LDY #1:JSR cursoron
1230 JMP destroy
1240 :
1250 .compact
1260 JSR window1
1270 JSR mapfree
1280 JSR window2
1290 LDA #compacting MOD 256
1300 STA &F8
1310 LDA #compacting DIV 256
1320 STA &F9
1330 JSR print
1340 .response
1350 JSR osrdch
1360 .checkesc
1370 CMP #27:BEQ no
1380 AND #&DF
1390 CMP #ASC"Y":BEQ go
1400 CMP #ASC"N":BEQ no
1410 JMP response
1420 .no:JMP menuretry
1430 .go:JSR oswrch
1440 .doccompact
1450 JSR window1
1460 LDX #discount MOD 256
1470 LDY #discount DIV 256
1480 JSR oscli
1490 JSR window1
1500 JSR mapfree
1510 JSR window3
1520 LDA #done MOD 256
1530 STA &F8
1540 LDA #done DIV 256
1550 STA &F9
1560 JSR print
1570 JMP getescape
1580 .discompact
1590 EQU$"COM. 1D 3B"+CHR$13
1600 :
1610 .print
1620 LDY #&FF
1630 .nextchr
1640 INY
1650 LDA (&F8),Y:CMP #&FF
1660 BEQ out:JSR oswrch
1670 JMP nextchr
1680 .out:RTS
1690 :
1700 .window0
1710 LDA #data0 MOD 256:STA &F8
1720 LDA #data0 DIV 256:STA &F9
1730 JMP setwindow
1740 :
1750 .window1
1760 LDA #data1 MOD 256:STA &F8
1770 LDA #data1 DIV 256:STA &F9
1780 JMP setwindow
1790 :
1800 .window2
1810 LDA #data2 MOD 256:STA &F8
1820 LDA #data2 DIV 256:STA &F9
1830 JMP setwindow
1840 :
1850 .window3
1860 LDA #data3 MOD 256:STA &F8
1870 LDA #data3 DIV 256:STA &F9
1880 JMP setwindow
1890 :
1900 .window4
1910 LDA #data4 MOD 256:STA &F8
1920 LDA #data4 DIV 256:STA &F9
1930 .setwindow:JSR print:RTS
1940 :
1950 .data0
1960 EQU$ 28:EQU$ 0:EQU$ 30
1970 EQU$ 39:EQU$ 4:EQU$ 12
1980 EQU$ &FF
1990 :
2000 .data1
2010 EQU$ 28:EQU$ 0:EQU$ 22
2020 EQU$ 39:EQU$ 4:EQU$ 12
2030 EQU$ &FF
2040 :
2050 .data2
2060 EQU$ 28:EQU$ 0:EQU$ 30
2070 EQU$ 39:EQU$ 23:EQU$ 12
2080 EQU$ &FF
2090 :
2100 .data3
2110 EQU$ 28:EQU$ 0:EQU$ 30
2120 EQU$ 39:EQU$ 26:EQU$ 12
2130 EQU$ &FF
2140 :
2150 .data4
2160 EQU$ 28:EQU$ 17:EQU$ 28
2170 EQU$ 39:EQU$ 27:EQU$ 12
2180 EQU$ 10:EQU$ &FF
2190 :
2200 .cursoroff
2210 .cursoron
2220 LDA #25:JSR oswrch
2230 LDA #1:JSR oswrch
2240 TYA:JSR oswrch
2250 LDX #6:LDA #0
2260 .set:JSR oswrch
2270 DEX:BPL set
2280 RTS
2290 :
2300 .mountdisc
2310 LDX #discount MOD 256
2320 LDY #discount DIV 256
2330 JSR oscli:RTS
2340 .discount
2350 EQU$"MOU."+CHR$13
2360 :
2370 .catdisc
2380 LDX #discat MOD 256
2390 LDY #discat DIV 256
2400 JSR oscli:RTS
2410 .discat
2420 EQU$"."+CHR$13
2430 :
2440 .mapfree
2450 LDX #discmap MOD 256
2460 LDY #discmap DIV 256
2470 JSR oscli:JSR osnewl
2480 LDA #discfree MOD 256
2490 LDY #discfree DIV 256
2500 JSR oscli:RTS
2510 .discmap
2520 EQU$"MAP"+CHR$13
2530 .discfree
2540 EQU$"FREE"+CHR$13
2550 :
2560 .changedir
2570 JSR window3
2580 LDA #dirmess MOD 256
2590 STA &F8
2600 LDA #dirmess DIV 256
2610 STA &F9
2620 JSR print
2630 JSR getfilename
2640 LDY #3
2650 .storecommand1
2660 LDA dircommand,Y
2670 STA commandstring,Y
2680 DEY:BPL storecommand1
2690 JSR execute
2700 JMP deletefiles
2710 .dircommand
2720 EQU$"DIR"
2730 :
2740 .execute
2750 LDX #commandstring

```



```

2760 LDY #0
2770 JSR oscli:RTS
2780 :
2790 .changeaccess
2800 JSR window3
2810 LDA #accessmess MOD 256
2820 STA &F8
2830 LDA #accessmess DIV 256
2840 STA &F9
2850 JSR print
2860 JSR getfilename
2870 LDY #3
2880 .storecommand2
2890 LDA accesscomm,Y
2900 STA commandstring,Y
2910 DEY:BPL storecommand2
2920 JSR execute
2930 JMP deletefiles
2940 .accesscomm
2950 EQU"ACC."
2960 :
2970 .errroutine
2980 .resetstack
2990 LDX #&FF:TX5
3000 JSR window2
3010 LDY #0:JSR cursoroff
3020 LDA #errormessage MOD 256
3030 STA &F8
3040 LDA #errormessage DIV 256
3050 STA &F9
3060 JSR print
3070 .printerror
3080 LDY #1
3090 .error
3100 LDA (&F),Y:BEQ getescape
3110 JSR oswrch
3120 INV:JMP error
3130 .getescape
3140 JSR osrdch
3150 CMP #27:BNE getescape
3160 JMP menurentry
3170 :
3180 .destroy
3190 .zerobuffers
3200 LDX #34:LDA #0
3210 .flush:STA &70,X
3220 DEX:BPL flush
3230 .mainloop
3240 .savefilecounter
3250 LDA block+9:STA temp
3260 LDA block+10:STA temp+1
3270 .setparamblk
3280 LDA #commandstring+3
3290 STA block+1
3300 LDA #0:STA block+2
3310 LDA #1:STA block+5
3320 .readirectory

```

```

3330 LDX #block:LDY #0
3340 LDA #&:JSR osgbbp
3350 .checkforfiles
3360 LDA #1:CMP block+5
3370 BNE delete
3380 .nomoresoend
3390 JMP deletefiles
3400 .delete:LDY #1
3410 .printfilename
3420 LDA commandstring+3,Y
3430 JSR oswrch
3440 INV:DEC commandstring+3
3450 BNE printfilename
3460 LDA #ASC":":JSR oswrch
3470 .setret
3480 LDA #13
3490 STA commandstring+3,Y
3500 LDY #5
3510 .setdel
3520 LDA delcommand,Y
3530 STA commandstring,Y
3540 DEY:BPL setdel
3550 .getYN
3560 JSR osrdch
3570 .checkesc
3580 CMP #27:BEQ esc
3590 AND #0F
3600 CMP #ASC"Y":BEQ godelete
3610 CMP #ASC"N":BEQ not
3620 JMP getYN
3630 .godelete
3640 LDA #ASC"Y":JSR oswrch
3650 JSR execute
3660 .restorefilecounter
3670 LDA temp:STA block+9
3680 LDA temp+1:STA block+10
3690 JMP repeat
3700 .not
3710 LDA #ASC"N":JSR oswrch
3720 .repeat
3730 JSR osnewl:JMP mainloop
3740 .esc
3750 JMP menurentry
3760 .delcommand
3770 EQU"DEL."
3780 :
3790 .getfilename
3800 LDY #1:JSR cursoron
3810 LDX #0
3820 .getinput
3830 JSR osrdch
3840 .checkesc
3850 CMP #27:BEQ esc
3860 CMP #13
3870 BNE checkdelete
3880 .returnpressed
3890 STA commandstring+4,X

```

```

3900 .endroutine:RTS
3910 .checkdelete
3920 CMP #127:BNE checkchar
3930 .deletepressed
3940 CPX #0:BEQ outofrange
3950 .delonscreen:JSR oswrch
3960 DEX:JMP getinput
3970 .checkchar
3980 CPX #14:BEQ outofrange
3990 CMP #32:BCC outofrange
4000 CMP #127:BCC validchr
4010 .outofrange
4020 .bEEP:LDA #7:JSR oswrch
4030 JMP getinput
4040 .validchr
4050 .printoscreen:JSR oswrch
4060 .saveinbuffer
4070 STA commandstring+4,X
4080 INX:JMP getinput
4090 :
4100 .title
4110 EQUB 31:EQUB 12:EQUB 0
4120 EQU"DISC HOUSEKEEPER"
4130 EQUB 31:EQUB 12:EQUB 1
4140 EQU"-----"
4150 EQUB 31:EQUB 13:EQUB 31
4160 EQU"ESCAPE for Menu"
4170 EQUB 8FF
4180 :
4190 .newdiscmess
4200 EQUB 31:EQUB 6:EQUB 14
4210 EQU"INSERT DISC and PRESS
RETURN"
4220 EQUB 8FF
4230 :
4240 .menu
4250 EQUB 31:EQUB 18:EQUB 5
4260 EQU"MENU"
4270 EQUB 31:EQUB 13:EQUB 10
4280 EQU"1...New DISC"
4290 EQU"31:EQUB 13:EQUB 12
4300 EQU"2...Delete Files"
4310 EQU"31:EQUB 13:EQUB 14
4320 EQU"3...Compact Disc"
4330 EQUB 8FF
4340 :
4350 .deletemess
4360 EQUB 31:EQUB 14:EQUB 1
4370 EQU"DELETE FILES"
4380 EQUB 31:EQUB 1:EQUB 4
4390 EQU"1...Delete from CSD
2...Change DIR"
4400 EQUB 31:EQUB 12:EQUB 6
4410 EQU"3...Change ACCESS"
4420 EQUB 8FF
4430 :
4440 .deleteornot
4450 EQUB 31:EQUB 5:EQUB 2
4460 EQU"Delete Y/N?"
4470 EQUB 8FF
4480 :
4490 .compacting
4500 EQUB 31:EQUB 15:EQUB 1
4510 EQU"COMPACTING"
4520 EQUB 31:EQUB 16:EQUB 4
4530 EQU"GO Y/N? "
4540 EQUB 8FF
4550 :
4560 .done
4570 EQUB 31:EQUB 18:EQUB 1
4580 EQU"Done"
4590 EQUB 7
4600 EQUB 8FF
4610 :
4620 .dirmess
4630 EQUB 31:EQUB 4:EQUB 1
4640 EQU"DIR "
4650 EQUB 8FF
4660 :
4670 .accessmess
4680 EQUB 31:EQUB 4:EQUB 1
4690 EQU"ACCESS "
4700 EQUB 8FF
4710 .errormessage
4720 EQUB 31:EQUB 0:EQUB 3
4730 EQU"ERROR: "
4740 EQUB 7
4750 EQUB 8FF
4760 :NEXT
4770 :
4780 .comm$="SAVE HK 880 "+STR$P
%
4790 OSCLI comm$

```

Here's how you can get the very best out of your Electron

Within the pages of these three books you'll find ALL the information you need to fully harness the power of your Electron. They cover Basic, machine-code programming and the operating system, and between them they also show how to combine all three to create more powerful and effective programs.

For the give away price of just £7.95 for the three, these books represent exceptional value and are a must for any serious Electron user.

Electron Advanced User Guide

This detailed guide to the Electron's operating system is packed full of invaluable information. It shows you how to:

- Implement the powerful *FX/OSBYTE calls
- Write your own paged roms
- Program the ULA
- Make every byte count where program space is tight
- Use the Electron's exciting capabilities to the full by following the complete circuit diagram

...and much, much more.

This essential handbook will help you to exploit the full potential of your Electron. And for just £2.95, saving £6.50 off the recommended price, can you afford not to miss this offer?

Electron Assembly Language

The Electron Assembly Language reference guide will help you get to grips with machine code in next to no time. Whether you're a beginner or are already fairly proficient, there is something for you in this book.

It has over 200 pages packed with hints, tips and example programs on subjects ranging from basic hex, binary and decimal number theory and logical operators, through addressing modes, stacks and loops, to subroutines, jumps and calls.

Every aspect of machine-code programming is covered in this book in a friendly, readable style, and there's also a comprehensive index. If you want to get more out of your micro, but thought machine code was indecipherable, this is the book for you. *Save £3 off the recommended retail price.*

Getting started in BBC Basic on the BBC Micro & Electron

This is the ultimate guide available on BBC Basic. Written by a leading expert on the language, it will lead you through each Basic function in a simple, easy-to-follow style.

Whether you are a beginner or more advanced, there are examples of commonly-needed routines and neat tricks you can use to make Basic jump through hoops.

By working through its many examples you will gain a clear insight into structured programming and will quickly acquire the ability to use structured techniques in creating your own programs. *Save £3 off the recommended retail price.*

Only
£7.95 for all three



SAVE
£12.50



SHIMA's
micro
series



TO ORDER PLEASE USE THE FORM ON PAGE 45

The elementary Electron

Francis Botto takes off your micro's casing and explains how all the components function

If you treat your Electron as the proverbial black box and disregard its inner workings you probably have about as much proof of the existence of computer hardware within its casing as historians have of the Arthurian legend.

The Electron is most frequently referred to as having 32k of ram and a 6502 8 bit processor. There is a lot more to its hardware than is contained in that concise sentence, so what does it mean?

Beginning with the memory, ram is an acro-

nym for random access memory. It is, comically, a misnomer that has plagued and confused newcomers to hardware for a long time.

It was originally thought up because each piece of data in a typical memory device took an equal amount of time to access. However, it was later realised that a rom, or read only memory device, could be described as ram too.

All you have to remember is this: You can read and write data to and from ram while you can only read data from rom, as its name clearly suggests. As such, programs in rom are usually unalterable. In this form, roms are sometimes referred to as firmware packages.

The Electron's operating system itself is stored in such a package as is the Basic interpreter.

For the record, there are numerous types of rom including prom (programmable read only memory) and eprom (erasable program-

mable read only memory). These can be programmed and then erased by shining ultra violet light on to the chip via a transparent window.

Finally, there is the eeprom (electrically erasable programmable read only memory) which can be erased by passing a small electric current through it.

Dram (dynamic random access memory) and sram (static random access memory) represent two types of ram. Dram has to be constantly "refreshed" by revitalising charges from capacitors which are used to retain the state of each individual memory cell. Like all ram, dram is said to be volatile in that when the computer is switched off all memory contents are lost.

Sram does not require constant refreshing, so it relies on less sophisticated electronics. However, it consumes more power, is slower and less compact - three reasons why dram is the more popular of the two.

Outside the world of the Electron the best known dram device is the 256k chip. Extreme fluctuations in their price caused turmoil in the computer industry in recent years with many computer manufacturer's designing and redesigning computers according to the unit price. The price of 256k dram chips has almost been like a high risk share.

When anyone mentions memory capacity the letter k is bandied about like there's no tomorrow. It is a measure of bytes. And what's a byte? It is simply eight binary bits of information, like this: 10011011.

The letter k is really short for kilobyte and is often regarded as 1,000 bytes. In actual fact it is slightly more - a k is 1,024 bytes of memory.

Where does that odd 1,024 figure come from? It stems from the number of address lines in an array of memory. For example, suppose you had a memory device which had an address bus made up of 10 lines, as shown in Figure 1.

The address lines on a memory device determine how many memory locations it can support. For instance, the device shown will support two to the power 10, which is $2 \times 2 \times 2$, and if you work that out you will find it equals 1,024. So conveniently, it was decided that this would be a k.

Microprocessors represent another microelectronics device which is mentioned whenever reference is made to a machine. For instance, you hear people say 6502-based, 6502 CPU or 6502 processor. CPU stands for central processing unit.

The CPU itself is made up of several elements such as ALU (arithmetic logic unit) which performs all arithmetic and logic operations, and numerous registers which are small slices of memory containing eight bits of data - a byte.

The program counter - another register found in the microprocessor - is made up of two 8 bit registers. Since it points to loca-

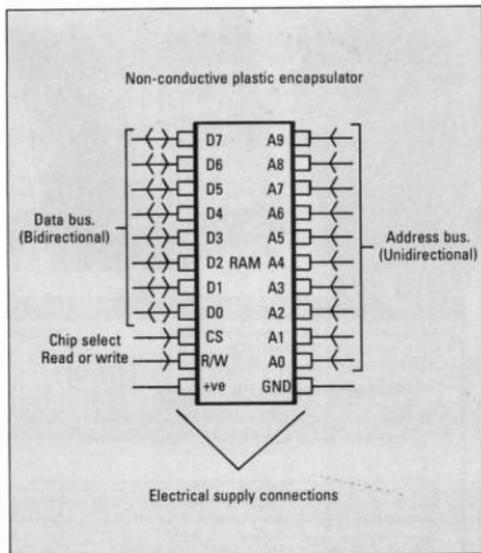


Figure 1: Address bus of a typical microprocessor

Turn to Page 22 ▶

◀ From Page 21

tions in the Electron's memory, it has to be able to count up to 32k. This is a 16 bit number, thus requires two bytes.

The 6502 is said to be 8 bit. Lots of machines and microprocessors are referred to in this manner. In simple terms it refers to the size of pieces of data which can be ma-

nipulated in a single operation.

If you look at a microprocessor like that shown in Figure 11 for instance, you can determine whether it is 8 bit, 16 or 32 bit by counting the data lines. Of course, the various lines are not marked on real devices, so you will need an accompanying manufacturer's data sheet to determine which line does what.

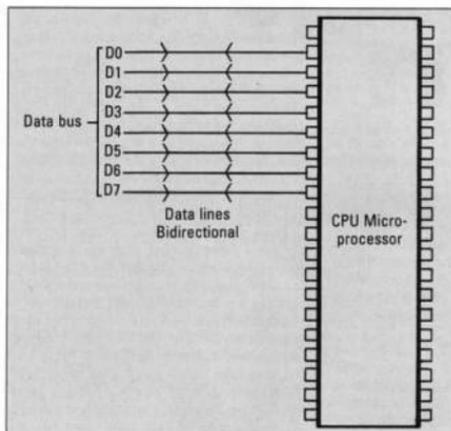


Figure 11: Counting the data lines of a micro-processor will tell you whether it is an 8, 16 or 32 bit device

The data lines making up the data bus affect the speed of the microprocessor. Generally speaking, the more there are the faster it is.

So far we have looked at the fundamentals of the Electron's design, but there is a great deal more to it. For instance, there is the whole matter of driving monitors, controlling disc drives, transmitting and receiving data to and from cassette recorders and so forth.

An interesting feature of the hardware is the inclusion of an uncommitted logic gate array. If you were to take the lid off your micro you would find this device staring you in the face. The ULA is a large square chip directly above the copyright symbol.

This is not an off-the-shelf device that you can buy from any electronics outlet, but specifically designed for the Electron. The ULA starts life as a collection of electronic logic gates. It is then left to designers to commit, or connect, the gates so as to satisfy a particular design.

A ULA could therefore be described as a kind of blank chip which can be aimed at a number of applications. The Electron's is used to handle the video and sound controller as well as cassette input and output (I/O) and various other I/O operations.

This is by no means the end of the story, but armed with this information you should be able to tackle some of the more advanced hardware manuals.

NOW OUT!

The bright new magazine that shows you how easy it is to make your own video movies...

If you have a video camera – or just thinking of getting one – you'll find *Video Action!* your passport to an exciting new world. No dull technical reviews but pages packed with help and advice – written by experts in a language **anyone** can understand.

You'll find all you need to know about lighting, scripting, directing, sound dubbing... and the magic of desktop video – using a home computer to create titles and captions and generate your own startling special effects.



It's available at your newsagents now for £1.50. If you take out a 12 month subscription on the form below you'll save £5 off the normal price. (UK only)

ORDER FORM

Please send me the next 12 issues of *Video Action!* for the special price £13 (normally £18) (1530)

Payment: Please indicate method (✓)

Access/Mastercard/Eurocard/Bardaycard/Visa Expiry Date

No. _____

Cheque/Eurocheque made payable to Database Publications Ltd.

Name _____

Signed _____

Address _____

Post Code _____

Send to: Database Direct, Freeport Ellesmere Port, South Wirral L65 3EB. Tel: 051-357 2961

EU6

How to apply the big squeeze

THE Electron is a very reliable performer when it comes to saving and loading files from floppy disc. However, disc space is rather limited, particularly when you want to save several Mode 2 graphics screens to a 40 track DFS disc. You can just about squeeze five screens into the 100k of storage space. The ADFS is slightly better in having three times the storage capacity, but there's still only room for 15 pictures.

In my Sprites series of articles running from the February to July 1988 issue of *Electron User* I showed how graphics screens in arcade games can take up as little as eight bytes. This is fine for games made up of sprites, but it doesn't help the artist drawing freehand in Mode 2. How can we squash these massive 20k screens?

Many compaction methods are available to the programmer and the one chosen largely depends on the particular screen being treated. The simplest method is the byte and counter method.

If you look closely at most Mode 2 graphics screens you'll notice that there are often large areas of solid colour, and looking at the bytes making up the screen memory, you'll see large areas where they are all the same.

What we could do is start scanning through the screen memory looking for these areas. Get a byte, count how many identical ones follow it, store the byte and counter. Get the next - different - byte, count how many identical ones there are, store the byte and counter. And so on.

In this way, the following section of screen memory:

10,10,10,10,28,28,28,91,91...

would be stored as:

10,4,28,3,91,2,...

In this case nine bytes have been compacted into six - two thirds the space. Quite a significant saving. The major drawback is that the method only works for simple screens. Take the case where every byte is different to its neighbour. The byte will be stored along with a counter value of one:

10,57,34,86,98,...

becomes:

10,1,57,1,34,1,86,1,98,1,...

You can see that twice as much space is taken up - the exact opposite of what is wanted. However, the technique must be improved.

Now the Electron's screen memory is laid out in a peculiar manner, and if each of the eight colours numbered zero to seven is displayed you'll see that each screen byte has a value less than 128. In other words, bit seven is never used.

We can use this as a flag to indicate whether the following byte is the same or different as the

current one. The same byte and counter method can still be used, but with the additional condition that if bit seven is set there is a following counter byte, and if it's clear there isn't a counter and the byte is simply stored in the screen.

So bit seven becomes a flag to show whether the current byte is repeated more than once. If it is, the following byte is a counter. Taking the worst possible case where every screen byte is different to its neighbours, the screen will not be compacted and will be exactly the same size as before.

However, as soon as a run of identical bytes is found the compaction routine starts to operate and the screen is crunched into a smaller space. All this is assuming, as mentioned earlier, that only colours zero to seven are used.

Program I will draw and save a moderately complicated Mode 2 screen and you can see the compaction routine in action by running Program II. The degree of compaction depends on the complexity of the display. A 20k screen can be squeezed into as little as 2k. Compare the file sizes of the original and compacted screens and see for yourself.

To prove that the compaction routine really does work, Program III will expand the crunched screen and display it as it originally appeared. With the aid of this utility you can now store up to 50 screens on a DFS disc and around 150 on an ADFS disc - quite an improvement!

**Cram more graphics
on to disc with this
handy utility from
Roland Waddlove**

