40 Rock ©

POPULAR Computing WEEKLY

Only 40p.

30 August — 5 September 1984

It's the best selling weekly

Vol 3 No 35

Top titles pirated

PORTUGUESE company Microbaite Software is copying Spectrum software in large quantities.

Based in Oporto, the company is offering around 54 cassettes for sale in Portugal. Each contains two different top selling Spectrum titles from a wide variety of software houses. The cassette artwork is faithfully reproduced in full colour and the inlays contain extensive instructions printed in Portuguese.

Not one of these games has been authorised by their original publishers.

At least eight of the 100 plus titles in Microbaite's catalogue come from Quicksilva. Managing director, Rod Cousens, said: "Portugal seems to be one of the main offenders for this type of organised piracy. It's not the kids copying stuff that worry us so much, as this kind

continued on page 5 ▸

Virgin pushes for quality

VIRGIN Games' plans for the autumn reveal a change of strategy.

The company will launch just six new titles and this autumn many of its existing games are to be deleted from Virgin's catalogue. Deleted titles include *Owzat* for the BBC, *Sheepwalk* and *Ghost Town* for the Spectrum, and all its Dragon titles.

"The best of our current software will be reduced to £2.99 until the end of November. These are games like *Falcon Patrol* and *Racing Manager*. The deleted titles are our not-so-good products," said managing director Nick Alexander.

"We're cutting the price because we've found that catalo-

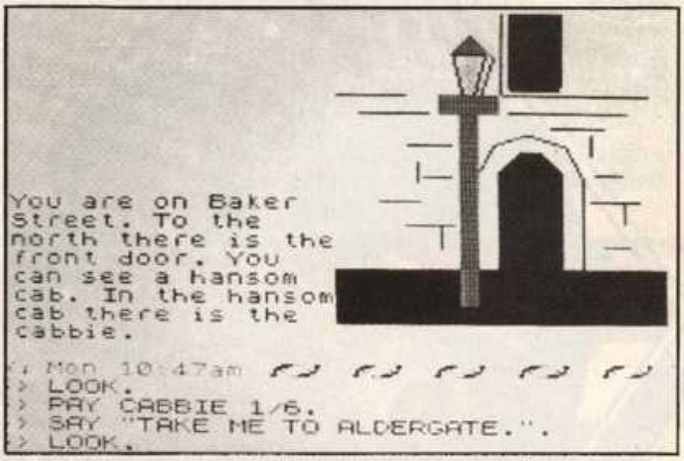
continued on page 5 ▸

Camputers takeover

CAMPUTERS, manufacturer of the Lynx micros, which has been in receivership since June, is hoping to exchange contracts with a buyer

Receivers Hacker Young says that final negotiations are now taking place.

Spicer, the paper manufactu rer, is reported to be the buyer.



Melbourne House reveals Holmes' latest case

THE long awaited *Sherlock Holmes* adventure from Melbourne House is now completed and should be available from mid-September.

Like *The Hobbit*, *Sherlock Holmes* was written by Philip Mitchell in 'Inglish', with complex sentence constructions being understood and with characters leading 'inde-

continued on page 5 ▸

INSIDE ⟩ SCRABBLE 64 ⟩ ELECTRON PLUS 1 ⟩ MUD ⟩

Braingames

The tough nuts to crack!

Braingames bring you the most entertaining and fulfilling adventure and strategy games.

Our adventures combine strong story lines, high quality graphics and sound to produce games you will want to play time after time.

Strategy games ranging from the White House to King Arthur's Court, from the oil business to a used car lot, will test your skills and imagination.

For the Commodore 64
Cassette £7.95
Disk £9.95

FAME QUEST

A friendly joust or duel to the death? Kill the dragon, run away or even try to talk to it?

These are some of the questions you will have to answer on your Fame Quest. You enter this world as a lowly knight without sword or armour. By means of your skill and judgement you will accumulate fame (and money!). Given time you may aspire to be the mightiest warrior in the land, but beware – many encounters await you on your Quest.

A game of strategy for one player, with full graphics and sound.

For the Commodore 64
Cassette £7.95
Disk £9.95

ELECTION TRAIL

Run a media campaign in the Western States? Try to raise funds in Texas? Hold a rally in New York?

You are organising the presidential campaign for your candidate and decisions must be made which will make or break his bid for the White House. With everything at stake, you may find it hard to choose between a rally and a campaign tour; a press conference and a public debate.

An exciting and original strategy game for one or two players. Full colour graphics, maps and music make this a must for any aspiring politicians.

For more information on the tough nuts Phone us on Brighton (0273) 608331 NOW

Postal enquiries to :–

BRAINGAMES Amplicon Group
Richmond Road, Brighton East Sussex BN2 3RL
Tel: Brighton (0273) 608331 Telex: 877470 AMPCON G

Braingames is a division of Amplicon Micro Systems Limited

POPULAR Computing WEEKLY
Vol 3 No 35

View

That a Portuguese company, Microbaite, should be selling unlicenced copies of UK Spectrum titles is not, at first sight, particularly noteworthy in these days of rampant piracy.

But two aspects of the company's activities will be giving cause for concern.

First, it is commercial piracy on a grand scale. Over a hundred top British Spectrum titles are involved including all the big names — *Chequered Flag, The Hobbit, Jet Pac, Manic Miner* and *Scrabble* are all on its list.

Second, this is no underground operation working out of some shady back-street accommodation address. Microbaite is apparently trading quite openly. The games are advertised, they are available in the high-street shops with four-colour window display stickers — the works.

Yet there is very little that the British software houses can do to stop it.

International copyright law is a funny thing. Even though Portugal is a signatory of the Berne Convention and the Universal Copyright Convention, halting Microbaite would be a lengthy and above all costly process. Bringing legal actions in foreign countries and then enforcing them is very difficult and time consuming.

So what can the UK houses do. Do they write off Portugal as a lost cause? Do they now add Portugal to an increasing list of such countries where there is no hope of controlling blatant software piracy?

Unfortunately, the answer is almost certainly yes on both counts.

British software is the best in the world, and it is being openly ripped-off.

What Microbaite is doing is a crime. An even bigger crime is that Microbaite seems likely to get away with it.

Presents...

News > *Sherlock Holmes* > Cheetah's cordless joystick — 5

Star game > Laser warfare on the 16K Spectrum, with *Astrocrash* — 10

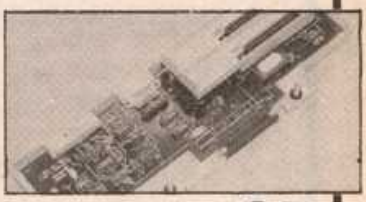
Street Life > Mud, Mud, glorious Mud — Christina Erskine meets Multi-User Dungeon wizard Richard Bartle — 12

Hardware review > MRM's disc filing system for the BBC B > and the Plus-1 expansion for the Electron — 14

Software reviews > Activision's *Pitfall* has arrived in the UK > Electron games from Romik — 17

Spectrum > Keep a track of your characters in machine code programs — 21

The QL Page > Andrew Pennell tries his hand at multi-tasking with a *Trace* facility — 23



Dragon > Wayne Smithson helps you cut down loading problems — 25

BBC & Electron > Watch shooting stars with the aid of Alex Treacher's prediction and calculation program — 31

Commodore 64 > Continuing Adrian Warman's on-screen menu facility — 34

Best of the rest > Letters 7 > Open Forum 38 > Microradio 38 > Arcade Avenue 39 > Baud Walk 40 > Adventure Corner 43 > Peek and Poke 45 > Diary 51 > New Releases 52 > Top Ten, This Week 54 > Ziggurat, Puzzle, Hackers 55

Futures...

Race to the finish with *Turbo Track*, Star Game for the C64 . . . Street Life talks to commercial computer graphics house Communications Studios . . . a sophisticated graphic designer program for the BBC . . . and UDGs on QL.

Editor David Kelly **News editor** Christina Erskine **Features editor** Graham Taylor **Production editor** Lynne Constable **Editorial secretary** Geraldine Smyth **Advertisement manager** David Lake **Assistant advertisement manager** Alastair Macintosh **Advertisement executive** Tom Watson **Classified executive** Diane Davis **Advertising production** Lucinda Lee **Administration** Theresa Lacy **Managing editor** Duncan Scot **Publishing director** Jenny Ireland.
Published by Sunshine Publications Ltd, 12-13 Little Newport Street, London WC2R 3LD. Tel 01-437 4343 Telex 296275 **Typeset by** The Artwork Group, 55-63 Goswell Road, London EC1, in association with Ink on Paper Ltd **Printed by** East Midland Litho Printers Ltd, Oundle Road, Woodston, Peterborough PE2 9QR **Distributed by** S M Distribution, London SW9, tel 01-274 8611, telex 261643. © Sunshine Publications Ltd 1984.

ABC
56,052 copies sold every week (Jan-June 1984 ABC).

How to submit articles Articles which are submitted for publication should not be more than 2000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted. **Accuracy** *Popular Computing Weekly* cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

Computer Trade Association Magazine of the Year

COMPUTERS of Wigmore Street

104, WIGMORE STREET, LONDON W1H 9DR **Telephone: 01-486 0373**

To celebrate our move to larger premises across the road, we take great pleasure in inviting you to our 'Grand Opening' and ...

★★★ FESTIVAL OF COMPUTING ★★★

Programme:-

September

Monday 3rd. Noon
--Grand Opening-- by A TRIBE OF TOPO ROBOTS, (as seen on TV), supplied by **PRISM.**

Tuesday 4th & Wednesday 5th
Demonstration of BBC, including Z80 and 6502 second processors — Torch disc pack — Teletex adaptor — Digitiser — Gemini Datagem Database and Integrated business software.

Thursday 6th, Friday 7th & Saturday 8th
Demonstration of Memotech MTX, FDX disc drives, Solidisc, the incredible HRX graphics display using hard discs — RS128 — 128k version of MTX

Monday 10th & Tuesday 11th
Commodore presentation — 64 MODEM AND COMPUNET — 1541 Express Loader — Printers and Monitor — SX64 Portable AND sneak preview of PLUS 4 and Commodore 16!!!

Thursday 13th, Friday 14th & Saturday 15th
PRISM will demonstrate the Sinclair QL and the Enterprise computers — also Spectrum and BBC modems and Wren Portable Computer.

Throughout the exhibitions there will be a continuous display of **MICROVITEC** colour monitors for Sinclair QL...Spectrum...BBC and Commodore 64.

Spend £10 or more and gain the chance to

WIN A SINCLAIR QL

Draw and presentation on Saturday 29th September

SPECIAL OFFERS — available throughout the Festival:-

BBC 100K disc drives	£19.95	inc VAT
BBC 400K D/S drives	£169.00	—„—
Spectrum 48K + £50 software	£127.95	—„—
Prism BBC and Spectrum Modem	Special reductions	
Memotech RS128 (RS232 + 128K)	£399.00	—„—
Smith Corona TP1, D/Wheel- Serial	£199.95	—„—
80 col Dot Matrix-80 CPS	£199.95	—„—
Fuller FDS Keyboards	£44.95	—„—

AND MUCH MORE!!!

Piracy

continued from page 1

of professional outfit."

Melbourne House, with *The Hobbit* and the *Horace* series, Psion and Beau Jolly — several ex-Imagine titles are on the list — have also been Microbaite's major targets.

Peter Norman, Psion's product director, said, "We will pursue this extremely vigorously. We always go to great lengths to stamp out professional piracy."

Programs in Microbaite's catalogue include: *Chuckie Egg* from A&F; *Football Manager* (Addictive Games); *Invasion Force, Voice Chess* (Artic); *Pimania* (Automata); *Zip Zap, Arcadia, Zzoom* (Beau Jolly); *Manic Miner* (Bug Byte); *Dallas* (CCS); *Pool* (CDS); *Gulpman* (Campbell Systems); *Black Crystal* (Carnell); *Halls of the Things* (Crystal); *Jungle Trouble, Harrier Attack* (Durell); *Dictator, Embassy Assault* (DK'Tronics); *Violent Universe, The Pyramid, Black Hole* (Fantasy); *Heathrow Air Traffic Control, 3D Space Wars* (Hewson); *Bugaboo* (Indescomp); *Mad Martha* (Mikrogen); *Hungry Horace, Horace Goes Skiing, Horace and the Spiders, Pterodactyls, Penetrator, The Hobbit* (Melbourne House); *3D Tunnel* (New Generation); *Kong* (Ocean); *Invaders, Planetoids, Chequered Flag, Scrabble* (Psion); *Smugglers Cove, Aquaplane, The Chess Player, Xxadon, Trader, Galaxians, Games Designer* (Quicksilva); *Navigator, Everest Ascent* (Richard Shepherd); *Star Trek, Slippery Sid, Cyber Rats* (Silversoft); *Joust* (Softek); *Cruisin, Blind Alley* (Sunshine); *Transam, Cookie, Jet Pac* (Ultimate).

Virgin

continued from page

gue sales have now all but stopped — this is a way of repromoting the titles."

The six titles Virgin will release this autumn reflect the company's new policy of selective publishing.

"We are now going for quality rather than quantity," Nick continued. "But we are still going to market the titles extremely hard, and will spend £0.25m in advertising the games in the run-up to Christmas."

The new titles are *Falcon Patrol II, Terrorist* — written by Andromeda Software — and *Sorcery*, all for the Commodore 64, *Strangeloop* and *The Biz* for the Spectrum and *Sinbad* for the BBC B. *Sorcery* is adapted from the Spectrum version of the game, *Sinbad* has the Arabian Nights as its theme and *The Biz* is a simulation game based on the life of a rock star.

Virgin will continue this selective policy into 1985. "In the long term, Virgin will be releasing fewer games than in the past; at the most, it'll be two per month," confirmed Nick Alexander.

Strangeloop for Spectrum

Cheetah releases Rat

THE first cordless joystick has been launched by Cheetah Marketing. Available first for the Spectrum, versions for other machines are also planned.

The Remote Action Transmitter (RAT) works on much the same principle as a remote control TV unit. It has a touch sensitive control pad and fire button. When pressed, these send out the relevant infra-red signals to a receiver which plugs directly into the edge connector at the back of the Spectrum.

The RAT can be used effectively up to thirty feet away from the screen, and the signals are sent out at a wide angle — about 30 degrees — so the player need not point the 'joystick' directly at the receiver.

The RAT is compatible with many top software titles including *Psytron, Trashman, Atic Atac, Sabre Wulf* and *Hunchback*.

The RAT should be available within the next week or so, and costs £29.95. The PP3 battery needed for the unit is not included in the pack.

Rabbit creditors take action

RABBIT creditors are taking legal action to stop Stuart Edgar from continuing to act as liquidator of the company.

Stuart Edgar was appointed as liquidator by Rabbit shareholders after the company's creditors put forward no alternative at the creditors meeting on August 10th.

Now they have filed a petition to the courts objecting to Edgar's appointment.

However, because the courts are now in recess, the petition will not be heard until October.

Aquarius price falls

THE price of the Aquarius 1 micro has been cut by manufacturer Radofin Electronics to £49.95.

The drop means that the Aquarius 1 is now effectively competing with the ZX81 in the starter computer market. However, unlike the ZX81, the Aquarius offers 16 colours and 40 × 24 character graphics resolution. Software is available on both cassette and cartridge.

Radofin's sales director Mike Quelch

Radofin has also recently appointed Mike Quelch as sales director. Mike was formerly software sales manager at Dragon Data.

Sherlock

continued from page 1

pendent' lives.

As with *The Hobbit*, a knowledge of the literature is useful although not essential to the playing of the game.

The faithful Dr Watson is, of course, an integral part of the adventure and Inspector Lestrade of Scotland Yard also appears.

The player takes on the persona of Holmes and the game begins at his rooms at 221b, Baker Street. Successful completion of the adventure depends on solving a particularly difficult case that has Lestrade of the Yard completely baffled.

The adventure takes place in 'real time', and the locations are scattered over Victorian England. The number of locations and the complexity of the sentence interpretation routines have meant that the graphics in the game have had to be kept simple.

Sherlock Holmes for the Spectrum will cost £14.95. A Commodore 64 version is due for release in October.

Domark's marathon quest

A PRIZE of £25,000 is being offered to the first person who can complete *Eureka*, an adventure-arcade program from a new company, Domark.

The game has been programmed by the Hungarian team from Andromeda, and consists of five separate adventures linked by five arcade games. The arcade screens must be successfully completed for the player to move from one adventure to the next.

Domark was formed last March by two ex-advertising account managers, Mark Strachan and Dominic Wheatley. The latter is the grandson of author Dennis Wheatley. The pair originated the ideas for *Eureka*, and commissioned the Games Workshop founder and author of Puffin's *Fighting Fantasy* series, Ian Livingstone, to plan the structure of the adventure.

While Domark expects the prize to be claimed eventually, the company believes it will take six to nine months for anyone to finish it.

Eureka will be launched at the *Personal Computer World* Show. Available by mail-order only from November, it will cost £14.95.

Spectrum and Commodore versions only are planned at the moment.

ZX MICROFAIR

EVERYTHING FOR SINCLAIR COMPUTERS

THE GREATEST SHOW ON EARTH

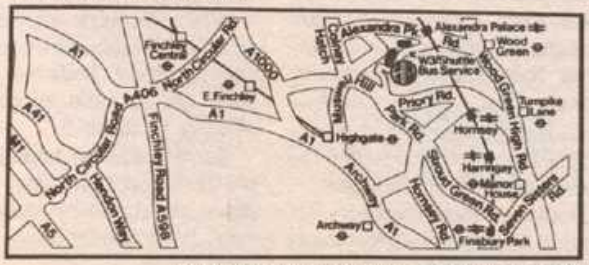
ONCE AGAIN AT ALLY PALLY
SEPTEMBER 8th 1984

FEATURING A GALAXY OF EXHIBITORS WITH SPECIAL OFFERS AT THE SHOW!

SEE THE MIGHTY KINGDOM OF SOFTWARE!
THRILL TO THE COMPUTER HARDWARE!
GASP AT THE RANGE OF ADD-ONS, BOOKS, PERIPHERALS!
WITNESS THE OUTSTANDING FEATS OF THE QL, SPECTRUM AND ZX81!

One Day Only! Don't Miss It!
Only £1.25 (Adults) 60p (Kids)

By Road
Follow signs from the A1 (Links with M1 and North Circular). Plenty of parking space available! Variety of routes from Central London.



Free shuttle service to Exhibition — ALEXANDRA PALACE / KINGS CROSS / MOORGATE

By British Rail
From London (Kings Cross or Moorgate) — about every 10 minutes to Alexandra Palace station — free shuttle bus or short walk from there!

By London Transport
Underground: Victoria Line from Victoria (also Oxford Circus, Kings Cross/St Pancras) to Highbury and Islington — change (cross platform) to BR Suburban Service to Alexandra Palace — free shuttle bus or 5 minute walk from there!

Suburban — BRITISH RAIL ALEXANDRA PALACE
change for B.R. Suburban service — HIGHBURY ISLINGTON
KINGS CROSS
VICTORIA

Link with W3 bus to exhibition — WOOD GREEN
FINSBURY PARK
Piccadilly Line — KINGS CROSS
HEATHROW — OXFORD CIRCUS

Alternative: Piccadilly Line (from Heathrow etc) to Finsbury Park or Wood Green — Link with W3 bus service to the fair.

12th ZX MICROFAIR at Ally Pally on 8th September 1984

Letters

Just too expensive

I am writing on the subject of your editorial in the August 16 issue.

If the home computer market is suffering from disenchantment it has nothing to do with any lack of intelligent software.

There is only one reason for the depression and that is the price of computer software. For a person such as myself, like a great many of my friends, good quality arcade or adventure games are just too expensive for our allowance of pocket money. This means that when one of us buys a game it is copied and passed around; a process which I am sure is taking place all over the country. The result is that the software houses lose out.

Can you really imagine the many thousands of "trigger-happy" arcade freaks buying documentaries or biographies for their micro? The idea is totally ludicrous.

Scott Murdoch
9 Kinnaird Drive
Linwood
Renfrewshire
Scotland PA3 3RL

Microdrive utility

I read with geat interest the microdrive utilities published this week on your 'QL' page. I too have developed a similar program and would like to make a couple of observations which may save potential users many hours of fruitless bug-hunting:

1) It is impossible to call *Merge* (or *DLine* for that matter) from procedures on machines with the later issue Roms — mine is 'AH'. Attempting to do so results in the 'Not Implemented' message. The only ways around this are either to exit from the program via a *Stop* after the *Proc/Fn* cleared message has appeared or by the intelligent use of simple Basic.

2) The routines as listed start at line number 30000. This is inadvisable as it renders the *Auto* command useless, whilst developing start at line '1' cures this problem.

Finally, try including the following routine which completely wipes the screen — very useful when experimenting with different window sizes:

```
150 DEF PROCedure reset
160 OPEN#15,SCR_
512,256,0,0:PAPER#15,1:INK
#15,1:CLS#15:CLOSE#15
170 END DEFine
```

To call this routine from SuperBasic simply enter *Reset*.

John Lawlor
35 Stonefield Drive
Inverurie
Aberdeenshire
Scotland

Existing text

Could I ask for help from one of your computer wizards out there?

After patiently typing in the recently published *Word Processor* program by Simon Wallace for the Commodore 64, I could not get it to input new text — although it appeared to allow for amendments to existing text.

Did anyone else have the same problem or can anyone explain what I am doing wrong?

P B Nash
7 Tewkesbury Close
Cheadle Hulme
Cheshire SK8 7QQ

A fab review

In the *Ziggurat* column in your issue dated June 21, Boris Allan considered the subject of magazine reviews of computer books, and with a style of review that he referred to as the 'Fab review'.

The article said that Boris took 'a random sample' of such reviews, and presents quotations from this sample. I'm rather perplexed that all four quotations are from the same issue of *Personal Computer News*, and furthermore, that they're drawn from reviews of only two books written by my good self.

I'd be the last person to suggest that Boris was suggesting that my reviews are superficial and inadequate, and I just can't believe his article had anything to do with my not totally favourable review of his QL book in *PCN* issue 60. I wouldn't even like to think he has a warped sense of humour, but perhaps you could draw to his attention the fact that his random number generator appears to be broken...

John Lettice (Features Editor)
Personal Computer News
62 Oxford Street
London W1A 2HG

"Stand by to board! She's carrying British software!"

Health and fitness

I would like to know the purpose of advertising a book on Break Dancing in your classified ads section. Is this an attempt to bring health and fitness to all us pale-faced, overweight computer junkies?

David Hawkins
107 Butts Hill Road
Woodley
Reading
Berks

Search me

Extra income

I have an excellent idea to solve the problem of saving your favourite games on to ZX Microdrive.

The problem arises when software companies use machine code to load parts of programs to stop software pirates from making a profit. Tape copiers cannot change the machine code and therefore cannot copy the more complicated programs.

The solution is simple: customers with the tape version of the program simply send off the cassette inlay, as proof of purchase, along with their Microdrive cartridge to the software company which would, for a small fee, copy the program on to microdrive and, to prevent further copies being made, mark the cassette inlay.

This would be a very good idea as the buyer profits, by having a fast loading game, and the software company also has a source of extra income.

R J Cockshott
48 Mercury Close
Lordshill
Southampton

Did he understand?

I would like to reply to comments made by W. A. George in the August 16 issue.

He says he wishes I had been "more lucid". Does this mean he did not understand the article (QL Page, August 2)? Or is it that he was upset because the features and concepts would not cram into his ZX81?

I quite clearly stated that many Basic dialects could not support such concepts because they did not have local variables and procedures and functions which could be called recursively.

Alan Turnball
Stockport
Cheshire

Increased piracy

In reply to Chris Sawford, I feel that I must make the following points. Firstly, making their routines available to the general public is exactly what most programmers want to avoid, as they may have put a lot of time and effort into them. Making them generally available might eventually put them out of a job, with others being able to write similar programs.

Secondly, making the program easy to copy also increases piracy and therefore reduces sales, another thing the programmer wants to avoid. Thinking that there is nothing wrong with copying software if you don't sell it is absurd, and people must realise that this is crippling the industry as much as organised piracy.

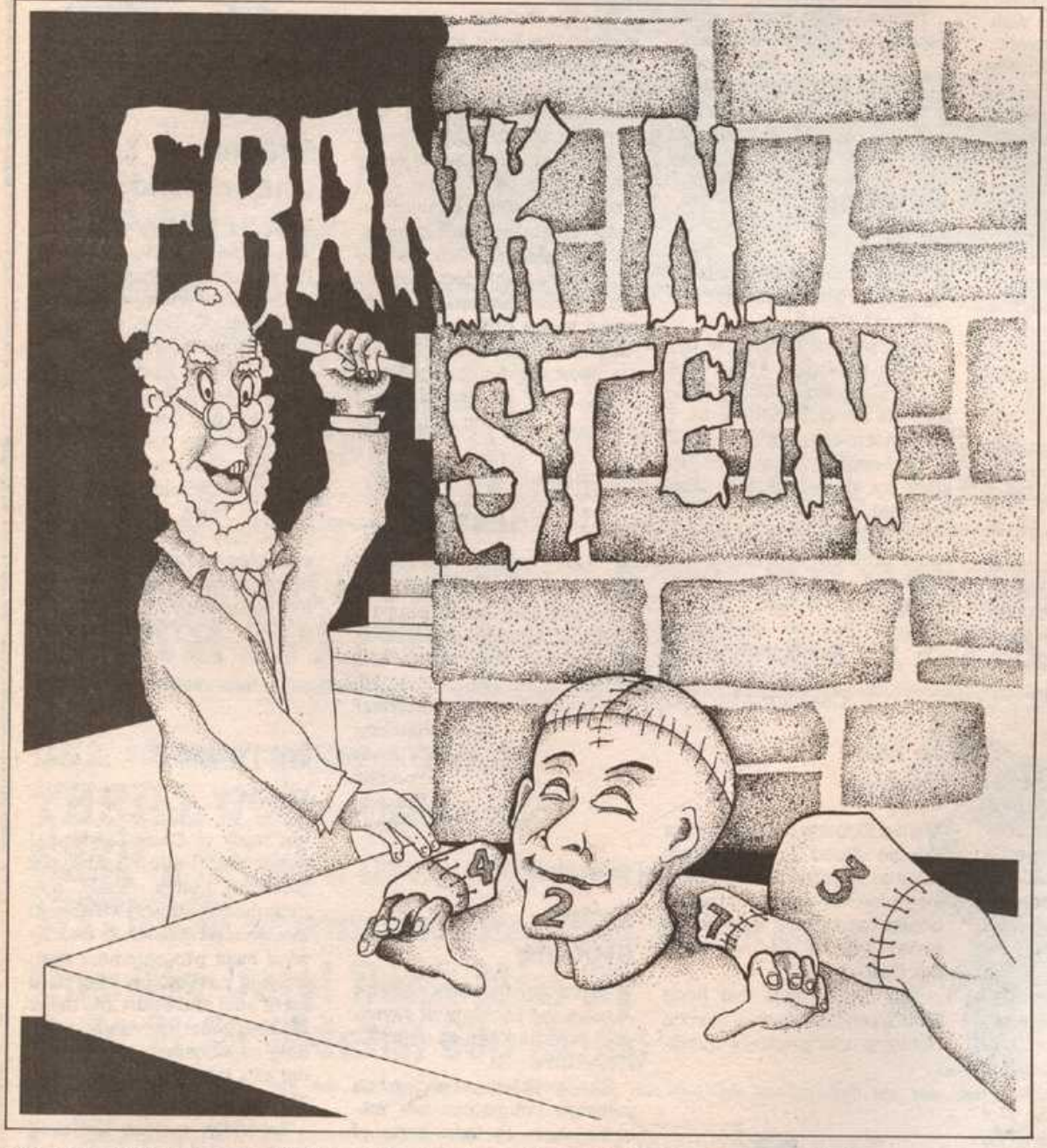
Stephen Godwin
37 Dollis Hill Avenue
London NW2 6EU

Have you got what it takes to build your very own monster?