```
10 REM Program I
20 REM Draw triangles
30 MODE 2
40 FOR i=1 TO 10
50 GCOL 3,RND(7)
```

```
60 MOVE RND(1280),RND(1024)
70 MOVE RND(1280),RND(1024)
80 PLOT 85,RND(1280),RND(1024)
90 NEXT
100 *SAVE SCREEN 3000 8000
```

```
10 REM Program II
20 REM Compact screen
30 REM Bit 7 = multiple bytes
40 ON ERROR CLOSE#0:REPORT:PRI
NT" at line ";ERL:END
50
60 MODE 2 : *FX16
70 *LOAD SCREEN 3000
80 PROCsave("SCR1")
90 END
100
110 DEF PROCsave(fnames)
120 FX=OPENOUT fnames
130 AX=83000
140 REPEAT
150 IF ?AX=AX?1 PROCcount ELSE
```

```
BPUT#FX,?AX : AX=AX+1
160 UNTIL AX>80000
170 CLOSE#FX
180 ENDPROC
190
200 DEF PROCcount
210 PX=AX
220 REPEAT
230 PX=PX+1
240 UNTIL ?PX<=>?AX OR PX=AX=255
250 BX=?AX OR 128
260 CX=PX-AX
270 AX=PX
280 BPUT#FX,BX : BPUT#FX,CX
290 ENDPROC
```

```
10 REM Program III
20 REM Expand screen
30 REM Bit 7 = multiple bytes
40 ON ERROR CLOSE#0:REPORT:PRI
NT" at line ";ERL:END
50
60 MODE 2 : *FX16
70 PROCload("SCR1")
80 END
90
100 DEF PROCload(fnames)
110 FX=OPENIN fnames
120 AX=83000
130 REPEAT
```

```
140 BX=GET#FX
150 IF BX AND 128 PROCmulti ELSE
?AX=BX : AX=AX+1
160 UNTIL AX>80000
170 CLOSE#FX
180 ENDPROC
190
200 DEF PROCmulti
210 BX=BX AND 127
220 CX=GET#FX
230 REPEAT
240 ?AX=BX : AX=AX+1 : CX=CX-1
250 UNTIL CX=0
260 ENDPROC
```

If you are struggling with your chemistry A level here are two educational utilities to help you brush up on some of the more complicated, but essential, calculations required in both the laboratory and chemistry theory.

The first program, Titration, is a computer simulation of the acid/base titration procedure normally carried out in the laboratory to produce a salt. A burette of acid and beaker of alkali are drawn on the screen. Add acid to the alkali by pressing the spacebar. Stop when the alkali changes colour indicating that it has been neutralised.

The first titration is performed simply to get a rough estimate of the amount of acid required. The second and third should be done more accurately – adding acid quickly at first, then slowing down near the end point.

Once this has been done the Electron will calculate the average titre and demonstrate, step by step how to calculate the strength of the alkali, given that of the acid. On subsequent titrations you'll be asked to work this out yourself. If you make a mistake the micro will again demonstrate the calculation.

The second program will test your ability

```

10 REM Titration
20 REM By Julie Boswell
30 REM (c) Electron User
40 IF PAGE=BEOD PROCrelocate
50 MODE 1
60 PROCinitialise
70 PROCinstructions
80 REPEAT
90 PROCTitles
100 PROCdraw_burette
110 PROCdraw_beaker
120 PROCfill_beaker
130 FOR titrest TO 3
140 PROCartart
150 PROCTitrate
160 NEXT
170 PROCfinished
180 PROCcalculation
190 PROCanother
200 UNTIL INSTR("Ee",key$)
210 MODE 6
220 *FX4,0
230 *FX12,0
240 END
250
260 DEF PROCstart
270 VDU 19,1,1;0;:PROCFill_bure
tte
280 cc=0:PRINT TAB(4,31);cc;" c
m";CHR$236;
290 ENDPROC
300
310 DEF PROCinitialise
320 *KEY10,"OLDNRUNN"
330 *FX11,0
340 *FX4,1
350 PROCcharacters:DIM vol(3)
360 @:=820207:titrations=0
370 ENDPROC
380
390 DEF PROCcharacters
400 REM ** burette **
410 VDU 23,224,128,128,128,128,
128,128,128,128
420 VDU 23,225,1,1,1,7,1,1,12
7
430 VDU 23,226,128,64,32,16,8,4
,2,1
440 VDU 23,227,1,2,4,8,16,32,64
,128
450 VDU 23,228,129,129,129,129,
129,129,129,129
460 VDU 23,229,0,0,1,1,1,0,0
470 VDU 23,230,129,129,255,0,0,
255,129,129
480 VDU 23,231,24,24,216,248,24
,8,216,24,24
490 VDU 23,232,129,129,231,0,0,

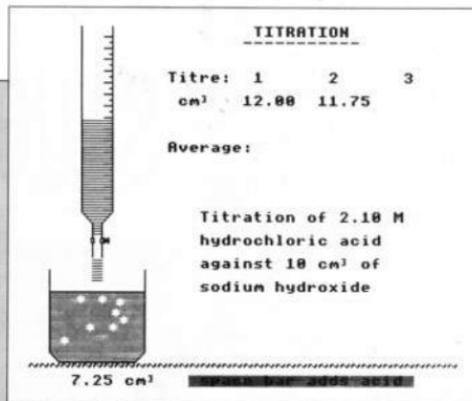
```

It's Electron micro analysis

to balance chemical equations. An incomplete equation – for instance a reaction of a metal with water – will be displayed on the screen. Using only the numeric keys you must balance the equation so that there are an equal number of atoms on both sides.

An example is demonstrated on the instruction screen. You can have two attempts, and if you still get it wrong the Electron will provide the correct answer.

Julie Boswell puts on her white coat and presents two advanced programs for testing your knowledge and understanding of chemical procedures



Practise your titration technique

```

231,129,129
500 VDU 23,233,0,0,216,248,248,
216,0,0
510 VDU 23,234,1,1,1,1,1,1,1,12
7
520 REM ** beaker **
530 VDU 23,235,1,1,1,1,1,1,1,1
540 REM ** 3 **
550 VDU 23,236,56,8,24,8,56,0,0
,0
560 REM * tap *
570 VDU 23,237,129,129,195,66,6
,195,129,129
580 REM * acid **
590 VDU 23,238,0,255,0,255,0,25
5,0,255
600 VDU 23,239,0,24,24,0,0,102,
102,0
610 ENDPROC
620
630 DEF PROCdraw_burette
640 GCOL 0,128:GCOL 0,3
650 VDU 31,5,1,224,32,234
660 FOR i%=2 TO 16
670 VDU 31,5,i%,224,32,225,32
680 NEXT
690 VDU 31,5,17,226,32,227,31,6
,18,228
700 VDU 31,5,19,229,230,231,31,
6,20,228
710 ENDPROC
720
730 DEF PROCdraw_beaker
740 FOR i%=22 TO 28
750 PRINT TAB(2,1);CHR$224;"
";CHR$235;
760 NEXT
770 PRINT"" ";CHR$226;"
";CHR$227"STRINGS(40,"");
780 ENDPROC
790
800 DEF PROCfill_burette
810 GCOL 0,2:GCOL 0,128
820 FOR i%=41 TO 967 STEP 8
830 PLOT 77,207,i%
840 NEXT
850 ENDPROC
860
870 DEF PROCfill_beaker
880 GCOL 0,1
890 FOR i%=67 TO 255 STEP 4
900 PLOT 77,127,i%
910 NEXT
920 GCOL 0,3
930 MOVE 67,259:DRAW 351,259
940 ENDPROC
950
960 DEF PROCTitrate
970 titrations=titrations+1
980 REPEAT
990 IF INKEY=99 PROCadd_acid
1000 UNTIL cc=>end
1010 vol(titre)=cc
1020 PRINT TAB(13,titre*7,7);cc
1030 SOUND 1,-10,50,5
1040 PROCpause(200)
1050 ENDPROC
1060

```



Average Titre=18.75 cm³ Acid=2.70 M

1888 cm³ acid will contain 2.70 moles
 1 cm³ acid will contain 2.70/1888 moles
 18.75 cm³ contain 18.75x2.70/1888 moles

18.75x2.70/1888 moles must also be the number of moles of alkali in the 18 cm³ in the beaker.

1888cm³ contains 188x18.75x2.70/1888 mol

∴ the alkali is 188x18.75x2.70/1888 M

Alkali=2.98 M

Press the space bar...

Calculating the strength of an alkali

Reaction Of Metals With Water



Q1. Try to balance the equation.

The first number is...

The second number is...

The third number is...

The fourth number is...

Hurray, you got it right.

Balance the chemical equation

```

1070 DEF PROCadd_acid
1080 PRINT TAB(6,19);CHR$237;CHR
$233
1090 VDU 17,2,31,6,21,238,8,10,2
38
1100 COLOUR 3:GCOL 0,130:GCOL 0,
0
1110 REPEAT TIME=0
1120 VDU$:MOVE 92+RND(192),255-R
ND(128):VDU42,4:PLOT 77,207,963-3
2*cc
1130 cc=cc+.25:PRINT TAB(4,31);c
c;
1140 IF cc=end VDU 19,1,0;0;
1150 REPEAT UNTIL TIME>20
1160 UNTIL NOT INKEY-99 OR cc=16
1170 PRINT TAB(6,19);CHR$230;CHR
$231
1180 VDU 17,1,31,6,22,32,8,11,32
,17,3
1190 COLOUR 129
1200 FOR I%=28 TO 24 STEP -1
1210 TIME=0
1220 PRINT TAB(2,1);CHR$224;"
";CHR$235
1230 REPEAT UNTIL TIME>20-end*cc
1240 NEXT
1250 COLOUR 128
1260 ENDPROC
1270
1280 DEF PROCtitles
1290 VDU 19,1,1,0;19,2,4;0;23,1,
0;0;0;
1300 PRINT TAB(21,1);"TITRATION"
```

```

;TAB(20,2);"-----";TAB(13,5
);Titre: 1 2 3";TAB(1
4,7);"cm";CHR$236;TAB(13,11);"Ave
rage:"
1310 COLOUR 130:PRINT TAB(15,31)
";" space bar adds acid ":"COLOUR
128
1320 end=2+RND(48)/4
1330 Macid=RND(50)/10
1340 PROCpick_reagents
1350 PRINT TAB(16,17);"Titration
of ";Macid;" M";TAB(16,19);acid$
;" acid";TAB(16,21);"against 10 c
m";CHR$236;" of";TAB(16,23);alkal
i$
1360 ENDPROC
1370
1380 DEF PROCpick_reagents
1390 RESTORE 1490
1400 FOR I%=1 TO RND(3)
1410 READ acid$
1420 NEXT
1430 RESTORE 1500
1440 FOR I%=1 TO RND(3)
1450 READ alkali$
1460 NEXT
1470 ENDPROC
1480
1490 DATA hydrochloric,nitric,ac
etic
1500 DATA sodium hydroxide,potas
sium hydroxide,ammonia solution
1510
1520 DEF PROCfinished
```

```

1530 PRINT TAB(15,31);SPC(21);
1540 average=(vol(2)+vol(3))/2
1550 PRINT TAB(21,11);average;"
cm";CHR$236
1560 SOUND 1,-10,0,5
1570 COLOUR 130:PRINT TAB(16,27)
";" Titration finished ";TAB(18,31)
";" press space bar ";
1580 *FX21,0
1590 REPEAT
1600 UNTIL GET=32
1610 ENDPROC
1620
1630 DEF PROCcalculation
1640 COLOUR 128 : CLS
1650 VDU 19,1,2;0;19,2,3;0;23,1,
1;0;0;0;
1660 PRINT""Average Titre="ave
rage"; cm";CHR$236;TAB(28);"Acid=
";Macid;" M"
1670 COLOUR 2:answer=TRUE
1680 IF titrations=3 PROCwork_ou
t ELSE PROCinput
1690 IF NOT answer PROCwork_out
1700 IF end=average PROCerror
1710 ENDPROC
1720
1730 DEF PROCwork_out
1740 PRINT TAB(0,5);"1000 cm";CH
R$236;" acid will contain ";Macid
;" acid"
1750 PRINT""1 cm";CHR$236;" acid
```

Turn to Page 26 ▶

◀ From Page 25

```

will contain ";Macid;"/1000 mole
"
1760 PRINT";average;" cm";CHR$23
6;" contain ";average;"x";Macid;
/1000 moles"
1770 COLOUR 1:PRINT";average;"
x";Macid;"/1000 moles must also b
e the""number of moles of alkali
l in the 10 cm";CHR$236;" in the
beaker."
1780 PRINT""1000cm";CHR$236;" c
ontains 100x";average;"x";Macid;
/1000 mol"
1790 COLOUR 129:COLOUR 3:PRINT""
";CHR$239;" the alkali is 100x";
average;"x";Macid;"/1000 M"
1800 COLOUR 128:PRINT""Alkali"
;average;Macid/10;" M"
1810 PRINT""Press the space bar
...;"
1820 VDU 7
1830 REPEAT
1840 UNTIL GET=32
1850 CLS
1860 ENDPROC
1870
1880 DEF PROCinput
1890 REPEAT
1900 INPUT TAB(0,5);"What is the
molarity of the alkali""in the
beaker ";alkali$
1910 UNTIL LEN alkali$
1920 IF ABS((average;Macid/10)-E
VAL alkali$)>.01 answer=FALSE
1930 PRINT""Your calculation is
";
1940 IF answer PRINT "correct."
ELSE PRINT "wrong...";SOUND 1,-15
,0,20:PROCpause(500)
1950 COLOUR 3
1960 ENDPROC
1970
1980 DEF PROCerror
1990 VDU 19,1,6;0;
2000 PRINT""Your titration how
ever was inaccurate,""you added
too much acid too quickly""and
missed the end point. The alkali
""was actually ";end;Macid/10;"
M not ";average;Macid/10;" M."
2010 COLOUR 2:PRINT""The indicat
or changed at ";end;" cm";CHR$23
6;" your average titration was ";
average;" cm";CHR$236
2020 COLOUR 1:PRINT""Try to be
more careful when you add""the
acid next time." :COLOUR 3
2030 VDU 7
2040 ENDPROC
2050
2060 DEF PROCanother
2070 PRINT""Press the space ba
r to try another""titration or
E to end the program...;"
2080 *FX21,0
2090 REPEAT
2100 key$=GET$
2110 UNTIL INSTR("Ee ",key$)
2120 CLS
2130 ENDPROC
2140
2150 DEF PROCinstructions
2160 VDU 12,19,1,6;0;
2170 PRINT";TAB(14);";"TITRATION"
2180 COLOUR 2:PRINT""Three titrat
ions are carried out, the""first
is a rough one then 2 accurate o
nes.""The average of the 2nd and
3rd is found."
2190 COLOUR 1:PRINT""The molarit
y of the alkali must be""calcul
ated given the molarity of the""
Macid, C by the computer the firs
t time,""then by you after that
";
2200 COLOUR 2:PRINT""The acids
and alkali used have been""cho
sen to make the calculation as ea
sy""as possible. The number of m
oles of acid""needed to neutral

```

```

ise the alkali is the""same as
the number of moles of alkali."
2210 COLOUR 3:PRINT""Press the
space bar to start...";VDU 7
2220 REPEAT
2230 UNTIL GET=32
2240 CLS
2250 ENDPROC
2260
2270 DEF PROCpause(timeX)
2280 TIME=0
2290 REPEAT
2300 UNTIL TIME>timeX
2310 ENDPROC
2320
2330 DEF PROCrelocate
2340 *FX200,2
2350 *KEY9 "OLD|NRUN|N"
2360 *TAPE
2370 DS=PAGE-&E00;FOR IX=PAGE TO
TOP STEPS:(IX-DX)=1;IX=NEXT:?(TO
P-DX)=255:PAGE=&E00:*FX21,0
2380 *FX138,0,137
2390 END

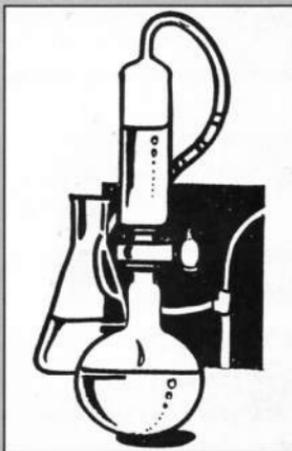
```

Balancing act

```

10 REM ** EQUATION **
20 REM By Julie Boswell
30 REM (c) Electron User
40 IF PAGE=&E00 PROCrelocate:E
ND
50 MODE 1
60 PROCinitialise
70 PROCinstructions
80 REPEAT
90 PROCstart
100 FOR QX=1 TO 10
110 PROCget_data
120 PROCprint_equation
130 PROCinput_answer
140 NEXT
150 PROCscores
160 UNTIL INSTR("Nn",key$)
170 MODE 6:*FX4,0
180 *FX12,0
190 *FX220,27
200 END
210
220 DEF PROCstart
230 score=0
240 VDU19,1,1;0;19,2,3;0;19,3,7
,0;
250 VDU23,1,0,0;0;0;
260 ENDPROC
270
280 DEF PROCinitialise
290 *FX11,0
300 *FX220,64
310 ENVELOPE 1,1,1,4,8,4,4,20,1
26,0,0,-126,126,126
320 ENVELOPE 2,128,-1,-2,-4,5,1
0,20,126,0,0,-126,126,126
330 PROCcharacters:*FX4,1
340 equation$=STRINGS(40,"*")
350 DIM number(6),answer(6)
360 ENDPROC
370
380 DEF PROCcharacters
390 REM ** arrow **
400 VDU 23,225,0,0,0,255,0,0,0,0
,0
410 VDU 23,226,8,4,2,255,2,4,8,0
,0
420 REM ** double arrow **
430 VDU 23,227,0,0,255,0,255,64
,32,0
440 VDU 23,228,4,2,255,0,255,0,0
,0,0
450 REM ** numbers **
460 VDU 23,230,0,0,0,56,40,40,4
0,56
470 VDU 23,231,0,0,0,16,48,16,1
6,56
480 VDU 23,232,0,0,0,56,8,56,32
,56
490 VDU 23,233,0,0,0,56,8,24,8
,56
500 VDU 23,234,0,0,0,32,32,40,6
0,8
510 VDU 23,235,0,0,0,56,32,56,8
,56
520 VDU 23,236,0,0,0,56,32,56,4
0,56
530 VDU 23,237,0,0,0,56,8,8,8,8
,56
540 VDU 23,238,0,0,0,56,40,56,4
0,56
550 VDU 23,239,0,0,0,56,40,56,8
,8
560 ENDPROC
570
580 DEF PROCinput_answer
590 COLOUR 3:PRINT TAB(0,15);"Q
";QX;" . Try to balance the equati
on.";tries=0
600 REPEAT tries=tries+1
610 COLOUR 1:PRINT TAB(0,31);"
";
<press a number>
620 VDU 28,0,30,39,18,12,26
630 FOR IX=1 TO answer(0)
640 COLOUR 2:PRINT TAB(0,18+IX
IX);"The ";
650 IF IX=1 PRINT "first";
660 IF IX=2 PRINT "second";
670 IF IX=3 PRINT "third";
680 IF IX=4 PRINT "fourth";
690 IF IX=5 PRINT "fifth";
700 PRINT " number is...";
710 VDU 23,1,1;0;0;0;
720 COLOUR 1:*FX21,0
730 REPEAT KX=GET-48
740 UNTIL KX<=0 AND KX<10
750 VDU 23,1,0;0;0;0;0;0;
760 answer(IX)=KX:PRINT;KX
770 PROCinput_equation
780 NEXT
790 PROCmark_answer
800 UNTIL correct OR tries=2
810 PROCpause(500)
820 COLOUR 3:COLOUR 129:PRINT T
AB(0,15);" Press the spac
e bar... ";COLOUR128:VDU
7
830 REPEAT
840 UNTIL GET=32
850 ENDPROC
860
870 DEF PROCmark_answer
880 correct=TRUE
890 FOR IX=1 TO answer(0)
900 IF answer(IX)<number(IX) c
orrect=FALSE
910 IF tries=2 answer(IX)=numbe
r(IX)
920 NEXT
930 IF tries=2 AND NOT correct
PROCwrong
940 IF tries=1 AND NOT correct
COLOUR 1:PRINT TAB(0,31);"The equ
ation is not balanced-try again";
:SOUND 1,-15,0,20:PROCpause(500)
950 IF correct PROCright
960 ENDPROC
970
980 DEF PROCwrong
990 COLOUR 1:PRINT TAB(0,31);
1000 RX=RND(5)
1010 IF RX=1 PRINT"oh, No!";
1020 IF RX=2 PRINT"No,No,No";
1030 IF RX=3 PRINT"Dear me";
1040 IF RX=4 PRINT"silly billy";
1050 IF RX=5 PRINT"Aaaaahhh...";
1060 PRINT"; wrong again!";STRIN
G$(39-POS;" ");
1070 FOR IX=1 TO 50
1080 SOUND 0,-15,RND(8),1:*FX19
1090 VDU 19,1,RND(7);0;
1100 NEXT
1110 VDU 19,1,1;0;0;SOUND 1,-15,0
,20
1120 COLOUR 3:PRINT TAB(0,15);"T
his is the correct equation."
1130 PROCprint_equation:PROCpau
se(200)
1140 ENDPROC
1150
1160 DEF PROCright
1170 COLOUR 3:PRINT TAB(0,31);
1180 RX=RND(5):score=score+0/tr
ies
1190 IF RX=1 PRINT"Yippee";

```



```

1200 IF R%#2 PRINT "Murray";
1210 IF R%#3 PRINT "Well done";
1220 IF R%#4 PRINT "WOW!";
1230 IF R%#5 PRINT "Brilliant";
1240 PRINT " you got it right. ";
STRINGS(38-POS, " ");
1250 SOUND 1,1,0,200
1260 FOR I%#1 TO 5
1270 VDU19,3,RND(70);:PROCpause
(4)
1280 NEXT
1290 VDU19,3,7;0;:SOUND B11,2,10
5,40
1300 ENDPROC
1310
1320 DEF PROCscores
1330 CLS:VDU19,1,6;0;19,3,5;0;
1340 COLOUR:COLOUR131:PRINT"STR
INGS(120," ");TAB(15,2);"S C O R
E":COLOUR128
1350 COLOUR2:PRINT TAB(0,10);"Yo
u scored ";COLOUR3:PRINT;score;:
COLOUR2:PRINT " %."
1360 COLOUR1:PRINT"''''''This is "
;
1370 IF score<30 PRINT"very poor "
1380 IF score>29 AND score<50 PR
INT"not very good."
1390 IF score>49 AND score<70 PR
INT"average."
1400 IF score>69 AND score<100 P
RINT"quite good."
1410 IF score=100 PRINT"excellen
t.":FOR I%#1 TO 100:SOUND 1,-15,R
ND(25)*4+100,1:NEXT:SOUND 1,-15,1
20,20
1420 VDU23,1,1;0;0;0;
1430 COLOUR3:PRINT"''''''Would you
like to try some more ?''''( pre
ss Y or N )";
1440 VDU7:*FX21,0
1450 REPEAT keys=GETS
1460 UNTIL INSTR("YyNn",keys)
1470 CLS
1480 ENDPROC
1490
1500 DEF PROCinstructions
1510 VDU19,1,2;0;19,3,4;0;
1520 COLOUR129:COLOUR:PRINT"STR
INGS(120," ");TAB(10,2);"CHEMICAL
EQUATIONS":COLOUR2:COLOUR128
1530 PRINT"''''''There are ten equ
ations to be balanced. ''''''To bal
ance the equations the number of "
''''''atoms on either side of the eq
uation ''''''must be the same."
1540 PRINT"''''''Eq.":COLOUR1:PRIN
T TAB(12);"C + O";CHR$232;";CHR
$225;CHR$226;"; CO":COLOUR2:PRINT'

```

```

"when balanced is":COLOUR1:PRIN
T TAB(11);"C + O";CHR$232;";CHR
R$225;CHR$226;"; 2CO"
1550 COLOUR2:PRINT"''''''The first n
umber is 2,the second is 1''''''and
the third is 2."
1560 COLOUR131:COLOUR2:PRINT TAB
(5,31);" Press the space bar to s
tart "
1570 VDU7:*FX21,0
1580 REPEAT
1590 UNTIL GET=32
1600 COLOUR128:CLS
1610 ENDPROC
1620
1630 DEF PROCpause(delay)
1640 *FX21,0
1650 key$=INKEY$ delay
1660 ENDPROC
1670
1680 DEF PROClocate
1690 *FX200,2
1700 *TAPE
1710 *KEY9 "D%#PAGE=BE00:FOR I%#
PAGE TO TOP STEP:(I%#-D%#):I%#NE
XT:PRINT(TOP-D%#)=255)MPAGE=BE00)M
OLD[RUNIN]"
1720 *FX21,0
1730 *FX138,0,137
1740 ENDPROC
1750
1760 DEF PROCget_data
1770 RESTORE:READ N%
1780 RESTORE (2110+N%*(N%+10))
1790 READ answer(O)
1800 FOR I%#1 TO answer(O)
1810 READ number(I%#):answer(I%#)=
0
1820 NEXT
1830 READ question$,N%
1840 RESTORE (2040+10*N%)
1850 READ title$
1860 CLS:COLOUR 3:COLOUR 129:PRI
NT"STRINGS(120," ");TAB(0,2);titl
e$:COLOUR 128
1870 ENDPROC
1880
1890 DEF PROCprint_equation
1900 LOCAL I%:COLOUR 2:N%#0
1910 PRINT TAB((42-LEN question$
)DIV2,9);
1920 FOR I%#1 TO LEN question$
1930 IF q%#MID$(question$,I%,1)
1940 IF q%#<" " AND q%#>"/" VDU 23
O=VAL q%
1950 IF q%#=" " VDU 225,226
1960 IF q%#=" " VDU 227,228
1970 IF q%#="?" N%#N%+1:IF answe
r(N%#)=1 PRINT;answer(N%#);
1980 IF q%#=">" AND q%#<="/" OR q%#
="<" AND q%#<="/" OR INSTR(" + )",q%#
) PRINT q%#
1990 NEXT
2000 PRINT " "
2010 ENDPROC
2020
2030 DATA 50 :REM number of equa
tions
2040 REM ** titles **
2050 DATA " Reaction Of An Ele
ment With Oxygen"
2060 DATA " Acid / Metal
Reaction"
2070 DATA " Acid / Base
Reaction"
2080 DATA " Oxidation Reduc
tion Reaction"
2090 DATA " Action Of Heat
On A Nitrate"
2100 DATA " Reaction Of Meta
ls With Water"
2110 REM ** equations ** :number
of answers,answer1,answer2,...,eq
uation,title
2120 DATA 3,2,1,2,7H2 + 7O2 = 7
2O,1
2130 DATA 3,1,1,1,7S + 7O2 = 7SO
2,1
2140 DATA 3,2,1,2,7Mg + 7O2 = 7M
9O,1
2150 DATA 3,2,1,2,7C + 7O2 = 7CO
,1
2160 DATA 3,2,1,2,7Cu + 7O2 = 7C
uO,1
2170 DATA 3,1,5,1,7P4 + 7O2 = 7P
4O10,1
2180 DATA 3,3,2,1,7Fe + 7O2 = 7F
e3O4,1
2190 DATA 4,1,2,1,1,7Zn + 7HCl =
7ZnCl2 + 7H2,2
2200 DATA 4,1,2,1,1,7Ca + 7HNO3
= 7Ca(NO3)2 + 7H2,2
2210 DATA 5,3,8,3,4,2,7Cu + 7HNO
3 = 7Cu(NO3)2 + 7H2O + 7NO,2
2220 DATA 5,1,4,1,2,2,7Cu + 7HNO
3 = 7Cu(NO3)2 + 7H2O + 7NO2,2
2230 DATA 5,1,2,1,2,1,7Cu + 7H2S
O4 = 7CuSO4 + 7H2O + 7SO2,2
2240 DATA 4,1,2,1,1,7Mg + 7HCl =
7MgCl2 + 7H2,2
2250 DATA 4,1,2,1,1,7Mg + 7HNO3
= 7Mg(NO3)2 + 7H2,2
2260 DATA 4,1,2,1,1,7Fe + 7HCl =
7FeCl2 + 7H2,2
2270 DATA 4,1,2,1,1,7CaO + 7HCl =
?7CaCl2 + 7H2O,3
2280 DATA 4,1,2,1,1,7CuO + 7HCl
= 7CuCl2 + 7H2O,3
2290 DATA 4,1,2,1,1,7CuO + 7HNO3
= 7Cu(NO3)2 + 7H2O,3
2300 DATA 4,2,1,1,2,7NaOH + 7H2S
O4 = 7Na2SO4 + 7H2O,3
2310 DATA 4,2,1,1,2,7KOH + 7H2SO
4 = 7K2SO4 + 7H2O,3
2320 DATA 4,2,1,1,2,7NaOH + 7H2S
O4 = 7Na2S + 7H2O,3
2330 DATA 4,2,1,2,1,7Mg + 7SO2 =
7MgO + 7S,4
2340 DATA 3,2,1,2,7FeO + 7O2 = 7C
O2,4
2350 DATA 4,1,3,2,3,7Fe3O2 + 7H2
= 7Fe + 7H2O,4
2360 DATA 5,1,4,1,2,1,7MnO2 + 7H
Cl = 7MnCl2 + 7H2O + Cl2,4
2370 DATA 3,2,1,2,7FeCl2 + 7Cl2
= 7FeCl3,4
2380 DATA 4,1,1,2,1,7H2S + 7Cl2
= 7HCl + 7S,4
2390 DATA 4,1,4,1,4,7PbS + 7H2O2
= 7PbSO4 + 7H2O,4
2400 DATA 4,2,1,2,1,7Mg + 7CO2 =
7MgO + 7C,4
2410 DATA 4,1,3,2,3,7Fe3O2 + 7CO
= 7Fe + 7CO2,4
2420 DATA 5,1,2,1,1,2,7SO2 + 7H2
O + 7Cl2 = 7H2SO4 + 7HCl,4
2430 DATA 4,2,1,3,2,7H2S + 7SO2
= 7S + 7H2O,4
2440 DATA 3,2,1,2,7SO2 + 7O2 * ?
SO3,4
2450 DATA 3,1,3,2,7M2 + 7H2 * ?N
H5,4
2460 DATA 4,2,1,2,1,7H2S + 7O2 =
7H2O + 7S,4
2470 DATA 4,2,3,2,2,7H2S + 7O2 =
7H2O + 7SO2,4
2480 DATA 3,2,2,1,7KNO3 = 7KNO2
+ 7O2,5
2490 DATA 3,2,2,1,7NaNO3 = 7NaNO
2 + 7O2,5
2500 DATA 4,2,2,4,1,7Ca(NO3)2 =
7CaO + 7NO2 + 7O2,5
2510 DATA 4,2,2,4,1,7Mg(NO3)2 =
7MgO + 7NO2 + 7O2,5
2520 DATA 4,2,2,4,1,7Zn(NO3)2 =
7ZnO + 7NO2 + 7O2,5
2530 DATA 4,2,2,4,1,7Pb(NO3)2 =
7PbO + 7NO2 + 7O2,5
2540 DATA 4,2,2,4,1,7Cu(NO3)2 =
7CuO + 7NO2 + 7O2,5
2550 DATA 4,2,2,2,1,7AgNO3 = 7Ag
+ 7NO2 + 7O2,5
2560 DATA 3,1,1,2,7NH4NO3 = 7N2O
+ 7H2O,5
2570 DATA 4,2,2,2,1,7K + 7H2O =
7KOH + 7H2,6
2580 DATA 4,2,2,2,1,7Na + 7H2O =
7NaOH + 7H2,6
2590 DATA 3,3,4,1,4,7Fe + 7H2O *
7Fe3O4 + 7H2,6
2600 DATA 4,1,2,1,1,7Ca + 7H2O =
7Ca(OH)2 + H2,6
2610 DATA 4,2,2,2,1,7Li + 7H2O =
7LiOH + 7H2,6

```

Don't miss out on the mass of material that's appeared in *Electron User* over the past few months. Bring yourself up to date with this back issue bundle, packed with games, utilities, features and programming tutorials.

Here's what you'll find in the February 1989 - July 1989 bundle:

February 1989 issue:

Games: Slippery Sam. *Utilities:* Supercharge your programs. Verify tape programs. *Features:* Random access filing. Adventure hints. Reverse Polish tutor. *Reviews:* Pixel Perfect DTP. Preparing for breakdowns.

March 1989 issue:

Games: Taktiks, Trivia Test, Bomb Disposal, Sprog. *Utilities:* Search and Replace, Poetry. *Features:* Map of The Nine Dancers. Disc directories explored. *Reviews:* Repton Infinity, Question of Sport, Zenon, Last Ninja. Advanced File Manager.

April 1989 issue:

Games: Diamonds - a mind bending puzzle. *Utilities:* Pattern fill routine, automatic program saver, Home Finance Manager. *Features:* Input routines explained, disc drives revealed, palindromic numbers explored. *Reviews:* Sam 6, Exile, Orbital.

May 1989 issue:

Games: Eliminator. *Utilities:* EZ Type, DFS disc formatter. *Features:* Tournament sorts, Party Cocktail Creator, Landscape Designer, Fractal Generator. *Reviews:* Barbarian II, Circus Games, Superman, Mode 7 Simulator Rom.

June 1989 issue:

Games: Tic Tac Rhymes, Duel. *Features:* ADFS osword calls explained, creating customised tapes, maps to Woodbury End and Palace of Magic. *Utilities:* Disc-based database, new CIRCLE graphics command, Morse Code Tutor. *Reviews:* Holed Out, Tank Attack, Sam 7.

July 1989 issue:

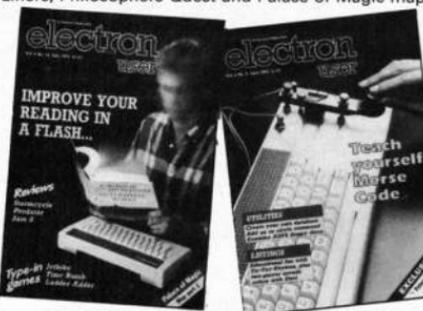
Games: Jet Bike arcade adventure, educational fun with Ladder Adder, Time bomb arcade fun. *Utilities:* Speedy Reader. *Reviews:* Predator, Stormcycle, Sam 8. *Features:* 10 Jafa Systems interview, Disc error codes documented, 10 Liners, Philosophers Quest and Palace of Magic mapped.

electron USER

BACK ISSUE BUNDLE

Everything you ever wanted to know about your Electron but were afraid to ask is in these back issues of Electron User

Only £1.50
each or
£7.99
for all six



TO ORDER PLEASE USE THE FORM ON PAGE 45

Get on the ball!



Pick up your hockey stick and try your hand at Stuart Bain's Rollerball, a fast paced two player game

ROLLERBALL is rather loosely based on the game of hockey. In this fast-paced computerised version there are only two players - it's a battle between you and a friend - you can't play against your Electron.

At the start of the game each player stands on his goal line and the ball is placed in the centre of the pitch. You must dash to the ball - attempting to get there before your opponent - and using your stick to push it ahead of you, dodge round your opponent and knock it into the back of the net. The first player to score 10 goals is the contest winner.

If your opponent gains control of the ball his running speed is reduced, so this provides an ideal opportunity for you to catch up and tackle him. Keep your wits about you and shield the ball with your bat when you gain possession.

The controls might feel strange at first, but they are easy to get used to. You can rotate your stick so that it is pointing in any of the eight compass directions and move in that direction pushing the ball in front of you.

Your controls are Z and X to rotate left and right, and Control to run forward. Your opponent's controls are > and ? for swivelling round and Return to run forward.