FRANK N. STEIN

BY COLIN STEWART

NEW RELEASE AVAILABLE SOON



THE SETTING: Professor F.N. Stein's laboratory in his Castle in the Black Forest.
THE TIME: 1884
THE GAME: 50 Screens requiring timing, logic and planning to complete.
THE OPPOSITION: Too many to list here but featuring:- Snails, bats, ice (it makes you slip), firemen's poles, man eating pumpkins, spiders, slime (it slows you down), caterpillars, tanks, springs, light bulbs (they electrocute you), mice, lobsters, snakes, bumble bees, jack-in-the-box etc.

THE OBJECT: As you know, all the best monsters are hand built. Prof. Stein's life long ambition has always been to build his own monster - but first he needs all the bits!
You guide him around the dungeon picking up the bones - make sure you get the right order - then activate him by throwing the switch - the longer you take to complete each screen the higher will be the charge you give him - and the angrier he will become - so watch out!

ARCADE HORROR FOR SPECTRUM 48K **£5·95**

P.S.S. 452 STONEY STANTON RD. COVENTRY CV6 5DG.
TEL: COVENTRY (0203) 667556

SIMPLY THE CHEAPEST — CHECK THESE PRICES

	RRP	OUR PRICE
SPECTRUM		
SABRE WULF	9.95	7.11
LORDS OF MIDNIGHT	9.99	7.15
TORNADO LOW LEVEL	5.95	4.25
MUGSY	6.95	4.99
HULK	9.95	7.11
PSYTRON	7.95	5.68
JACK AND THE BEANSTALK	5.95	4.25
FIGHTER PILOT	7.95	5.50
TRASHMAN	5.95	4.25
NIGHT GUNNER	6.95	4.99
MATCH POINT	7.95	5.68
WORLD CUP	6.95	4.96
STOP THE EXPRESS	5.95	4.25
JET SET WILLY	5.95	4.25
ATIC ATAC	5.50	4.39
WAR OF THE WORLDS	7.95	5.68
MANIC MINER	5.95	4.25
CHEQUERED FLAG	6.95	5.07
BLADE ALLEY	5.95	4.25
ZAXXAN	5.50	4.25
BLUE THUNDER	5.50	3.92
FOOTBALL MANAGER	6.95	5.15
LAVELON	5.90	4.59
COMMODORE 64		
BEACH HEAD	9.95	7.67
VALAHALLA	14.95	10.69
ARABIAN NIGHTS	7.00	5.39
ENCOUNTER	7.50	5.36
SUMMER GAMES(D)	19.95	15.00
FLIGHT PATH	7.95	5.68
MANIC MINER	5.95	4.25
HOBBIT	14.95	10.69
LOCO	7.95	5.68
SPACE PILOT	7.95	5.68
AZTEC CHALLENGE	8.95	6.87
SOLO FLIGHT	14.95	11.51
SHEEP IN SPACE	7.50	5.35
FOOTBALL MANAGER	7.95	5.68
TWIN KINGDOM VALLEY	9.50	6.80
THE QUILL	14.95	10.69
THE BOSS	8.95	6.39
TRASHMAN	7.95	5.68
WHERES MY BONES	7.00	5.00
DECATHALON	9.99	7.13
VIC 20		
FLIGHT PATH	7.95	5.68
BETWITCHED	5.50	3.93
COMPUTER WAR	5.95	4.74
TANK COMMANDER	5.95	4.75
TOWER OF EVIL	5.95	4.75
SUB COMMANDER	5.95	4.75
KRAZY KONG	7.95	5.68
BBC		
HOBBIT	14.95	7.95
AVIATOR	14.95	10.69
FORTRESS	8.9	56.39
MICRO OLYMPICS	5.95	4.25
OVERDRIVE	7.95	5.68
GHOULS	7.95	5.68

All tapes guaranteed genuine; First class delivery within 7 days. P+P UK please add 50p per order: Europe add 75p per tape: Elsewhere add £1.00 per tape
Send large S.A.E. for full list (state machine) please make Cheques P/O's payable to

Bargain Software, 10 Melody Court, Stonehill Road Estate, London W4 3AW Tel: (01) 995 2763

12th ZX MICROFAIR at Ally Pally on 8th September 1984

WIN THE POOLS???

48k

SPECTADRAW 3 - THE LATEST VERSION OF THE ORIGINAL AND BEST POOLS PREDICTION PROGRAM FOR THE 48K SPECTRUM!!

"The most user friendly of the programs reviewed, making full use of the Spectrum's colour facilities . . . better than my own methods of the national newspapers". **Personal Computer World March 1984**

- SUPPLIED WITH A DATABASE TAPE CONTAINING DATA ON OVER 10000 MATCHES SINCE 1980!
- DATABASE UPDATED EACH WEEK BY USER. BUT NO TEDIOUS TYPING AS THE TEAM AND DIVISION NAMES ARE ALREADY IN THE PROGRAM
- ERRORS CAN EASILY BE CORRECTED - THE PROGRAM EVEN CHECKS YOUR ENTRIES!
- COMPREHENSIVE INSTRUCTION MANUAL AND MENU DRIVEN PROGRAM - EVEN A NEWCOMER TO COMPUTING CAN EASILY USE SPECTADRAW3!
- WILL FORECAST THE LEAST LIKELY DRAWS FOR THOSE WHO PREFER TO BET ON FIXED ODDS!
- NOW INCLUDES SPECTASORT - THE PERM GENERATION PROGRAM THAT TAKES SPECTADRAW'S PREDICTIONS AND TURNS THEM INTO A PERM. COMPLETE YOUR COUPON DIRECT FROM THE SCREEN!
- FULLY MICRODRIVE COMPATIBLE - LOADS AND SAVES THE DATA FROM YOUR MICRODRIVE IN SECONDS!
- COMPATIBLE WITH THE CURRAH MICROSPEECH SYNTHESISER - THE FIRST POOLS PREDICTIONS PROGRAM THAT WILL READ YOU ITS PREDICTIONS! (N.B. THIS FACILITY WILL ONLY WORK IF YOU HAVE A CURRAH MICROSPEECH UNIT CONNECTED TO YOUR COMPUTER)

THE INTERNATIONALLY POPULAR POOLS PREDICTION PROGRAM (NOW IN USE IN 14 DIFFERENT COUNTRIES) STILL AT THE UNBEATABLE PRICE OF £9.95 INCLUSIVE (CHEQUES / P.O.s PAYABLE TO B.S. McALLEY)

(WE DISPATCH EVERY MONDAY DURING THE FOOTBALL SEASON WITH THE DATABASE MADE UP TO INCLUDE ALL MATCHES TO THE DATE OF DISPATCH)

SPECTADRAW (Dept YS) 1 COWLEAZE, CHINNOR, OXFORD OX9 4TD (TEL: 0844-5246)

... NOW AVAILABLE ...
... NOW AVAILABLE ...

RICHARD SHEPHERD SOFTWARE

Astrocrash

Destroy all the meteors with your laser but avoid the red ones in Kevin Ridley's game for 16K Spectrum

Astrocrash is an *Asteroids*-type game written in Basic for the 16K Spectrum. The subroutine starting at line 800 in the listing explains how the game is played. Basically, the player has to destroy 50 meteors with his spaceship's laser to win. If his ship crashes into a meteor five times or his power runs out, he loses. The meteors are not destroyed by crashing into the ship, so one meteor can have several crashes. Since some meteors (the red ones) home-in on the ship, it is therefore necessary to race away from them to gain room to manoeuvre. Manoeuvring consists of rotating either clockwise or anticlockwise or moving forward.

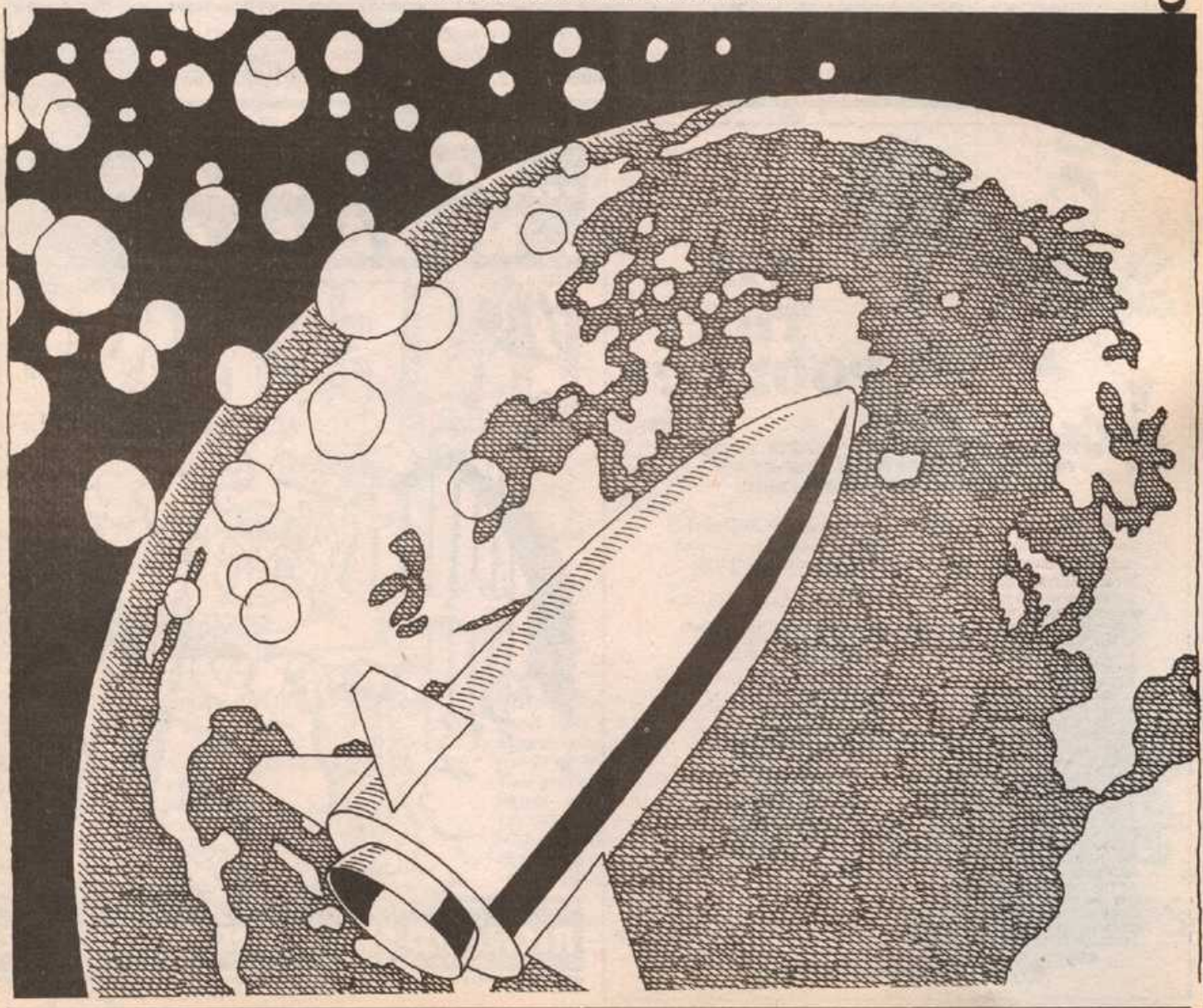
Notes

The game is controlled by means of the subroutine calls at the beginning of the program.

The rocket rotation is achieved by having four user-defined graphics characters (A-D), each showing the rocket pointing in a different direction. The variable (ch) representing the ASCII code of the character is increased or decreased by 1 depending on the key pressed and the new character is then printed.

The number of meteors on the screen (m) increases as the score increases but is never more than three. The line numbers, column numbers, and ink colours of the meteors are held in three arrays — l( ), c( ), i(). To move the meteors, the line and column numbers are increased by values held in the array d( ) (d(1) to d(3) is for lines, d(4) to d(6) for columns). To enable the red meteors to home-in, the signs of the relevant values in d( ) are always kept such that these meteors move towards the rocket.

The laser effect is achieved by plotting a point (px,py) at the centre of the rocket and drawing a line from that point, using the draw coordinates dx,dy, which are calculated according to the rocket's orientation. This line is shortened if a meteor is hit or if the rocket is near the edge of the screen.



```
  1 REM [illegible]
[illegible]
  5 GO SUB 901
 10 GO SUB 801
 15 GO SUB 701: GO SUB 21: GO S
UB 601: IF INKEY$="s" THEN BORDE
R 7: INK 0: PAPER 7: CLS : STOP
 17 GO TO 15
 20 REM [illegible]
 21 LET i$=INKEY$: IF i$="z" OR
 i$="q" THEN GO SUB 101: IF p<=0
 THEN RETURN
 22 IF i$=" " THEN GO SUB 151:
IF p<=0 THEN RETURN
 23 IF i$<>CHR$ 13 THEN GO TO 2
5
 24 GO SUB 201: IF hit THEN GO
SUB 401: IF s<>50 THEN RETURN
 25 IF p<=0 THEN RETURN
 26 IF NOT m THEN GO SUB 301
 27 IF m THEN GO SUB 351
 28 IF crash THEN GO SUB 501: I
F NOT life OR p<=0 THEN RETURN
 29 GO TO 21
 100 REM [illegible]
 101 PRINT AT l,c;CHR$ ch
 105 LET ch=ch+((-3 OR ch<147) A
ND i$="z")-((-3 OR ch>144) AND i
$="q")
 115 PRINT AT l,c;CHR$ ch
 120 LET p=p-1: PRINT OVER 0;AT
 21,6;p AND p>0;" "
 149 RETURN
 150 REM [illegible]
 151 LET dl=(3-((l-17 AND l>17) A
ND ch=146)-(3-(3-l AND l<3) AND
ch=144)
 155 LET dc=(3-((c-28 AND c>28) A
ND ch=147)-(3-(3-c AND c<3) AND
ch=145)
 157 IF dl=dc THEN RETURN
 160 PRINT AT l,c;CHR$ ch
 165 LET l=l+dl: LET c=c+dc
 170 PRINT AT l,c;CHR$ ch
 175 LET p=p-2: PRINT OVER 0;AT
 21,6;p AND p>0;" "
 199 RETURN
 200 REM [illegible]
 201 LET px=c*8+3: LET py=171-l*
8
 205 LET dy=(80-(py-95 AND py>95
) AND ch=144)-(80-(80-py AND py<
80) AND ch=146)
 210 LET dx=(80-(px-175 AND px>1
75) AND ch=147)-(80-(80-px AND p
x<80) AND ch=145)
 225 FOR f=1 TO m
 235 IF dy AND c=c(f) THEN LET n
dy=(l-l(f))*8: IF SGN ndy=SGN dy
 AND ABS ndy<=ABS dy THEN LET hi
t=f: LET dy=ndy
 240 IF dx AND l=l(f) THEN LET n
dx=(c(f)-c)*8: IF SGN ndx=SGN dx
 AND ABS ndx<=ABS dx THEN LET hi
t=f: LET dx=ndx
 245 NEXT f
 250 FOR n=1 TO 2
 255 PLOT px,py: DRAW dx,dy
 260 BEEP .05,10*n
 265 NEXT n
 270 LET p=p-5: PRINT OVER 0;AT
 21,6;p AND p>0;" "
 299 RETURN
 300 REM [illegible]
 301 LET m=1+(sc>5)+(sc>21)
 302 FOR f=1 TO m
 305 IF INT (RND*2) THEN LET l(f
)=20*INT (RND*2): LET c(f)=INT (
RND*31+.5): GO TO 315
 310 LET l(f)=INT (RND*20+.5): L
ET c(f)=31*INT (RND*2)
 315 LET d(f)=INT (RND+1.5): LET
 d(f+3)=INT (RND+1.5)
 320 LET i(f)=6-(4 AND RND>.66)
 325 PRINT INK i(f);AT l(f),c(f)
;CHR$ 148
 330 IF l(f)=l AND c(f)=c THEN L
ET crash=1
 335 NEXT f
 349 RETURN
 350 REM [illegible]
 351 FOR f=1 TO m
 354 LET ml=l(f): LET mc=c(f)
 356 IF i(f)=5 THEN GO TO 368
 357 LET ld=l-l(f): LET cd=c-c(f
)
 358 IF ABS ld<3 AND ABS cd<3 AN
D (ld OR cd) THEN LET l(f)=l: LE
T c(f)=c: GO TO 390
 362 IF ld THEN LET d(f)=ABS d(f
)*SGN ld
 364 IF cd THEN LET d(f+3)=ABS d
(f+3)*SGN cd
 368 LET l(f)=l(f)+d(f): LET c(f
)=c(f)+d(f+3)
 370 IF l(f)>=20 THEN LET d(f)=-
d(f): LET l(f)=20
 372 IF l(f)<=0 THEN LET d(f)=-d
(f): LET l(f)=0
 374 IF c(f)>=31 THEN LET d(f+3)
=-d(f+3): LET c(f)=31
 376 IF c(f)<=0 THEN LET d(f+3)=
-d(f+3): LET c(f)=0
 380 IF ATTR (l(f),c(f))<>64 THEN
 LET l(f)=ml: LET c(f)=mc: LET d
(f)=INT (RND+1.5)*SGN d(f): LET
d(f+3)=INT (RND+1.5)*SGN d(f+3):
 GO TO 356
 390 PRINT INK 0;AT ml,mc;CHR$ 1
48
 392 PRINT INK i(f); BRIGHT 1;AT
 l(f),c(f);CHR$ 148
 394 IF l(f)=l AND c(f)=c THEN L
ET crash=1
 396 NEXT f
 399 RETURN
 400 REM [illegible]
 401 LET hl=l(hit)-(l(hit)<>0)-(
l(hit)=20)
 402 LET hc=c(hit)-(c(hit)<>0)-(
c(hit)=31)
 404 PRINT AT l(hit),c(hit);CHR$
 148
 405 PRINT AT hl,hc+1;"!";AT hl+
1,hc;"-■-";AT hl+2,hc+1;"!"
 406 FOR n=9 TO 0 STEP -1
 407 INK n+(9 AND NOT n)
 408 PRINT AT hl,hc;"▗▖";AT hl+
1,hc;"▝▘";AT hl+2,hc;"▗▖"
 410 BEEP .005,10+20*(n<5)
 412 NEXT n
 414 PRINT AT hl,hc+1;"!";AT hl+
1,hc;"-■-";AT hl+2,hc+1;"!"
 420 LET sc=sc+1
 425 PRINT OVER 0;AT 21,30;sc
 430 IF hit=m THEN GO TO 498
 435 FOR f=hit TO m-1
 440 LET l(f)=l(f+1): LET c(f)=c
(f+1)
 445 LET d(f)=d(f+1): LET d(f+3)
=d(f+4)
 450 LET i(f)=i(f+1): NEXT f
 498 LET m=m-1: LET hit=0
 499 RETURN
 500 REM [illegible]
 501 LET crash=0
 502 LET cl=l-(l<>0)-(l=20)
 503 LET cc=c-(c<>0)-(c=31)
 504 PRINT AT l,c;CHR$ 148;AT l,
c;CHR$ ch;AT cl+1,cc+1;"#"
 506 FOR n=1 TO 10: INK n-(n=10)
 508 PRINT AT cl,cc;"▗▖";AT cl+
1,cc;" # ";AT cl+2,cc;"▝▘"
 510 BEEP .005,10+20*(n<6)
 512 NEXT n
 513 PRINT AT cl+1,cc+1;"#";AT l
,c;CHR$ ch;AT l,c;CHR$ 148
 514 LET life=life-1: PRINT OVER
 0;AT 21,21;life
 520 LET p=p-10: PRINT OVER 0;AT
 21,6;p AND p>0;" "
 599 RETURN
 600 REM [illegible]
 601 OVER 0: IF sc<50 THEN GO TO
 650
 605 FOR n=2 TO 5
 610 BORDER n
 615 PRINT INK n;AT 6,12;"SUCCES
S!".
 617 IF n<>5 THEN BEEP .25,11
 618 IF n=5 THEN BEEP 1,7
 620 NEXT n
 625 PRINT AT 8,11;"YOU'VE WON"
 630 GO TO 680
 650 FOR n=5 TO 1 STEP -.5
 655 BORDER n
 660 PRINT INK 6-n;AT 6,12;"FAIL
URE!"
 662 BEEP .1,(n-5)*10
 665 NEXT n
 670 LET m$=("YOU'RE DEAD" AND N
OT life)+" NO POWER" AND life)
 675 PRINT AT 8,10;m$
 680 PRINT AT 12,2;"Press ""s""
to stop, any other";TAB 2;"key t
o play again"
 685 IF INKEY$="" THEN GO TO 685
 699 RETURN
 700 REM [illegible]
[illegible]
 701 OVER 1: BORDER 1: CLS
 702 FOR n=1 TO 50
 704 INK RND*6+1
 706 PLOT RND*254,RND*167+8
 708 DRAW RND,0: NEXT n: INK 9
 710 LET life=5: LET p=999: LET
 sc=0
 711 PRINT PAPER 2;AT 21,0;"POWE
R:";p;" "
 712 PRINT PAPER 4;AT 21,10;"LIV
ES LEFT:";life
 714 PRINT PAPER 3;AT 21,22;"  S
CORE:";sc;" "
 715 LET ch=144: LET l=10: LET c
=15
 716 PRINT AT l,c;CHR$ ch
 720 LET m=0: LET hit=0
 722 LET crash=0
 799 RETURN
 800 REM [illegible]
 801 BORDER 0: PAPER 0: PAPER 8
 805 INK 9: CLS
 810 PRINT TAB 10; PAPER 1;"*AST
ROCRASH*"
 815 PRINT AT 3,3;"Your rocket i
s in a meteor storm. To win y
ou must destroy 50 meteors with
 your laser. If your power runs
 out or your 5 lives are used u
p, you lose."
 820 PRINT AT 10,3;"Power is use
d up by turning the rocket (1 u
nit), by advanc- ing the rocket
 (2 units), by firing the lase
r (5 units), and by crashing int
o a meteor (10 units). Crashi
ng also causes 1 life to be lost
."
 825 PRINT AT 20,3; FLASH 1;"PRE
SS ANY KEY TO CONTINUE."
 830 PAUSE 0
 835 CLS : PRINT TAB 3;"The numb
er of meteors on the screen at a
ny one time increasesto a maximu
m of 3. The yellow meteors mov
e randomly but the red ones a
re magnetic and thus home in on
 the ship."
 840 PRINT AT 8,3;"Control keys:
-"
 845 PRINT AT 10,3;"[illegible] - Fire
s laser."
 850 PRINT AT 12,3;"[illegible] - Adva
nces rocket."
 852 PRINT AT 14,3;"■";TAB 9;"-
Turns ship 90 degrees";TAB 11;"c
lockwise."
 855 PRINT AT 16,3;"■";TAB 9;"-
Turns ship 90 degrees";TAB 11;"a
nti-clockwise."
 857 PRINT AT 19,3;"Make sure th
e cursor is in "; FLASH 1;"L"
 858 PRINT "mode."
 860 INPUT TAB 3; FLASH 1;"Enter
 ""y"" to play. ";r$
 865 IF r$<>"y" THEN BEEP 1,10:
GO TO 860
 899 RETURN
```

Mud in your eye

***Christina Erskine** talks to Richard Bartle, creator of MUD, at Essex University*

Richard Bartle must be extremely thankful that his A Level grades weren't quite up to scratch. A grade higher, and he would have gone to his first choice of university; Exeter. If he had gone to Exeter, MUD might never have come into being.

As it happened, that one grade short took him to the University of Essex. The rest is probably D & D history . . .

About 2-3000 people have sampled Richard's creation, the Multi-user Dungeon in Essex's mainframe computer, in the four years that it has been running. Only 44 have managed to reach the ultimate status of Wizard or Witch.

So far, only members of the university's Computing Society and a few external users with PSS (Packet Switching Service) systems have been able to access the DEC-10 computer where this vast Dungeon and Dragon adventure is stored. Now Century Communications plans to publish MUD commercially so that it is available to the public, sometime next year.

"The idea for MUD's creation began when I met Roy Trubshaw, a fellow student at Essex. He had had a long-term interest in adventures, and wanted to set up a multi-user game. I had been playing D & D games since I was at school, mostly by mail, so I was obviously enthusiastic about the idea.

"Roy wrote and designed the core of the game — it took up most of his third year and ruined his degree. After he'd graduated — just — I took over the game's development."

MUD started as a scenario of about 100 locations — a diversion for the Computing Society. The word spread, however, and demand from external users — mainly American students to start with — made Richard expand to 300. Today's version has about 400 locations.

The game's development took up all of Richard's spare time in his third year — evenings and weekends.

"Having completed my degree course, I wasn't too keen on the look of the outside world, so I took the opportunity of doing a PhD in Artificial Intelligence like a shot. Now I'll be able to stay with MUD indefinitely, because I've been offered a lectureship at Essex."

At one point there were too many external players for the Computing Society's time to cope with. "I went to the university authorities, expecting them to disapprove strongly of giving more time to a 'mere game'. But they were surprisingly understanding, and arranged that we could play at night, when no-one else would be disturbed.

"When MUD 'goes public', it won't be on the university computer — the night hours will be too inconvenient. Either there will be one big computer with the whole lot on it, or lots of smaller ones linked to a larger one. But it should be capable of accepting input from any modem, even the very slow baud ones. And obviously people will be charged, per hour, for playing the game."

The essential aim of MUD is to collect treasure and drop it in the swamp in order to collect points and enhance your status. The treasure may not always be obvious — you may well find some 'dirty old groats' lying around. Giving them to a beggar may earn you goodwill, but washing them and discovering that when clean they're actually quite valuable is a lot more useful.

Not only are the traditional assortment of villains out to get you — dryads, dwarfs, zombies — but the interaction between players can be amicable or decidedly vicious. Nor are people as they seem — a senior lecturer in the computing department stole my axe three times while masquerading under the title of Bom the Beserker Enchanter!

You can talk to other players — either to help or mislead — and you can 'snoop' on them to find out where they are and what they're carrying.

Richard's title — as befits the game's Lord High Priest — is Arch Wizard. His role frequently involves acting as mediator when squabbles between players break out.

"I have to make sure that everything is sorted out amicably, as well. If I offend someone, they could wreak havoc in the game before leaving it. Also, I get a huge number of letters from people interested in learning how to play, wanting hints and so on."

Once you have become a wizard, or witch if you adopted a female persona at the start, you remain one, and can't be toppled from your position. But even without specific goals to aim for, the 44 wizards and witches still play. And you can always adopt a new identity and start the quest all over again — the interaction with different characters means that no game is ever going to be the same.

"People certainly get very wrapped up in it-myself, for one. I've known students stay behind in the holidays to have a go when they aren't going to be thwarted by other players. When we start the commercial version, it'll probably start with about 100 lines open — at the moment, the maximum number at any one time is 36, and only six of those can be external players."

Most novice players end up getting immediately lost in the graveyard, where the tombstones are inscribed with various names. Richard has commemorated all the wizards and witches on the stones — and some others as well. Roy Trubshaw has his own headstone, Brian Roberts, who wrote a chunk of the original game, is remembered, as is Nigel Roberts who extensively tested the game before it was launched to an unsuspecting computing society.

My personal favourite is the tomb dedicated to Murrell's Balloon Emporium.

"A friend of mine and Roy's tried to set up his own multi-user game, called PIG, because he said it was a PIG to write. But he never had time to finish it, and when he gave it up, his major location was Murrell's Balloon Emporium." Well, it beats radio dedications.

After an afternoon with MUD, I'll admit to being hooked. All I can say to anyone who doesn't have a modem/can't wait for Century to make it available, is, get those UCCA forms off to Essex.

COMPUTER GAMES

£2·99

(INCLUDING POST AND PACKING)

TOP QUALITY + LEADING COMPANIES + ALL GUARANTEED

SPECTRUM		COMMODORE 64	VIC 20
DINKY DIGGER	48K	CONNECT 4	SNAKE PIT
FIRE HAWK	ANY	BMX RACERS	MOSQUITO
SNAKE PIT	ANY	XANAEGRAMS	NEW YORK BLITZ
3.D.DEEP SPACE	ANY	SPACE WALK	SPACE SCRAMBLE
ALCATRAZ HARRY	48K	VEGAS JACKPOT	3.D.MAZE
WHO DUNNIT	48K	MUNCH MANIA	VEGAS JACKPOT
RIFLE RANGE	ANY	DUCKSHOOT	SUB HUNT
LIGHT CYCLE	48K	RATTLER	DUCK SHOOT
XANAEGRAMS	ANY	SUB HUNT	PSYCHO SHOPPER
TWO GUN TURTLE	48K	ELECTION GAME	PHANTOM ATTACK

FULL LIST OF ALL GAMES AVAILABLE SENT WITH ORDER OR UPON REQUEST
PLEASE SEND CHEQUE OR POSTAL ORDER (NOT CASH) TO **COMPUTER GAMES INTERNATIONAL, 464 WIMBORNE ROAD, WINTON, BOURNEMOUTH BH22 2EY**

All games despatched immediately upoon receipt of Postal Order or clearance of cheque.

The computer game is DEAD...

Big brother

Hardware *Plus 1 Expansion Unit* **Micro** Acorn Electron **Price** £59.90 **Supplier** Acorn Computers, 4a Market Hill, Cambridge.

When I first bought my Electron I was obviously aware that it wasn't quite the same as its big brother the BBC, but took solace in the fact that it was a lot cheaper and that an interface providing a printer port would be coming soon.

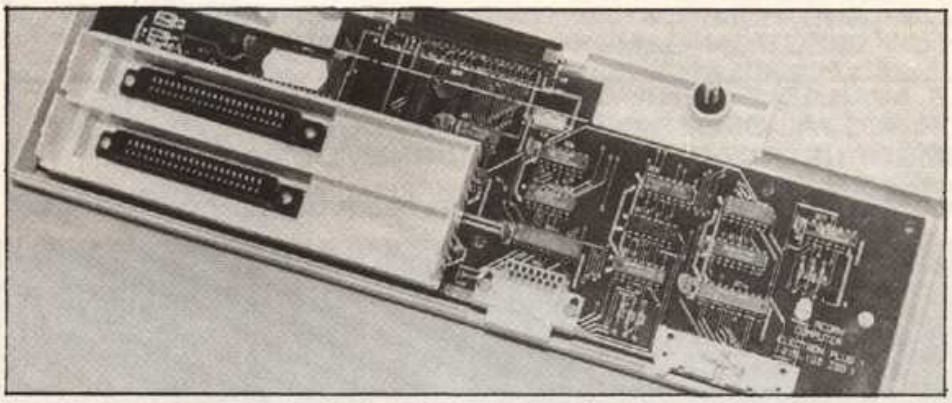
My hopes were well founded — it didn't take long to come and at £56.90 it now gives me very nearly a 'big brother' for about £255 as opposed to £399.

To me the Plus 1 unit is very good value for money. It allows my Electron to at last use a printer, joysticks and, eventually, Rom cartridges.

The analogue interface not only provides the facility for joysticks but virtually, in theory, allows the Electron to be used in control applications. Any electrical sensor apparatus could, in principle, be coupled up. The interface measures electric currents and converts them to a numeric form.

However, being an analogue port does mean that any game requiring a joystick will need analogue units to be connected. Most of the other interfaces on the market so far for the Electron have used switched joysticks. Whilst Acornsoft games needing joysticks will no doubt be compatible with the Plus 1, other software houses who already produce titles compatible with the switchable type may need some encouragement to make their programs compatible.

Having said that, I have found it very strange moving from key controlled games to joystick control. Whilst my fingers have learned to locate accurately the required keys, my hand has yet to develop the reflexes necessary for the joystick.



For me the most important facility the Plus 1 offers is the Centronics-compatible parallel interface which allows me at long last to couple up to a printer. It's only really when you haven't got a printer that you realise its true value.

Not only that but I found the Plus 1 manual far easier to follow than the manuals I have read which accompany printers — the Plus 1 manual lists all the previously unlisted **FX* calls that are needed when using a printer.

Rather curiously, the Plus 1 also has two Rom cartridge ports. Where do I get a Rom cartridge to try? To date it would appear that there aren't any to be had. The BBC B also has a cartridge facility, though again there are no cartridges to use with it. All very strange.

This is a pity because Rom cartridges allow for virtually instant loading of games programs, etc, by merely plugging them in. No more time wasting with cassettes. It could also allow other computer languages to be used provided in the form of plug-in Roms. Not only is the Plus 1 very good value for money, but at last it provides the kind of facilities before only available to BBC owners.

The Plus 1 is a very neatly designed and powerful extension.

Fred Short

Extra Ram

Hardware *E00 Disk Filing System* **Micro** BBC B **Price** £24.95 **Supplier** MRM Software, 17 Cross Coates Road, Grimsby, South Humberside, DN34 4QH.

One of the problems with Acorn's own disc filing system (DFS) is that it uses up some of the RAM (2.75K) that is usually available for programs.

MRM Software have produced a DFS that does not use up any of the available RAM. Unlike Acorn's DFS, which comes on a single chip, the MRM DFS comprises three chips, and is mounted on a two inch square board.

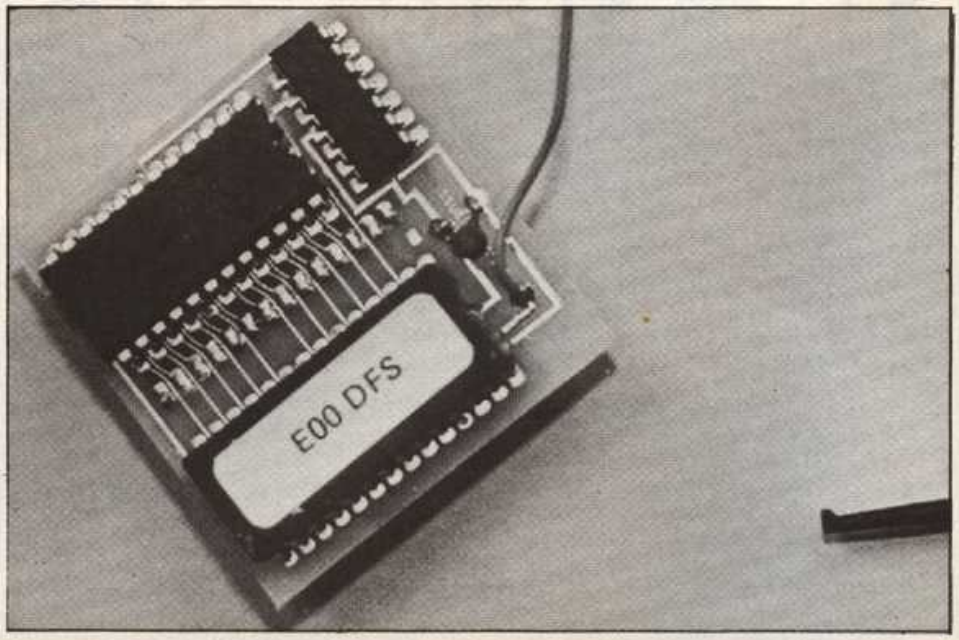
When trying the MRM DFS with a large number of commercially produced programs, it performed well and no problems were found; however, in order to avoid using the RAM on the computer, some sacrifices have been made. The most notable is that only four files can be open at the same time, whereas the Acorn DFS allows up to five.

The MRM DFS is intended for anyone who already has a DFS in their computer, but finds that the amount of RAM left for their programs is insufficient for their needs. The way in which the MRM DFS operates is the same as Acorn's and MRM assume that any manuals and formatting disks are provided by the supplier of the original DFS and therefore do not supply any themselves.

The MRM DFS cannot be considered to be fully Acorn compatible because of the inability to open up to five files simultaneously. However, MRM do offer the facility to keep the original and their DFS in the machine at the same time and to switch between them when necessary.

Only worth thinking about if you need a little extra RAM.

Stephen Hamill



Stell Software

_____for top quality programs

COMING SOON "TABLE INVADERS" FOR SPECTRUM & COMMODORE 64

Identikit

An educational game for 2-8 years

A Captains Badge is yours Free with each Identikit Program.

FREE

Stell Software Captain

Make 15,000 different faces

Maths Invaders

An educational game for 4-12 years

An Admirals Badge is yours Free with each Maths Invaders Program.

FREE

Stell Software Admiral

Start as a Captain with Identikit - then earn your Admirals Badge by answering the maths questions and shooting the Invaders.

Spectrum programs only £6.95
BBC, Electron & Commodore 64 only £7.95
Atari only £8.95

IDENTIKIT Spectrum 48K, BBC B/Electron, Commodore 64.
Identikit is an ideal introduction to the computer for young children. All you have to do is use just two keys to select all the features you want to build up a face. When you have made the face, you can also animate it -wriggle the nose, blink the eyes, smile, frown etc..

MATHS INVADERS Spectrum16/48K,BBC B/Electron,Commodore 64, Atari. Provides excellent motivation to learn simple arithmetic, Subjects covered are addition, subtraction, multiplication and division. The invaders are coming down the screen towards you. Load your gun with the right answer to their question and fire it at them before they land on you. Superb graphics and sound plus a range of difficulty levels to suit any age, make this a favourite with every child.

Most titles available from Boots

or direct from Stell Software Ltd., 36, Limefield Ave., Whalley, Lancs.. BB6 9RJ. Tel: 025482 3432.

Please send by return of post.
Identikit £..... Maths Invaders £..... Total £.....
ZX Spectrum ☐ Commodore 64 ☐ BBC B/Electron ☐ Atari ☐
To: Name .....
Address .....
.....
P9

...LONG LIVE Eureka!

250K of pure mystery. Be the first to know.
Send your name and address to: Eureka!, 228 Munster Road, London SW6 6AZ

MEMOTECH MTX500

OVER £35·00 WORTH OF FREE SOFTWARE

The Ultimate. Only £199.

MEMOTECH MTX500 MAJOR FEATURES

STANDARD I/O PORTS
- Variable rate cassette port (up to 2400 baud)
- Two joystick ports using Atari configuration
- Centronics-type parallel printer port
- ROM cartridge port
- Uncommitted parallel input/output port
- Internal ROM board port
- Hi-Fi output port
- 4-channel sound through TV speaker
- PAL composite video colour Monitor port

THE RS232 COMMUNICATIONS BOARD
(required for disc expansions)
- Two independent RS232 ports
- 60-way Disc Drive Bus supporting up to four 5.25 and/or 8 inch floppy disc drives, plus instant access Memotech Silicon Discs, and Hard Discs with capacities up to 32 Megabytes

USER RAM
- Optionally expandable to 512K in increments of 64, 128, or 256K

24K OF ROM which includes:
- MTX BASIC
- Noddy, a simple, text-handling language
- A powerful Assembler/Dissassembler – sections of machine code can be created and run by calling the Assembler from within BASIC
- The sophisticated Front Panel, which displays the contents of all registers (including the F flag register) and pointers during program execution
- All four languages can be used interactively with each other, and with the user

ROM EXPANSIONS
- MTX NewWord, a 32K word processing package
- Hisoft PASCAL, written specially for the MTX Series

THE KEYBOARD
- Full size, 79-key, full-stroke professional quality keyboard incorporating:
- Main Block with typewriter-style layout
- A separate 12-key numeric/editor keypad
- Eight programmable function keys (16 with shift)

HI-RES GRAPHICS MODE
- 256 × 192 pixel resolution plus
- 32 × 24 Text in 16 foreground and background colours
- All 16 colours (i.e. 15 colours plus transparent) are available on the screen together
- 32 user-definable easily controllable sprites
- 128 separate GENPAT statements providing a huge range of user-defined characters

TEXT MODE
- Text resolution is 40 × 24 characters plus
- 128 user-defined characters
- Eight user-definable virtual screens or "windows" (available in all modes)

For further information, please contact:

MEMOTECH

MEMOTECH LIMITED STATION LANE WITNEY
OXON OX8 6BX
TEL: (0993) 2977
TELEX: 83372

Zaps & pows

Program *Spectrum Sound Effects* **Micro** Spectrum **Price** £7.95 **Supplier** MFM Data Services, 141a Camden Road, Tunbridge Road, Tunbridge Wells, Kent TN1 2RA.

Let's face it — the Spectrum isn't ever going to have amazing sound no matter what.

What has been achieved with the programs that have appeared so far is nevertheless pretty surprising though — zaps and pows never thought possible.

There are a few programs on sale to let you play around with the sound on the Spectrum — basically using machine code you can make a number of very short boring sounds appear to be one interesting sound.

Perhaps the best of these programs is *Spectrum Sound Effects* from MEM Data Services. This program lets you design and store sounds and then play them using the keyboard. It will even show you a (sort of) waveform for the sound. You can incorporate sounds into your own programs and keep a library of 50 sounds in the computer at any time.

Despite the limitations, it's certainly good fun for people who like to play around with sounds although Commodore 64 owners should try to restrain their mirth.

Ian Waltham

Sand-bags

Program *Answer Back Junior Quiz* **Price** £10.95 **Micro** BBC B **Supplier** Kosmos Software, 1 Pilgrim's Close, Harlington, Dunstable, Beds.

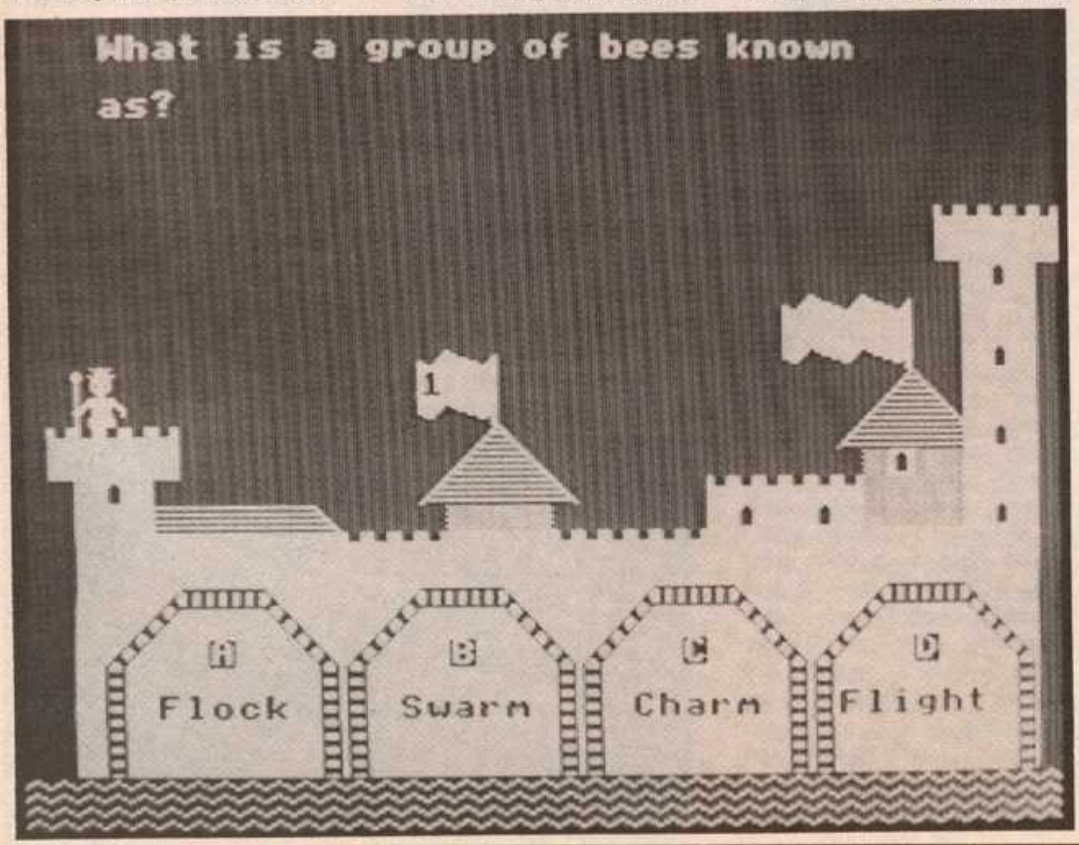
Save the maiden on the battlements from a nasty dragon! Answer the question correctly and your hot-air balloon is free to chase the beast and bomb it with sandbags. That's the reward for success in Keith Spence's quiz program. It's important because otherwise you might just buy a quiz book. Apart from this bit of arcade action, you finish up with a score sheet that includes the number of maidens eaten!

After loading a master handling program, you select one of 16 general knowledge quizzes such as 'Nature', 'TV Films and Theatre', 'Games and Sport'. Then choose the number of questions and whether to be timed. There are three formats: multiple choice (choose A,B,C or D); yes/no or complete the answer (where l?t?er? are missed out and you have to type them in.) You can choose which format or have a random selection. I could not fault Susan Van Baars's question research.

The quizzes can be modified or you can invent your own. The master program makes this extremely easy and demands no programming knowledge. This facility alone will recommend it to many teachers.

Finally, a word of special praise for Roz Woodcock's very attractive cover painting (14" x 8" when opened out). This brings micro program packaging into the same class as top-rate album sleeves, though it would not reproduce well in our columns.

Dave Walterson



Dizzy!

Program *Alien Break In* **Micro** Electron **Price** £6.95 **Supplier** Romik Software, 272 Argyll Avenue, Slough, Bucks.

My first impression when I saw the screen display of *Alien Break In* was how extra ordinarily fast it was. For the Electron, or even the BBC, this display of aliens whizzing around the screen is enough to send you dizzy. What a pity, therefore, that the game doesn't allow continuous firing, but only one bullet at a time until that bullet reaches its target.

The mother ship lays pods that hatch on landing or split into two if shot. Other ships peel off from the main fleet and fire towards holes made in the defences. The successful ones mutate into mother ships which are indestructible.

Alien Break In is a cross between *Space Invaders, Killer Moths* and a few other games, all of a similar nature with a similar objective in mind. Having accepted this lack of originality, there was much I was impressed with, not so much the game itself but in the way Romik Software have given a lot of consideration to the needs of the player.

At the beginning, you are allowed to choose your own keys with which to play; so often games producers choose difficult key combinations. You can, also at the very beginning, choose your level of play. If like me, you're not so hot at some games, it gets rather discouraging to be stuck at one level.

Also a rare facility is the incorporation of an automatic demonstration of the game should you not press the space bar to begin. How often are the instructions as clear as mud and, until you've been 'killed' several times, impossible to grasp the objective.

So whilst the game is like so many others it merits praise for its user considered facilities. Well done, Romik Software.

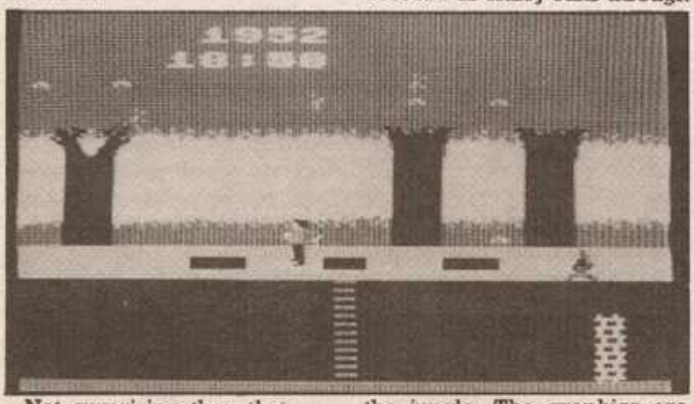
Fred Short

Jungle life

Program *Pitfall* **Micro** Commodore 64 **Price** £9.99 **Supplier** Activision UK, CGL House, Goldings Hill, Loughton, Essex

Pitfall from Activision is another jungle game for the Commodore 64.

In fact, it bears an amazing similarity to another game recently reviewed — *Cuthbert in the Jungle* — the setting, the hazards and the goals are all the same.



Not surprising then that — since this is the original — Activision have recently takenf legal action to stop Microdeal continuing to sell *Cuthbert.*

In this official version of the game you have to guide someone called Harry through the jungle in search of various valuables like money bags, silver and gold bars and diamond rings. However, there are plenty of obstacles in his way — if the cobras or quicksands don't get you, the crocodiles or rolling logs probably will. You have to avoid these hazards by either jumping over them or swinging over them on a vine. An alternative route is via the underground tunnels, but these contain deadly scorpions and the path is sometimes blocked by brick walls.

Although the range of hazards is quite small, variety is produced by changing their distribution on the different screens as Harry runs through the jungle. The graphics are nicely done, and the overall presentation is better than the otherwise almost identical *Cuthbert in the Jungle.* Like Cuthbert the game is good fun for a while, but it soon becomes rather repetitive.

Richard Corfield

Detonated

Program *Blocker* **Price** £7.95 **Micro** BBC B **Supplier** Thor, Erskine Industrial Estate, Liverpool.

This fast action game by Martin J. Sykes involves running to collect a set of detonators. You can only tread on blocks, but they disintegrate after you pass so choose a path with care. There is screen wraparound so you can go in a single step from one edge of the screen to the opposite one. Obstacles in the form of TNT sticks appear on some blocks — hit them and you die. You must complete the task in 20 seconds or be fried by a million volts!

Just to make the task harder, you are pursued by giant boots; if they tramp on you it's all over!

Between frames of the main game there is a diversion for bonus points. A simpler version of the field of blocks is presented with just one detonator at the bottom of the screen. You start by bouncing left to right at the top of the screen and choose your moment to dive for the detonator — trying to avoid any TNT.

The action, if not totally original, is fast, furious and just simple enough for you to feel frustrated when you cannot quite make it, so you try again... and again... Very good fun.

Dave Atterson

Forgettable

Program *Oracle's Cave* **Micro** Commodore 64 **Price** £7.99 **Supplier** Dorcas Software, 3 The Oasis, Glenfield, Leicester

Oracle's Cave from Dorcas Software follows the current trend of combining an adventure game with some graphics to add to the interest.

In the game, you find yourself in a mysterious cave complex, into which you have inadvertently wandered. To escape, you must collect up 40 units of treasure, including that guarded by the cave dweller of your choice, and then defeat the mighty Oracle, all within five days.

The screen is divided into various sections. The top half shows you a picture of the part of the cave where you are currently standing. Another part displays your present status — energy, strength and what you are carrying. A third area gradually builds up a map of the caves, which saves you the bother of drawing your own.

It is a fairly standard, uncomplicated adventure with not many locations or objects to bother about. Although quite nicely presented the game does have one or two irritations. For example, all the commands and objects are represented by one-letter codes which are rather forgettable. Also, if you accidentally clear the screen, the display is ruined and it never sorts itself out.

It is difficult to see who this game will appeal to. Dedicated adventure gamers will probably find it too simple and there is no action to appeal to arcade fans.

Richard Corfield

Gin sling

Program *Shaken Not Stirred* **Micro** QL **Price** £9.95 **Supplier** Soft in the Head, Front basement, 67 Earl's Court Square, London SW5 9DQ

The first non-serious QL program (well, serious to some maybe) is *Shaken* Not Stirred by the wonderfully named Soft in the Head Software.

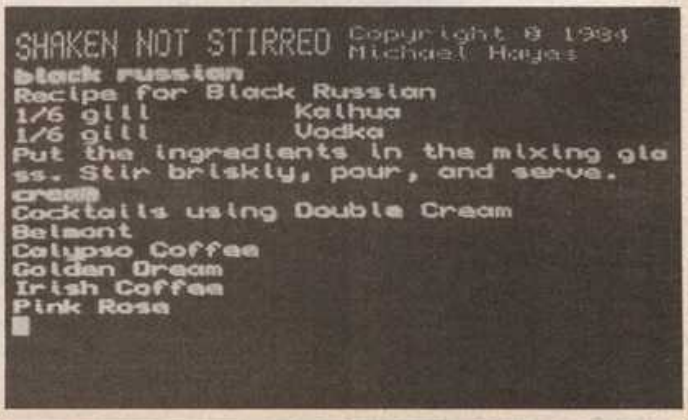
What this ingenious and vital program does is provide you with the recipe for most cocktails known to mankind.

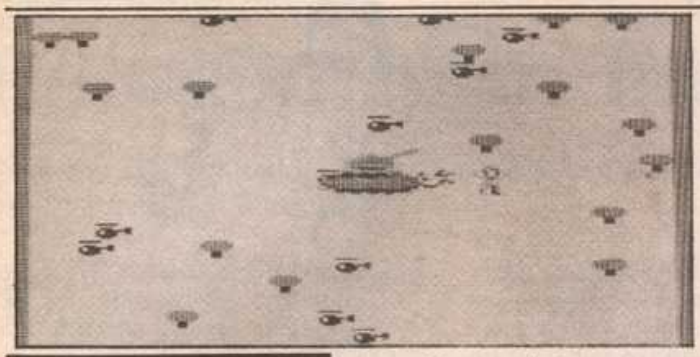
The system to find the cocktail could hardly be simpler, you simply type in a series of letters and the computer finds any cocktail or ingredient containing those letters; for example, typing mar will find you Márgharita whilst gren wil find you both the cocktail grenadier as well as grenadine the ingredient.

The only problem appears to be that there is no facility to add your own cocktails to the database and I suspect that many of the cocktails are also known by a vast number of other names so a synonym collection would have been useful.

It should also be noted that the program costs £9.95. a price doubtless not unrelated to the fact that blank microdrives cost £4.

Ian Waltham





Invisible wall

Program *Spy School* **Micro** Commodore 64 **Price** £3.95 **Supplier** Dimension 21, 91 The Broadway, Southall, Middlx.

It's a pleasant change to come across a new arcade game which seems to have an original theme. In *Spy School* from Dimension 21, as the name implies, you have to perform various tricky tasks which even James Bond might find intimidating.

You have to shoot down a whole squadron of enemy helicopters. You have to collect a briefcase (no doubt full of secret documents) and make your escape while dodging detector beams which trigger off a deadly rain of shells. Or you have to find your way to safety through a maze of trees, mines and invisible walls.

After you complete each task the rescue helicopter arrives to fly you back to home base. If you achieve all the objectives on level one, the whole process is repeated, but is made a bit more tricky.

The game is quite interesting for a while, especially as the theme is rather unusual, but, unfortunately, it does become rather repetitive.

What is more, the graphics and sound are rather lacklustre and really not up to the high standard which most games for the 64 now achieve.

A pity, because the idea itself has plenty of potential.

Richard Corfield

Star map

Program *Starseeker* **Price** £7.95 Micro BBC B **Supplier** Mirrorsoft, Holborn Circus, London EC1P 1DQ.

Starseekers could only exist in a Planetarium or on a computer. The main program shows you the stars — from anywhere on Earth and at any time between 1st January 1900 and 31st December 2100. You can look in any direction and zoom in on items of interest.

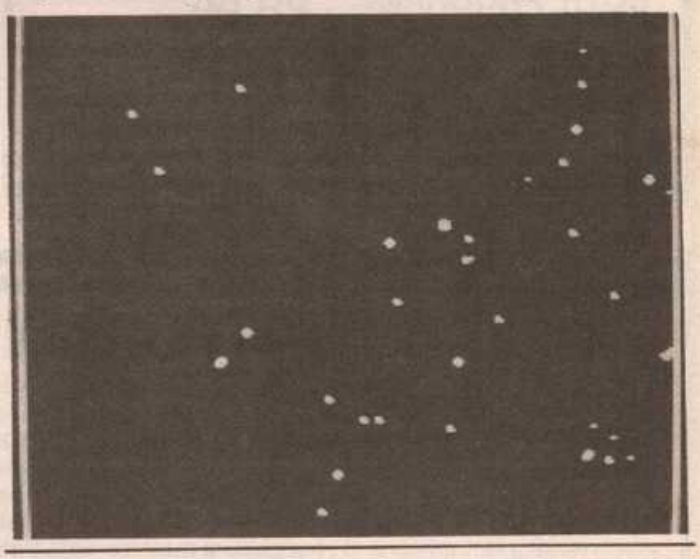
The constellations can be outlined and named, and by placing a cursor over any star, you can learn its vital statistics. It's even possible to dump key images onto an Epson printer and carry a star-map with you at night.

There is a mass of information in this program and booklet; it's here astonomy comes to life. You can even watch stars move as the night progresses.

The second part is *Solar System* which provides similar detailed views of our home area, paying special attention to the Moon and Halley's comet. The comet comes close to earth once every 76 years and early 1986 will be the best time to see it.

The program is sensitive about any extra paged ROMs on board your Beeb. A quick poke of ?&2AD=0 before loading solves that.

Dave Watterson



Melt-down

Program *Atom Smasher* **Micro** Electron **Price** £6.95 **Supplier** Romik Software, 272 Argyll Avenue, Slough, Berks.