```

10 REM Rollerball
20 REM By Stuart Bain
30 REM (c) Electron User
40 PROCinit:ONERRIFERR=17MO
DE6:REPORT:PRINT" at line ";ERL: E
ND
50 REPEATMODE6:PROCinstruct
60 MODE4:sc1X=0:sc2X=0:REPEAT
ROcScreen
70 REPEATIME=0:PROCmove(D):PR
OCmove(1):VDU31, bxX, byX, 232:REPE
TUNTILIME>10:UNTILgoalX
80 SOUND1, -12, 80, 4: SOUND1, -12,
128, 5: UNTILsc1X>9ORsc2X>9
90 Ifsc1X>9winX=1ELSEwinX=2
100 PRINTTAB(14, 16)"PRESS SPACE
"
110 REPEATPRINTTAB(7, 13)"Player
";winX" wins by ";ABS(sc1X-sc2X)
";goals"
120 FORI=0TO250:NEXT:PRINTTAB(7
, 13)SPC25
130 FORI=0TO250:NEXT
140 UNTILINKEY=99
150 UNTILO
160 DEFPROCmove(PX)
170 XX=XI(PX):YY=YI(PX):DX=D(P
X):I=1:IFPROCkey2:ELSEPROCkey1

```

```

180 IfmoveXI=XI+HX(DX):YI=YI+V
X(DX)
190 XX=XI*32:YY=(32-YI)*32-1:IF
POINT(XX, YY)ORPOINT(XX+28, YY)ORP
OINT(XX, YY-28)ORPOINT(XX+28, YY-28)
XX=XI(PX):YY=YI(PX):moveX=FALSE
200 IFNOTmoveXANDDX=D(PX)ENDPR
OC
210 IFPOINT(XX+16, YY-16)ANDmove
XPROCHitball:ELSEVDU31, XX(PX), YI(
PX), 32, 31, XX, YY, 224+DX
220 XX(PX)=XX:YY(PX)=YY:DX(PX)=
DX:ENDPROC
230 DEFPROCkey1:DX=D+INKEY-98-
INKEY-67:IFDX<0DX=7ELSEIFDX=8DX=
240 moveZ=INKEY-2:ENDPROC
250 DEFPROCkey2:DX=D+INKEY-104
-INKEY-105:IFDX<0DX=7ELSEIFDX=8DX
=0
260 moveZ=INKEY-74:ENDPROC
270 DEFPROCHitball
280 XX=XI(PX):YY=YI(PX):hX=HX(D
X):vX=VX(DX)
290 REPEATmoveX=0:AX=bxX+hZ:BX=
vX+vZ
300 IFAZ=XI(1-PX)ANDBX=YY(1-PX)
IY=ND(8)-1:hX=HX(IX):vX=VX(IX):m
oveZ=TRUE

```

```

310 UNTILOmoveX:XX=AX*32:YY=1
023-BX*32
320 IFFPOINT(XX, YY)ORPOINT(XX+28
, YY)ORPOINT(XX, YY-28)ORPOINT(XX+2
8, YY-28)AX=bxX:BX=byY
330 IFAZ=1AX=2ELSEIFAZ=38AX=37
340 IFBZ=1BX=2ELSEIFBZ=38BX=24
350 IFAZ<ANDBX>8ANDBX<18goalX=
TRUE:sc2X=sc2X+1ELSEIFAZ>36ANDBX>
8ANDBX<18goalX=TRUE:sc1X=sc1X+1
360 VDU31, bxX, byY, 32, 31, AX, BX, 2
32:bxX=AX:byY=BX:hX=0:vX=0:ENDPR
OC
370 DEFPROCinit
380 VDU23, 224, 255, 24, 24, 24, 2
4, 24, 24, 23, 225, 16, 8, 4, 10, 17, 32, 64
, 128, 23, 226, 1, 1, 1, 255, 255, 1, 1, 2
3, 227, 128, 64, 32, 17, 10, 4, 8, 16
390 VDU23, 228, 24, 24, 24, 24, 24,
24, 255, 23, 229, 1, 2, 4, 136, 80, 32, 16
, 8, 23, 230, 128, 128, 128, 255, 255, 128
, 128, 128, 23, 231, 8, 16, 32, 80, 136, 4
, 2, 1
400 VDU23, 232, 24, 126, 126, 255, 25
5, 126, 126, 24

```

Turn to Page 30 ▶

CONTROLS

| | |
|--------|--------------|
| Z | Player 1 |
| X | Rotate left |
| | Rotate right |
| | Forward |
| > | Player 2 |
| ? | Rotate left |
| Return | Rotate right |
| | Forward |

◀ From Page 29

```

410 DIMXX(1),YX(1),DX(1),HX(7),
VX(7):RESTORE430:FORIX=0T07:READX
(X(IX)),VZ(IX):NEXT
420 ENDPROC
430 DATA 0,-1,1,-1,1,0,1,1,0,1,
-1,1,-1,0,-1,-1
440 DEFPROCscreen
450 CLS:VDU23,1,0;0;0;0:RESTOR
E510:FORIX=0T01:READX(IX),YX(IX)
,DX(IX):NEXT:bxX=19:byX=13:hZ=0:v
X=0:goalZ=FALSE
    
```



ROLLERBALL SCORES

Player 1:8

Player 2:8

```

460 PRINTTAB(11,28)"ROLLERBALL
SCORES"TAB(1,30)"Player 1:"sc1X1
AB(28,30)"Player 2:"sc2X
470 COLOUR129:PRINTTAB(0,0)SPC4
DTAB(0,26)SPC40:FORIX=1T025:VDU31
,0,IX,32,31,39,IX,32:NEXT
480 PRINTTAB(1,9)SPC2TAB(1,17)S
PC2TAB(37,9)SPC2TAB(37,17)SPC2
490 COLOUR0:FORIX=1T04:PRINTTAB
(0,10-IX)MID$("GOAL",IX,13)TAB(39,
10-IX)MID$("GOAL",IX,13):NEXT
500 COLOUR128:COLOUR1:PRINTTAB(
5,12)CHR$226TAB(34,14)CHR$230TAB(
19,13)CHR$232:ENDPROC
510 DATAS,12,2,34,14,6
520 DEFPROCInstruct
530 CLS:VDU23,1,0;0;0;0:PROCT1
tle
540 PRINT"" In this fun game y
ou try to beat your"" friend by
being the first to score 10""
goals. You move the ball around t
he
550 PRINT"" screen by pushing i
t with the '1' clubs"" which sac
h player controls. Push the"" b
all into your opponents goal to s
core.""
560 PROCspace:PROCTitle
570 PRINT'SPC16"CONTROLS"SPC4"
Player 1"SPC16"Player 2""SPC5"
2"SPC5"ANTI-CLOCKWISE"SPC5">"
580 PRINT""SPC5"X"SPC7"CLCK
WISE"SPC8"?""SPC5"CTRL"SPC
7"MOVE"SPC8"RET"
590 PROCspace:ENDPROC
600 DEFPROCspace:PRINTTAB(14,24
)"PRESS SPACE":REPEATUNTILINKEY-
99:ENDPROC
610 DEFPROCtitle:CLS:PRINTTAB(1
4,13)-----TAB(13)CHR$232
"ROLLERBALL "CHR$232'TAB(14)-----
-----":ENDPROC
    
```

electron
user

MAIL ORDER OFFERS

electron
user

MAIL ORDER OFFERS

SAVE £3

TANK ATTACK

Tank Attack

The unique computerised board game

Tank Attack is a computerised board game for two, three or four players, where each one takes the role of a General commanding a country's Tank Corps of one or more armoured divisions.

Your objective is to capture the enemy headquarters, which will require the planned strategic deployment of your forces and regular fire duels between your own and enemy units.

Weather, morale, skill, judgement, planning foresight, careful management of rebuild and repair facilities and luck all play a part in deciding the result of each game.

Tank attack is one of those games you keep coming back to, and at the special offer price of only £19.99 is guaranteed to give you and your friends hours of action-packed excitement.

- Control a full division of tanks and armoured cars
- See all the fighting 'live' on your computer
- Superb board and fully detailed playing pieces
- Real time graphics
- Play as allies or enemies
- Suitable for all ages

RRP £12.99
OUR PRICE
£9.99

TO ORDER PLEASE USE THE FORM ON PAGE 45

Phil Ord presents an entertaining DIY Bingo game for all the family

CLICKETY click, 66... On its own number one... Two fat ladies 88... Blind five oh - House! Yes, you've guessed it, Bingo comes to the Electron. This superb version from Phil Ord is a complete do-it-yourself Bingo kit specially designed so you can produce your own games for all the family to play.

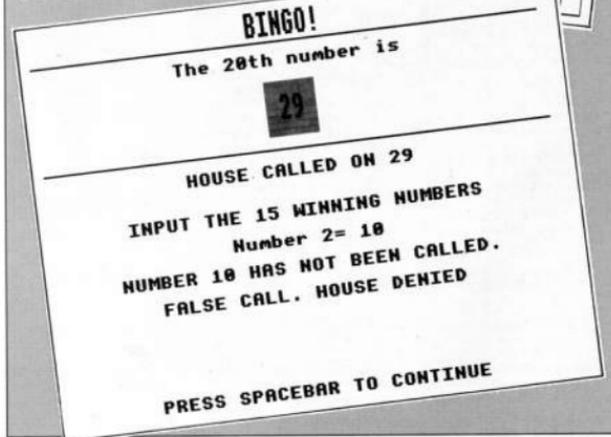
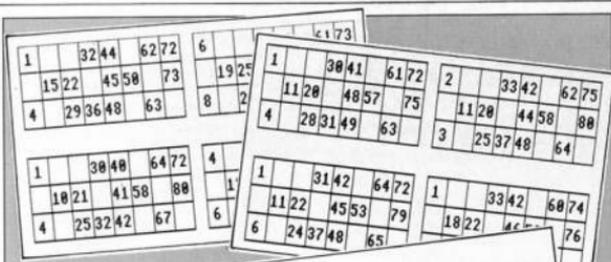
The kit consists of two programs. The first, called Cards, is used to create the Bingo cards and you'll need a printer to run them out. The second program is used when playing the game and calls out the numbers.

First enter and save Cards. Make sure the printer is plugged in and switched on then run the program. Eight cards will be drawn on screen and then dumped to the printer. When they have all been printed cut them out and you are ready to play.

The screen dump procedure is written in Basic and will work with Epson-compatible printers. If you have a non-standard machine the codes setting up the paper feed and bit image mode may have to be altered. To help, the routine contains REMs explaining what each line does. It takes around 10 minutes to print eight cards.

The second program, Caller, should now be typed in and saved. Run it to play Bingo. It will display the numbers on the screen and you simply tick them off your card. When a player has ticked off all of his or her numbers on the card press H and the Electron will then check the card's numbers so there is no cheating.

If at any time you need to check all the numbers called press R to reprint them all on screen.



Eyes down!