The object of Atom Smasher is to prevent melt down of a nuclear reactor. All I can say is, if what the game requires is all that is needed to prevent the real thing happening, then living as I do within two miles of a nuclear power station which was approximately nine years behind schedule and is constantly taken "off line" because of "slight hick-ups", it does not justify the constant worry I have of the real thing happening.

The game begins with a blue electron moving rather erratically around the neutron. To delay melt down you must shoot the proton, which moves around the purple nucleus, with your remote controlled super laser.

Each time you shoot the proton, an extra electron appears. If you collide with an electron, you lose one of your three lives. If you shoot an electron, everything speeds up for a short time until the electrons cool down a little. If you delay shooting, melt down starts.

The molten debris approaches the nucleus from each side. You can blast the debris away, but the only way that you can stop it from advancing is to keep shooting the proton.

That's the theory of the game. *Atom Smasher* is yet another example of the actual game not living up to the excitement which the written blurb attempts so colourfully to infuse into a prospective purchaser.

Fred Short

Deadly spikes

Program *Ghouls* **Micro** Electron **Price** £6.95 **Supplier** Micro Power, Sheepscar House, Sheepscar Street South, Leeds LS7 1AD

I was beginning to wonder if games inventors had run out of ideas, since quite a lot of so called 'new' games have obviously been rehashes of older tried and tested models. *Ghouls* nearly comes into this category with its similar nature to *Pacman* type games.

Your task is to rescue the power jewels from the creepy mansion on the top of the hill. Sounds easy until you are confronted with deadly spikes, not to mention the nasty spider that jumps up and down ready to catch you. Eating the yellow titbits earns you extra points and a stray power jewel causes the ghosts to disappear.

The game gives you the choice of key control or joysticks, but not those used with Acorn's Plus 1. This highlights the problem Acorn have given their Plus 1 buyers, since to date Electron interfaces have opted for the more familiar switch type joystick and games producers like Micro Power have incorporated switched joystick option.

I like the novelty of the game, the option of stopping the action mid-game, sound or no sound and more important, the option of returning to the instructions.

Fred Short

SPECTRUM & BBC

POOLS PREDICTOR

WITH 11,000 MATCH DATABASE

Now in its 3rd successful season, Mayday Software's Pools Predictor has been made even more powerful with a new and unique 11,000 match database. SEVEN separate forecasting techniques have been combined to give you the best forecasts yet. Still as easy to use as ever, you can you can tune the program yourself to improve forecasts as the season progresses.

+ FREE! RACING ANALYSER

Using the racecard from your daily paper, this easy to use program will combine 7 different horse race factors to analyse any race, flat or NH.

BOTH PROGRAMS FOR ONLY £8.99

MAYDAY SOFTWARE

181 PORTLAND CRESCENT STANMORE, MIDDX HA7 1LR

PROGRAMMERS

We are looking for freelance machine-code programmers to join our team. We are a growing company and have already secured significant levels of national and international distribution for our games, recreational and utility software. We have been asked by our distributors to extend our range of titles. We are prepared to lend equipment to programmers of high calibre.

We are particularly interested in hearing from programmers who either have programs ready for, or who will be able to produce programs for MSX, Amstrad, Commodore, Spectrum and Atari.

We package our products extremely well and have facilities to produce extensive documentation should this be necessary.

The managing director will be pleased to give further information. Please telephone, or write to us in Basingstoke.

Dream Software Ltd (Dept PCW1)
PO Box 64
Basingstoke RG21 2LB
Tel: (0256) 25107

DREAM

ATTENTION! ATTENTION! ALL VIC & CBM USERS!

Do you use tapes? Are you sick and tired of waiting for your programs to be Loaded/Saved from on the tape? Then you need a **TORNADO!!** Tornado allows you to Save/Load/Verify your Basic/machine code programs faster than a CBM 1541 disk drive does!! Due to popular demand! Tornado now comes with new and more powerful commands plus extra instructions to assist you in making fast versions of your existing machine code/Basic programs. Tornado is available on tape for CBM 64 and 8K + Vic 20.

Do your Run/Stop and Restore keys often fail? Do you want to come out of those crashes?! Or come out of those unbreakable loops?! Then what are you waiting for, get yourself a **BREAKER!!** Reset switch and let your computer know who is the boss!! Breaker can be connected to your machine in seconds. Connecting directly to the serial port of the CBM/Vic20/1540-1 MPS 801 etc. included with the Breaker reset switch is a basic recovery program. Breaker is now available for any CBM 64 or Vic 20.

Available for CBM 64 and the Vic 20 now is the NEW EDITION! Now combining Vic 20 & CBM 64 **ROM-FILE.** Containing a complete disassembly of CBM 64 & Vic 20 Basic & Kernal Rom with comments! As well as a complete description of all 6502/6510 instructions and addressing modes + a complete listing of a machine code monitor.

Please make cheques/PO payable to:

BSF COMPUTER SERVICES LTD.
DEALERS AND GENERAL ENQUIRIES
TEL: 0293 510020

MAD SUMMER OFFER!! A FREE BREAKER WITH EVERY TORNADO IF YOU USE THIS COUPON!!

D Please send me..... Tornado at £9.95 + my free! Breaker

Please send me..... Breaker at £7.95

Please send me..... Rom-File at £7.95

I enclose cheque/PO/cash to the sum of £.....

Name..... Computer.....

Address .....

.....

Please use this form and block letters only. All prices are inclusive of p&p (mail order only, add £2 if outside UK). Please post to:
BSF CSL, 82 FURNACE DRIVE, CRAWLEY, W. SUSSEX RH10 6JE

Recalled from memory

Graeme Brown helps you trace characters in memory with his machine code program

This short machine code routine allows you to input the coordinates of a character position and it will return with the address in the display file that corresponds to the top pixel row of that position. This may be useful within a larger machine code program when the construction of a graphic is required. Once the top pixel address is known, the remaining 7 lines can be found simply by adding 256 to each address until the complete character position is filled. It is, in some ways, easier to do this routine in Basic but the machine code version shown here is intended as a subroutine to a larger program that can be called when required.

The program itself is quite simple and makes use of the following formula:

Top, Address (X Y)= 16384+INT(X/8)*2048+(X−INT(X/8)*8)*32+Y

where X = Row coordinate

Y = Column coordinate using the *Print At* format.

The program is shown in listing 1 in a demonstration form and lines 10 to 50 *Poke* the code directly into memory. It uses the printer buffer so disconnect your printer if you have one. I use the printer buffer for testing any short routines since *Ramtop* does not need to be moved and at 256 bytes long it is big enough for most routines.

The program asks you first for the row coordinate then the column coordinate of the required position. It will return from the routine and print the address. If the routine is included as a subroutine within a larger program, then the swapping of the HL and the BC registers is not strictly required. This was done as part of the demonstration to enable the calculated value to be "handed back" to the Basic operating system.

```
LD   HL,          : Load address containing ROW
     ROWSTORE       coordinate
LD   B, (HL)      : Put it into B
INC  HL           : Point to address of COLUMN
                    coordinate
LD   C, (HL)      : Put it into C
LD   HL, 16384    : Start of display file
LD   A, 248       : Load mask and use to find
AND  B            : which screen portion the
                  : required address is in
PUSH AF           : Save this value on stack
ADD  A, H         : Add it to the HIGH byte of
LD   H, A         : HI
LD   A, B         : Get ROW coordinate
POP  DE           : Load DE with screen portion
                  : Indicator
SUB  A, D         : Reduce ROW no. to a line within
                  : a particular screen portion
ADD  A, A         :
ADD  A, A         :
ADD  A, A         : Multiply by 32
ADD  A, A         :
ADD  A, A         :
ADD  A, C         : Add COLUMN coordinate
LD   L, A         : Make the result the LOW byte
                  : of HL
PUSH HL           : Swop HL and BC
POP  BC           :
RET               : Return
```

Note

The swapping of the HL and BC registers is only required if the program is being run in response to a *Usr* command. This is to ensure that the address required can be printed using the Basic command *Print Usr* storage address. If the routine is used as a sub routine within a larger M/C program then the address can be left in the HL register as it is normally used for this purpose.

```
  10 REM *** ADDRESS FINDER ***
  20 REM ************************
  30 FOR A=23305 TO 23332
  40 READ D
  50 POKE A,D
  60 NEXT A
  70 DATA 33,4,91,70,35,78,33,0,
64,62,248,160,245,132,103,120,20
8,148,135,135,135,135,135,129,11
1,229,193,201
  80 REM ***COORDS INPUT***
  81 REM ********************
  90 PRINT "INPUT THE ROW COORDI
NATE"
 100 INPUT R
 110 IF R>23 THEN PRINT AT 12,4;
"INVALID INPUT": PAUSE 100: CLS
: GO TO 90
 120 PRINT "INPUT THE COLUMN COO
RDINATE"
 130 INPUT C
 140 IF C>31 THEN PRINT AT 12,4;
"INVALID INPUT": PAUSE 100: CLS
: GO TO 120
 150 CLS : POKE 23300,R: POKE 23
301,C
 160 LET J=23305
 170 PRINT USR J
 180 STOP
1000 PRINT "INPUT THE COLUMN COO
RDINATE"
```

```
7D00                0005        ORG  32000
7D00 2104EB         0010        LD   HL,23300
7D03 46             0020        LD   B,(HL)
7D04 23             0030        INC  HL
                    0040
7D05 210040         0050        LD   HL,16384
7D08 3EF8           0070        LD   A,248
7D0A A0             0080        AND  B
7D0B F5             0090        PUSH AF
7D0C 84             0100        ADD  H
7D0D 67             0110        LD   H,A
7D0E 78             0120        LD   A,B
7D0F D1             0130        POP  DE
                    0140
7D10 92             0150        SUB  D
                    0160
7D11 87             0170        ADD  A
7D12 87             0180        ADD  A
7D13 87             0190        ADD  A
7D14 87             0200        ADD  A
7D15 87             0210        ADD  A
                    0220
7D16 81             0230        ADD  C
7D17 6F             0240        LD   L,A
                    0250
7D18 E5             0260        PUSH HL
7D19 C1             0270        POP  BC
                    0280
7D1A C9             0290        RET
                    0300        END

#      5DDB
```

BEAT THE SYSTEM

AMSTRAD PRINTER CABLE

£14.95 fully inclusive

★ Connects CPC 464 to any CENTRONICS compatible parallel printer eg: Epson, Cannon, Juki Shinwa, MCP 40, Seikosha, etc., etc.

★ 1 metre long.

★ Nothing else required.

Please make cheques payable, and send your order to:-

MIRACLE SYSTEMS LTD
Unit 37a
Woodland Way
Avondale Workshops
Kingswood
Bristol BS15 1QL
Tel 0272-603871 x210

*Also **QL** parallel printer interface available £49 inc.*

Ask at your local computer shop.

GOLD CREST
9 WINCHESTER ST.
LONDON W.3

MAIL ORDERS ONLY
TOP-SAVINGS

COMPUTERS:

ZX SPECTRUM 16K	93.00	48K	£118.00
COMMODORE 64 64K			£186.00
BBC MICRO 32K			£380.00

SPECTRUM SOFTWARE:
Hulk, Sabre Wulf, Lords of Midnight, R.R.P. £9.95 **O.R.P. £8.50. Mugsy** R.R.P. £6.95 **O.R.P. £5.85. Antics** R.R.P. £6.95 **O.R.P. £5.75. Jack & The Beanstalk** R.R.P. £5.95 **O.R.P. £4.90. Ad Astra, Tutenkamen, Kosmic Kanga, Pengy, Harrier Attack, Wheelie, Cavern Fighter, Manic Miner, Tribble Trubble, Blue Thunder,** R.R.P. £5.95 **O.R.P. £4.90. Atic Atak, Beaky & The Eggsnatchers,** R.R.P. £5.50 **O.R.P. £4.80. Psytron** R.R.P. £7.95 **O.R.P. £6.50. Pyramid** R.R.P. £5.50 **O.R.P. £4.85. Doomsday Castle** R.R.P. £6.50 **O.R.P. £5.75. Deathchase, Code Name Mat, Scuba Dive, Les Flics, Skull, Penetratop, Football Manager** R.R.P. £6.95 **O.R.P. £5.75. Jungle Trouble, Cyberzone** R.R.P. £5.50 **O.R.P. £4.60. Android Two** R.R.P. £5.95 **O.R.P. £4.80. Blade Alley** R.R.P. £5.95 **O.R.P. £5.20. Gilligan's Gold** R.R.P. £5.90 **O.R.P. £4.80. Moon Alert** R.R.P. £5.90 **O.R.P. £5.20. Pogo** R.R.P. £5.90 **O.R.P. £4.85. Hunchback** R.R.P. £6.90 **O.R.P. £4.80. Mr Wimpy** R.R.P. £5.90 **O.R.P. £5.20. Jet Set Willy** R.R.P. £5.95 **O.R.P. £4.95. Time Bomb** R.R.P. £5.95 **O.R.P. £4.80. Trashman** R.R.P. £5.95 **O.R.P. £4.70. Chequered Flag** R.R.P. £6.95 **O.R.P. £6.40. Night Gunner** R.R.P. £6.95 **O.R.P. £5.60. Timegate** R.R.P. £6.95 **O.R.P. £5.40. Fred, 3-D Ant Attack, Bugaboo, Snowman** R.R.P. £6.95 **O.R.P. £5.90. Flight Simulation** R.R.P. £7.95 **O.R.P. £7.20. Hobbit, Valhalla** R.R.P. £14.95 **O.R.P. £10.95. Classic Adventure** R.R.P. £6.95 **O.R.P. £5.75.**

COMMODORE SOFTWARE:
Hulk, Beach-Head, R.R.P. £9.95 **O.R.P. £8.50. Loco, Blagger, Son of Blagger, 737 Flight Path, Cybotron** R.R.P. £7.95 **O.R.P. £6.20. Sheep In Space** R.R.P. £7.50 **O.R.P. £6.40. Cavelon** R.R.P. £6.90 **O.R.P. £5.70. Attack/Revenge of Mutant Camels** R.R.P. £7.50 **O.R.P. £6.40. Heligate** R.R.P. £5.00 **O.R.P. £4.00. Gidrunner** R.R.P. £5.00 **O.R.P. £4.20. Quark** R.R.P. £7.95 **O.R.P. £6.80. Scuba Dive** R.R.P. £6.95 **O.R.P. £5.80. Les Flics** R.R.P. £7.95 **O.R.P. £6.90. Space Pilot** R.R.P. £7.95 **O.R.P. £6.50. Superpipeline** R.R.P. £6.90 **O.R.P. £5.60. Bozo's Night Out** R.R.P. £6.90 **O.R.P. £5.75. Solo Flight** R.R.P. £14.95 **O.R.P. £11.95. Voodoo Castle, Snowball,** R.R.P. £9.95 **O.R.P. £8.00. Odyssey** R.R.P. £6.95 **O.R.P. £5.90. Hobbit 64** R.R.P. £14.95 **O.R.P. £10.95. Colossal Adventure** R.R.P. £9.95 **O.R.P. £8.00. Transylvanian Tower** R.R.P. £6.50 **O.R.P. £5.20. Tales of Arabian Nights** R.R.P. £7.00 **O.R.P. £5.95.**

THE LAST FOUR LINES ON STOCK, ORDERS UNDER £10.00, 28 DAYS FOR DELIVERY AND CONTACT BE MENTIONED AS BEFORE.

TITANIC

The Adventure Begins...

With Currah Micro Speech

FREE on Side 2
a mini-epic in high energy rock
TITANIC (The music)

R&R SOFTWARE

FOR 48K SPECTRUM

NOW AVAILABLE ONLY £7.95

R&R Software Ltd, 5 Russell Street, Gloucester GL1 1NE. Tel: 0452 502819

Tracing a line

***Andrew Pennell** makes use of the QL's multi-tasking to give the machine a* Trace *facility*

This program uses the most powerful feature of the QL — multi-tasking — to add a *Trace* ability to SuperBasic.

To my knowledge, not only is this the first QL machine-code program to be published, but it must be the first to use multi-tasking. What it does is to set up a small program that constantly monitors Basic, and prints the current line number at the top of the screen. It can do this as it seemingly runs at the same time as the Basic interpreter.

To use it, firstly type in the listing, and save it before running. Next, *Run* it, and you should be greeted with *"loaded OK"*. If you get *"wrong data"*, then you must have made a mistake in the data somewhere. To turn the *Trace* on, you have to *Call 261120* (It's important that you only do this call once). You should get "−0" printed at the very top left of the screen. Next you should *Call 261192,8*, which sets the speed of the trace to an average value. From now on, any program that *Runs* should be accompanied by a display along the top of the screen of the line number each time it changes, separated by dashes.

On my television, there is quite a gap between the top of the screen, and the top of the listing window. If you don't have such a gap on yours, you can change Line 160 to position your *Trace* window at a more convenient place, but try not to make it clash with any other windows. If you changed it to *a$="ser1"* then the trace will appear on a printer, but firstly set the printer's width using control codes, or else it will all be printed on one line of paper!

A machine-code program that runs under multi-tasking is known as a 'job', and normally on the QL only one job is running — the Basic interpreter. However, what the machine-code does is to set up a second job, the sole purpose of which is to print line numbers every time they change. Each job has a speed factor, from 1 to 32, and this determines how fast it runs compared to the other jobs. Basic runs at the maximum of 32, but *Trace* works OK at a speed of 8, and this is what the *CALL 261192* is for — you can change the speed of the *Trace*. Normally 8 is OK, but sometimes 16 gives better results, and if you want to be extravagant you could get it to run at 32. Note that the faster you make the *Trace*, the slower Basic runs at, so that a *Trace* speed of 32 will make Basic half its normal speed. A speed of 0 will switch *Trace* off, and make Basic run normally.

With *Trace* enabled, the *Respr* function cannot be used, and will give a *'not complete'* error. Also, during some I/O operations, you can get strange numbers printed, and a *Mode* instruction makes the print-out disappear, for (as yet) unknown reasons. After you've run the loader program, you can safely do a *New* — *Trace* will remain intact, and possibly running.

An assembly language listing of this program, along with masses of other information, will shortly be available in my forthcoming book *Assembly Language Programming on the Sinclair QL* published by Sunshine Books.

```
10 REMark ****************************
20 REMark ********* TRACE ************
30 REMark **(C) Andrew Pennell 1984**
40 REMark ****************************
50 REPeat makeroom
60 IF RESPR(0)<=261120 THEN EXIT makeroom
70 a=RESPR(1024)
80 END REPeat makeroom
90 t=0
100 RESTORE
110 FOR i=261120 TO 261305
120 READ a
130 POKE i,a:t=t+a
140 NEXT i
150 IF t<>12642 THEN PRINT #0;"wrong
data":STOP

160 a$="scr_400x12a40x4"
170 POKE_W 261220,LEN(a$)
180 FOR i=1 TO LEN(a$):POKE 261221+i,
CODE(a$(i))
190 PRINT "TRACE loaded OK"
210 PRINT "to setup: CALL 261120"
220 PRINT "speed    : CALL 261192,?"
230 DATA 114,0,36,60,0,0,0,62
240 DATA 66,131,34,67,112,1,78,65
250 DATA 67,250,0,76,34,129,34,124
260 DATA 0,3,252,124,36,60,0,0
270 DATA 0,61,16,217,81,202,255,252
280 DATA 112,1,118,2,65,250,0,54
290 DATA 78,66,67,250,0,38,34,136
300 DATA 16,60,0,10,34,58,0,32
310 DATA 116,1,118,0,78,65,78,117
320 DATA 34,121,0,2,128,104,34,105
330 DATA 0,4,19,65,0,19,66,128
340 DATA 78,117,0,0,0,0,0,0
350 DATA 0,0,255,255,0,15,83,67
360 DATA 82,95,52,48,48,88,49,50
370 DATA 65,52,48,88,52,0,0,0
380 DATA 0,0,0,0,46,124,0,4
390 DATA 0,0,32,121,0,3,252,90
400 DATA 34,121,0,2,128,16,50,41
410 DATA 0,208,178,121,0,3,252,98
420 DATA 103,232,51,193,0,3,252,98
430 DATA 18,60,0,45,118,255,112,5
440 DATA 78,67,50,57,0,3,252,98
450 DATA 52,121,0,0,0,206,78,146
460 DATA 96,200
```

A Fair Deal For Our Advertisers

No guesses, no wishful thinking – the circulation of this magazine is audited to the strict professional standards administered by the Audit Bureau of Circulations

ABC

The Hallmark of Audited Circulation

WALTHAMSOFT '84

THE HOME COMPUTER SHOW FOR ALL
SATURDAY SEPTEMBER 8TH
10AM — 5PM

WALTHAM FOREST TECHNICAL COLLEGE
FOREST ROAD,
LONDON E17

- LOTS OF FREE PARKING
- EASY BUS & TRAIN ACCESS
- REFRESHMENTS ALL DAY

GOOD SIZE STANDS AVAILABLE FROM JUST £25.00
NO EXTRAS! TABLES & POWER INCLUDED

NON-PROFIT MAKING ORGANISATIONS, GROUPS & CLUBS WE HAVE FREE SPACE FOR YOU! CONTACT US NOW!

PARTY BOOKINGS
***
STANDS
***

ADMISSION £1

ENQUIRIES:- LONDEX
38 EXETER GARDENS, ILFORD ESSEX IG1 3LB.
01-554-5039/3498

NEW

The Spectrum lives on!

Say NO to power cuts with NIKE

available now!

NIKE-SP is a nickel-cadmium battery back-up unit to safeguard against momentary or short duration mains supply failure.

SIMPLY connects between the Sinclair power supply and the Spectrum.

OVER 30 minutes of back-up in the event of mains failure.

not suitable for microdrives.
ALSO AVAILABLE FOR THE ZX81/ATMOS

Price: £17.35 +VAT

NEW PRINT-SP. Centronics I/F for Spectrum (cable included), with FREE SPWRITE text processor, for 'normal people'. **£31.25**

"NEW" BLOPROM-SP. Professional Eprom programmer for the Spectrum Developed from the outstanding BLOPROM-81 but also handles 2764A/128A Eproms.

OTHER PRODUCTS AND PRICES
ROM-SP, loads 16K in 1/10 of a second from Eprom (£29.95) ● PROMER-SP, great value Eprom programmer for the Spectrum (£29.95) ● DHOBI-1, Eprom eraser (£18.95) ● BLOPROM-81, professional Eprom programmer for the ZX-81 (£79.95) ● PIO SP/81, 8+8 channel latched I/O card (£18.50/£14.95) ● APPLICATION NOTES on understanding Eproms (S.A.E. ref. EPROMS).

UK VAT extra, P&P free
Europe P&P+5%. Overseas + 10% NO VAT.

CAMEL PRODUCTS from
Cambridge Microelectronics Ltd,
One Milton Road, Cambridge.
Tel: (0223) 314814 Telex 81574

NOW 3RD GREAT YEAR!

HIRE

SPECTRUM 2X81 and COMMODORE 64 TAPES

LIFE MEMBERSHIP £5·00
TAPE HIRE FROM 50P INCLUDING VAT

HUGE RANGE!
ADVENTURE GAMES
ARCADE and SIMULATION GAMES
BUSINESS and PRACTICAL PROGRAMS
UTILITIES
M/c COMPILERS
EDUCATIONAL
FROM OVER 60 TOP SUPPLIERS

FREE ILLUSTRATED QUARTERLY MAGAZINE WITH TIPS, NEWS, REVIEWS, DISCOUNT OFFERS

OVER 3,000 DELIGHTED MEMBERS!

■ The first true software library to be set up in the world—and still the largest ■ Unrivalled tape stock, as you'd expect from our head start ■ Run by a 16-bit computer (**2 million bytes** of program and data on disk!) with the help of six less able but more friendly mere humans! ■ Often imitated (sometimes almost to the letter—flattery indeed!) but never equalled ■ Friendly, helpful service—at the end of a phone if needed ■ **Free** membership of our Discount Club: pounds off peripherals and top-of-the-chart tapes ■ Any loading problems (rare!) automatically credited ■ Shop now open (next to Post Office) for rental and discount sales of tapes and peripherals ■ Branches throughout the world ■ No complicated schemes, no commitment to quantity—rent what and when you like ■ Printed, illustrated magazine "Computerchat" packs in more than any mere typed newsletter ■ Keenest-ever rates ■ ACCESS holders can join by telephone on 0730 892732 ■ **NO RIVAL can offer all this....**

SPECIAL OFFER! YOUR FIRST TWO TAPES FREE IF YOU USE THIS COUPON!

or send £1 for magazine & details.
Props: ALEC FRY ARPS, FRSA and ERNA FRY, BA

To: SOFTWARE LIBRARY, Farnham Road, West Liss, Hants GU33 6JU.

NAME.....Machine.....

ADDRESS.....

THE ORIGINAL SOFTWARE LIBRARY!

Special offer from this issue: LIFE MEMBERSHIP £5
(normally £9.50). Overseas (Europe only) £10, or join local branch in W. Germany, France, Holland, Belgium, Scandinavia, South Africa, Ireland—send Int. Reply Coupon and we'll forward your enquiry.
All software supplied with publishers permission.

Error trap

***Wayne Smithson** helps cut down Dragon loading problems with this machine code utility*

Although the Dragon has superior saving and loading procedures to many of its rivals, that doesn't stop the dreaded *I/0 Error* occurring...

Here is a program to combat the *I/O Error* and so relieve the tension of Dragon owners everywhere.

This program sits at the top of *Ram* and, whenever a *Cload* or *Cloadm* command is typed in, the program notes which you chose and, if an *I/O Error* occurs, the program effectively types it in again for you. When you type *Cloam/m* in, the program doesn't remember the name, however; this is in case you get an *I/O Error* in the middle of a program or you type in the wrong name. In other words, the computer will search for a file of the name typed unless an *I/O Error* is encountered, in which case the next valid file will be loaded in.

After some thought, I decided not to check for an *F/M Error*. This is because you may want to find a file on a cassette without loading it in. To do this just type *Cloadm* for a Basic program and *Cload* for a machine code program. The computer will click through the tape until it finds the file, the name will be printed on the screen and an *FM Error* will occur. You will then be just past the beginning of that program, and no corruption will have taken place.

The program itself occupies 66 bytes at the top of *Ram*, it isn't repositionable unless you have an assembler. The Basic loader will insert the machine code and check it for mistakes. The assembler listing is included with brief notes for those interested.

Some locations of interest are:-

401-403 Whenever an error occurs, Basic jumps here and does nothing in particular, so you can intercept any error. (Each has a number held in the B ACC. If B=0 then no error).

377-379 Whenever a Basic command is typed in, a jump is made here which does nothing so intercept this and you can tell which command has been typed in. (Token will be in A ACC.).

&HA6 Basic pointer, tokenise a Basic line, store it address pointed to by this location-1, load A ACC. with the first token and the computer will think it is running a Basic line (dopel). Each 'line' must end with a 0.

The Basic tokens can be found in PCW (Vol 2 No 42) October 1983 and please note that:-

Cload token=153

Cloadm token=153,77 (A ACC.=77)

```
*******I/O ERROR  GO HOME*******
********WAYNE J SMITHSON********
        ORG #32701 *THESE CAN BE
        PUT #32701 *CHANGED.

        CMPA #153  *CLOAD/M ?
        BNE OUT    *NO, RETURN
        LDX $A6
        LDB 1,X    *CHECK FOR
        CMPB #77   *CLOADM
        BEQ MCODE  *YES, KEEP 'B'
        CLRB       *NO, CLEAR 'B'
MCODE   STD $7FFE  *TEMP. STORE
        LDX #ERROR
        STX 402    *INTERCEPT
        LDA #$7E   *ERROR HANDLER
        STA 401    *TO MY ROUTINE
        LDA #153   *CLOAD/M TOKEN
OUT     RTS
ERROR   CMPB #42   *I/O ERROR ?
        BEQ IOERR  *YES, RELOAD
CLEAR   LDX #$3939 *RESTORE ERROR
        STX 401    *HANDLER
        STX 402
        RTS
IOERR   LDD $7FFE  *GET TEMP.
        LDY $A6    *STORE & CLEAR
        CLR 1,Y    *PUT TEMP. AT
        STD ,-Y    *1 LESS 'Y'
        CMPB #0    *CLOAD ?
        BEQ CLOAD  *YES
        LDA #77    *NO, CLOADM
CLOAD   JSR 46804  *JSR CLOAD/M
        BRA CLEAR  *GOTO BASIC.
```

```
0 CLEAR200,32700:CLS:PRINT"machine code
loading"
1 FORN=1 TO 65:READ A$
2 POKE32700+N,VAL("&H"+A$):PRINT@32,3270
0+N
3 C=C+VAL("&H"+A$):NEXT
4 IF C<>7771 THENPRINT"cock-up!":SOUND1,
10:END
5 POKE378,&H7F:'HEX ADDRESS OF
6 POKE379,&HBD:'MY ROUTINE.
7 POKE377,&H7E:'TO ENABLE
8 'POKE377,&H39 TO DISABLE.
9 PRINT"load successful!":SOUND150,10
10 DATA 81,99,26,19,9E,A6,E6,01,C1,4D,27
,01,5F,FD,7F,FE,8E,7F,DB,BF,01,92,86,7E,
B7,01,91,86,99,39,C1,2A,27,0A,8E,39,39,B
F,01,91,BF,01,92,39,FC,7F,FE,10,9E,A6,6F
,21,ED,A2,C1,00,27,02,86,4D,BD,B6,D4,20,
E1
=======> BASIC LOADER <=======
```

INPUT

The leading home computer software publication has vacancies for

EXPERIENCED PROGRAMMERS WRITERS or EDITORS

who have detailed knowledge of one or more of these machines

SINCLAIR SPECTRUM, COMMODORE 64, BBC B or DRAGON 32

Candidates must be able to work to tight deadlines under pressure. Vacancies are for full-time staff or freelance contributors. Previous applicants need not reapply.

Please apply in writing, enclosing a CV to

SUE BULPITT
INPUT
Marshall Cavendish Limited
58 Old Compton Street
London W1V 5PA

COURSEWINNER

The Punters Computer Program

COURSEWINNER allows you to use the power of your computer to get the edge on the bookmaker.

- COURSEWINNER contains a database full of detailed information on all English and Scottish flat courses. The ten leading jockeys and trainers, and effect of the draw is detailed for each course. This information can be displayed on the screen at any time.
- The program analyses these factors combined with the results of the last three outings, starting price and weight carried.
- COURSEWINNER is simple and quick to use, yet very powerful.
- Boxed with detailed instruction booklet.

Price £12.50 all inclusive IMMEDIATE DISPATCH (RETURN OF POST)

Available for:
SPECTRUM (48K), BBC (B), COMMODORE 64, DRAGON, APPLE II/IIe, ATARI (48K).

POOLSWINNER

The Ultimate Pools Prediction Program

- POOLSWINNER is the most sophisticated pools prediction aid ever produced. It comes complete with its own massive database.
- Can be used for Scoredraws, Draws, Aways and Homes.
- The database contains over 20000 matches (10 years league football). It updates automatically as results come in.
- The precise prediction formula can be set by the user. This allows development of your own unique method.
- Package is complete with program, database and detailed instruction booklet.

Price £15.00 all inclusive IMMEDIATE DISPATCH (RETURN OF POST)

Available for: SPECTRUM (48K), ZX81 (16K), BBC (B), COMMODORE 64, DRAGON, APPLE II/IIe, ATARI (48K).

Available from dealers or direct (return of post) from:

VISA PHONE

selec SOFTWARE

ACCESS PHONE

37 Councillor Lane, Cheadle, Cheshire. Phone: 061-428 7425

THE MEGASAVE FANTASTIC SAVINGS

SPECTRUM		SPECTRUM		COMMODORE	
SABRE WULF	8.25	BLUE THUNDER	4.95	BEACH HEAD	8.50
PSYTRON	6.50	GIANTS REVENGE	4.95	VALHALLA	11.50
MUGSY	5.95	CODDE NAME MAT	5.50	QUILL	11.50
JACK & BEANSTALK	4.95	MICRO OLYMPICS	4.75	THE EVIL DEAD	5.85
FIGHTER PILOT	6.40	WHITE LIGHTNING	12.50	ARABIAN NIGHTS	5.85
TORNADO LOW LEVEL	4.75	BORZAK	5.75	SOLO FLIGHT	12.00
MISSION 1	6.85	WORLD CUP F'BALL	5.95	TRASHMAN	6.85
LORDS OF MIDNIGHT	8.50	FULL THROTTLE	5.95	POTTY PIDGEON	6.85
KOSMIC KANGA	4.95	QUILL	10.75	MICRO OLYMPICS	£4.95
MONTY MOLE	5.85	FACTORY BREAKOUT	4.75	MYSTIC MANSION	7.75
AD ASTRA	4.95	BLADE ALLEY	4.75	DECATHLON (DALEYS)	6.85
NIGHT GUNNER	5.75	3D LUNAR ATTACK	4.75	FOOTBALL MANAGER	6.85
TRASHMAN	4.75	WORST T.H. AT SEA	4.95	PITFALL	8.50
MOON ALERT	4.95	ANDROID II	4.75	HEATHROW A.T.C.	6.85
ANTICS	5.75	STOP THE EXPRESS	5.55	JACK/BEANSTALK	5.85
DECATHALON (DALEYS)	5.85	MATCH POINT	7.75	LOCO	6.50
CAVELON	4.95	3D TANK DUEL	5.20	MONTY MOLE	6.85
RAPSCALLION	5.85			FLIP FLOP	7.75
AUTOMANIA	5.75	**BBC**		STRIP POKER	8.50
STAR TRADER	5.85	FRAK	7.85	ASTRO CHASE	7.75
		STAR STRIKER	6.85		
		THE COUNT	6.85		

FREE POST PLEASE STATE WHICH MICRO

FAST SERVICE

SEND CHEQUE/P.O. TO:
MEGASAVE Dept 1, 76 Westbourne Terrace, London W2

ASTROLOGY

Wide range of Self-teaching and Accurate Calculation Programs for many computers including

Spectrum, BBC/Electron, CBM 64/VIC 20/PET
Dragon, ZX81, Sharp, Texas TI99a
NewBrain, Tandy, Genie, Oric

Please send large sae to:–

ASTROCALC

67 Peascroft Rd, Hemel Hempstead
Herts HP3 8ER tel: 0442 51809

POPULAR Computing WEEKLY

★ CLASSIFIEDS ★

★ *Popular Computing Weekly* was voted magazine of the year by the C.T.A.

★ It is Britain's only weekly home computer magazine with a published Audit Bureau of Circulation sales figure.

★ It has a classified section that is now required reading for everyone with an interest in small micros, or who wants to buy or sell: SOFTWARE ★ UTILITIES ★ ACCESSORIES ★ SERVICES ★ HARDWARE ★ HIRING ★ CLUBS ★ RECRUITMENT ★

★ £6 per SCC semi-display, 25p per word lineage.

★ 6 day copy date.

CALL DIANE DAVIS ON 01-437 4343 FOR AN IMMEDIATE QUOTE.

Popular Computing Weekly, Sunshine, 12/13 Little Newport Street, London WC2R 3LD

SUNSHINE

COMMODORE 64

EDGE

QUO VADIS

"The largest arcade adventure yet seen on a micro" PCG
(over 1000 screens of playing area)

Only for the ultimate games player with the unique QuoVadis Sceptre as the prize

Commodore 64 £9.95 on Turbo-cassette; £12.95 on Disc

Available at selected branches of: W.H.Smith, Boots, Dixons, John Menzies, Lightning Dealers & Selfridges and all good software dealers. Dealers' contact: The Edge on 01 240 1422, or EMI Distribution

TURBO CHARGE YOUR SPECTRUM

Outperforms any Spectrum interface

The unique Turbo interface from Ram gives you all these features – and more – in one unit:

- A variety of interfaces including: Rom cartridges, two 9-way D plugs for standard joysticks, PLUS full expansion bus at rear.
- Compatible with Kempston and Protek protocols.
- Works with latest Quickshot Mk II auto rapid-fire joysticks!
- Choice of Rom cartridge or tape cassette software.
- Instant program loading with cartridge software.
- Built-in power safety device – unique to Ram Turbo.
- Full one year guarantee.
- Immediate availability – 24 Hr despatch on receipt of P.O./credit card details (cheques – seven days).
- Incredible value – only £22.95.

So don't wait around – simply complete the coupon and send it to us today.

Or call our credit card hot line on 02514 25252. (Access and Visa welcome).

Ram Electronics (Fleet) Ltd, 106 Fleet Road, Fleet, Hampshire GU13 8PA.

24 Hr despatch for credit cards and postal orders

Please send me:

_____ Spectrum Turbo Interface(s) at £22.95 + £1 p+p (overseas orders £3 p+p)

_____ Quickshot II Joystick(s) at £9.95
(Only when purchased with Turbo – normally £12.95 + £1 p+p)

I enclose cheque/postal order or charge my Access/Visa for: £_____

Name _____

Address _____

_____

_____ Tel _____

To: Ram Electronics (Fleet) Ltd, 106 Fleet Road, Fleet, Hampshire GU13 8PA.

RAM TURBO

Trade and export enquiries welcome.

48K SINCLAIR ZX SPECTRUM

£9.95

THE GREEN
ASHBY DE LA ZOUCH
LEICESTERSHIRE LE6 5JU

Now your Commodore 64 is a robot or a synth . It's processing words , painting pictures & doing maths in machine code . It's teaching you , taking you on an adventure & using its brains ...All because you've read a book.

Sunshine books make your Commodore mean more.

Start building your library today:

Use this order form to buy the best books available for your Commodore 64.
Please send me the books indicated on this form.

☐ I enclose a cheque/postal order for £_____, payable to Sunshine Books.
☐ Please charge my Access Card No._____
Signed:_____
Name:_____
Address:_____

☐ Please send me your free Sunshine Microcomputer Books catalogue.

Send this order form with your cheque or postal order to: Sunshine Books, 12/13 Little Newport Street, London WC2R 3LD.
Phone orders: call 01-437 4343 and charge to your Access | Barclaycard
Computer dealers: Ring our dealer enquiry line on 01-437 4343.

☐ **The Working Commodore 64 £5.95**
A library of practical subroutines.

☐ **Commodore 64 Machine Code Master £6.95**
A library of machine code routines.

☐ **Graphic Art for the Commodore 64 £5.95**
Techniques for high resolution graphics.

☐ **Commodore 64 Adventures £5.95**
A guide to writing and playing adventures.

☐ **Mathematics on the Commodore 64 £5.95**
Essential routines for programming.

☐ **Business Applications for the Commodore 64 £5.95**
Write your own business programs.

☐ **Advanced Programming Techniques on the Commodore 64 £5.95**
Powerful ideas and applications.

☐ **Programming for Education on the Commodore 64 £5.95**
A handbook for primary education.

☐ **Artificial Intelligence for the Commodore 64 £6.95**
Make your micro think.

☐ **DIY Robotics and Sensors for the Commodore 64 £6.95**
Practical projects for control applications.

☐ **Machine Code Graphics & Sound for the Commodore 64 £6.95**
Easy to load routines and ideas.

☐ **Machine Code Games Routines for the Commodore 64 £6.95**
A guide to creating top quality games.
Published June 1984

☐ **Building with Logo on the Commodore 64**
Creative use of the language.
Published May 1984

☐ **Commodore 64 Disk Companion £7.95**
Essential routines for the Commodore disk users. *Published May 1984*

In the heat of the night

***Alex Treacher's** program enables you to predict and calculate the rate of meteor showers*

I find that observing meteor showers, or shooting stars, can be the most satisfying form of astronomy. All you need is a deck-chair and warm clothing. (It gets quite chilly at 3am, even in the summer). To make accurate observations you will need a tape recorder or pen and paper to note what you see. Then, just sit back and watch!

The activity of a particular meteor shower — ie, meteors per hour — starts off at zero, increases, peaks, and then diminishes again. The date and time of these occurrences can be found in various publications, such as *The Astronomical Almanac*, and the *Handbook of the British Astronomical Association*, as they vary from year to year. The activity is measured by the Zenithal Hourly Rate (ZHR). If the radiant (ie, the point in the sky the meteors seem to be coming from) was directly overhead — at the zenith — and the weather conditions were perfect, the number of meteors observed every hour should come very close to the ZHR. Are all these conditions ever met? Not a chance.

Hence this program: working on average figures for the showers' rates, which strictly speaking ought to be updated every year, this program calculates the Expected Hourly Rate for the showers included in the program. I have excluded data on several minor showers, as they are often difficult to observe. To include these, their rates for each day should be put into the data for array *RT%* (lines 1440-1620), add the appropriate data between lines 1330 and 1420, and alter the day-number testing (lines 260-350) to recognise the appropriate dates, and to collect the data.

Some of the showers extend beyond the dates in the program, but as the ZHR for these days is less than five, the shower would hardly be noticeable. I have made the Ursids the exception to this rule because they are very poorly observed. They occur so close to Christmas that, even if the sky is clear, everyone is so full of bonhomie that meteors are the last thing on their mind!

I'm still working on the *Proc* to figure out if it's going to be cloudy! In the meantime, good observing.

Important Variables

Y Year
M Month
D Date
T Time
Daynum Number of day (1-366) that has been selected.
RT%() Rate for every day in year.
Strms Name of selected stream.
Fsts First day of activity (day/month)
Lsts Last day of activity (day/month)
Max Date of maximum activity
Mxzhr ZHR for above date
Rate ZHR for the selected day.
Ehr Activity expected for date and time selected
Ra Right Ascension of radiant (decimal)
Dec Declination of radiant (decimal)

Line Descriptions

180-210 User input: numerical input for all responses. Time should be in decimal form.
2630-350 Identifies which stream visible (if any) and selects correct data.
400 Puts an ending on the date of maximum.
430-510 Displays data.
1020-1040 If the rate for the selected date is zero, the program assumes that no shower is present.
1330-1420 Data for individual streams.
1440-160 Rate for each day of year.

Procedures

*Proc*dataload Reads lines 1440-1620 into array RT%.
*Proc*daynum Calculates how many days into year the selected date is. (Accounts for leap years.)
*Proc*alt_az Calculates elevation and bearing of the radiant. Line 860: Replace 0.0276 with −0.066 for every degree you are west of Greenwich.
Lines 900 and 930: Replace 51.52 by your own latitude (decimal).
*Proc*ehr Correction of Hourly Rate for altitude of radiant.

```
L.
   10 REM  METEOR VISIBILTY V1.5
   20 REM   84/8/1  A.T.
   30
   40 REM PROCalt-az originally written
   50 REM  for ZX81 by W. Cartwright
   60
   70
   80 *TV255
   90 MODE7
  100 VDU23,1,0;0;0;0;
  110 PRINTTAB(9,10)CHR$141"METEOR VISIB
ILITY"
  120 PRINTTAB(9)CHR$141"METEOR VISIBILI
TY"
  130 W=INKEY(300)
  140 PROCdataload
  150 REPEAT
  160 CLS
  170 VDU23,1,1;0;0;0;
  180 INPUT'"Year ",Y
  190 INPUT"Month ",M
  200 INPUT"Day ",D
  210 INPUT"Time ",T
  220 VDU23,1,0;0;0;0;
  230 PROCdaynum
  240 SS=DAYNUM
  250 CLS
  260 IFSS>1 AND SS<6 RESTORE1340:GOTO36
0
  270 IFSS>109 AND SS<115 RESTORE1350:GO
TO360
  280 IFSS>116 AND SS<137 RESTORE1360:GO
TO360
  290 IFSS>213 AND SS<229 RESTORE1370:GO
TO360
  300 IFSS>291 AND SS<298 RESTORE1380:GO
TO360
  310 IFSS>304 AND SS<313 RESTORE1390:GO
TO360
  320 IFSS>319 AND SS<324 RESTORE1400:GO
TO360
  330 IFSS>343 AND SS<350 RESTORE1410:GO
TO360
  340 IFSS>352 AND SS<358 RESTORE1420:GO
TO360
  350 IFSS>50RSS<110OR SS>114ORSS<117OR
SS>136OR SS<214OR SS>228OR SS<292OR SS>2
97 OR SS<305OR SS>312OR SS<320OR SS>3230
R SS<344OR SS>349OR SS<353OR SS>357 ORSS
=1 THEN1020
  360 READSTRM$,MAX,FST$,LST$,MXZHR,RA,D
EC
  370 PROCalt_az
  380 RATE=RT%(DAYNUM)
  390 PROCehr
  400 DT$="th":IFINT(MAX+.5)=1 DT$="st"
ELSE IFINT(MAX+.5)=2 DT$="nd" ELSE IFINT
(MAX+.5)=3 DT$="rd"
  410 CLS
  420 TT=20-(LEN(STRM$)/2)
  430 PRINTTAB(TT)STRM$
  440 PRINT
  450 PRINT"The shower extends from ";FS
T$;" to ";LST$
  460 PRINT'"The date of maximum is the
";MAX;DT$
  470 PRINT'"The ZHR at maximum is ";MXZ
HR
  480 PRINT'"The ZHR for today is ";RATE
  490 PRINT'"For ";T;" UT on ";D;"/";M
```

continued over the page

```
  500 PRINT''"The expected hourly rate is
 ";EHR
  510 PRINT'''''"Press any key to run a9
ain"
  520 A=GET
  530 UNTILFALSE
  540 END
  550
  560 DEFPROCehr
  570 IFALT>=66 EHR=RATE
  580 IFALT>=52 AND ALT<65 EHR=RATE/1.11
  590 IFALT>=43 AND ALT<51 EHR=RATE/1.25
  600 IFALT>=35 AND ALT<42 EHR=RATE/1.43
  610 IFALT>=27 AND ALT<34 EHR=RATE/1.67
  620 IFALT>=21 AND ALT<26 EHR=RATE/2.0
  630 IFALT>=15 AND ALT<20 EHR=RATE/2.5
  640 IFALT>=9 AND ALT<14 EHR=RATE/3.3
  650 IFALT>=3 AND ALT<8 EHR=RATE/5.0
  660 IFALT<3 EHR=RATE/10.0
  670 EHR=INT(EHR+0.5)
  680 ENDPROC
  690
  700 DEFPROCalt_az
  710 REM M=MONTH,D=DAY,T=HOUR
  720 REM RA=RA, DEC=DEC
  730 IFM>2 THEN 780
  740 B=M-1
  750 R=INT(B*63/2)
  760 DYS=R+D
  770 GOTO820
  780 A=M+1
  790 C=INT(A*306/10)
  800 H=C-63
  810 DYS=H+D
  820 REM*********DYS - DAYS
  830 A=DYS*0.065709
  840 B=A-17.377592
  850 S=T*1.002743
  860 LST=S+B-0.0276
  870 IFLST>24 LST=LST-24
  880 IFLST<0 LST=LST+24
  890 H=(LST-RA)*15
  900 ALT=(SIN(RAD(DEC))*SIN(RAD(51.52))
)+(COS(RAD(DEC))*COS(RAD(51.52))*COS(RAD
(H)))
  910 Q=DEG(ASN(ALT))
  920 ALT=Q
  930 AZ=(SIN(RAD(DEC))-(SIN(RAD(51.52))
*SIN(RAD(Q))))/(COS(RAD(51.52))*COS(RAD(
Q)))
  940 Z=DEG(ACS(AZ))
  950 W=SIN(RAD(H))
  960 IFW<0 AZ=Z
  970 IFW>0 AZ=360-Z
  980 ALT=INT(ALT+0.5)
  990 AZ=INT(AZ+0.5)
 1000 ENDPROC
 1010
 1020 REM error trap
 1030 PRINT''"There is no major shower o
n ";D;"/";M
 1040 PRINT'''"Press any key to run a9ai
n"
 1050 A=GET
 1060 UNTILFALSE
 1070
 1080 DEFPROCdaynum
 1090 YEAR=Y:MONTH=M:DAY=D
 1100 IFMONTH>2THEN1150
 1110 MO=MONTH-1
 1120 IFYEAR/4=INT(YEAR/4)THEN MO=MO*62
ELSE MO=MO*63
 1130 MO=INT(MO/2)
 1140 GOTO1180
 1150 MO=MONTH+1
 1160 MO=INT(MO*30.6)
 1170 IFYEAR/4=INT(YEAR/4)THEN MO=MO-62
ELSE MO=MO-63
 1180 MO=MO+DAY
 1190 DAYNUM=MO
 1200 IFYEAR/4=INT(YEAR/4) LPYR=TRUE ELS
E LPYR=FALSE
 1210 IFLPYR=TRUE AND M>2 DAYNUM=DAYNUM-
1
 1220 ENDPROC
 1230
 1240 DEFPROCdataload
 1250 DIMRT%(366)
 1260 RESTORE1440
 1270 FORDN%=1TO365
 1280 READRT%(DN%)
 1290 NEXT
 1300 ENDPROC
 1310
 1320
 1330 REM DATA:STREAM,MAX,1ST DAT,2ND DA
T,ZHR,RA,DEC
 1340 DATAQUADRANTIDS,4.25,1/1,6/1,80,15
.46,50
 1350 DATALYRIDS,22.6,19/4,25/4,15,18.13
,32
 1360 DATAETA AQUARIDS,6,24/4,20/5,40,22
.3,-1
 1370 DATAPERSEIDS,13,23/7,20/8,100,3.06
,58
 1380 DATAORIONIDS,21,16/10,26/10,20,6.4
,15
 1390 DATATAURIDS,3,20/10,30/11,12,3.73,
18
 1400 DATALEONIDS,18.1,15/11,20/11,10,10
.13,22
 1410 DATAGEMINIDS,14.2,7/12,15/12,60,7.
46,32
 1420 DATAURSIDS,23,17/12,24/12,5,14.46,
78
 1430
 1440 DATA0,20,40,60,50,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0
 1450 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0
 1460 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0
 1470 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0
 1480 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0
 1490 DATA0,0,0,0,0,0,0,0,0,5,11,14,9,5,
0,0,11,15,19,22
 1500 DATA26,29,32,36,40,38,35,32,29,26,
24,21,19,16,14,11,0,0,0,0
 1510 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0
 1520 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0
 1530 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0
 1540 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,5,6,
7,7.5,8.5,9,9.5
 1550 DATA14,18.5,25,40,90,38,21,13.5,0,
0,0,0,0,0,0,0,0,0,0,0
 1560 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0
 1570 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0
 1580 DATA0,0,0,0,0,0,0,0,0,0,0,12,16,20
,16,12,8,0,0,0
 1590 DATA0,0,0,0,10,11,12,11,11,11,10,1
0,0,0,0,0,0,0,0,4
 1600 DATA9,7,4,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0
 1610 DATA0,0,0,10,15,24,52,60,10,0,0,0,
5,7,10,12,6,0,0,0
 1620 DATA0,0,0,0,0
```

SUNARO SUPERSAVERS

SPECTRUM		CBM 64		BBC	
Monty Mole	5.80	Decathlon (Daley)	6.90	Frak	7.85
Star Trader	5.80	Monty Mole	6.95	Mr Wiz	6.95
Rapscallion	5.80	Potty Pigeon	6.95	Zalaga	7.85
Full Throttle	5.90	Merlin	6.25	Star Striker	6.95
Micro Olympics	4.95	Where's My Bones	6.10	Gisburnes Castle	6.95
Match Point	7.10	Astro Chase	7.85	Mini Office	5.25
Jet Set Willy	4.95	Flip Flop	7.85		
World Cup	5.80	Decathlon (Activ')	8.75	ELECTRON	
TLL	4.95	Wimbledon	6.95	Gisburnes Castle	6.95
Olympicon	4.95	Arabian Nights	6.10	Mr. Wiz	6.95
Mission 1	6.70	Beach Head	8.75	Hulk	6.95
Kosmic Kanga	4.95	Evil Dead	6.95	Blagger	6.95
Sabure Wulf	8.40	Football Manager	6.95		
Lords of Midnight	8.40	Encounter	8.75	ATARI	
Giants Revenge	4.95	Mission 1	7.85	Warloc	13.10
Jack/Beanstalk	4.95	Death Star Interceptor	8.75	Encounter	8.75
Mugsy	5.80	Beam Rider	8.75	Zaxxon	13.10
Frank N. Stein	4.95	hero	8.75	Blue Thunder	8.75
Antics	5.80	Pitfall	8.75	Stranded	8.75
Worse Things Happen	4.95	Mystic Mansion	7.85	Hulk	8.75

also Quickshot II joystick only £9.75 postage and VAT included. Send cheque/PO with order to:

SUNARO SOFTWARE (PCW3)
PO BOX 78, MACCLESFIELD, CHESHIRE, SK10 3PF

PRINTER BARGAINS

JUST PLUG IN AND GO

INTERFACE/CABLE VAT & CARR. INCLUDED

	QL	BBC	Spec	Vic 20/64
Seikosha **GP50A/S** 40cps 40 column	129	109	99	135
Seikosha **GP100A/AS/VC** 30-50cps	169	169	199	145
Seikosha **GP500A** 50cps Graphics	199	178	199	205
Seikosha **GP250X** 50cps Para & Ser	235	215	235	245
Seikosha **GP550A** 50cps Correspondence	247	229	247	255
Seikosha **GP700A** 7 Colour 50cps	365	347	365	370
Shinwa...**CP80** 80cps Friction/Tract	225	208	225	235
Canon....**PW1080A** 160cps-Draft 27cps-NLQ	339	325	339	348
Epson....**RX80T** 80cps Traction	269	257	269	288
Epson....**RX80FT** 80cps Friction/Traction	299	287	299	309
Daisy step 2000∝ **CPS** Daisy Wheel	290	255	275	285
Intertace/cable Miracle Syst. Etc.	39	12	39	45

Monitors Philips **V7001 — £85** Fidelity **CM14 — £219** (no cable)
GP700A (Demo models)
2 only, 12 months guarantee 290 275 290 299

STRONG COMPUTER SYSTEMS
Bryn Cottage, Peniel, Carmarthen, Dyfed
Telephone: 0267 231246 for full price list & specs.

HIGH SPEED

commodore

COMMODORE 64 owners, at last the long wait is over — **FASTBACK** allows multipart software to load around ten times faster and run independently of the utility. For example 'The Hobbit' loads in 150 seconds with **FASTBACK.**
Supplied on tape with full instructions
ONLY £9.95

AMSTRAD

SPEEDMASTER is here. Allows choice of save speed. Approx. 2 × faster.
ONLY £7.95

TAPE TO DISK TRANSFER UTILITIES

Transfer games etc. to disk. Supplied on tape with full instructions for:—

BBC £9.95
ATARI (All models) £9.95

COMMODORE 64
NEW IMPROVED VERSION **DISCO**
No user knowledge required. Still only £9.95
We guarantee this is the best available.