```

10 REM Bingo Cards
20 REM By Philip Ord
30 REM (c) Electron User
40 MODE4
50 DIM num(3)
60 t%=RND(-TIME)
70 VDUS:GCOL0,1
80 PROCgrd(4,1020,80,1020)
90 PROCgrd(664,1020,740,1020)
100 PROCgrd(6,760,80,760)
110 PROCgrd(664,760,740,760)
120 MOVE0,528:PRINTSTRINGS(40,"
--")
130 PROCgrd(4,460,80,460)
140 PROCgrd(664,460,740,460)
150 PROCgrd(4,200,80,200)
160 PROCgrd(664,200,740,200)
170 PROCprint(8,1000)
180 PROCprint(668,1000)
190 PROCprint(8,740)
200 PROCprint(668,740)
210 PROCprint(8,440)
220 PROCprint(668,440)
230 PROCprint(8,180)
240 PROCprint(668,180)
250 PROCdump
260 END
270
280 DEFPROCgrd(X,Y,X1,Y1)
290 MOVEX,Y:DRAWXX+608,Y:DR
WX+608,Y-128:DRAWXX,Y-192:DR
XX,Y1
300 FORJ=1 TO 8
310 MOVEX,Y:DRAWX,Y-192:X1=
X1+76
320 NEXT
330 FORY=1 TO 2
340 MOVEX,Y-64:DRAWXX+608,Y-
64:YX=Y-64
350 NEXT
360 ENDPROC
370 DEFPROCprint(XX,Y)
380 K=0
430 FORJ=1 TO 8
440 FORI=1 TO 3
450 FORI=2 TO 1 STEP-1
470 IF num(I)*num(I+1) PROCswap
480 NEXT
490 NEXT
500 raX=RND(3):rbX=RND(2)+1
510 IF J=1 MOVEX+16,Y:PRINT;n
um(1):MOVEX+16,Y-128:PRINT;num(
rbX)
520 IF J=2 MOVEX+76,Y-64:PRIN
T;num(raX)
530 IF J=3 MOVEX+152,Y-64:PRI
NT;num(1):MOVEX+152,Y-128:PRIN
T;num(rbX)
540 IF J=4 MOVEX+228,Y:PRINT;
num(1):MOVEX+228,Y-128:PRINT;n
u(rbX)
550 IF J=5 MOVEX+304,Y:PRINT;num(
1):MOVEX+304,Y-64:PRINT;num(3
)
560 IF J=6 MOVEX+380,Y-64:PRI
NT;num(raX)
570 IF J=7 MOVEX+456,Y:PRINT;
num(1):MOVEX+456,Y-128:PRINT;n
u(rbX)
580 IF J=8 MOVEX+532,Y:PRINT;
num(1):MOVEX+532,Y-64:PRINT;num
(rbX)
590 K=K+10
600 NEXTJ
610 ENDPROC
620 DEFPROCswap
630 num=num(1):num(1)=num(I+1):
num(I+1)=num
640 ENDPROC
650
660 DEF PROCdump
670 *FX6,255
680 *FX3,10
690 VDU 27,64:REM Reset printer
700 VDU 27,65,4:REM 4/72in line
spacing
710 FOR Y%=1020 TO 0 STEP -8
720 VDU 27,75,64,1:REM Bit imag
e mode
730 FOR X%=0 TO 1276 STEP 4
740 BX=8:PX=0
750 FOR IX=0 TO 6 STEP 2
760 IF POINT(XX,Y-IX)PX=PX+BX
770 BX=BX DIV 2

```

Turn to Page 32 ▶

◀ From Page 31

```
780 NEXT
790 VDU PX
800 NEXT
810 VDU 10
820 NEXT
830 VDU 27,64:REM Reset printer
840 *FX3
850 ENDPROC
```

```
10 REM Bingo Caller
20 REM By Philip Ord
30 REM (c) Electron User
40 MODE1
50 DIMN(80)
60 VDU23,1,0;0;0;0;
70 PROCrand:GOTO110
80 DEFPROCrand
```

```
90 FOR I=1 TO 20:NI(I)=I:NE
KT:FOR IX=80 TO 2 STEP-1:CI=ROW(I
X):IX=NI(CX):NI(CX)=NI(IX):NI(IX
)=IX:NEXT
100 ENDPROC
110 PROCbig("BINGO!",17,2)
120 ENVELOPE1,1,135,198,173,151
173,212,126,0,0,-126,126,126
130 ENVELOPE2,1,86,105,162,238,
194,167,126,0,0,-126,126,126
140 MOVED,888:DRAW1279,888
150 MOVED,640:DRAW1279,640
160 FOR I=1 TO 80
170 A=NI(I):IF A<10 C=2 ELSE C=
180 IF RIGHTS(STRS(I),1)="1" E$
="st" ELSE IF RIGHTS(STRS(I),1)=""
E$="nd" ELSE IF RIGHTS(STRS(I),
1)="3" E$="rd" ELSE E$="th"
190 IF I>10 AND I<20 E$="th"
200 PROCbig(STRS(A),C,1):VDU26:
COLOUR128
210 SOUND1,-15,170,1
220 PRINTTAB(6,13)"SPACEBAR FOR
```

```
THE NEXT NUMBER"TAB(9,15)"OR HIT
H TO CALL HOUSE"TAB(12,17)"PRESS
R TO RECAP"
230 *FX21
240 WS=GETS:IF WS<>" " AND WS<>
"H" AND WS<>"R" GOTO240
250 IF WS="H" PROChouse
260 IF WS="R" PROCrecap
270 NEXT
280 GOTO730
290 DEF PROCbig(str$,C,R)
300 IF str$="BINGO!" GOTO350
310 PRINTTAB(11,5)"The ":I;e$;"
number is"
320 VDU28,18,10,21,7:COLOUR129:
CLS
330 PRINTTAB(C,R);
340 LOCAL IX,AX
350 FORIX=1TOLEN(str$)
360 I&70=ASC(MID$(str$,IX,1))
370 AX=10:IX=870:YX=0:CALL &FFF
1 380 FOR J=X-1TO1
390 VDU23,224
400 FORKX=2TO9
410 VDU?(&70+4*JX+KXDIV2)
420 NEXT
430 VDU28,24,10,8
440 NEXT
450 VDU11,11,9
460 NEXT
470 ENDPROC
480 DEFPROChouse
490 SOUND1,2,100,40:FORB=1 TO 1
000:NEXT
500 VDU28,0,29,39,13:CLS:VDU26:
PRINTTAB(11,13)"HOUSE CALLED ON "
;A;
510 FORInp=1 TO 15
520 PRINTTAB(6,16)"INPUT THE 15
WINNING NUMBERS"TAB(14,18)"Numbe
r ";Inp;"=":VDU7,23,1,1;0;0;0;:IN
PUTTAB(24,18)wn:VDU23,1,0;0;0;0;
```

```
530 FORf=1 TO I
540 IF wn=NI(f) f=I:WN=TRUE:PROC
Ccorrect:NEXT:GOTO580
550 IF wn<>NI(f) WN=FALSE
560 NEXT f
570 IF WN=FALSE PROCIncorrect:I
np=15:NEXT:ENDPROC
580 NEXT Inp
590 PROCwinner:END
600 ENDPROC
610 DEFPROCcorrect
620 PRINTTAB(15,20)"Confirmed."
;FORB=1 TO 200:NEXT:PRINTTAB(24,1
8);SPC2;TAB(15,20);SPC10
630 ENDPROC
640 DEFPROCIncorrect
650 SOUND1,-15,20,4;SOUND1,-15,
10,8
660 PRINTTAB(5,20)"NUMBER ";wn;
" HAS NOT BEEN CALLED."TAB(8,22)"
FALSE CALL. HOUSE DENIED"
670 PRINTTAB(7,29)"PRESS SPACEB
AR TO CONTINUE":REPEATUNTILGET=32
680 VDU28,0,29,39,13:CLS:VDU26
690 ENDPROC
700 DEFPROCwinner
710 SOUND1,1,100,40
720 VDU28,0,29,39,13:CLS:VDU26:
PRINTTAB(17,14)"BINGO!"TAB(13,20)
"HOUSE CORRECT."
730 PRINTTAB(6,24)"PRESS SPACEB
AR FOR NEXT GAME":REPEATUNTILGET=
32:RUN
740 ENDPROC
750 DEFPROCrecap
760 VDU28,0,29,39,13:CLS:VDU26
770 PRINTTAB(17,13)"RE-CAP"
780 FORrC=1 TO I
790 PRINT"NI(rC);";
800 IF rC MOD13=0 PRINT"
810 NEXT
820 GOTO760
830 ENDPROC
```

TWO WAYS TO ENSURE
YOU GET

electron
user

EVERY MONTH

1. Complete and mail subscription form on Page 45
2. Hand this form to your newsagent.

Please reserve me a copy of Electron User magazine every month until further notice.

- I will collect
 I would like it delivered to my home.

Name _____

Address _____

Note to newsagent: Electron User should be obtainable from your local wholesaler, or contact Circulation Manager on 0424 430422

ELECTRON SPARES

| | |
|---|--------|
| Acorn Data Recorders | £24.99 |
| Electron Mains Power Unit | £9.95 |
| Plus 1 Dual Rom Holders | £9.95 |
| Cassette Leads (7 Din - 3 Jacks) .. | £3.99 |
| Printer Leads (Parallel) | £4.99 |
| Complete Keyboard Assembly (inc keytops) | £12.99 |
| Keyboard Key Switches (Pack of 5) | £1.99 |
| Keytops (complete set) | £4.99 |
| Cases (Top & Bottom Complete) .. | £7.50 |

GRACAR

Unit 6 Acacia Close
Leighton Buzzard
Tel: 0525 383074

TOWERHILL

Unit 7, Acacia Close, Cherry Court Way Ind. Est.

Leighton Buzzard, Beds.

Telephone: Leighton Buzzard (0525) 385329

Fair Means or Foul

Become the world champion - a great realistic boxing simulation

£5.50

Barbarian I

Drax has kidnapped Princess Mariana. You are the mighty Barbarian Warrior wielding your broad sword with deadly skill

£5.50

PEDRO

Stop the animals eating Pedros plants by blocking off the maze exits and catching the animals. Very addictive

£1.99

ROM CARTRIDGES

Viewsheets £11.95
View £11.95
Logo £28.50

SPYCAT SUPER OFFER

Arcade adventure - discover secret passages, hatches and lifts in 10 Drowning Street. A good captivating game

£4.75

Rick Hanson Trilogy

Three great adventures from Robico

Project Thesis
Myraon
Rick Hanson

Special offer price £9.95

XOR

Ultimate maze challenge. Logical thinking strategy and tactical problem solving are required. No time limit to solve the puzzles

£2.99

Turtle Graphics

Teaches Geometry, Mathematics and graphics at elementary level

£2.25

TALKBACK

This program allows users to create simple conversations on the screen. Provides valuable lessons in English and computer literacy - very entertaining. Age 10+

£1.50

Life of Repton or Repton Through Time

That little Repton creature around again Buy either at our great summer price

£2.99 each

DARE DEVIL DENIS

Fancy being a stunt man? Try your skills against the hazards using a motorbike

£1.99

WORKSHOP

Provides a micro world in which to discover what each of the programs amazing "Machines" can do with simple shapes. Lively replay sequence for young learners. Ages 3-6

£1.50

PLAY IT AGAIN

SAM 10

Contains: 3D Doty, Qwak, Zalen, Repton Thru Time

£7.00

FIRST STEPS WITH MR. MEN

Simple and absorbing games (4-8 yrs) for early learners when starting to read

£4.99

HERE AND THERE WITH MR. MEN

These games (4-8 yrs) are designed to teach children about giving directions and plan simple routes.

£4.99

EDUCATIONAL OFFER

All 4 Ivanberg revision packs - covers all GCE-GCSE topics + syllabus. Maths 1+2, English 1 + Biology 1

£5.00 complete

POWER PACK 2

Another 7 Great Games Includes: Psycastria, Thunderstruck, Stix, Saracoid, Last of the Free, Froot Raid, Drain Mania

£4.50

NEW RELEASES FOR 1989 NEW

| | |
|--------------------------------|-------|
| Ninja | £6.75 |
| Question of Sport | £9.25 |
| Commando | £2.99 |
| Indoor Soccer | £1.99 |
| Play it again Sam V | £4.75 |
| Repton Infinity | £9.25 |
| Exile Superior | £9.25 |
| Play it Again Sam IV Sup. | £6.75 |
| Pipeline Sup. | £6.75 |
| Barbarian II | £6.75 |
| Play it again Sam VII | £6.75 |
| Circus Games | £6.75 |
| Superman | £6.75 |

NEW Predator NEW

Lead a commando unit into the jungle to rescue the diplomats

£7.50

Electron Power Supply Unit

£9.95

BRIAN CLOUGH FOOTBALL FORTUNES

with Board Game

£4.99

Elixer

Help Cyril to find the Magic Elixer to restore him to full size

£2.99



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



Write your own arcade smashes using the

ARCADE GAME Creator

Arcade Game Creator is a suite of programs for the Electron and BBC Micros. Taken from the pages of *Electron User*, it lets you into the secrets of writing fast-action arcade games, and provides you with a number of utilities to make design and programming easier.

Among the programs are:

- A Mode 5 sprite editor that lets you design your own multi-coloured characters.
- A selection of fast print routines that will move sprites both in front or behind other objects on the screen.
- Map generators that will squeeze a Mode 5 screen into 8 bytes!
- Scrolling maps.
- Score update and printing routines. . . . and much, much more.

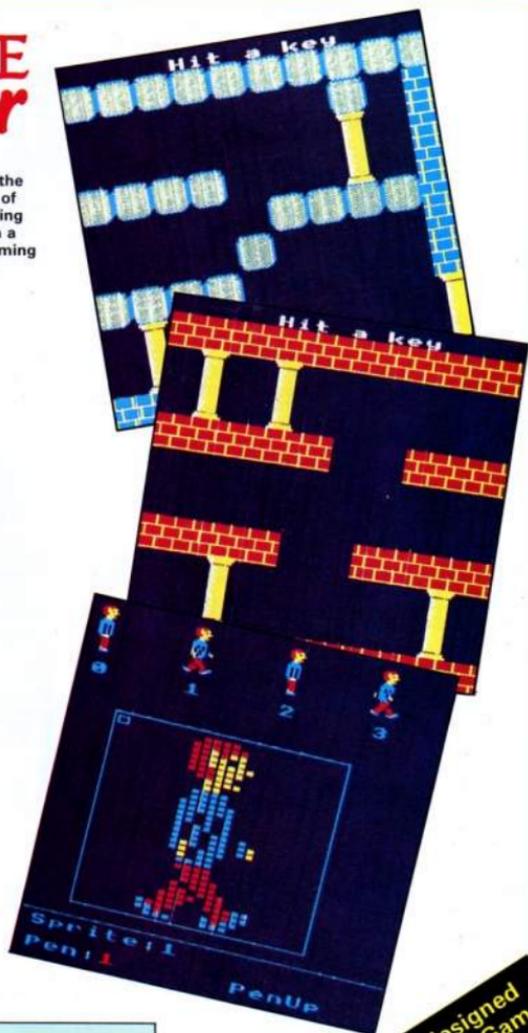
To help you make the most of the Arcade Game Creator, you will also get a comprehensive manual based on the original series.

Written in an easy to read style and with many illustrations and screen shots, it contains all the information you need to create and animate sprites, to design backgrounds and to link the two together into a complete arcade game.

If you are an aspiring games programmer, this is an offer you simply cannot afford to miss!

Arcade Game Creator

Tape + manual£9.95



Screens designed
using Arcade Game
Creator

TO ORDER PLEASE USE THE FORM ON PAGE 45

MICRO MESSAGES

Putting the !Boot in

HAVING upgraded my Electron with a Slogger Master Ram board, Pres Plus 1 and Plus 3, and a Panasonic KX-P1081 printer, I find any articles relating to these peripherals of great interest.

I realise that you have given quite a bit of information on them already, but there are still some things that puzzle me. I have often envied the way that numerous files on the Welcome disc are accessed using !Boot, and I have several times tried to emulate this facility on my own discs but without success, so how about a bit of tuition on this command?

Another topic I would like to know more about is disc error messages. Many are self-explanatory, but sometimes when clearing the screen after using a file I get the message Bad Sum. Although the remedy for this is simple, I cannot understand from the manual what the reason is. One I find incomprehensible is Channel on channel.

I have tried without success to make use of the Letterhead Designer program from your March 1988 issue. I have checked and rechecked the listing, including the alterations suggested by John Bloxham in June's Micro Messages. I think a published listing showing how the illustrated Letterhead was achieved would have been preferable to a lot of erudite explanation.

Now that I have taken out a subscription

to Electron User I look forward to the postman's visit each month - it's one of life's bright spots, so please keep up the good work. - J. D. Hatfield, Hull.

● Creating !Boot files is quite straightforward. Copy the Build Utility from the Library directory on your welcome disc to your work disc. Entering the following lines will create a !Boot file that will load and run a file called Menu:

```
*BUILD !Boot  
CHAIN "Menu"
```

Press Escape after typing the last line and enter:

```
*OPT4,3
```

When you press Shift+Break the instructions in the !Boot file will be executed as if they were typed in at the keyboard. Some programs corrupt the disc filing system's reserved workspace when they are run. If this happens then you will get the error messages you mention. To prevent this, press Control+Break after each program.

The letterhead accompanying the article was created using the program listed and was simply drawn freehand. Please check your typing carefully if your version doesn't work properly.

roms. If the first rom is intercepting calls meant for the second one a simple alternative is to swap the rom positions. Also try storing a zero in &2A0+rom number to disable the one causing problems.

Printing on a budget

COULD you recommend some printers of reasonable standard and price which I could use to produce listings and hard copies of text from a word processor. I have already bought the Plus 1 expansion.

Secondly, could you recommend an ideal package, either View and Viewsheet cartridges or the Mini Office package, which could be of use to me and also compatible with the printer? - Carwin Jones, Fareham, Hants.

● The Star LC10 at around £175 and Panasonic KX-P1081 at around £139 are two excellent printers available from Watford Electronics, Jessa House, 250 Lower High

Street, Watford WD1 2AN. Mini Office can be used with these printers, as can View and Viewsheet. However the last two are far superior, being rom-based and extremely powerful.

Looking for Pascal

I AM trying to find a Pascal rom cartridge suitable for use with my Electron and Plus 1. Do you know where I can find one? I have a Pres AP6. Would a Pascal rom suitable for the BBC Micro be compatible with the Electron? - Richard Fawcett, Edinburgh.

● Acornsoft produces a superb implementation of Pascal. However, it is difficult to find so you'll have to ring round the suppliers. The BBC Micro version of Pascal probably runs, but the editor's function keys will not be suitable, so it should be avoided.

Electron on Radio One

MY Electron is interfering with the reception of my radio. This means I can't listen to Radio One while playing with my computer. Do you have any suggestions as to how I can tackle the problem? - Eddie Irwin, Camberley, Surrey.

● We have heard of this sort of thing before, and apart from shielding your micro by encasing it in metal foil there's nothing you can do. Even this solution isn't recommended, as the machine might overheat and the foil could short circuit the pcb.

Disappearing Bowls

A WHILE ago I bought Indoor Sports from Tynesoft. Unfortunately, there seems to be some kind of graphics corruption with 10-Pin Bowling. When the bowler starts to run with the bowl, the top section of the scores and the portion of the screen below the alley disappear. When the bowler throws the bowl they reappear.

Also when the bowl is shown hitting the pins the top of the screen is black. This is an annoying problem and I am sure it is not meant to happen, because the sections cut off are not always the same and the edge of the cut-off picture flickers.

I disconnected my Plus 1, but this makes no difference and I have no other add-ons. Please could you tell me whether your reviewer had any similar problems with his

Turn to Page 36 ▶

Knock out program

I HAVE been searching for a program which simulates the game Knock Out Whist and in your July 1988 issue I noticed one. I would like to know if it possible to buy this game on tape, as I do not wish to type in the program. - Glen Cooper, Billingham, Cleveland.

● Sorry, it isn't available on tape.

Calling too many roms

I HAVE an Electron with an AP6 expansion but have found that two of my roms respond to the same call. Is there any way to disable one rom temporarily without physically unplugging it? Your help would be greatly appreciated. - R. A. Stevens, Portsmouth.

● The best solution is to add a utility rom such as ADT to your micro. This has a built in UNPLUG command to remove unwanted

◀ From Page 35

review copy. I have the Pres Battery-Backed Sideways Ram and I have always had problems using LOADROM.

To load a rom image including MAKEROM and PRNTBUF, I have to keep switching the computer off and on, trying LOADROM each time until it successfully works. I usually have to switch the machine off and on at least six times.

What usually happens when I try to use LOADROM is that either the computer crashes followed by a continuous beep – only Break stops this – or the message Syntax error, Bad Program appears. I have tried locking and unlocking the ram, but this makes no difference.

I have been trying to convert your utilities, for example BOS and Find and Replace, to run from sideways ram. As they use Basic rom routines I am having problems as only one rom can be paged in at a time. Is there any way in which a program in sideways ram can call a Basic rom routine and then continue after the call?

I cannot miss this opportunity to say that your magazine is excellent. The format is great – S. Creed, Cowley, Oxford.

● The Slogger Turbo Driver can cause the blackout problems you mention, as it makes the Electron run too fast and the timing of interrupt routines is wrong. Switch it off if this is the case.

You can easily cause problems with battery backed sideways ram by loading in a corrupt rom image or a partially working one. The solution is to switch off, remove the cartridge, switch on, insert the cartridge and then try to load your rom images.

Sounds rather interesting

I WAS experimenting with the SOUND command on my Electron when I came across

All programs printed in this issue are exact reproductions 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.

some unusual noises, none of which I'd heard before.

I have never seen a program in books or magazines which gives sounds other than plain notes or the two noises on channel zero. Enter and run this to hear some unusual sounds:

```
10 FOR I=1 TO 2
20 SOUND 1,-15,0,-1
30 ?$822=10
40 ?$823=2
50 NEXT
```

By changing the 10 and 2 in lines 30 and 40 other sounds can be generated. – Richard Fryer, Edinburgh.

Marginal amendment

WHEN I use the Label Printer utility from the October 1987 issue of Electron User I find that when I select enlarged text with margin, I get an enlarged margin which throws the text to the right edge of the label. I have written a small modification to line 950 which

cures this for the Amstrad DMP2000 printer:

```
950 IF FNyn VDU 2,1,27,1,ASC"
W",1,1,3:VDU 2,1,27,1,ASC"D",1,
4,1,0,3
```

The following change should also be made:

```
850 VDU 1,27,1,ASC"R",1,1,3:
VDU 2,1,27,1,ASC"D",1,8,1,0,3
```

The first halves the margin size – the standard eight-space margin size becomes four spaces. In enlarged mode this means the four-space margin is about the same width as the eight-space margin in normal mode.

The second resets the margin each time to eight spaces for normal mode, but automatically alters it for enlarged again when enlarged is used. – Robert Goddard, Rugby, Warwickshire.

Jetting around with Droid

I TOOK out a subscription to Electron User with the free tape offer and I think it's great. I hope the tapes are still on offer when I come to renew my subscription.

In reply to Alexander Bowyer's request for help in June's issue, the following advice should sort his Codename: Droid problems out.

To get the jet-pack on level three, sector two he should pick up the key that can be found high up towards the left of the jet-pack on the same sector, ensuring that it is the first item picked up after collecting the spring on level two, sector two.

I am interested in upgrading my Electron to a disc system and am very keen on the Pres Advanced Plus 3 MkII. I have yet to buy a Plus 1, but if I bought the disc system from Pres would I need a disc interface? – Michael Severn, Preston, Lancashire.

● You'll need a Plus 1 to use an AP3. The AP3 is a disc interface that plugs into it.

Who's who in View?

Who is Mark Colton? Does anybody know? Why his name is printed out when the word Daytona is entered into View? – Andrew Sellar, Old Hutton, Kendal.

● We are just as puzzled as you Andrew.

Achieving the impossible

MR BIBBY from Wrexham is correct, Repton Infinity is impossible. I also had the game for Christmas and soon found that two screens were impossible. I contacted Superior Software and was told that the game was bugged and that it was in the process of



producing a new one.

The replacement game, which is not impossible, arrived about a month later. So, Mr Bibby and anyone else with a faulty copy should either take it back to the supplier or contact Superior Software. — D. Hare, Liverpool.

● This month's Arcade Corner on Page 38 features many hints and tips for Repton Infinity.

Memory trouble

I have recently bought an Electron with both a Plus 1 and Plus 3 attached. I intend to use my machine primarily for word processing. However when I have a View ram installed the lack of useable memory is a handicap. What's the easiest and cheapest way to add more memory for word processing? — Stuart Bookless, Hemlington, Middlesbrough.

● The trouble isn't View, but the Plus 3. You could add Pres' Battery Backed Ram Cartridge and E00 ADFS to solve your memory problem. There is a cheaper way though: View can handle files much larger than will fit in the memory using EDIT. You should be able to edit files up to 150k long by entering:

```
EDIT filein fileout
```

Where filein is the old file you want to edit, and fileout is the new edited file you wish to create. When you have finished enter FINISH.

Weaving a tangled web

I NOTICED a short listing in the April issue which converts Basic programs into machine code. I am confused as to how it is used, could you please explain.

Also, I entered the 10 Liners program Spider's Web from the same issue into a BBC Micro and got different results from those shown in the magazine. Why is this? — S. Walters, Ruislip Gardens, Middlessex.

● The Basic to machine code converter was an April fool joke — it's not possible to do this in the manner described. Spider's Web should give the same results on the BBC Micro and Electron. Have you made a typing error and come up with a completely new pattern?

Gone but not forgotten

I TYPED in the Disc Drive Toolkit program from your January 1988 issue, but unfortunately did not read the introductory text. The disc I had in the drive at the time contained a lot of valuable files.

As you warn in the text, the root directory of my disc was corrupted and I repeatedly got the Broken directory error message, despite all my efforts to recover the data. Please, before I have a nervous breakdown, could you tell me if there is a way that I can recover the files?

In July 1988's Electron User the Knock Out Whist card game has an annoying habit of producing more than one of the same card, such as two Ace of Hearts.

Is there a way in which I can change this? Lastly, is there a back issue of Electron User which tells me how to make the most of the 32k sideways ram? — Kenneth MacLeod, Clackmannan-shire, Scotland.

● Unfortunately you can't recover the lost files on your disc, they are gone forever. We haven't experienced the card duplication problem you mention. Check your typing carefully, as a simple slip could cause this error.

Multi-shade screen dumps

I HAVE got an Electron, a First Byte printer interface and an Epson FX80 printer. Can you tell me how to produce multi-shade screen dumps?

I have been having problems with games freezing once they've been loaded. Can you suggest what may be wrong and if so how it can be cured. Finally, where can I get hold of a copy of US Gold's Impossible Mission? — K. W. Thomas, Modbury, Devon.

● We have covered the tricky problem of screen dumps several times over the past few years, but the back issues are no longer available so below is an Epson compatible screen dump.

This routine prints black and white correctly, however, most screen dumps look

The most recent article featuring sideways ram was in our July 1987 issue. There you'll find a listing to execute a !Boot file on disc automatically when the micro is switched on.

Cheaper connection

PLEASE could you tell me if there is an RS423 interface for modems to the Electron that retails at less than £30, as Slogger's is too expensive for me. — I. White, Wimbledon Park, London.

● We don't know of anyone producing an interface providing an RS423 socket.

better if the colours are reversed. To do this change line 280 to read:

```
260 LDA data,Y:JSR oswrch
```

The program assembles a machine code routine to &C00. To dump a screen first load it and then CALL &C00.

The key to unlocking frozen games may lie with the ULA chip. Keith Watts in the November 1988 Micro Messages solved this by removing the ULA, sliding it back and forth in the carrier, then replacing it. Brian Giggins — January 1989 Micro Messages — also reports that this technique works.

We cannot locate a distributor with stocks of Impossible Mission. Can any readers help?