All prices include VAT, Post & Packing. Cheques, P.O. or Phone your Card Number to:

EVESHAM MICRO CENTRE

Bridge St, Evesham, Worcestershire
Tel: 0386 49641
NEW SHOP NOW OPEN – Micro Centre,
1756 Pershore Rd, Cotteridge, Birmingham Tel: 021-458 4564
TRADE AND OVERSEAS ORDERS WELCOME

OFFERS VALID TILL 30th SEPTEMBER ONLY

GOODBYTE

SPECTRUM

GAME	RRP	OUR PRICE
HOBBIT**	14·95	9·99
HULK	9·95	7·99
MUGSY	6·95	5·50
SABRE WULF	9·95	7·99
LORDS OF MIDNIGHT	9·95	6·99
ANTICS	6·95	4·99
JACK & BEANSTALK	5·95	4·50
MICRO OLYMPICS	5·95	4·75
PSYTRON	7·95	5·99
CODENAME MAT	6·95	4·99
HARRIER ATTACK	5·95	4·75
SCUBA DIVE	6·95	5·25
GILLIGANS GOLD	5·90	4·50
OTHER OCEAN ONLY	5·90	4·50
JET SET WILLY	5·95	4·50
MANIC MINER	5·95	4·99
GLUG GLUG	5·95	4·50
BLUE THUNDER	5·95	4·50
WAR OF THE WORLDS	7·95	5·99
TORNADO LOW LEVEL	5·95	4·60
TRASHMAN	5·95	4·40
ALL IMAGINE	5·50	2·99
FIGHTER PILOT	7·95	5·99
NIGHT GUNNER	6·95	5·25
QUICKSILVA TITLES (6·95 TITLES ONLY)	6·95	4·99
PENETRATOR	6·95	5·50
CAESAR THE CAT	6·95	5·75
MILLIONAIRE	5·50	4·25
WORLD CUP	6·95	5·99
CLASSIC ADVENTURE	6·95	5·50
VALHALLA	14·95	9·99
FOOTBALL MANAGER	6·95	5·25
POOL**	5·95	3·99
H.U.R.G	14·95	9·99
BIRDS & THE BEES	5·95	4·75
MANIC MINER (BUG BYTE)	5·95	4·75
FULL THROTTLE	6·95	5·75
MATCHPOINT	7·95	6·75
THE CASTLE	6·95	5·50

COMMODORE 64

GAME	RRP	OUR PRICE
HOBBIT**	14·95	9·99
TALES OF ARABIAN NIGHTS	7·00	5·50
DALEY THOMPSON DECATHLON	7·95	6·50
LOCO	7·95	5·50
SHEEP IN SPACE	7·50	5·99
BEACH HEAD	9·95	7·75
ASTRO CHASE	8·95	7·75
ALL LAMASOFT	7·50	5·25
DECATHLON	9·99	7·95
MICRO OLYMPICS	5·95	4·75
FOOTBALL MANAGER	7·95	6·75
HARRIER ATTACK	6·95	5·50
SCUBA DIVE	6·95	5·50
HOUSE OF USHER	6·95	5·70
HUNCHBACK 64	6·90	4·99
PIT FALL I	9·99	7·95
PIT FALL II	9·99	7·95
ALL ANIROG AT	7·95	5·99
ALL INTERCEPTOR AT	7·00	5·50
SOLO FLIGHT	14·95	11·00
COLOSSUS CHESS	9·95	7·50
TRASHMAN 64	7·95	6·50
VALHALLA	14·95	10·99
BLUE THUNDER	6·95	5·75

ALL PRICES INCLUDE P&P
QUICKSHOT II ONLY £8.99
CLUBS PLEASE NOTE IF YOUR ORDER EXCEEDS £50 YOU GET 10% FURTHER DISCOUNT
SEND CHEQUES/P.O. TO **GOODBYTE PC3** **94 LEATHER LANE, LONDON EC1**
PLEASE STATE WHICH MICRO

VIC 20

GAME	RRP	OUR PRICE
ALL INTERCEPTOR AT	6·00	4·50
CHARIOT RACE	6·95	5·25
ALL ANIROG AT	7·95	5·99
WIZARD & THE PRINCESS	5·95	4·75
PINBALL WIZARD	6·95	5·99
JET PAC	5·50	4·75
COSMOIDS	6·95	5·50
ANOTHER VIC IN THE WALL	6·95	5·50
CHESS (16K)	7·95	6·95

BBC GAMES

GAME	RRP	OUR PRICE
OLD FATHER TIME	9·50	7·50
CITY DEFENCE	7·50	5·95
MUSIC SYNTHESISER	9·50	7·50
TWIN KINGDOM VALLEY	9·50	7·50
HULK	7·95	6·50
AVIATOR	14·95	11·00
BLAGGER	7·95	6·95
JCB DIGGER	9·95	8·50
HOBBIT	14·95	9·99
VOODOO CASTLE	9·95	8·50

ELECTRON GAMES

GAME	RRP	OUR PRICE
TWIN KINGDOM VALLEY	9·50	7·50
HULK	7·95	6·50
ALL ACORNSOFT	9·20	7·50
CHUCKIE EGG	7·90	6·50
BLAGGER	7·95	6·50

ORIC/ATMOS

GAME	RRP	OUR PRICE
HARRIER ATTACK	6·95	5·50
SCUBA DIVE	6·95	5·50
HOBBIT	14·95	9·99
HUNCHBACK	6·90	5·50
MR WHIMPY	6·90	5·50

And to follow . . .

***Adrian Warman** continues with the second part of his menu program*

This week we finish off the assembly listing of the program and also present a Basic loader for those without assemblers.

How the Program works (cont from last week.)

70-73. Finds the value for *ystart*. This value is also placed in *row*, which is used to keep track of which screen row the selection cursor is currently on.

74-80. Finds the value for *xend*. Ensures that it is greater than *ystart*.

81-82. Finds the current position of the text screen, and adds this to the *posn* pointer to the menu position.

86-89. Posn is the master value of the screen position. Knowing the current row that the selection cursor is on, it is necessary to convert this to a memory location, stored in *from*.

90-99. Row has the screen row that the selection cursor is on. Using this, it calculates how many screen rows to move down to show the current position of the selection cursor.

100. Highlights this menu item.

101-103. Waits for any key-press. When found, it puts the key into *key*.

104. Removes the highlight from the menu item.

106-108. Was the key *F1*. If not goes on to check for a different key.

109-112. Moves up by the number of rows in *skip*.

113-114. If the cursor would be off the top of the screen, goes and tests to see if *wrap* is available.

115-116. Is the cursor past the top of the menu? If so, branches to the end of main loop.

117-124. The cursor is now too high. If *wrap* is allowed, sets cursor position to the bottom menu item — otherwise puts cursor on the top menu item.

126-127. Was the key *F7*. If not it ignores.

128-131. Moves down to next menu item.

132-134. If the cursor is still in the menu item rows, carries on to the end of the main program loop.

135-141. The cursor is past the end of the menu. Depending on the value of *wrap*, moves the cursor to the top or bottom of the menu column.

143-146. Makes a final check. Was the key *Return*? If not, goes and repeats the program loop until selection is made. Otherwise, finish program.

148-150. Should the selected item remain highlighted? If so, sets highlight again.

152-159. Row contains the screen row of the selection cursor. Uses this to calculate which menu item this was. The answer is put into the *Y* register.

160-161. Loads *A* with zero, in order to return the correct value. Finally it returns to Basic with the menu item number.

166-167. Produces the error message.

171-177. Finds the next parameter in the command line. Routine *getbyt* evaluates and returns a value in the *X* register. This is compared with the maximum value allowed. If it is OK, it returns; otherwise it produces an error.

181-187. Highlights menu item. *From* has the start address of the menu item on the screen. *Width* has the maximum number of characters to highlight.

In practice, the routine is very easy to use; but in order to make it as flexible as possible, the calling parameters must be correspondingly powerful. As with most things, the best way to learn how to use the routine is first to run the example program, and then modify it for yourself.

```
1000 REM BASIC LOADER FOR MENU SELECTION PROGRAM.
1010 :
1020 REM BY A.WARMAN
1030 :
1040 ADDRESS=49152
1050 SUM=0
1060 :
1070 FOR LOC=ADDRESS TO ADDRESS+273
1080  READ DATUM
1090  POKE LOC,DATUM
1100  SUM=SUM+DATUM
1110 NEXT LOC
1120 :
1130 IF SUM<>34549 THEN PRINT "SUM ERROR."
1140 :
1150 DATA 169, 14,141, 17,  3,169,192,141, 18,  3, 96, 76,238,192,169,  2
1160 DATA  32,243,192,134,139, 32,243,192,134,140,169,  6, 32,243,192,134
1170 DATA 141,224,  0,240,230,169, 40, 32,243,192,134,251,142, 60,  3, 32
1180 DATA 243,192,134,252,138, 56,229,251,141, 62,  3,240,206, 48,204,169
1190 DATA  25, 32,243,192,134,253,134,142, 32,243,192,134,254,224,  0,240
1200 DATA 186,202,228,253,144,181,173,136,  2,141, 61,  3,173, 60,  3,133
1210 DATA  20,173, 61,  3,133, 21,166,142,240, 12,169, 40, 24,101, 20,133
1220 DATA  20,144,  2,230, 21,202,208,242, 32,  5,193, 32,228,255,240,251
1230 DATA 141, 63,  3, 32,  5,193,173, 63,  3,201,133,208, 31,165,142, 56
1240 DATA 229,141,133,142,201,240,176,  4,197,253,176, 47,165,140,208,  6
1250 DATA 165,253,133,142, 16, 37,165,254,133,142, 16, 31,201,136,208, 27
1260 DATA 165,142, 24,101,141,133,142,197,254,240, 16,144, 14,165,140,208
1270 DATA   6,165,254,133,142, 16,  4,165,253,133,142,173, 63,  3,201, 13
1280 DATA 240,  3, 76, 92,192,165,139,240,  3, 32,  5,193,165,142, 56,229
1290 DATA 253,160,  0,200, 56,229,141, 16,250,169,  0,108,  5,  0,162, 14
1300 DATA  76, 55,164,141, 63,  3, 32,253,174, 32,158,183,236, 63,  3,176
1310 DATA 237,173, 63,  3, 96,172, 62,  3,177, 20, 73,128,145, 20,136, 16
1320 DATA 247,96
```

```
00070  c03f  a9 19     lda   #$19
00071  c041  20 f3 c0  jsr   getval        ;what is ystart?
00072  c044  86 fd     stx   ystart
00073  c046  86 8e     stx   row
00074  c048  20 f3 c0  jsr   getval        ;what is yend?
00075  c04b  86 fe     stx   yend
00076  c04d  e0 00     cpx   #$00
00077  c04f  f0 ba     beq   badnum
00078  c051  ca        dex                 ;is yend bigger than ystart?
00079  c052  e4 fd     cpx   ystart
00080  c054  90 b5     bcc   badnum
00081  c056  ad 88 02  lda   hibase
00082  c059  8d 3d 03  sta   posn+1
00083  c05c            ;
00084  c05c            ;main program loop.
00085  c05c            ;
00086  c05c  ad 3c 03  loop  lda posn      ;find menu position.
00087  c05f  85 14     sta   from
00088  c061  ad 3d 03  lda   posn+1
00089  c064  85 15     sta   from+1
00090  c066  a6 8e     ldx   row           ;move to correct row.
00091  c068  f0 0c     beq   lpend
00092  c06a  a9 28     calclp lda #$28     ;move down by one row.
00093  c06c  18        clc
00094  c06d  65 14     adc   from
00095  c06f  85 14     sta   from
00096  c071  90 02     bcc   clcend
00097  c073  e6 15     inc   from+1
00098  c075  ca        clcend dex          ;..until at correct row,
00099  c076  d0 f2     lpend  bne calclp
00100  c078  20 05 c1  jsr   change        ;reverse current row.
00101  c07b  20 e4 ff  getchr jsr getin    ;find a command key.
00102  c07e  f0 fb     beq   getchr
00103  c080  8d 3f 03  sta   key
00104  c083  20 05 c1  jsr   change        ;restore current row.
00105  c086            ;
00106  c086  ad 3f 03  lda   key           ;test command key.
00107  c089  c9 85     cmp   #$85          ;is it f1?
00108  c08b  d0 1f     bne   notup
00109  c08d  a5 8e     lda   row           ;move up one row.
00110  c08f  38        sec
00111  c090  e5 8d     sbc   skip
00112  c092  85 8e     sta   row
00113  c094  c9 f0     cmp   #$f0
00114  c096  b0 04     bcs   chkwrp
00115  c098  c5 fd     cmp   ystart        ;past the top?
00116  c09a  b0 2f     bcs   keydon
00117  c09c  a5 8c     chkwrp lda wrap     ;yes, so wrap or not?
00118  c09e  d0 06     bne   wrapup
00119  c0a0  a5 fd     lda   ystart        ;no wrap, so move to top row.
00120  c0a2  85 8e     sta   row
00121  c0a4  10 25     bpl   keydon
00122  c0a6  a5 fe     wrapup lda yend     ;wrap, so move to bottom.
00123  c0a8  85 8e     sta   row
00124  c0aa  10 1f     bpl   keydon
00125  c0ac            ;
00126  c0ac  c9 88     notup  cmp #$88     ;is command key f7?
00127  c0ae  d0 1b     bne   keydon
00128  c0b0  a5 8e     lda   row           ;move down one row.
00129  c0b2  18        clc
00130  c0b3  65 8d     adc   skip
00131  c0b5  85 8e     sta   row
00132  c0b7  c5 fe     cmp   yend          ;past bottom?
00133  c0b9  f0 10     beq   keydon
00134  c0bb  90 0e     bcc   keydon
00135  c0bd  a5 8c     lda   wrap          ;yes, is there wrap?
00136  c0bf  d0 06     bne   wrapdn
00137  c0c1  a5 fe     lda   yend          ;no, so move to bottom.
00138  c0c3  85 8e     sta   row
00139  c0c5  10 04     bpl   keydon
00140  c0c7  a5 fd     wrapdn lda ystart   ;move to top.
00141  c0c9  85 8e     sta   row
00142  c0cb            ;
00143  c0cb  ad 3f 03  keydon lda key      ;end of movement.
00144  c0ce  c9 0d     cmp   #$0d          ;is it end of selection?
00145  c0d0  f0 03     beq   exit
00146  c0d2  4c 5c c0  jmp   loop
00147  c0d5            ;
00148  c0d5  a5 8b     exit   lda retain   ;keep highlight?
00149  c0d7  f0 03     beq   noretn
00150  c0d9  20 05 c1  jsr   change
00151  c0dc            ;
00152  c0dc  a5 8e     noretn lda row      ;calculate return value.
00153  c0de  38        sec
00154  c0df  e5 fd     sbc   ystart
00155  c0e1  a0 00     ldy   #$00
00156  c0e3  c8        rsloop iny
00157  c0e4  38        sec
00158  c0e5  e5 8d     sbc   skip
00159  c0e7  10 fa     bpl   rsloop
00160  c0e9  a9 00     lda   #$00
00161  c0eb  6c 05 00  jmp   ($0005)
```

```
00162  c0ee                    ;
00163  c0ee                    ;
00164  c0ee                    ;error routine.
00165  c0ee                    ;
00166  c0ee  a2 0e             badval ldx #$0e         ;show illegal value error.
00167  c0f0  4c 37 a4          jmp    error
00168  c0f3                    ;
00169  c0f3                    ;find next value routine.
00170  c0f3                    ;
00171  c0f3  8d 3f 03          getval sta temp         ;get value, cannot exceed a
00172  c0f6  20 fd ae          jsr    tstcom
00173  c0f9  20 9e b7          jsr    getbyt           ;get value in range 0-255.
00174  c0fc  ec 3f 03          cpx    temp
00175  c0ff  b0 ed             bcs    badval
00176  c101  ad 3f 03          lda    temp
00177  c104  60                rts
00178  c105                    ;
00179  c105                    ;reverse characters on screen.
00180  c105                    ;
00181  c105  ac 3e 03          change ldy width
00182  c108  b1 14             chloop lda (from),y
00183  c10a  49 80             eor    #%10000000
00184  c10c  91 14             sta    (from),y
00185  c10e  88                dey
00186  c10f  10 f7             bpl    chloop
00187  c111  60                rts
00188  c112                    ;
00189  c112                    .end
errors = 00000

symbol table

symbol value
 badnum   c00b    badval   c0ee    calclp   c06a    change   c105
 chkwrp   c09c    chloop   c108    clcend   c075    error    a437
 exit     c0d5    from     0014    getbyt   b79e    getchr   c07b
 getin    ffe4    getval   c0f3    hibase   0288    init     c000
 key      033f    keydon   c0cb    loop     c05c    lpend    c076
 noretn   c0dc    notup    c0ac    posn     033c    retain   008b
 row      008e    rsloop   c0e3    skip     008d    start    c00e
 temp     033f    tstcom   aefd    usr      0311    width    033e
 wrap     008c    wrapdn   c0c7    wrapup   c0a6    xend     00fc
 xstart   00fb    yend     00fe    ystart   00fd
```


You've got your QL hardware. You've got your Psion software.

Now get your Sunshine book.

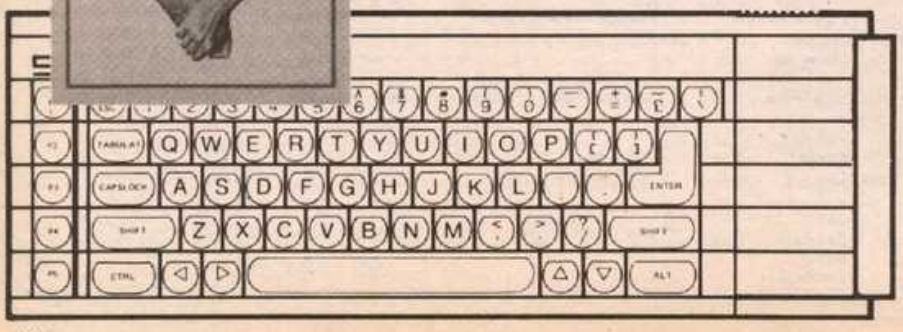
SUNSHINE

Just released from Sunshine is the latest book from the highly acclaimed QL QLassics series – and it's called *Quill, Easel, Archive & Abacus on the Sinclair QL.* All these packages, which are included with every QL sold, are recognised as powerful in their own right, but when working together with one another, they become highly effective problem-solving tools for business.

Alison McCallum-Varey's book introduces you to all the four packages, but, most importantly, shows you exactly how to run them as a complete system.

This book, essential for every QL Owner, will expand the day-to-day use of your QL, letting you run Quill and Archive in tandem for instance, and then outputting the results for graphic interpretation by the Easel package.

If you've Quill, Easel, Archive and Abacus on your Sinclair QL, then you need *Quill, Easel, Archive and Abacus on the Sinclair QL.*



Please send me Quill, Easel, Archive & Abacus on the Sinclair QL at £6.95 plus 50p p&p. I enclose a cheque/postal order for £..... payable to Sunshine Books.

☐ Please charge my Visa/Access card No. .....

valid from ..... expires end: .....

Signed: .....

Name: .....

Address: .....

.....

Send to: Sunshine Books, 12/13 Little Newport Street, London WC2R 3LD. Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and all good bookshops. Dealer enquiries: 01-437 4343.

commodore HORIZONS

BRITAIN'S PREMIER COMMODORE MAGAZINE NOW HAS AN A.B.C. CERTIFICATION

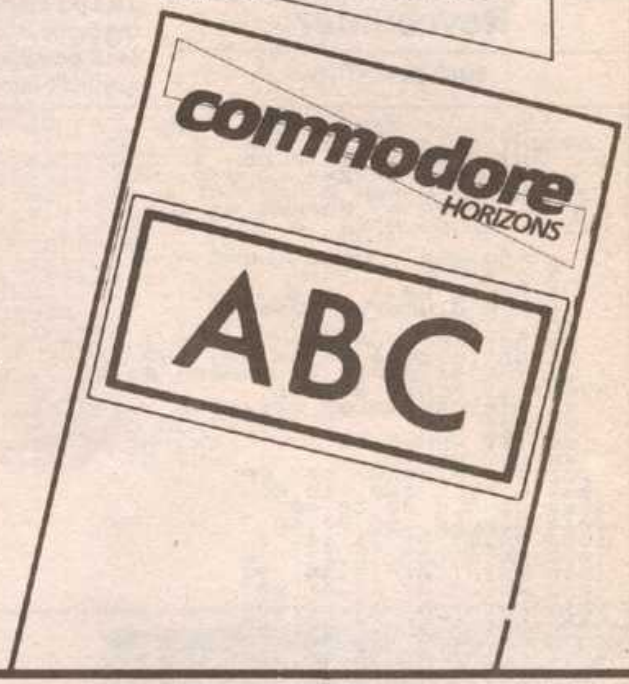
51,972 JAN-JUNE 1984 (ABC)

It's an independent, audited figure that you'll find unchallenged amongst our competition. We've achieved it through quality. Each month, Commodore Horizons presents to its readers, a balanced range of programs, reviews, articles, profiles, letters and news.

Combine this with a monthly prize competition and an innovative discount club for readers, and you'll see why we've become Britain's No. 1 support magazine for one of the most popular range of computers.

There need be no more guesswork, confusion or doubt — with a page cost per thousand of £6.63 there's simply no better way to reach Commodore enthusiasts, and that's ABC guaranteed.

Contact Jeremy Kite on 01-437-4343 right away for further media information.



SUNSHINE

Commodore Horizons
12/13 Little Newport St.
London WC2 3LD

Spectrum 48K

Historical Wargaming

AUSTERLITZ £9.50

This game is a re-creation of Napoleons famous victory at Austerlitz. 'You are Napoleon'
The computer provides a highly sophisticated opponent with 90% of the program written in machine code.
All the mechanics of wargaming, such as movement, combat, terrain effects, reports etc., are taken care of by the computer. The game is for one player only with 3 levels of difficulty and is played on a physical map of the battlefield.

PACIFIC WAR £6.00
MIDWAY £5.25

Refight the aircraft carrier battles of World War 2. The player controls the American forces, your computer the Japanese. Full screen display of task forces and aircraft movement. Includes airsearches, airstrikes, fighter defence of ones own carriers and allows the player to control the detailed activities of each aircraft carrier from within its own status display.

Cheques or Postal Orders to:—
K W SOFTWARE
155 Ringinglow Rd., Sheffield S11 7PS

Subscribe to Popular Computing Weekly

I would like to subscribe to *Popular Computing Weekly*.
Please start my subscription from the ..... issue

UK Addresses ☐ 26 issues at **£18.70** ☐ 52 issues at **£19.95**
Overseas Addresses ☐ 26 issues at **£18.70** ☐ 52 issues at **£37.40**
Please tick relevant box
I enclose my cheque to *Popular Computing Weekly* for

Name .....

Address .....

.....

.....

Please send this form, and cheque, to *Popular Computing Weekly*, Subscription Dept. 12-13 Little Newport Street, London WC2R 3LD.

COULD YOU TEACH BASIC?

If you can write your own programs in BASIC and can talk to people then YOU CAN TEACH with the PROTOS System (c) The PROTOS System contains all the information you need: Organisers Manual, Tutors manual, full lecture notes, handouts, visual aid guide, how to advertise ... and a FREE back-up service by phone.

The PROTOS System costs are covered by just 3 students at home ... but is designed for up to 40.

For more details and an application form write NOW to

PROTOS

Dept. PCW, The Computer Group, Oaklea, Goldhanger Road, Maldon, Essex CM9 7QU or ring 0621-58091 NOW.

POPULAR Computing WEEKLY Back Issues

Almost all the copies of **PCW** that you missed can still be bought as back issues for only 50p, including postage and packing.

An **Index** of the contents of the 36 issues published in 1982 is now available from the Publishers for only £1.20. It includes full details of all the programs, routines, reviews and news that you might have missed.

Please send me the following back issues at 50p each:

Total £

Please send me a copy of the 1983 PCW Index at £1.20 ☐
I enclose a cheque postal order for £

Name

Address

Please return to Back Issues, PCW, 12-13 Little Newport Street, London WC2R 3LD.

Open Forum

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed.

Revcounter

on Spectrum

This program simulates a car — the idea of the game is to accelerate to 90 M.P.H. in the least possible revs. To help you, two gears are built into the car. If you reach 90 your driving skill will be rated.

Program notes

1-21	Program start
22-40	Variables start
900-1100	Screen set up.
1113-3000	Game working out.
2999-4080	End reports
8005-8050	New game option
9000-9100	Introduction and instruction

To save the program *Save* "REVCOUNTER" *Line* 1.

```
   1 CLS : FLASH 0: CLS : INK 6:
 BRIGHT 1: PAPER 0: BORDER 0: CL
S : PRINT AT 10,6; FLASH 1;"STOP
 THE TAPE": FOR Z=0 TO 350: NEXT
 Z: INK 6: PAPER 0: BRIGHT 1: FL
ASH 0: PAPER 0: BORDER 0: CLS :
PRINT "REVCOUNTER  D.WESTBY 1984
"
   2 FOR A=0 TO 350: NEXT A
   3 CLS
   4 PAUSE 50
  10 REM D.WESTBY 1984
  15 LET G=1
  20 REM REVCOUNTER
  21 GO TO 9000
  22 INK 6: PAPER 0: BORDER 0: B
RIGHT 1: FLASH 0: CLS
  24 REM VARIABLES SET UP
  25 LET G=0
  30 LET RPM=0
  40 LET MPH=0
 900 REM DISPLAY SET UP
 999 CIRCLE 120,110,20
1000 CIRCLE 60,50,40
1010 CIRCLE 160,50,40
1020 PRINT AT 11,10;"0"
1030 PRINT AT 15,13;"30"
1040 PRINT AT 19,10;"60"
1050 PRINT AT 15,6;"90"
1060 PRINT AT 11,20;"0"
1070 PRINT AT 15,23;"20"
1080 PRINT AT 19,20;"40"
1090 PRINT AT 15,15;"60"
1100 PRINT AT 13,9;"MPH"
1110 PRINT AT 13,19;"RPM";AT 14,
18;"*100"
1113 REM MAIN PART
1115 IF RPM<0 THEN FOR N=0 TO 75
: NEXT N: CLS : PRINT "THE CAR C
ONKED OUT BECAUSE YOU  CHANGED G
EAR TOO EARLY!!": FOR A=0 TO 350
: NEXT A: GO TO 4040
1117 FOR Z=-40 TO +50
1120 IF G=1 THEN PRINT AT 8,13;
INK 7; INVERSE 1; PAPER 0;"1"
1125 PRINT AT 0,0;"SPEED:";MPH;A
T 0,11;"REVS PER MIN:";RPM*100:
IF INKEY$="9" THEN LET RPM=RPM+4
: BEEP .05,Z
1126 PRINT AT 6,13;"GEAR"
1127 PRINT AT 8,13;"1";AT 8,15;"
2";AT 7,15;"0": IF G=0 THEN PRIN
T AT 7,15; INK 7; INVERSE 1;"0"
1128 IF G=1 THEN PRINT AT 8,13;
INK 7; INVERSE 1;"1"
1129 IF G=2 THEN PRINT AT 8,16;
INK 7; INVERSE 1;"2"
1130 IF RPM=0 THEN PRINT AT 11,2
0; INVERSE 1; INK 7;"0"
1140 IF INKEY$="1" THEN LET G=1
: BEEP .06,2
1145 IF INKEY$="2" THEN LET RPM=
RPM-30: LET G=2: BEEP .06,4
1150 IF INKEY$="9" THEN LET RPM=
RPM+6.25: BEEP .05,Z
1155 IF INKEY$="9" THEN LET MPH=
MPH+4
1156 PRINT AT 0,6;MPH
1160 IF RPM=20 THEN PRINT AT 15,
23; INK 7; INVERSE 1;"20"
1170 IF MPH=30 THEN PRINT INK 7;
 INVERSE 1;AT 15,13;"30"
1175 IF MPH=90 OR MPH>90 THEN FO
R N=0 TO 200: NEXT N: GO TO 3000
1176 PRINT AT 0,6;MPH
1180 IF MPH=60 THEN PRINT AT 19,
10; INK 7; INVERSE 1;"60"
1190 IF RPM=40 THEN PRINT AT 19,
20; INK 7; INVERSE 1;"40"
1200 IF MPH=90 THEN GO TO 3000
1210 IF RPM=66 OR RPM>66 THEN PR
INT AT 15,6; INVERSE 1; INK 7;"6
0": PRINT AT 4,7; INK 6; FLASH 1
;"PLAY ABOUT WITH THE GEARS"
1215 IF RPM<66 THEN PRINT AT 4,0
```

Microradio

GW6JJN

Clickety-click

This column tries to keep up with the latest in computer and communications technology. This none-too-easy task will become much more difficult when new legislation and the privatisation of British Telecom come into being very soon.

Some of you are already interested in packet radio and data packet switching techniques. Commercial systems like BT and Mercury who use these systems already on a vast scale have taken the technology a long way towards the situation where it is now possible to transmit, accurately, vast amounts of data almost anywhere in the world. Packet switching techniques make these systems fully interactive so that just as you can play a computer game in real time with an opponent across the globe linked by a satellite, so can hundreds of people be involved in an interactive situation or game within the UK.

If this were just the Prestel system, that would be one thing but it has already gone much further, particularly in the United States. There, it is possible to do all your shopping, message sending, financial dealing, responding to your favourite soap opera and even your daily work without even getting out of bed.

I suppose that there are some who may think that this sounds like heaven, but there's no accounting for taste.

Back in 1982, the British government agreed in principle to a new, perhaps inevitable idea, called Value Added Networks or VANs for short. What this means is that following privatisation, data networks like Mercury and British Telecom will have competition from third party carriers who will be licensed to carry traffic as long as there is added value, or something special about the traffic. BT and Mercury will still be the prime normal carriers but the systems with a VANs licence will be operating the 'special' systems. Some are already in existence carrying data for the Midland Bank and various Building Societies among others.

Proposed VANs systems involve the interactive use of data systems for the public, some in conjunction with cable television, which will provide instant opinion polls in which millions of people can take part from their own homes. Imagine the interminable panel games on the cable networks with a million or so contestants.

One idea for a VAN that has already been floated is the uniquely British game of *Bingo*. Packet switching operates so quickly that Bingo is believed to be feasible on a grand scale. Recent Bingo games in national newspapers have shown that there need be no limit to the number of players. It is hard to say where it might end . . . was that clickety-click or unlucky for some . . ?

Ray Berry GW6JJN

This series of articles is designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share, or topics that you would like to see covered, write to: Ray Berry, Microradio, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

```
;"
1230 PRINT AT 0,6;MPH
2000 GO TO 1115
2999 REM END REPORTS
3000 CLS : PRINT "YOU REACHED 90
 MPH"
3001 PRINT "YOUR REVS WERE:";RPM
*100
3002 PRINT INVERSE 1;"D.WESTBY F
EV COUNTING"
4000 FOR A=0 TO 250: NEXT A
4020 IF RPM=40 OR RPM>40 AND RPM
<70 THEN PRINT "YOU REVS WERE AV
ERAGE SO YOU AREAN AVERAGE DRIVE
R"
4025 IF RPM=66 OR RPM>66 THEN PR
INT "YOU ARE A PATHETIC DRIVER.
     YOUR REVS WERE FAR TOO HIGH
     I ADVISE YOU TO TRY AGAIN"
4030 IF RPM<39 OR RPM=39 THEN PR
INT "EXCELLENT!!
     YOU KEPT THE REVS DOWN SUPE
RLY WHICH MEANS YOU ARE A TOP C
LASS DRIVER.
     WELL DONE!!"
4050 FOR N=0 TO 600: NEXT N
8005 REM NEW GAME?
8010 CLS : PRINT AT 9,0;"FOR ANO
THER GAME INPUT 1 OR TO  STOP TH
EN INPUT 2!!"
8020 INPUT "YOUR DECISION";Q
8030 IF Q=1 THEN CLS : GO TO 23
8040 IF Q=2 THEN STOP
8050 IF Q>2 OR Q<1 THEN GO TO 80
10
9000 INK 6: LET A$="REVCOUNTER":
 PRINT AT 21,11;A$: FOR F=1 TO 1
0: FOR G=20 TO 0 STEP -1: BEEP .
004,F*2+20: PRINT AT G,F+10;A$(F
): PRINT AT G+1,F+10;"": NEXT G: NEXT F
9005 FOR A=0 TO 21: PRINT AT A,0
;"*": PRINT AT A,31;"*": BEEP .0
1,A: NEXT A: FOR B=0 TO 31: PRIN
T AT 0,B;"*": PRINT AT 21,B;"*":
 BEEP .01,B: NEXT B
9010 FOR F=0 TO 30: BEEP .04,3:
PRINT INK 5;AT 2,F;"
DAVE  WESTBY": NEXT F: PRINT AT
8,31;"*"
9013 PRINT AT 16,5;: INK 6;"FOR
THE 48K ZX SPECTRUM"
9015 PRINT AT 3,0;"*": PRINT AT
4,0;"*": PRINT AT 3,0;"*"
9020 PRINT AT 10,11; INK 7;" PRE
SENTS ": FOR N=0 TO 59: BEEP .00
5,N: NEXT N: FOR N=59 TO 0 STEP
-1: BEEP .005,N: NEXT N
9030 FOR N=0 TO 175: NEXT N
9040 BEEP .1,8: BEEP .1,4: BEEP
.1,1: BEEP .1,6: BEEP .1,8:
9050 CLS : PRINT INK 6;"
  REVCOUNTER";  PRINT  "
9060 PAUSE 30: PRINT AT 3,3;"Rev
counter is a simulation of a car
.The idea of the game is  to  ac
cellerate to 90 MPH in the  le
ast possible revs."
9070 PRINT : INK 6: PRINT "  To
 control the car you use  the f
ollowing keys:-": PRINT : PRINT
INK 7;"To accellerate press";" IN
VERSE 1;" "0"": PRINT : PRINT "T
o change into first gear press";
 INVERSE 1;AT 15,14;" "1"": PRINT
 : PRINT "To change into second
gear press"; INVERSE 1;AT 19,14,
" "2"."
9080 PRINT AT 21,6; FLASH 1;"HIT
 SPACE TO CONTINUE!"
9090 IF INKEY$=" " THEN GO TO 22
9100 GO TO 9090
```

Revcounter
by David Westby

Bird bait

Superior Software of Leeds have lived up to their name and released a couple of high quality, if unoriginal, arcade copies for the BBC. *Star Striker* is a version of the post-Galaxion space shoot-em-up usually called *Moon Cresta*. The colourful aliens burble menacingly, swirl, split into two when shot and even fly up beneath you just when you thought it was safe to stop dodging. Asteroids and fireballs add to the difficulty but as a consolation careful docking of the three-part space ship can eventually provide you with a mega-craft capable of firing several shots at once and wiping out aliens at a cracking rate.

Mr Wiz is an almost perfect copy of *Mr Do* — the oddly named but popular arcade game where the central character, who looks a little like Andy Pandy in the original, digs a tunnel to eat cherries. Chasing monsters can be squashed by dropping apples onto them or by throwing crystal balls. Bright colours, attractive animation and continuous music (fortunately a feature that is becoming more common on machines like the BBC and CBM 64 that have excellent sound facilities) make this game a winner.

Mr Do has since reappeared in the arcades in two further arcade games. In one, the name of which escapes me, he has to climb all over a carnival roller coaster avoiding the cars. The second, called *Mr Do's Castle*, is probably my favourite arcade game at the moment with cartoon-quality graphics, marvellous monsters and tremendous bouncy music. If Superior ever produce a good enough version of that I may have to find £400 for my own BBC.

For the 64 there are a couple of interesting new games. Commodore themselves have released the official version of Balley's *Lazerian* — not a very successful game in this country, in fact I have only ever seen it once. This is nevertheless a very good copy. It is a three-screen game where first you must fly around a planet shooting at squirly things in the middle. When you hit them they fly out into space and chase you around. On the second screen you have to fly through some caverns avoiding swarms of nasty flying things and on the third you have a chance to blast away at a completely over the top *Phoenix*-like mothership.

Microdeal are now, sensibly, avoiding over-reliance on one micro by releasing games for the Commodore. *Arena 3000* is an interesting development despite being another version of the much-copied game *Robotron*. The company have cleverly allowed the option of using both joysticks — one to control the movement of your android and the other to control the direction of fire, just as in the original game. True *Robotron* fans will know that this is essential for achieving high scores as well as recreating the real feel of the game. However, in case you have never tried using a free-standing joystick with one hand, well let me tell you — you haven't missed much. You must fix them down to get the full benefit. (Incidentally *Robotron* is one of the few original arcade games that have the TV screen the 'right' way up, which helps with the conversion to home computers.)

Finally, whilst on the subject of Microdeal, you may remember a few weeks ago I mentioned their new Dragon game written by Tom Mix called *Buzzard Bait*. Well, having finally seen it load, I can reveal that it is a good version of the game *Joust* where you flap around ledges on giant buzzards trying to kill the enemy with your lance by being higher than they are at the time of collision. Needless to say, the enemy have lances as well, and there's an awful lot of them at any one time.

Tony Kendle

The Arcade Corner is a new section for anyone who enjoys playing arcade games. If you have any comments, from playing tips on difficult games or programs you'd particularly like to praise (or blame!) then write to: Tony Kendle, Arcade Avenue, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

Open Forum

Binary

on ZX81

This short program, which will run on a 1K machine, will convert decimal numbers to binary representation, and vice versa.

The response is almost instantaneous in *Fast* mode, and by converting decimal numbers on a "trial and error" basis, you will soon begin to see how binary numbers are built up from powers of 2.

The program itself is written in two distinct sections. The main program, written in Basic, deals with the screen display and the input of numbers, and it calls the appropriate machine code subroutine to carry out the conversion. The machine code section, held in the Rem statement at line 1, is 48 bytes long and comprises three short subroutines.

1 Address 16514 to 16527 tests bits 0 to 7 of A$(2), the single byte representing the decimal number to be converted, and places a "1" in the appropriate position in A$(3 to 10).

2 Address 16528 to 16543 checks in turn each of the 8 members of A$ (3 to 10), which represents the binary number to be converted. If A$(X) is a "1" then bit X of A$(2) is set to "1", otherwise bit X remains a "0".

3 Address 16544 to 16561 is a subroutine which is called by each of the previous subroutines. This finds where A$ is lurking in the variables area by using the system variable, DEST. (Remember that although strings and other variables get shunted around last referred to in DEST). The two register pairs HL and DE are pointed at A$(2) and A$(10) respectively, and the counter, BC, is set to 8 (the number of bits in a byte.)

Thus, after converting binary to decimal, the bit pattern of A$(2) is a duplicate of the string A$(3 to 10), and vice versa for decimal to binary conversion.

1 Type in the listing shown in Fig. 1.
2 *Run*, and enter the hex codes on the right of Fig. 3, either as single bytes (eg, CD) or as instructions (eg, CDA040)
3 Delee lines 10-80
4 Type in lines 15 to 250 in Fig. 2
5 *Save* the program before *Running*.

```
   1 REM .....................
.........................

  10 LET N=0
  30 INPUT A$
  35 LET X=16514+N
  40 LET Y=16*(CODE A$(1)-28)+CO
DE A$(2)-28
  50 POKE X,Y
  60 LET N=N+1
  70 IF LEN A$=2 THEN GOTO 30
  75 LET A$=A$(3 TO )
  80 GOTO 35
```

FIG.1

```
   1 REM LN RNDAC5 7C* ,.AC$ :(
PLOT TAN LN RND, RETURN 14 *AC$
LEN .AC$ :( POKE TAN Y1E>RND7 FA
ST !@ :?? LPRINT " TAN .
  15 CLS
  20 PRINT "1. BIN TO DEC",,"2.
DEC TO BIN"
  30 INPUT A
  35 CLS
  40 GOTO 100*(A=1)+200*(A=2)
 100 PRINT "KEY BIN. NO.(M FOR M
ENU.)"
 105 LET A$="          "
 110 INPUT A$(3 TO 10)
 115 IF A$(3)="M" THEN GOTO 15
 120 LET A$(1)=CHR$ USR 16530
 130 PRINT A$(3 TO 10),CODE A$(2
)
 140 GOTO 105
 200 PRINT "KEY DEC.NO.255 MAX.(
M FOR MENU.)"
 205 LET A$="0000000000"
 210 INPUT D$
 215 IF D$="M" THEN GOTO 15
 225 LET A$(2)=CHR$ VAL D$
 230 LET A$(1)=CHR$ USR 16514
 240 PRINT CODE A$(2),A$(3 TO 10
)
 250 GOTO CODE "LN "
```

FIG.2

```
4082 CALL 40A0      CD A0 40
4085 BIT 0,(HL)     CB 46
4087 JR Z,1         20 01
4089 LD(DE),A       12
408A DEC DE         1B
408B RRC (HL)       CB 0E
408D DJNZ -10       10 F6
408F RET            C9
4090 CALL 40A2      CD A2 40
4093 LD A,(DE)      1A
4094 CP 10          FE 10
4096 JR NZ,2        20 02
4098 SET 0,(HL)     CB C6
409A DEC DE         1B
409B RRC (HL)       CB 0E
409D DJNZ -12       10 F4
409F RET            C9
40A0 LD A,10        3E 10
40A2 LD HL,(4012)   2A 12 40
40A5 INC HL         23
40A6 PUSH HL        E5
40A7 LD DE,08       11 08 00
40AA ADD HL,DE      19
40AB LD D,H         54
40AC LD E,L         5D
40AD POP HL         E1
40AE LD BC,800      01 00 08
40B1 RET            C9
```

FIG.3

Binary
by Stuart Clarke

Baud Walk

The password

News first as usual on the Baud Walk. The biggest concerns IBM and BT's joint announcement to develop standard protocols for interconnection between networks. This is obviously going to make life easier in years to come for us networkers. On the political front, it will stop IBM — hopefully — steam-rollering its own network architecture in the UK to the detriment of all others.

Another piece of good news, is that Prestel, the viewdata service, plans to launch its own educational service for micro users this January. They are about to go the rounds of secondary education in the UK offering cheap connect time, subscriptions and a variety of hardware and software. The major problem I can see, perhaps, with this service is the position of the telephone in schools and its possible abuse.

I thought it was worth describing the special user instructions when accessing bulletin boards. The first few calls can be very difficult and distressing at times until you eventually get the hang of them.

Bulletin boards normally require a 300/300 band modem — although 1200/75 band is increasing in popularity. A full list appeared in the networking feature in the August 2 issue.

Information about software for the boards can be obtained from the associaiton of Free Public Access Systems, 421 Endike Lane, Hull. If you do write make sure you send an SAE and describe which configuration of micro and modem you have.

When logging on to these boards, first listen for the carrier tone. Switch your modem on and type *C/R* (carriage return) or *COM C/R*. The screen will normally clear and ask you to type in your call name. That registers with the system operating software (sysops), so stick to one call sign for subsequent calls.

Some systems will ask for a password. It is the system's way often of identifying what type of terminal you are. The answerback should be cbbs in lower case or toos. Typing *Help* or *F* for re-format at this stage may be your only way out.

Bulletin boards will then display your menu options, which will vary according to the degree of complexity and services of the board.

The most common are as follows:

R — Read messages left on the board
Q — Quick scan of messages currently on
K — Kill message
M — Electronic mail section
L — Leave message on board
S — Special interest group area
B — Bulletins
I — Information request
T — Elapsed time
D — Down-load files
Hash — Upload files
G — Goodbye, log-off
F — Reconfigure terminal
C — Chat to sysops
U — User-log of other callers

Keep this list handy until you've got the hang of it. The only real way to learn, however, is get that dial going.

Robin Wilkinson

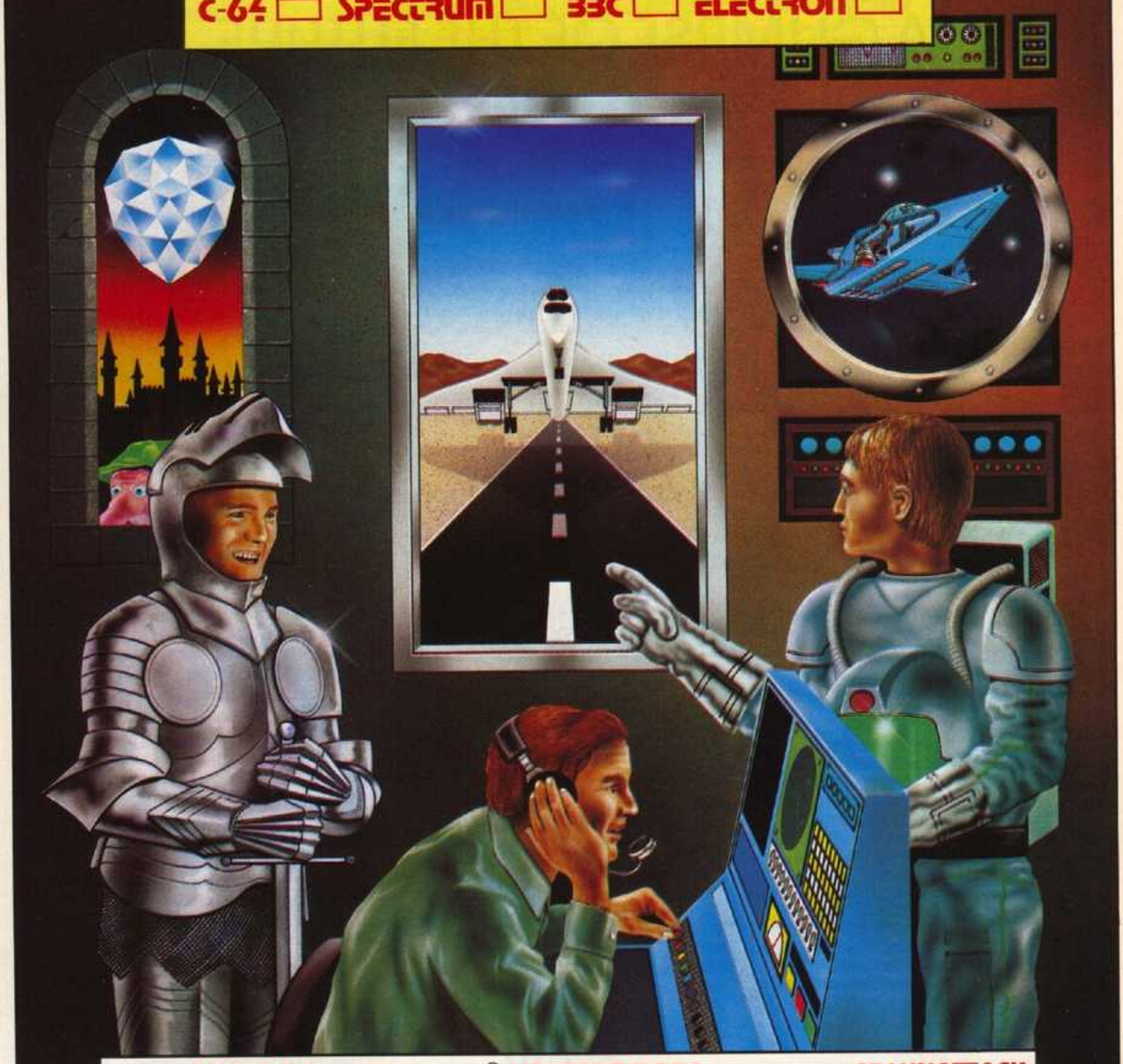
Baud Walk is a new weekly column with news on networking, databases, reviews of modems and software and points of contact for information.

Any readers with experience of networking are asked to send their experiences or news of services to Robin Wilkinson, Baud Walk *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

He can also be contacted on Prestel mailbox 019993727.

THE BEST SOFTWARE IN AGES

C-64 ☐ SPECTRUM ☐ BBC ☐ ELECTRON ☐



FANTASIA DIAMOND

Delve deep into the age of fantasy with a host of intriguing characters that may help or hinder your exploration of this dream world.

Retrieve the magnificent Fantasia Diamond recently stolen and rescue Boris the master spy from the imposing fortress and its evil guardian. Talk to the Robot, Violinist and other characters to illicit their help.
An enthralling and sophisticated graphic adventure by Kim Topley for the Spectrum 48K, Commodore 64, BBC Model B* and Acorn Electron*.

SRP £7.95

*No graphics on these versions.

HEATHROW ATC

Your challenge in the age of technology is to direct the incoming aircraft at the world's busiest international airport, Heathrow. Monitor the stack displays of altitude, heading, velocity and aircraft type. Scan the radar for blips and trails. Develop your skills to tackle emergencies, rogue aircraft, radio and instrument failure.
A highly acclaimed simulation of one of today's most demanding jobs, by Mike Male for any Spectrum, Commodore 64, BBC Model B and Acorn Electron.

SRP £7.95

3D LUNATTACK

Do battle with the Seiddab in a futuristic age. Pilot your Z5 Hoverfighter over the craters and around the mountains of the luna landscape. Equipped with the latest iridium lazers, duodec missiles, radar, navigation and shields penetrate the Seiddab defences and head towards their command base. Destroy the Seiddab Dab Tanks, Aerial Mines, missile silos and Hoverfighters, you must not fail in your mission to drive the Seiddab from their luna base. A stunning 3D Graphic Presentation by Steve Turner for the Spectrum 48K and Commodore 64.

SRP £7.95

GSH

HEWSON CONSULTANTS

568 Milton Trading Estate, Milton, Abingdon, Oxon OX14 4RX

As part of our continuing development of innovative software we are always happy to evaluate software sent to us with a view to publication.

Selected items available from Centresoft Dealers and all leading computer software retailers

WHSMITH Rumbelows John Menzies TIGER TRADER Spectrum LASKYS HMV

A GLIMPSE OF THE FUTURE....

THE INTELLIGENT PRINTER INTERFACE FROM CAMBRIDGE COMPUTING

FEATURES:

- ★ FOR 16K OR 48K **SPECTRUM.**
- ★ COMPATIBLE WITH **ALL** CENTRONIC PRINTERS.
- ★ COMPATIBLE WITH **ALL** CENTRONICS PLOTTERS.
- ★ RECOGNIZES **L LIST** AND **L PRINT.**
- ★ WILL RECOGNIZE **COPY** TO PRODUCE SCREEN DUMPS ON ANY GRAPHICS PRINTER — IN UP TO SIX SIZES AND THREE STYLES INCLUDING GRAY SCALE SHADING AND COLOUR. (SUBJECT TO PRINTER CAPABILITIES)
- ★ DOWN LOADABLE USER DEFINABLE CHARACTER SET TO ALLOW THE WIDEST POSSIBLE RANGE OF PRINT STYLES.
- ★ SPECIAL SOFTWARE ALLOWS THE INTERFACE TO RECOGNISE THE FUNCTIONS OF THE PRINTER IN USE AND ALLOWS THE STYLE OF PRINTING AND COPYING TO BE EASILY ALTERED — BECAUSE THE SOFTWARE IS IN ROM IT DOES NOT NEED TO BE LOADED FROM TAPE EVERY TIME THE INTERFACE IS USED.
- ★ CHANGING FROM ONE PRINTER TO ANOTHER IS READILY ACCOMPALISHED BY A QUICK AND EASY-TO-USE MENU PROGRAMME.

—— £45.00 ——

AT A STOCKIST NEAR YOU SOON
OR
STANDS M7/8 AT THE ZX MICRO FAIR

CAMBRIDGE COMPUTING RESEARCH LIMITED

61, DITTON WALK, CAMBRIDGE. CB5 8QD TEL: 0223 214451

TRADE ENQUIRIES WELCOMED

12th ZX MICROFAIR at Ally Pally on 8th September 1984

Tony Bridge's Adventure Corner

Follow the hare

Dear Tony,

Please help! I know it's a little early for you to have tried Hareraiser Prelude, *but having recently received my copy for my Commodore 64 (after a month of impatient waiting!), I find all my feelings of eager anticipation suddenly turned to shock and desolation.*

On loading you are given a rhyme about the origins of the Hare and told that keys Z,X and the cursor keys are used for movement. These keys do not follow the N,E,S and W that I had assumed they would; it is therefore difficult to record where you've been. Each location is graphically similar, the scene consisting of grass, sky, clouds, sun and trees. The text consists of such gems as: Use your brain; Can you see the wood for the trees; Early bird catches the worm — to give you a few examples. In a few locations a Hare runs from right or left to the cente of the screen and then disappears. No inputs seem to be required.

"So, Tony, please, what on earth am I meant to be doing. Do I have to follow the Hare? Do I make words from the clues? Help! Mrs Gillian Slade, 73 Amethyst Rd, Christchurch, Dorset BH23 3ED.

Hareraiser is the adventure from Haresoft which offers the prize of the golden jewelled Hare of Masquerade, or £30,000. While I haven't yet seen it, let alone tried it, we have had a couple of letters from people less than satisfied with the game.

Masquerade is the book of puzzles that had thousands of hopeful people digging up half of the British Isles in the quest for the the Golden Hare, and this game, for several "popular micros", promises the same sort of thing for the more home-bound of us. Gillian is stuck in the first part, the Prelude, and the finale is on sale soon.

"Dear Tony, here is a list of adventures I have completed. If anyone out there needs a clue to any of them, they can write to me, including a SAE, and I'll be happy to help: Colossal Adventure (Level 9) : 10/10 — what can I say! Magic Mountain *(Phipps) : 7/10 — good for beginners,* Greedy Gulch *(Phipps) : 6/10 — beginners only,* Pharoah's Tomb *(Phipps again) : 9/10 — reasonable,* Knight's Quest *(Phipps) : 10/10 — not for beginners!* Colditz *(Phipps : 7/10 — not as difficult as it looks,* Velnor's Lair *(Quicksilva) : 5/10 — I finished this in three days,* Quest *Hewson): 10/10 — no comment!* The Hobbit *Melbourne House) : 8/10 — Lower marks because I felt the run home with the treasure was a little flat.* Espionage Island *(Arctic) : 8/10 — reasonable.*

"Now, can anyone help me with two problems — In Artic's Golden Apple, *how do I get the emeralds from the glass case in the red room, and in Incentive's* Mountains of Ket, *how do I get past the skull and the dragon?" Karen Tyers 19 Pams Way, West Ewell, Surrey KT19 0HA.*

I can help you with these two, Karen: to get the emerald from the glass case in *Golden Apple,* just try *Singing*! As for the skull in *Ket,* you must wear a certain combination of articles to get past — and to avoid the dragon, try *Pouring* the oil in the warm room.

Douglas Smith writes to me from Glasgow, asking me to suggest adventures for the beginner on the Commodore 64, while Robert Hardie writes from Sydney in Australia, asking for a list of good novices' programs for the BBC. Several American users have also sent pleas for Basic adventures to run on their Timex 2000s.

The first adventure I would recommend to anyone remotely interested in the art, is a version of the original *Colossal Adventure.* Melbourne House's versions for the BBC, Commodore and Spectrum is as good as any — although Level 9's similarly-named *Colossal adventure* is available for these and many other micros, and has the advantage of 70 extra locations at the end.

To get an easier introduction to the techniques of adventuring, and have a lot of fun on the way, try Melbourne Houses's masterpiece, *The Hobbit.* This features many innovative ideas, not the least of which is "animaction" — this refers to the habit of the other characters in the adventure to go wandering about getting on with their own lives, while you are struggling with the various problems (just don't come back to me in a couple of months, asking for help in the Goblin's Dungeon').

Graphic adventures are well-liked by many adventurers, but, unfortunately, there are not many for the BBC. Some of the best, though again, not necessarily the easiest, are from Epic Software. You'll find this company at 11 Edendale Road, Melton Mowbray, Leicestershire LE13 0EW. *Castle Frankenstein* is actually text-only, boasting 220 locations and 29,000 characters of text — but *The Wheel of Fortune,* Epic's newest Epic, is text and graphics.

The grand Elf can't leave the good old Beeb without mention of the grandaddy of all BBC adventure-writers, Acornsoft. Games like *Philosopher's Quest, Countdown to Doom, Castle of Riddles* and *Sphinx Adventure* have endeared themselves to countless (almost!) Beeb'ers — and the newest adventure, *Kingdom of Hail,* seems set to become yet another classic.

While on the subject of BBC adventures, it may be worth looking at a couple of new releases from Micrograf (of 120 Oxford Road, Reading, Berks.), who, with *Vampire Castle* and *Flint's Gold,* have a pair of good introductory adventures.

As for the Commodore — there are many adventures available for the machine from the States, including the Infocom series, which are rather state-of-the-art, and thus may prove rather frustrating for the beginner. Companies like Datasoft, Spinnaker and Adventure International all release a lot of software for the Commodore, including adventures of all sorts. The latter software house is the brainchild of Scott Adams, whose name is synonomous with adventure programs — try *Pirate Adventure, Adventureland,* and *The Count* as good introductions, leaving some of the others for later.

Finally Basic adventures for the Spectrum — I'm afraid that there are not many! The market, as it stands at the moment, demands fast responses to a variety of input, and that can only be achieved by machine-coded programs. The only two that spring to mind readily are *Treasure of Meathos,* that I mentioned in Vol 3 No 33, and *Velnor's Lair,* from Quicksilva. This one is written by Derek Brewster, a well-known personality in the software world. This was his first (I believe) commercial enterprise, largely ignored until he became more famous for programs like *Lunar Crabs* and *Codename MAT.*

I'll leave you now with a couple of not-often-mentioned adventures. Brett Marl, from Chester, writes: *"Please help me with* Ghost Town, *from Virgin. In three months, I have still not found the combination to the Safe".*

And, from Richard Alexander of London, some hints for *Denis Through the Looking Glass,* from Applications Software. *"To get out of No. 10* [a problem that vexes many people; TB] *try this* [refer to the list of clues below] 7,7,3,2,14,7,16,12,18,15,9 — *and after every 10th move, you should* 9. *Other hints include* 5,19 *three times before going* 14 *out of the* 10 — *don't* 4 *the* 13 *in the* 20, *and finally,* 6 *needs his* 1,21,8,11!