```
10 REM Screen Dump
20 REM CALL &C00 to dump
30 oswrch=&FFEE:osbyte=&FFF4:0
sword=&FFF1
40 x=&70:y=&72:block=&80
50 FOR pass=0 TO 2 STEP 2
60 FX=&C00
70 IF pass=2 PRINT"Start...&";
"PX
80 [ OPT pass
90 LDA #26:JSR oswrch \VDU 26
100 LDA #6:LDX #255:LBY #0:JSR
osbyte \*FX6,255
110 LDA #3:LDX #10:LBY #0:JSR o
sbyte \*FX3,10
120 LDA #27:JSR oswrch:LDA #85:
JSR oswrch:LDA #1:JSR oswrch \VDU
27,85,1
130 LDA #27:JSR oswrch:LDA #65:
JSR oswrch:LDA #2:JSR oswrch \VDU
27,65,2
140 LDA #1020 MOD256:STA Y:LDA
#1020 DIV256:STA Y+1 \Y=1020
150 .loop
160 LDA #10:JSR oswrch \VDU 10
170 LDA #27:JSR oswrch:LDA #76:
JSR oswrch:LDA #960 MOD256:JSR o
swrch:LDA #960 DIV256:JSR oswrch \
VDU 27,76,960 MOD256,960 DIV26
180 LDA #0:STA X+1 \X=0
190 .loop1
200 LDA X:STA block:LDA X+1:STA
block+1
210 LDA Y:STA block+2:LDA Y+1:S
TA block+3
220 LDA #9:LDX #block MOD256:LD
Y #block DIV256:JSR oswrd \POIN
T
230 LDA block+4:AND #7:TAX:LBY
mult,X \Y=POINT*6
240 LDX #6
250 .loop2
260 LDA data,Y:EOR #3:JSR oswrch
h
270 INY:DEX:BNE loop2
280 CLC:LDA X:ADC #8:STA X:LDA
X+1:ADC #0:STA X+1 \X=X+8
290 CMP #1280 DIV256:BNE loop1
300 SEC:LDA Y:SBC #4:STA Y:LDA
Y+1:SBC #0:STA Y+1 \Y=Y-4
310 BNE loop
320 LDA Y:BNE loop
330 LDA #3:LDX #4:LBY #0:JMP os
byte \*FX3,4
340
350 .mult
360 EQU 0:EQU 6:EQU 2*EQU
3*EQU 4*EQU 5*EQU 6*EQU
370 7*EQU
380 .data
390 EQU 0:EQU 0:EQU 0:EQU 0:EQU 0
:EQU 0:EQU 0
400 EQU 0:EQU 1:EQU 0:EQU 0
:EQU 1:EQU 0
410 EQU 1:EQU 0:EQU 2:EQU 2
:EQU 0:EQU 1
420 EQU 0:EQU 3:EQU 0:EQU 0
:EQU 3:EQU 0
430 EQU 1:EQU 1:EQU 1:EQU 1
:EQU 1:EQU 1
440 EQU 3:EQU 0:EQU 3:EQU 0
:EQU 3:EQU 0
450 EQU 1:EQU 3:EQU 2:EQU 1
:EQU 3:EQU 2
460 EQU 3:EQU 3:EQU 3:EQU 3
:EQU 3:EQU 3
470 J
480 NEXT
490 PRINT"End....&";"PX
```

Clues to

iNFiNiTY

IN this month's Arcade Corner we feature hints and tips for Superior Software's *Repton Infinity*, the latest and greatest in this never-ending story of that lovable green reptile. This game has been causing readers quite a few headaches, so here are some cryptic clues that should cure them – or will they cause even more?

The clues are for *Repton 3*, *Repton 4*, *Robbo* and *Trakker*. These are subdivided even further into the individual game files.

Repton 3

The name is the same, but the meaning is different. Do the Repton "juggle" and keep two in the air at once.

G.Rep3A: When in the room of the four the left one is the one to take. Don't let too many spirits out or you'll be sorry. Grab the key and stick around for a clunk on the head.

Don't let the rocks fall until you make your way back up. The sixth column hides the true way. The top transporter is the key to your success.

G.Rep3B: Use the transporter, stopping the fungus as late as possible. Although symmetrical, two puzzles are not solved in the same way. Go for the top, then back and left to avoid the monsters trapping you. They'll prevent you completing the screen if they catch up with you. The hour glass needs special care or the grains will slip through too easily

Repton 4

Copy the things that PAC more points. A copier is a copier when it is a copier? Magi-blocks are magic for columns too. The jewel that runs away is the one that must carefully be collected. A spirit in a cage is one that can't be copied.

G.Rep4A: A rock needs to be transported so that it may turn magic walls to notes. When you pick up the key make sure you can run to the top to scramble those eggs. The snowflake needs to be defrosted very carefully. Transport or be crushed.

G.Rep4B: From the start move the rock over the copier so that it is copied and its copy falls into the transporter below. Believe it or not, the entire screen can be cleared. Start with the column to the left of centre and your

task will be much easier. Spirits need to be photocopied very carefully or they will be dazed. Avoid those nasties entering the transporters which are meant for you.

Robbo

Kettles cool in the fridge. Fry the fish in the great white telephone. The coolers have bottomless pits for stomachs. Keep off the grass.

G.RobboA: The coffee needs pouring carefully to get the orbs. Go left. Objects pushed through pipes still work. Mow the lawn at once – the mower needs transporting twice to cut the grass. Too many spanners spoil the computer soup. Cross the pipelines with care as the traffic is heavy at times.

G.RobboB: It's a jungle out there, so use the mowers to clear as much as possible. Remember you can't push them up. If you don't like it, put it in the fridge. Not all bulbs burn bright. DIScover that fish will make THINGS vanish. One wrong step and you're run over. Everything passes before your eyes. One

spanner in the works should bring most things to a halt.

Trakker

The spider is myopic. Bend a banana to bend a spider. The splats splat you as well. Put Repton to bed for a peaceful screen.

G.TrakA: Kevin is a useless lad. He is in places where you don't want him. Place him right though and he will kill the Jaggas for you. Place Kevin just right and the spiders won't worry you. Blow a hole in the wall to escape. Free Reptons with dynamite then put them to bed. A perilous maze of nasties to be trapped with the OOFs. Take the eyes to the signs.

G.TrakB: Clear the gantry so the rocket can take off. Practise your long distance road sign throwing. Be careful in the explosives shed. Detonate at the right moment and you'll kill the Jaggas.

Blow up REPTONS and there will be some left over for the wall as well. Release the Jaggas from their stone rooms to gain more points. Throw the tomatoes right or there will be none left.



NEW! TEN of the BEST! EDUCATIONAL GAMES

Packed full of some of the best educational games from the pages of *Electron User*, the new Ten of the Best Educational Games is the ideal way for your children to learn about maths, spelling, anagrams, telling the time, general knowledge, and even the rudiments of running a business!

Specially compiled by the *Electron User* team to give a good grounding in all aspects of learning, and at the very special price of only £5.95 on tape, or £6.95 on 3.5in disc, this collection is a treat you and your children cannot afford to miss!

Give your children hours of fun, and help them to learn the easy way by ordering your copy today.

THE PROGRAMS

Company Count – Work your way up through the company starting off as a messenger, and ending up as president!

Hungry Harry – Find out what it's like to be an assistant in a busy shop. Can you work out the correct change to give the customers?

Lemonade Stall – Try your hand at running a lemonade stall at a popular seaside resort.

Dozer Disorder – Fill in the

missing letters after they are bulldozed into a pit.

Crocodile – Unscramble the letters of a word before the crocodile gets you.

Snail Trail – See how good you are at general knowledge in this trivia quiz.

Hiss – Improve your spelling by guiding a snake round the garden eating up words in the right letter order.

Maths Fun – Test your powers of mental arithmetic.

Odd One Out – Pick the object that doesn't fit from the list of five.

Yule Spell – Guess the hidden word or you'll lose your Christmas presents!

ONLY £5.95

Order your copy today, using the form on Page 45



NEW THE ADVANCED PLUS 3 MK II NEW

The only fully compatible disc upgrade running Acorn's own filing system. The MK II is now supplied with 3.5" DOUBLE SIDED disc drive providing a storage capacity of 640K

A.P.3. MK II gives you:

1. A fully Acorn compatible 1770 interface (Cartridge)
2. 80 track 3.5" disc drive, double sided (640K)
3. Separate PSU
4. Acorn ADFS
5. Advanced Disc Filing System
6. Welcome disc
7. Utilities
8. Full documentation

Undoubtedly the most popular disc upgrade system for the Electron (Requires Plus 1)

Remember - 2nd drives (3.5 or 5.25) can be added and the AP3 drive can be used on a BBC or Master computer! Also most Electron disc-based software is supplied on 3.5" ADFS discs.

The only fully compatible disc upgrade running Acorn's own preferred filing system (supplied on: Plus 3, Master 128, Master Compact and now the Archimedes)

3 games on disc - SNAPPERS - DRAUGHTS - REVERSI
COMPLETE PACKAGE ONLY
£129 excl VAT; £148.35 inc VAT

ADVANCED PLUS 5

A unique interface for those wanting the maximum expansion from just one slot in the PLUS 1. AP5 contains: a User port for connecting peripherals such as a mouse, 1 MHz bus allowing Music 5000(E), prommers and various control devices to be added. Tube interface for connecting an Acorn 2nd processor or even a Master Turbo board (through a Co-Pro Adaptor) - & TWO spare ROM sockets (1 high priority). All hardware connecting to compatible thereby allowing many BBC products to be added (remember that some software modification may be necessary for the Electron). So although some expansion options may appear expensive on an Electron you do have upward compatibility.

£58.00 ex VAT; £68.24 inc VAT

ADVANCED PLUS 1... 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 you can ROM cartridges including ViewSheet, Pascal, Logo and our own popular range of disc upgrades.
£50.00 excl VAT; £57.50 inc VAT

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 ROMEPROMS or RAM chips. A further feature is the optional AP7 upgrade.
"A marvelous piece of design... don't hesitate, buy it!!" - EU, May '88
£33.00 excl VAT; £37.95 inc VAT

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 modern 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 excl VAT; £46.00 inc VAT

Incl. Mod. Fitting + Testing + Carriage + Send
P.R.E.S. Service Department, PO Box 34, Shipley BD17 6DE

ADVANCED ROM ADAPTER 2

An Acorn approved cartridge containing a card with special 'zero' profile sockets that allow you to fit compatible 8k or 16k EPROMS/RAMS. The cartridge is fully enclosed providing complete protection for your RAMS. Simple to use - No switching - complies fully to the Acorn (sideways) Rom filing system.

"The best ROM cartridge is by far the ARA 2...A&B Dec 86
£13.00 excl VAT; £14.95 inc VAT

ADVANCED BATTERY-BACKED RAM

A standard Acorn approved cartridge but containing 32k (2 x 16k) of sideways RAM. The added bonus is the battery-backed feature that holds the RAM contents when the power is switched off! Different ROM images can be loaded into either bank from ROM images previously saved. The banks can also be locked to inhibit ROM use. Now it is possible to have View & ViewSheet in one cartridge every time you switch on. Other uses include £600 ADFS, printer buffer, ROM software development. The use of ABR is simplified by the newly written PRES software utilities which include: SaveROM, LoadROM, Lock, Unlock, Printer Buffer, Zero and MakeROM a new utility to put your own software from disc or tape into ABR & use the ROM filing system. All software is supplied in ABR with a simple menu to transfer the utilities to your own media. No hardware switching - totally software controlled. Instructions for using supplied software and necessary information for users developing their own applications.
"It's a superb add-on and a must for all serious Electron users"...
Electron User

£39.00 excl VAT; £44.85 incl VAT

PRES POLICY

1. To provide the best possible service & assistance to users.
2. Supply Acorn based or Acorn compatible products & to enable upward compatibility wherever possible.
3. Provide tested products with special attention to quality of design, components & production.
4. **To cash cheques & credit card receipts when we know we can supply the goods ordered.**

DISC INTERFACES (Plus One required)

AP3 INTERFACE: As supplied with AP3 package. A fully Acorn compatible disc interface that will accept any standard 5.25" or 3.5" 80T drive with PSU. It runs Acorn's ADFS (as supplied on Acorn Plus Three, Master 128, Master Compact and now the Archimedes) supplied with ADFS manual and welcome disc + Utilities and 3 bonus games (please specify 3.5" or 5.25" 80T format). Also provides a spare 16K rom socket.
Price £52.00 ex VAT £59.80 inc VAT

AP4 INTERFACE: A fully Acorn compatible disc interface that will accept any standard 5.25" or 3.5" drive with PSU. It runs the 1770 DFS (as fitted in the BBC 'B' & Master) keeps pace at £60 - has utilities in rom and provides a spare 16K rom socket (DFS manual included).
Price £60.83 ex VAT £69.95 inc VAT

AP34 INTERFACE: Get the best of both filing systems. Now available from PRES the ultimate interface. Fitted with both Acorn approved filing systems... Acorn's current standard ADFS and Acorn 1770 DFS (which can be run at £600) ADFS and DFS manuals supplied + ADFS welcome disc with utilities.
Price £69.55 ex VAT £79.98 inc VAT
Please state 5.25" or 3.5"

ADVANCED PLUS 2 ROM

We feel this is one of the best, low cost, additions we have produced for the Electron & +1 user, especially for Plus 3, AP3 & ABR users.

1. Fix for Tape filing system in Hi-res screen modes.
2. "ROMS" - to display all ROMs/ROM images present on the system.
3. "UNPLUG" - disable ROM/RAM image.
4. "INSERT" - enables or inserts a previously unplugged ROM.
5. "KILL" - to totally disable the Plus 1.
6. "LOCK" - to lock a sideways RAM bank in ABR, AQR, AP7.
7. "LROMS" - to lock all sideways RAM banks found.
8. "UNLOCK" - to unlock a sideways RAM bank in ABR, AQR, AP7.
9. "UROMS" - to unlock all sideways RAM banks found.
10. "SAVEROM" - saves a copy of a ROM image to the current filing system.
11. "LOADRUN" - loads a ROM image from the current FS into a RAM bank.
12. "FORMAT" - will format an ADFS disc for Plus 3 or AP3.
13. "VERIFY" - reads and tests every sector on an ADFS disc.
14. "VFORM" - formats and verifies an ADFS disc in one command.
15. "BUILD" - creates a text file that can be used by "EXEC (ie IBOOT).
16. "LIST" - displays a numbered listing of a text file.
17. "DUMP" - displays a file on screen with no line numbers.
18. "VIEW" - to view a file's contents on screen.
19. "LANG" - selects a default language to be booted on
"CTRL-BREAK"
20. "HELP" - provides a full 'help' list on all the ROM's commands
TOP PRESS
21. "AORPAGE" - selects the specified page in any AQR present.

Now there is no need to search for your utilities disc every time you want to Format/Verify a disc, Build a /Boot file or Lock/Unlock/Load a ROM image into ABR. All software is more... the ideal companion from the company that produces the Acorn Plus 1.

£11.00 ex VAT; £12.65 inc VAT
"The AP2 is the definitive Plus 1 Rom... I'm not sure what I'd do without it... Like all of PRES's other products it's been well worth waiting for." EU July '88

PRES ABR SOFTWARE

The new PRES ABR software now available separately containing: SaveROM, LoadROM, Lock, Unlock, Printer Buffer, Zero and MakeROM. A new utility to put our own software from disc or tape into ABR & use the ROM filing system. Supplied on 3.5" ADFS or 5.25" DFS disc.
3.5" £39.99 ex VAT; £41.49 inc VAT
5.25" £8.99 ex VAT; £10.34 inc VAT

ADVANCED PLUS 7

An internal battery-backed RAM upgrade for the Advanced Plus 6. TWO 16K pages of Sideways RAM, battery-backed and featuring full write protect facility. Just like ABR but fitted internally & vacating a cartridge slot. This product is compatible with all Acorn BBC/Master & Electron computers.
£39.50 ex VAT; £45.42 inc VAT

** USER PORT **

A new low cost unit for those who just require a user port interface. Supplied in a standard size, Acorn approved cartridge, with the standard connector on top. Inside is a spare ROM socket which can also be configured for high priority use such as mouse software.
£19.99 ex VAT; £22.95 inc VAT

ADFS VERSION 1.1

Suitable for existing Plus 3 or A.P.4 users. This new version has the software fixes for Zsyshelp, write protect disable & compaction. Also Winchester code has been replaced with the necessary driving software to handle AGR as a 256k RAM DISC. Please note - ADFS is Acorn's adopted standard filing system supplied on the Plus 3, Master 128, Master Compact & now the Archimedes. Supplied on 16k ROM with Welcome disc & utilities. Please state 3.5" 5.25" welcome disc.

£14.95 ex VAT; £17.19 inc VAT
(ADFS manual supplied separately)

ADFS E00

For Electron users with either Plus 3 or A.P.4 and 32k of S/W RAM i.e. ABR. All the benefits of ADFS but without all the loss of RAM! Includes all the software 'fixes' as in version 1.1 as well as the AGR/RAM DISC code and an FX call for managing the new & original ADFS. One of the most frequent questions we are asked: "How do I get back the memory lost on my Plus 3 system?" Answer: PRES ADFS & E00 regains 3.75k leaving page @ &E00 the same as Tape!

ADFS E00 supplied; 3.5" ADFS (manual available separately)

£14.95 ex VAT; £17.19 inc VAT

5.25" ADFS (manual avail. sep.) £14.00 ex VAT; £16.10 inc VAT
5.25" DFS (2 discs-ADFS manual) £19.00 ex VAT; £21.85 inc VAT
(See Special Package Prices)

AP4 MOD

This converts an AP3 to an AP34 (i.e. DFSECO) supplied as a two chip set, full documentation and fitting instructions.

£21.74 ex VAT. £25.00 inc VAT

ADVANCED GAMES COMPENDIUMS - ON DISC

With so many of our products providing more 'serious' additions for the Elk, we thought it was time to allow easy access to some of the favourite games ON DISC... Three volumes of popular games, previously only available on tape, now 'instantly' loadable from menu on disc. Each volume contains EIGHT menu selectable games. Available on 3.5" ADFS or 5.25" ADFS.

| Vol. I | Vol. II | Vol. III |
|----------------------|-----------------------|----------------------------|
| Invaders | Felix and the Fruit | Danger LXB |
| Jet Power Jack | Monsters | Ghouls |
| Killer Gorilla | The Mine | Felix and the Evil Weenies |
| Stock Car | Rubble Trouble | Adventure |
| Sandals @ 3 | Swag | Postion |
| Burrito Bee | Cybertron Mission | Swoop |
| Croaker | Moonrider | Chess |
| Felix in the Factory | Franny | Galactic Command |
| | Escape Moonbase Alpha | |

3.5" £9.99 ex VAT each volume; £11.49 inc VAT
5.25" £8.99 ex VAT each volume; £10.34 inc VAT

A.D.F.S Guide Manual..... £5.00

NEW ELECTRON VERSION OF A.L.P.S. NEW

(Adventure Language Programming System)

Well received on the BBC now available for Electron users on a 16k Rom and utilities disc either: 3.5" ADFS or 5.25" DFS

£25.17 ex VAT £28.95 inc VAT

DISC DRIVES **NEW LOW PRICES** Ex VAT +VAT

| | | |
|---|---------|---------|
| Cumana 5.25" dbl/sided 40/80 track, switchable, inc. psu..... | £113.00 | £129.95 |
| Cumana 5.25" sing/sided 40 track, inc. psu..... | £112.17 | £129.00 |
| Cumana 3.5" dbl/sided 80 track, inc. psu..... | £112.17 | £129.00 |
| PRES Special 3.5" double sided 80 track, inc. psu..... | £78.00 | £89.70 |

DISCS

| | |
|--|--------|
| 3.5" 10 in plastic library box - ideal for Plus 3 users..... | £19.95 |
| 5.25" 10 dbl/sided dbl/dens..... | £12.99 |
| 5.25" 10 sing/sided sing/dens..... | £8.99 |
| 5.25" Twin Gift Pack..... | £1.49 |

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

MUSIC 5000

Turns your Electron into a computerised music production studio in which you can take a piece of music all the way from a sheet score, an idea of your own or one of the supplied examples, through entry, arrangement, replay and live 'mix-down' to a finished performance complete with custom instruments and studio effects.

Music 5000 is supplied as a powerful, stereo, digital, eight voice, 16 channel synthesiser with ROM software (containing the AMPLE language), disc software containing the example music files and full documentation.

The requirement for Electron Music 5000 is... Electron, Plus 1 disc system (3.5 or 5.25 drive) running DFS or ADFS (preferably @ &E00) i.e. Acorn Plus 3, A.P.3 or A.P.4, 1 MHz bus (best option A.P.5), and hi-fi amplifier or similar (Music 5000 has a standard 5-pin DIN audio connector for sound output). (Please state disc size & FS when ordering) £99.00 (ex. VAT) £113.85 (inc. VAT)

SPECIAL PACKAGE PRICES

| | | |
|---------------------------------|----------------|-----------------|
| AP1 + AP3..... | £165.00 ex VAT | £189.75 inc VAT |
| AP1 + AP6..... | £77.00 ex VAT | £88.55 inc VAT |
| ABR + 3.5" ADFS E00..... | £48.65 ex VAT | £55.95 inc VAT |
| ABR + 5.25" ADFS E00..... | £46.95 ex VAT | £53.99 inc VAT |
| ABR + 5.25" DFS (ADFS E00)..... | £51.00 ex VAT | £58.65 inc VAT |
| AP5 + Music 5000..... | £152.17 ex VAT | £175.00 inc VAT |
| AP7 + 3.5" ADFS E00..... | £49.52 ex VAT | £56.95 inc VAT |
| AP7 + 5.25" ADFS E00..... | £48.65 ex VAT | £55.95 inc VAT |
| AP7 + 5.25" DFS (ADFS E00)..... | £52.13 ex VAT | £59.95 inc VAT |
| AP4 + CS400..... | £147.78 ex VAT | £169.95 inc VAT |
| AP1 + AP4 + CS400..... | £189.00 ex VAT | £217.35 inc VAT |

ACCESSORIES

ELECTRON POWER SWITCH

For those who are fed up with removing the power connector every time when resetting the computer or for those whose jack-plug connector has become unreliable by removing the power at random! This useful accessory provides a double-pole in-line switch with a new power jack-plug already attached; just connect to the existing lead, having removed the old jack-plug. £3.96 ex VAT; £4.55 inc VAT

AP3 2nd DRIVE LEAD

Replaces existing drive cable with one containing an extra connector for adding a second drive configured as Drive 1.
£5.96 ex VAT; £6.85 inc VAT

PLUS 3 2nd DRIVE ADAPTOR

Converts the fitting at the back of the original Acorn Plus 3, to take a standard disc drive connector when adding a second drive which has been configured to Drive 1.
£6.91 ex VAT; £7.95 inc VAT

Panasonic KX-P1081 Printer Ribbon

£5.50 ex VAT; £6.32 inc VAT

ELECTRON ADVANCED USER GUIDE... further reading and information for the Electron user..... £3.95

ADVENTURE GAMES ON DISC

5 adventures available on disc for Electron users. Each game is sold separately on disc: Ultimate Prize, Dreamtime, Pirates Peril, Taroda Scheme and Stranded.
3.25" ADFS £6.95 ex VAT per Disc; £7.99 inc VAT per Disc

COLOUR MONITOR

See your favourite games in greater detail and 80 Col. Text Philips CM8833 14" Mod. Res. (600 x 285) RGB, CVBS, SKART + Audio inputs. Complete with BBC/Electron lead + Secucolor delivery
£213 ex VAT; £244.95 inc VAT

PRINTER

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

£155.65 ex VAT £179.00 inc VAT

NEW PRODUCT

ADVANCED BASIC EDITOR... an exciting new product based on Acorn's original Basic Editor. It contains all the original features plus enhancements that make it one of the most powerful basic editors available. Supplied as a 32k ROM module or a cartridge with spare ROM socket.

PLEASE CALL FOR DETAILS

Please send order to: P.R.E.S. LTD., PO. Box 319, LightWater, Surrey, GU18 5PW. Tel: 0276 72046 (24 hr). Fax: 0276 51427

(Mail order only)
All our prices include
UK delivery & VAT
Subject to availability

| Name | Product | Qty | @ | Total |
|------------------------|-------------------------------|-----|---|----------|
| Address | | | | |
| Postcode | | | | |
| Tel: | I enclose payment for £ | | | |
| Credit Card No.: | Exp date | | | (Ref E8) |



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

FUN SCHOOL 2 is a suite of educational programs intended for both school and home use which comes as three separate packages categorised by age range. Attractively presented, it has instant eye-catching appeal.

All the programs are colourful and simple to understand and operate regardless of the experience of the adult involved or the age of the children. It is refreshing to find that the age range label actually correlated with the children exposed to it.

There are eight programs for each age range, all adaptable to different abilities. It is also possible to set the skill level – although this seemed to be rather hit and miss – as well as adding your own choice of words for use in some programs.

Attractive teddies

The Under-6s package is especially welcome, as software for reception classes requiring a minimum of teacher interaction is very rare. These particular programs were used easily by children unfamiliar with micros and in only their second week at school.

The cursor in this first set of programs takes the form of an appealing teddy bear. He rewards correct responses with an amusing caper and the accompanying music is neither irritating nor too long.

Favourite of the reception class was undoubtedly Teddy Count in which various numbers of teddies parade around the screen leaving the child to identify their number. Very simple and extremely useful.

A wrong response results in the teddies lining up to be counted and stepping forward one by one. If the child still can't count them they are counted for him.

Running a close second in popularity came Teddy Bear Picnic – a simple case of guiding Teddy through a maze using the arrow keys until he is reunited with his food.

Colour Train was very popular. A train chugs around a varying size track towards differently coloured stations. Hit the spacebar when the colour of the station matches that of the train.

Also included is Find the Mole. With five

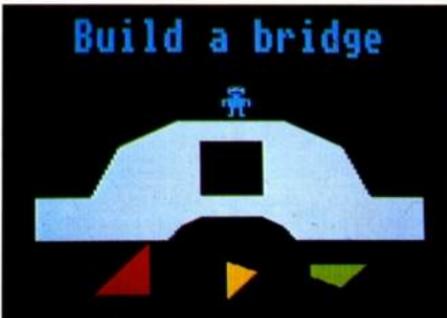


sizes of molehill numbered one to five, the child must guess the one which hides the mole. If it is in a smaller hole the word *lower* appears on the screen. Should he be lurking in a larger one then *higher* is the prompt.

Pick a Letter tests lowercase letter recognition and spelling. Using the cursor keys

Teddy must be guided to pick up letters.

Spell the Word is a variation on that old chestnut Hangman, but with the addition of pictures as clues. It would have been even better if it had kept to one-vowel sounds and three letter words, as it tends to jump around in phonic terms, and random words were



Use the robot to fill the hole with the pieces



Spend your money wisely on souvenirs

occasionally repeated in close succession.

It was necessary to provide the children with a written list of words to stem the flow of "How do you spell..." queries.

Shape Snap is another simple exercise. Shapes appear and if they are different you press any key except the spacebar, which you use if they are the same. Getting the match right makes them flash along with a congratulatory tune. However, they flash in different colours, which means that they no longer match – a little confusing for some younger children.

The only program that was not used in school, but will probably find its niche at home, is Write a Letter, a very simple text editor. It still has the age old problem of a keyboard in capitals and the screen in lowercase.

This can often lead to children not understanding the connection between their actions and the result. I feel that this particular program would have been more at home in the 6-8 year olds' package.

Jump to it

The next age group is for 6 to 8-year-olds. Here the cursor is an endearing frog which behaves in the same manner as the teddy. Number Train replaces Colour Train and is basically the same except that at each station passengers alight and board asking the children to input the new number of travellers.

Picnic becomes a Maths Maze full of robots posing mathematical calculations and Hangman becomes Caterpillar. Shopping is a very simple problem exercise requiring little reading skill. Given a shopping list and a row of four shops, you must guide the frog into the correct one for each item.

In Packing an assortment of shapes must be fitted into a rectangle. Treasure Hunt introduces coordinates and a warmer or colder technique to let children locate buried treasure on an island which has been overdrawn by a grid.

My only criticism is that it has letters rather than numbers on one axis – although this can be a plus for children starting to use coordinates.

A nice tables game called Number Jump encourages children to make the frog jump

across the screen, landing on multiples of a specified number.

Finally in this package is Bounce. I found it difficult to achieve the correct blend of coordination and logical thinking it required. The idea is to bounce a ball off a wall in such a way that it avoids obstacles. The angle of the initial throw can be changed as well as the starting position. It sounds easy, but I found it fiendishly difficult.

The Over-8s package is intrinsically different in that the first seven games all provide a keyword if completed and this is used in the last program. Again you can see that some of the games are progressions from earlier ones – Build a Bridge from Packing, Passage of Guardians from Maths Maze.

Build a Bridge is more complicated than its predecessor in that triangular shapes may need turning over for correct placing. In Passage of Guardians you are asked to solve anagrams instead of sums – some are very difficult. It suffers from too frequent repetition of some words.

Unicorn combines a simple maze/coordination game with the old fox, hen and corn conundrum. This took the children quite a long time to solve.

Logic Doors had my brightest fourth year juniors stumped for quite some time. It's a maze game requiring careful mapping, made deviously difficult by the introduction of one-way doors which are different colours on each side.

Furthermore, to gain a keyword it is necessary to play a second time using keys. This is much more difficult as the route needs to be planned in advance to make sure you have all the necessary keys to finish.

Souvenirs, on the other hand, was refreshingly simple. Your task is to travel to various European countries spending money in each one and returning with a souvenir from each. This nice introduction to geography requires some idea of how to work out simple ratios.

Baffling binary

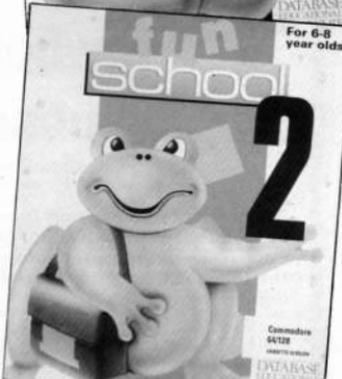
Code boxes involves something which few primary schools cover – binary. This really stretched the eldest, and after a lot of guess-work plus trial and error they worked out how 10 equalled two and 100 is four.

The penultimate challenge is Mystery Machine with knobs to turn, levers to pull and a key. All are coloured and must be moved in the correct order. The instructions are in a code that must be cracked. By now the whole class were dab hands at problem solving and soon had everything operating.

Last comes Escape – yet another maze with horrifying memories of Logic Doors. Again, careful mapping is needed. Here you must use the collected keywords, but beware of backtracking as words can be used once only.

Respond with the correct keyword at each stage and you have finished – rather an anticlimax, but only because there was no more to do.

The children – and staff – found Fun School 2 great educational entertainment. It's a must for anyone with children and an Electron.



Fun School 2 is available on tape for the Electron, but the BBC Micro disc version will run if you have a DFS filing system and you disable the Plus 1 by entering the following Basic routine:

```
*FX163,128,1
TX=18FFD7 AND &FFF
?8212=TX:12
?8213=TX:813
?82AC=0
```

This could be inserted into the IBOOT file to save typing it in each time you run a program.

Product: Fun School 2 (Under-6s, 6-8s, and Over-8s)

Price: £9.95 each

Supplier: Databass Educational Software, Europe House, Adlington Park, Adlington, Macclesfield SK10 4NP.

Tel: 0625 878888

Get this slimline
solar calculator,
PLUS the monthly
tapes
— when you
subscribe!

FREE!

A subscription to *Electron User* is incredible value for money. With it you get the latest issue delivered to your door before it's in the shops **PLUS** a program packed cassette with each magazine.

And now you get even more for your money because when you subscribe you'll also get the exclusive, Database Publications transparent calculator, worth £7.95.



Using state-of-the-art technology this calculator has an invisible membrane keypad, runs from solar cells (so you'll never need any batteries), and because it's only the size of a credit card it fits easily in your wallet or pocket.



So what are you waiting for? Subscribe today for only £19, and as well as getting the calculator and ensuring you receive Electron User each month, with the free tape you'll get programs that work correctly — the first time!

SAVE £7.95!

Subscribe today, using the form opposite

ORDER FORM

All prices include postage, packing and VAT
Overseas orders sent exclusively by Air MailValid to August 31, 1989
Please enter number required in boxAll software on this form is available only on tape
Some of the products mentioned are also available on disc from
P.R.E.S. through their advertisement in this issue.**Annual subscription** (see opposite page)
Includes FREE monthly tape and FREE calculator
(UK only)

£ p

| | NEW | RENEWAL |
|------------------------------|--------------------------|-------------------------------|
| UK £19 3010 | <input type="checkbox"/> | 3011 <input type="checkbox"/> |
| Europe (incl. Eire) £23 3003 | <input type="checkbox"/> | 3476 <input type="checkbox"/> |
| Overseas £38 3004 | <input type="checkbox"/> | 3477 <input type="checkbox"/> |

Orders received by August 13
will commence with September issue**Back Issues**

(see page 28)

February 1989 to July 1989 bundle £7.99 3152

Add £3 Europe & Eire / £12 Overseas

| | | | |
|---------------|-------|------|--------------------------|
| February 1989 | £1.50 | 3235 | <input type="checkbox"/> |
| March 1989 | £1.50 | 3236 | <input type="checkbox"/> |
| April 1989 | £1.50 | 3237 | <input type="checkbox"/> |
| May 1989 | £1.50 | 3238 | <input type="checkbox"/> |
| June 1989 | £1.50 | 3239 | <input type="checkbox"/> |
| July 1989 | £1.50 | 3240 | <input type="checkbox"/> |

Add 50p per issue Europe & Eire / £2 Overseas

Tank Attack

(see page 30)

NEW

£9.99 3151

Add £5 Europe & Eire/£11 for Overseas

See through Calculator

(see opposite)

NEW

£7.95 3020

Add £1 Europe & Eire/£2 for Overseas

Fun School 2

| | | | |
|---------------|-------|------|--------------------------|
| Under 6 years | £9.95 | 3087 | <input type="checkbox"/> |
| 6 to 8 years | £9.95 | 3088 | <input type="checkbox"/> |
| Over 8 years | £9.95 | 3089 | <input type="checkbox"/> |

Add £2 per program for Europe & Eire/£5 for Overseas

Zenon

(see page 12)

£4.95 3143

Add £2 per program for Europe & Eire/£5 for Overseas

Clogger

(see page 12)

£4.95 3144

Add £2 per program for Europe & Eire/£5 for Overseas

Orbital

(see page 12)

£4.95 3145

Add £2 per program for Europe & Eire/£5 for Overseas

DTP Yearbook

(see page 14)

NEW

£ p

£9.95 0505

Add £2 for Europe & Eire/£5 Overseas

Arcade Game Creator

Includes full documentation

(see page 34)

£9.95 3096

Add £1 for Europe/Overseas

Cheat It again Joe

(see page 12)

Volume 1 £2.99 3094 Volume 2 £2.99 3095 Volume 3 £2.99 3142

Add £2 per program for Europe & Eire/£5 for Overseas

Educational Bundle

ALL THREE Fun School 1 PLUS Nursery Rhymes

(see page 10)

£9.95 3084

Add £3 for Europe & Eire / £7 Overseas

Mini Office

(see page 4)

£5.95 3062

Add £1 for Europe/Overseas

10 of the Best Education programs

(see page 30)

£5.95 3063

Add £1 for Europe/Overseas

Magazine binder£3.95 3059

Add £3 for Europe & Eire/£7 for Overseas

Books

(see page 20)

All three books £7.95 3061

Add £3 for Europe/Overseas

Readers in Europe (inc Eire) add £2. Overseas add £5 per
item unless otherwise indicated

TOTAL

Send to:
Database Direct, FREEPOST,
Ellesmere Port, South Wirral L65 3EB

(No stamp needed if posted in UK) Please allow 28 days for delivery

Order at any time of the day or night

Telephone: 051-357 2961

Orders by Fax:
051-357 2813Orders by Postal:
Key '88, then 614568/383Orders by MicroLink:
MAC001

Don't forget to give your name, address and credit card number

Payment: please indicate method (✓)

 Access/Mastercard/Eurocard/Barclaycard/VisaExpiry Date No. Cheque/Eurocheque made payable to Database Publications Ltd.Name Signed Address Post Code Tel EUR

Taking the broad view

Janice Murray reviews a new book aimed at computer enthusiasts

HUNDREDS of books are now available to the computer enthusiast, some aimed at a particular micro, but others, like the *Computer Hobbyist's Handbook* reviewed here, are more general in nature. So what is in it for the Electron user?

The first chapter discusses the various microprocessors that have come and gone over the past 15 years and tries to predict what the next ones will be like. Starting with the now ancient Intel 8080 chip, progressing via the 6800 to the Electron's Mos technology 8 bit 6502 and then on to the Achimedes 32 bit Risc chip briefly examining the Z80, 6809, 8086 and 68000 along the way. It's fascinating reading.

Chapter two moves on to interfaces, starting with the Electron's - and almost every

other computer's - Centronics printer port. Next is the RS232 port, and although the Electron doesn't have one built in, several have been available from third party suppliers over the years.

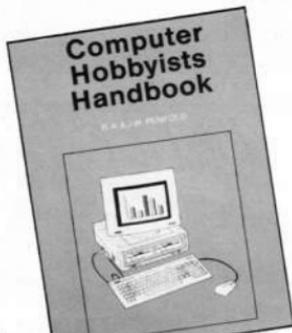
A wiring diagram of the RGB socket is useful to anyone making up or repairing their own monitor lead. The analogue port wiring diagram will help those intending making simple interfacing projects for their Electron.

Moving on to languages in chapter three, machine code, assembly language, Basic, Logo and Pascal are all given equal space and there's a brief look at some of the lesser known ones.

Anyone needing to brush up on their binary ones and twos complement, hexadecimal and all the other number bases will find a helping hand in chapter four.

Chapter five discusses operating systems, though not the Electron's. However, it is still interesting. The following chapter on graphics talks only in general terms, not specifics so there's no problems there.

A glossary of technical terms makes up chapter seven and this is useful as it ignores



Product: *Computer Hobbyist's Handbook*
Price: £5.95
Supplier: Bernard Babani, The Grampians,
Shepherds Bush Road, London W6 7NF.
Tel: 01-603 2581

the common ones you probably know already and concentrates on some of the latest buzzwords being used. Here you'll find explanations of blitter, CAD, co-processor, multi-tasking and object oriented, to name just a few.

While the book contains nothing specific to the Electron, it is a mine of useful general information. Ignore the illustration of the Amstrad PC on the cover - it's just as good for the Electron user.

DO YOU USE SIDEWAYS ROMS?

Are you fed up with them raising page even when you are not using them?
Are you fed up with "unplugging everything before running programs?"
With our Multi-Rom Cartridge you only "select the Rom you need."

ROMPLUS-144

Sideways Rom Cartridge with Printer Buffer and Filing System

Fits into Plus 1/Rombox Plus slot - holds 7 Roms plus 32k Ram
Roms selectable from software on integral OS Rom

Compatible with PMS-NTQ plus Font Roms

Electron User thought it an "excellent add-on" (August, 1988)

Romplus-144 costs just £39 + £15 for the 32k Ram

CARTRIDGES ARE MADE TO BE SWAPPED - ROMS ARE NOT!

THE MODE 7 SIMULATOR ROM

Gives FULL Mode 7 display facilities simulated in Mode 2

Includes Prestel terminal software - just add modem and RS423 adaptor

Compatible with screen poking software, e.g. Wordwise, Teletext

HIMEM at &7C00 with Master Ram board

Price £25 - includes disc based screen editor/carousel software on 3.5"

ADFS or Tape (for DFS transfer) - editor requires MRB

MODE 7 ADAPTOR KIT

Barre PCB, ROM, parts list and layout £25 + £15 for case

ORIGINAL E2P SECOND PROCESSOR KIT

Barre PCB, Construction Notes - With software on tape...£15
or on 3.5" ADFS disc or Rom...£20

All prices inclusive of post, etc. Please allow 28 days delivery
Kits do not include parts - you buy them separately from Watford, Maplins etc.

JAFAS SYSTEMS - Committed to the Electron
9 Lon-y-Garwa, Caerphilly,
Mid-Glamorgan CF8 1NL. Tel: 0222 887203



ADVERTISERS' INDEX

| | |
|-------------------------------------|--------|
| A1 Computer Services | 46 |
| Computer Shopper Show | 7 |
| Database Educational Software | 10 |
| Database Software | 4 |
| Graycar | 32 |
| Impact Posters | 47 |
| Jafa Systems | 46 |
| PRES | 40, 41 |
| Superior Software | 2, 48 |
| Swift Software | 11 |
| Towerhill | 33 |

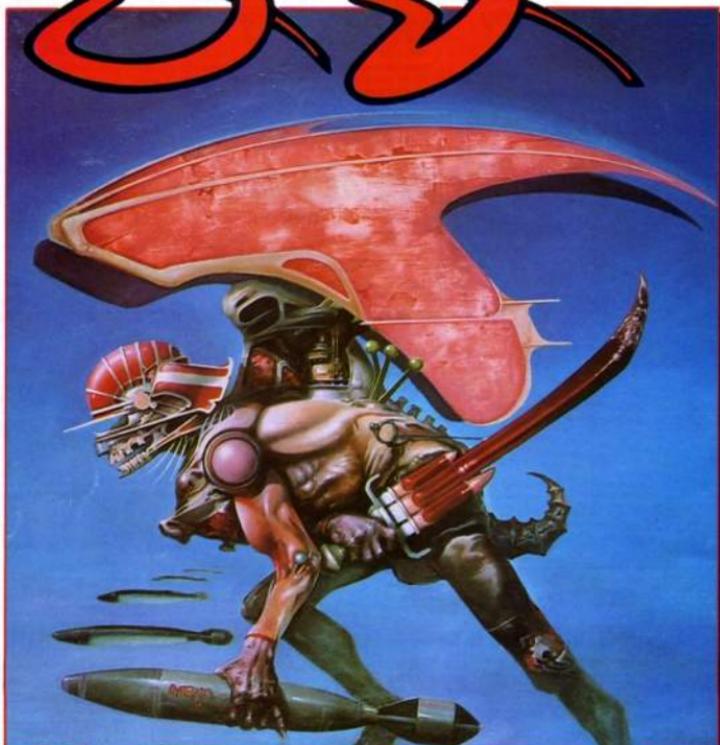
A1 COMPUTER SERVICES

For your Computer Repairs
and Supplies

We are Authorised Amstrad Dealers and
also an authorised Microvitec Service Centre.
Used Equipment bought and sold.
We also supply ribbons and discs at discount prices

**9 PADDOCK MOUNT, DAWLEY,
TELFORD, SHROPSHIRE. TF4 3PR
Tel: 0952-502737**

BALLISTIX



BALLISTIX - It's a whole new ball game!

Sick of silly old soccer? Tired of pathetic pinball? Then you need a dose of BALLISTIX - the fastest, wackiest, toughest computer ball game yet to appear - and a No. 1 smash hit on the Atari ST and Commodore Amiga computers. BALLISTIX just explodes with excitement, puzzles and an amazing 60 different screens of frenetic action.

BALLISTIX is incredibly flexible too. You can play against the computer or another player, can define where the balls are fired and their direction and can rack up bonuses that will get you extra goals, all to the accompaniment of a crowd that applauds your every goal. It's tough, fast, challenging and incredibly competitive.

BBC Micro Cassette..... £9.95 Acorn Electron Cassette..... £9.95
 BBC Micro 5 1/4" Disc..... £11.95 BBC Master Compact 3 1/2" Disc..... £14.95

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

Please make cheques payable to "Superior Software Ltd".

(The screen pictures show the BBC Micro version of the game.)

GAME FEATURES

The aim of the game is simple enough: score more goals than your opponent to win a match. However there are lots and lots of extra features to contend with as you advance from screen to screen, for example:

- **HIGHERS** to get free balls over.
- **SPLITTERS** produce extra balls.
- **BUMBERS** bounce balls all over.
- **MAGNETS** divert balls from you.
- **HIGLES** for balls to drop down.
- **TUNNELS** hide balls from view.
- **RED ARROWS** accelerate balls.
- **OH! SUCKS** stop balls dead.

SUPERIOR SOFTWARE
 Limited

ACORNSOFT

(Acornsoft is a registered trademark of Acorn Computers Ltd. Superior Software Ltd is a registered user.)
 Dept B13, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: (0532) 459453

Available from
WHSMITH
 and all major dealers

Accepted by
VISA
 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)