1 Eyebrows **2** Scuth **3** Hide **4** Kiss **5** Knot **6** Healey **7** North **8** By **9** Drink **10** Window **11** Lawnmower **12** Pot **13** Frog **14** East **15** Flask **16** Look **17** Needs **18** Get **19** Sheet **20** Garden **21** Trimmed

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further write to: Tony Bridge, Adventure Corner, *Popular Computing Weekly,* 12-13 Little Newport Street, London WC2R 3LD.

ZX-81 OWNERS

SOFTWARE FARM

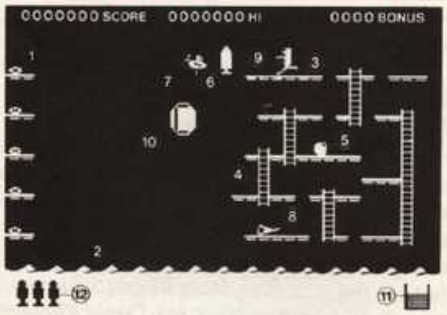
AT LAST THE PROGRAM YOU'VE BEEN WAITING FOR!

Rocket Man

Coming Soon! SPECTRUM VERSION

with Hi-Res Graphics on standard ZX-81 16K

Actual ZX-81 Screen Display!



1. Diamonds
2. Sea
3. Platforms
4. Ladders
5. Fuel Cans
6. Rocket
7. Vulture
8. Leg of Lamb
9. Player
10. Bubloid
11. Fuel Gauge
12. Men Remaining

Get rich quick by collecting Diamonds that are simply lying there waiting for you!

Oh . . . I forgot to mention that there are one or two problems! There is an expanse of Shark infested water between you and the Diamonds and a strange breed of Bubble that seems hell bent on getting you in it! Somehow you must cross it. . . .

You have a Rocket Pac to help you (a Vulture on higher levels) but you must rush around the platforms and ladders collecting cans of fuel (legs of lamb with the Vulture) and cursing that weird Bubble. Once you have enough fuel then it's Chocks Away!

Oh . . . but don't run out of fuel on the way – otherwise it's . . . . SPLASH!

The aim is to collect all the diamonds from the far left hand side of the screen, whilst avoiding the rampant Bubloid. These emerge from the sea and are hell-bent on returning to their watery habitat with you in tow. Sooner or later you are going to end up in the drink – The idea is to make it later!

By belting round the system of platforms and ladders, cleverly avoiding the Bubloid, you collect the fuel cans which appear in random positions, until you consider that your fuel gauge indicates sufficient in the tank. Now you can go and collect your rocket. With the rocket-pack strapped to your back you can fly across the expanse of sea to collect the diamonds . . . but don't run out of fuel or your rocket-pack will simply disappear and you will wind up in the drink!

There are six stages with six different platform layouts. On stages 1-3 the Bubloid, which floats in front of the platforms with uncanny ease, gets an ever increasing ability to home in on your position, making the task of staying alive more demanding with each stage. On stages 4-6 you once again start with the easiest Bubloid (which is a blessed relief!) but the fuel cans are replaced by legs of lamb which you must collect to feed your vulture, and once it has enough energy (or you think it has!) you must flap across the water on its back to collect the diamonds.

Extra men are awarded for every 10,000 points – but ONLY once you have collected all the diamonds and so completed each particular stage.

GOOD LUCK!

Available from all good computer shops or send cheque/P.O. for £5.95 (inc P&P) to:

Software Farm Dept PCW FREEPOST (no stamp required) (BS3658) ,BS8 2YY

Software Farm, 155 Whiteladies Road, Clifton, Bristol BS8 2RF.
Telephone (0272) 731411 Telex 444742 AFMADV G

Peek & Poke

Acoustic coupler

A Bennett of Whitehaven, Cumbria writes:

Q I am seriously thinking of buying a modem, but the snag is our telephone is not very new. The plug is permanently fixed to the wall, and an acoustic coupler would be no good either as the computer is rather a long distance from the phone. Could you please advise me on what to do?

A If you do not have one of the new BT jack plug sockets (which cost about £25), then you will have to use an acoustic coupler. Distance from the telephone is a problem, but only if you were upstairs and the phone was not. Acoustic modems are not as reliable as other types of modem, but they are still very usable. My advice to you is to consult your local BT Sales Engineer for advice on how to proceed. The service will cost you nothing and you are certain of an expert on-the-spot opinion.

Disabled keys

C Wright of Lewton, Suffolk writes:

Q I own a Vic 20 and would like to know how to disable the *Run/Stop* key. I have heard that *Poke*ing 37150,2 and using an *Input* statement will disable the *Run/Stop* and *Restore* keys, but that the only way to disable *Run/Stop* is to program in machine code. Also, what do the symbols < and > stand for? My speech synthesiser pronounces them as "Power", but I can't understand what they are there for. Just seems a waste of good keyboard space to me.

A In order to disable the *Run/Stop* key you should *Poke* 788,194. The *Poke* you mention only disables the *Restore* key. To disable both the *Run/Stop* and *Restore* keys you should *Poke* 808,100. The two characters you mention are normally used for cursor control, try experimenting with them when you have a program listed on the screen and you might find out how useful they can be.

Basic learning

P G Rix of Abergavenny, Gwent writes:

Q I have recently purchased a BBC B, for both personal and business use. However, the nearest I have ever been to a computer before this is the other side of a shop window.

Can you suggest any courses that people such as myself (I am a hotelier) could attend, where we could spend a week or so learning the basics (pardon the pun).

A As you are a hotelier can I suggest Butlin's. I know that may seem a little strange, but the course at their Skegness camp was highly recommended by Mr Harding in Vol 3 No 24.

The courses run for a week and details are obtainable from Butlin's at Skegness.

Computer education

Mohamed Inaam Al Sheraz of Kuwait, writes;

Q These days it is commonly heard that computers are in use in schools for educational purposes, especially the BBC computer.

I wish to know how computers and computer-aided learning and teaching can help the students in their normal studies, and what kind of software is used for this purpose?

A The biggest impact that computers have made in the educational field has occured in the primary schools. There are many reasons that the secondary schools have not made as much of computers in the classrooms, the main one being that they are constrained by the formal requirements of exam syllabuses.

Some teachers see computers as a way of interesting young children in the 'boring chores' of spelling, simple mathematics, and elementary geography. The computer is seen as a way of coping with the wide range of abilities found in a single class. Most of the software for these (and other) purposes has been produced, either by teachers, or by those closely associated with the teaching profession. Virtually all of the primary school software uses coloured graphics as a means of getting the message across and also as an 'interest grabber'.

Compiler answer

A Fearon of Birmingham writes:

Q I own a CBM 64. I am writing an adventure game,but I would like my program to be in machine code rather than slow Commodore Basic. I have heard that a compiler might be the answer, can you confim this? Also, can you tell me how big a Basic program it can compile, as my program will use nearly all the available memory (34-38K). How could I gain access to the hidden memory which is denied the Basic program programmer? Another question, how can I implement my own graphics in machine code in my adventure?

A A compiler would be the answer, except that as they normally have to reside in memory when the program runs you might well run short of memory. Also, you would be unable to sell your finished program, because of copyright problems. A compiler will take up between 5–10K of memory and will almost certainly place restrictions on you as to what Basic commands you can use, as well as restricting the facilities of the machine.

Whilst I sympathise with your wish for your program to be superfast, it is true to say that adventure games do not need to be very quick. You do need to respond to an input as fast as possible, I agree, but any random events, or movements can take place while you are waiting for the next *Input*. Your only other real alternative is to write in machine code, or to use a compiler and look for ways of saving space. One such way would be to use character compression to reduce the amount of memory needed to hold the textual descriptions of locations, etc.

Joystick interface

Paul Stead of Hull writes:

Q I recently purchased a Dk'Tronics keyboard for my Spectrum and I have found that I cannot find an interface to fix onto the back of it. I wrote to Dk'Tronics and told them of my problem, but I am afraid I did not get a reply. I would be very grateful if you could help me.

A I am sorry you never received a reply from the manufacturer. The only difficulty in connecting joystick interfaces to this keyboard that I have come across concerns the Sinclair joystick interface. You should be able to connect any other interface that uses the edge connector without any trouble. The ZX printer works quite happily with this keyboard.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Phil Rogers and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, 12-13 Little Newport Street, London WC2R 3LD

CLASSIFIED

Semi-display — £6 per single cc
Lineage — 25p per word

CALL *DIANE DAVIS* ON *01-437 4343* FOR SEMI/DISPLAY ADVERTISING

GAMES SOFTWARE

THE PRISONER
OF THE VILLAGE
You've been waiting for this!
A new adventure for the 48K Spectrum, 100% m.c.
£5.50 (inc. p & p) from:
SPOOF SOFTWARE (PCW)
58 Railway Road, Urmston
Manchester M31 1XT

SUMMER CLEARANCE SALE
FOR SPECTRUM 48K

	R.R.P.	Our Price
World Class Darts	£6.95	£4.95
Mix 'N Match and Mistermind	£6.95	£4.95
Stock Control Database	£10.95	£7.95

Last few now. **£9.95 for all three**
Send cheques/POs (p&p inc.) to:
ALPHASOFT,
7 Moss Carr Avenue,
Keighley, W. Yorks. BD21 4SE.
(same day despatch)

X-CERT
THE MUCH TALKED ABOUT X-CERT SOFTWARE
The sauciest game ever released for the 48K Spectrum, is available now, but only by mail order. Written entirely in machine code the game consists of 4 waves of SHOCK, HORROR and SCANDAL, featuring the ugliest to the most beautiful of girls, in which you have to..... CENSORED....also you must ..... CENSORED...all the time. For your copy "Gissa Kiss" (code name, Smut) discreetly packaged, send £5.00 to Titan Programs Ltd., 46 Market Place, Chippenham, Wilts. SN15 3HU.
OVER 18's ONLY
... BUY NOW BEFORE IT'S BANNED!

SPECTRUM BARGAINS
Mugsy 5.60 D.T. Decatholon 5.90 Fighter 6.20 Dungeon builder 7.60 Lords of mid. 7.70 Sabre Wulf 7.95 the Hulk 7.95 White lightning 10.95
Mail order Software. 9 Knowle Lane, Wyke, Bradford. BD12 9BE

SAVERS
COMPUTER COMMUNICATION (UK) Ltd.
9 Martins Close, Blackwater, Camberley, Surrey. GU17 0AH.

MATCH POINT	Spec	£6.90
SABURE WULF	Spec	£7.99
AUTOMANIA	Spec	£6.25
CHEQUERED FLAG	Spec	£6.20
CRAZY KONG	Vic20	£5.35
CHARIOT RACE	Vic20	£5.90
BEACHHEAD	CBM64	£7.99
MANIC MINER	CBM64	£6.85

SAE for lists of all MicroSoftware Books, Peripherals, State Micro.
HOTLINE for ORDERS 0276 33852.

SPECTRUM 16/48K, "Raquel" presents her games pack for ages 16 and over only (state age when ordering). Still only £3.50. I. Brooks, 17 Malvern, Coleman Street, Southend, Essex.

AQUARIUS. Football League team. Manage your own team to the top of the league! (unexpanded) £1.29. or 16K version with league-table £3.50. D. Spencer, 50 Cranswick Close, Billingham Cleveland.

THE WASTER
A highly original
48K Spectrum adventure.
Can you, a CIA assassin, survive the nightmare of your previous missions?
"The most entertaining text I've seen for some time . . I played it over and over again . . .-PCW"
£5.95 (mail order only) from:
HARDDATA SOFTWARE
230a Portway, Stratford, London £15.

PHOTO-FINISH
(Spectrum 48K)
At last! A genuinely taxing horse-racing game. Stockpile enough money through beating the bookmaker in the eventual hope of owning the Derby winner. 3 separate games, 5 skill levels, form display, as horses improve or tire. Realistic graphics.
This game requires patience, skill, concentration, and extraordinary judgement ***ONLY £5 inc.***
To: ***P. KERN,***
15, Norwich Rd., Northwood Hills, Middx.

UTILITIES

Q.L. UTILITIES
4 programs on microdrive for Sinclair Q.L. to prevent D.I.Rectory overflowing the screen, provide single key L.O.A.Ding or D.E.L.E.T.ion of files, repeat F.O.R.M.A.T.ting of cartridges and back-up C.O.P.Y.ing of whole or part of a cartridge. £10 from:
W.D. SOFTWARE
Hilltop,
St. Mary,
Jersey,
Channel Islands
Tel: (0534) 81392.

AQUARIUS PROGRAM booklets £4.95 each. Containing 10 programs each. Beginner's programs advanced programs, Aquarius graphic utilities. Send to: 2 Becklow Gardens, Shepherds Bush, London W12.

THE TRIAL OF ARNOLD BLACKWOOD
A NEW CONCEPT IN ADVENTURES FOR THE
AMSTRAD 64
(ALSO AVAILABLE FOR DRAGON 32) **£5.50 INC.**
NEMESIS, 10 CARLOW RD., RINGSTEAD, KETTERING, NORTHHANTS NN14 4DW

CLASSIFIED ADVERTISING RATES:

Line by line: 25p per word, minimum 20 words.

Semi-display: £6 per single column centemetre, minimum length 2 cm. (Please supply A/W as PMT. Or supply rough setting instructions.)

Conditions: All copy for Classified section must be pre-paid. Copy date 7 days before publication.

If you wish to discuss your ad, PLEASE RING Diane Davis 01-437 4343.

Here's my classified ad.

(Please write your copy in capital letters on the lines below.)

			Please continue on a separate sheet of paper

I make this ..... words, at ..... per word so I owe you £ .....

Name .....

Address .....

.....

.....

Telephone .....

Please cut out and send this form to: Classified Department, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

THERE'S ONLY ONE ALPHA-BE

MICRODRIVE ONE (MD1)

WE OFFER ON ALL OUR PRODUCTS A FULL MONEY BACK GUARANTEE an update service, and FULLY detailed instructions with USER friendly programs. Match that!

YES AT LAST 48K Spectrum owners with m/drive can NOW transfer the MAJORITY of their cassette programs to m/drive (inc headerless, long programs, + those with LOW addresses — say 18384) and get them running.

OUR TC5 program transfers the bytes + basic + arrays to m/drive at **£5.50,** but MD1 has 5 programs HELP YOU get them running + 2 "CAT" housekeeping programs. Includes program analysis, and other programs that produce the m/code you need. All our programs reviewed have received max 5 stars! (Incl **GRAPHICS toolkit £5.50**). Introductory price **£6.50** inc p/p. OVERSEAS customers: add £1 Europe, £2 others for each product. Send SAE for enquiries.

LERM, Dept WE1, 10 Brunswick Gdns, Corby, Northants.

COMMODORE 64-VIC 20

******BYTE BACK******
Commodore 64/Vic20
If you have never had a program CRASH don't bother to read on.
From beginning BASIC to mastering MACHINE CODE that DREADFUL moment comes when the computer LOCKS UP and all you can do is pull the switch and start again.
NOW YOU CAN HAVE ALMOST **TOTAL PROTECTION**
(i) A **RESET** device which plugs into your micro, no mods needed.
(ii) A m/code program which completely **RESTORES** programs after reset.
(iii) A mach. code **ASSEMBLER** enter mach. code easily in understandable form. IDEAL for MODIFYING or writing your own programs.
(iv) A superb m/code **DISASSEMBLER** which lets you examine, and explains each m/code instruction. LIST Basic and Machine Code. **PLUS** with BYTE BACK it is virtually **impossible** to **crash** your own programs.
CASSETTE £5.95. Disk £9.95.

******SUPERKIT 64******
COMMODORE64 ONLY
A **SUPERB TOOLKIT** of m/code routines, INCLUDING complete RE-NUMBER/AUTO LINE/TRACE/FIND/AUTO RUN/BLOCK DELETE/MEMORY SAVE and more. Software controlled flexibility, and at a sensible price. CASSETTE-£6.95 DISK £9.95 with SUPERKIT 64, BYTE BACK you have program PROTECTION and ALL the **EXTRA UTILITIES** you need for writing/modifying/ and learning about programs.
Eliminate C2N Datasette Problems.

******REKORDAKIT 64******
HEAR your Datasette performing. Keep C2N in Tip Top condition. Simple to use **plug-in** device which reproduces audio output and a **TEST TAPE** to ensure tape heads are correctly set. £5.95.
SPECIAL OFFER — buy all three — £2.00p DISCOUNT.
REMEMBER state computer.
Cheque/P.O. to:-
ASH BYPRODUCTS
P.O. Box 510, Birmingham B17 9ES

Q.L. DRAW

Cursor controlled text and Graphic Designer.
Save, load and Hi-Res printout.
£12 inc. p&p
From G. R. Taylor,
77 Warwick Rd.,
Milton Keynes
MK3 6AT

SHARP MZ 700. Utility on cassette. Graphics by Maysoft (DMB) is almost essential for writing games. It enables easy access to all 500 MZ 700 graphic characters, including tanks and rockets, while also demonstrating movement and speed variation. Limited offer £4.95 including P+P. Cheques/PO to: **Maysoft (DMB), 50 Thompson Avenue, Colchester, Essex. CO3 4HW.**

SOFTCELL'S DISCO

For the Commodore 64
This is the most powerful tape to disc transfer utility you can buy. No program rewriting is necessary! Why put up with second best? A must for all 1541 disc owners.
Only £9.95 and 50p p&p
Available from:
THE SIX-FOUR SUPPLIES CO
PO Box 19
Whitstable, Kent
CT5 1TJ
ACCESS/BARCLAY CARD ORDERS on: (0227) 266289

*****COMMODORE 64*****
R.B.S.
Convert your single and multipart tape programs to turbo-load faster than the CBM disc drive. Each converted program is fully self contained — nothing to pre-load no pokes no sys calls, no user knowledge required. Load "The Hobbit" in 120 secs. Cassette £7.50 inc.
HYPERSAVE 64
An essential programmers utility. Eight additional Basic commands. Save/load/verify up to 48K continuous RAM at Hyperspeed cassette £7.50 inc.
Special discount. Both programs, Hypersave and R.B.S. £9.99 plus! Free Secrets I/O leaflet with every order.

PRO-SPRITE
Sprite library/editor. Design, manipulate, catalogue multi and single colour sprites create data, joystick control. Packed with features. 100% machine code.
Cassette £7.50 inc. Cheque/PO or SAE to:
DOSOFT
2 OAKMOOR AVENUE
BLACKPOOL FY2 0EE
*****FAST DESPATCH GUARANTEED*****

Friendly Face

Microdrive Utility
BEYOND TAPE CONVERSION: These routines make your life easier, by using menus in place of commands.
Professionally written MERGE routines for any version of Tasword Two and Masterfile, giving complete flexibility.
Cartridge based routine aids loading and file management.
Available NOW from MONITOR.
P.O. Box 442, Mill Hill London NW7 2JF.
Cassette £7.95 Cartridge £14.95 incl VAT.
Write or call 01-959-1787 for leaflet.

THEE JETSET WILLY EDITOR
100% machine code program. Will totally redesign Jetset Willy and create an extra 3 rooms.
£3.50 (inc. p&p).
Send cheques/POs to:
SOFTRICKS
1, Rowan Place,
Dundee,
Scotland DD30 PH.

JOYSTICK ART

A multi-coloured drawing program for Commodore 64.
Turn your Joystick into a high-res graphics pen.
Create pictures & games background to match your imagination. Save and use them in your own Basic programs.
Circles, squares, triangles, lines, letters, fill, erase, freehand, and more.
On Cassette £8-95
Cheques/p.o. to:
INNAH, 1 Lynton Close
Woodley, Reading,
Berks RG5 3SF

MICRODRIVE TRANSFER

Programs 50p per listing. Chequered flag, 3D tank duel, Lords of Midnight, Tornado low level, full throttle.
Y. RUSSELL,
14A Clenluce Road, Blackheath, London SE3.

QL SOFTWARE

DRINK TO THE ARRIVAL OF YOUR
SINCLAIR Q.L.
with "SHAKEN NOT STIRRED", the expert program for the Sinclair Q.L. that knows everything worth knowing about how to make cocktails and other mixed drinks
£9.95 inc. P+P

SOFT-IN-THE-HEAD
FRONT BASEMENT,
67, EARL'S COURT SQ.,
LONDON SW5 9DG.
Tel: 01-370 7169

SOFTWARE

up to 50% off!
write to:
CLUBSOFT
Unit 18, Wye Industrial Estate
London Rd. High Wycombe

B.B.C. MODEL B

shorten the odds on selecting those elusive draws with
BONSOFT POOLS PREDICTOR
all data simply updated by entry of match results.
only £7 (inc. P/P)
send cheque/PO to
I. Humphreys
'Bonhill'
Reddish Lane
Whaleybridge
Cheshire SK12 7DP

UNIT TRUST INVESTORS
48K SPECTRUM PROGRAM
Review, update, analyse your holdings. Printer and Microdrive options.
£12 inc. p&p SAE for details
Michael Slatford Software,
Dept. PCW, 3 Campden Road,
South Croydon, Surrey, CR2 7EQ

SPORTING FORECASTS PROGRAMS by Professor Frank George for Commodore 64, BBC, Electron, Spectrum, Dragon. Football Forecast, Poolperm and Horse Forecast now available. Details from Poringware, PO Box 161, Brundell, Norwich.

CHORD TUTOR: everything you wanted to know about Guitar chords . . . send cheque/PO for £3.99 septic soft 22 Park Avenue, Kings Norton, Birmingham.

ANIMATED loading screens (48K Spectrum) each 800 bytes, cuts loading time. 90p+s.a.e. D. POOLE, 31 High Plash, Stevenage, Herts, SG1 1JG.

ACCESSORIES

Replica Loud Firing Colt 45 Automatic, 23 shot
As used by US Army, ideal stage prop, with ammo
£5.25 carriage 50p

Replica 44 Auto Magnum, the gangsters favourite, with ammo **£4.35** carriage 50p

Colt Python 357
As used by Police and screen heavies, with ammo
£4.45 carriage 50p

Ideal for video film making. (Mail order only.) Send PO or cheques to: Razzamattazz, 80 Selhurst New Road, London SE25

C20

BLANK CASSETTES
AGFA TAPE
10 FOR **£4.60**
20 FOR **£8.20**
50 FOR **£18.00**
100 FOR **£34.00**
Prices inc VAT & UK delivery.
Order despatched within 48 hours.
Send cheque/PO to:
K. WILLIAMS
48 Widden Street, Gloucester GL1 4AN

BLANK CASSETTES
C10 £2.95 for 10, £23 for 100
C15 £3.05 for 10, £24 for 100 inc. p+p
FULLY GUARANTEED
Send cheque/PO to:
G.R.P.
369 Mile End Road
London E3 4QS
Tel: 01-980 1186

BLANK CASSETTES

10 C10's for £3.65: 100 for £23.00
Inc: library case
"RAM" TURBO INTERFACE'S £21.00
"Fully Guaranteed (inc. P&P)"
UK HOME COMPUTERS
82, Churchward Ave, Swindon, Wilts.
(695034)

Quickshot IIs-£8.50
microdrive cartridges-£4.45
P+P FREE to: Computec
135-137 Glasgow Road
GLASGOW G6G 6TA
TEL: 041-7710074

WAY TO BEAT
ETH!

Rochdale 341111

Access

Book your Classified or Semi-display advert by Credit Card

Call Diane Davis on 01-437 4343

BARCLAYCARD VISA

JOYSTICKS FOR QL

Plugs straight into control port 1 or 2. NO INTERFACE REQUIRED. £7.99 each or 2 for £15.00. Add 50p p&p
COMPUTER SUPPLIES, 146, CHURCH Rd, BOSTON, LINCS.PE21 0JX

SERVICES

MICRO SERV

The home computer repair specialist in Scotland
BBC, SPECTRUM,VIC 20 AND ALL PERIPHERALS. 3 MONTH WARRANTY ON ALL REPAIRS.
UNIT 4, Denny Workspace, Denny, Scotland, FK6 6DW. Tel: Denny (0324) 823468

COMMODORE REPAIRS. By Commodore approved engineers. Vic 20 Modulators £6.50, Vic 20 from £14.50, CBM64 from £18.00, C2N from £7.00, printers, disc, etc. for more details write or tel: G. C. Bunce & Son, 36 Burlington Road, Burnham, Bucks. SL1-7BQ. Tel: (06286) 61696.

WHY DO SPECTRUM USERS FROM LONDON, DEVON, ESSEX, & CAMBRIDGE SEND THEIR MICROS TO US FOR REPAIR?
Average price £15
- Only Co. in all U.K. offering **while-you-wait service.**
- **For 24 hour turnaround every micro insured for return journey.**
- **phone or send for free estimate enc. £1.60 UK., I.O.M., Eire, C.I.**
- **No hidden handling charges.**
- **special rates for schools.**
- **please phone for appt.**

MANCOMP LTD. (dept. PCW)
Printworks Lane, Levenshulme, Manchester M19 3JP
Tel: 061 224 1888.

HEMEL COMPUTER CENTRE LTD.
For fast reliable repair service, send your 16/48K Spectrum computer to us.
We will repair and return for £18 + £1.60 p&p.
Also BBC, Commodore, Atari and Dragon service
Hemel Computer Centre Ltd. 52, High St, Hemel Hempstead, Herts. HP1 3AF
Tel: 0442 212436

SPECTRUM repairs service. We will repair Spectrums for £15, labour and return postage. RA Electronics, 50 Kimberley Road, Lowestoft, Suffolk. (0502) 66289.

REPAIRS — ZX81 — SPECTRUM out-of-guarantee repairs by our computer dept. Engineers have had three years experience servicing Sinclair computer products. Price including p+p ZX81 — £11.50; 16k Ram — £9.95; Spectrum — £18.75. Send with cheque or P.O. to: TV service of Cambridge Ltd., French's Road, Cambridge CB4 3NP. Tel: (0223) 311371.

DUPLICATION

jbs records
COMPUTER PROGRAMS
REAL-TIME or (Slow) HIGH SPEED Professional Cassette Duplication and Blanks from 1 to 1,000+. Computer printed Cassette Labels, etc. Fast Security Delivery service.
jbs records — a division of FILTERBOND LTD, 19 Sadlers Way, Hertford SG14 2DZ.
0992 — 551188

"DATATAPES" for highest quality blanks and data duplication, call now for a sample quote. You will find us VERY competitive. The Midland Railway Grain Warehouse, No 2, Derby St, Burton Upon Trent, Staffs. (0283) 38199.

DATA DUPLICATION
M.G. Copies, Burntwood Walsall West Midlands WS7 OES
High speed dedicated data duplication, printing if required. Prices from 28, 57p (C15) per cassette incl library case. Write for your full price list or telephone Burntwood 75375 (24 Hrs).

Dear Reader, my name is Simon Stable. I specialise in real-time data-duplication for most cassette based micros. Disc copying for BBC 40/80 (protection available) Dot-matrix printed labels/ blanks. Blank cassettes.
FAST TURNAROUND **0869 252831** COMPETITIVE PRICES
P/L, FREEPOST, 40 WESTEND, LAMBTON, OXON OX8 8TZ

CLUBS

MICRODRIVE USERS NEWSLETTER CLUB

Called Microdrive Exchange. Started in April 1984, join late & all back issues will be sent. Designed to help by exchange of info and ideas. Items covered so far include copying tapes to Microdrive WITHOUT using a tape copier, VUFILE, SCRABBLE, etc. Next issue includes transferring Headerless programs, etc. Members can now transfer program which normally are too low or too high in memory, (or even too long).
There will be 12 monthly issues. Membership is just £5 for the twelve issues, £8 to Europe. This is less than cost of most transfer tapes AND is GUARANTEED more successful. Please make cheques/PO payable to:
ZX-GUARANTEED. Editor: G.A.Bobker.

ZX-GUARANTEED (Dept PCW)
29 Chadderton Drive, Unsworth, Bury, Lancs, BL9 8NL
Tel: 061-766 5712

INDEPENDENT
AMSTRAD
MICRO USERS CLUB
Newsletter, software
S.A.E. for details
John Noyce
PO Box 450,
Brighton, BN1 8GR
(Tel. 0273-602354)

SELL your unwanted Sinclaire tapes, hardware. Adertise through Southern African Software Library. Send details plus postal order for 50p per item to Simpson, Box 1769, Manzine, Swaziland, and Tap Huge New Market.

COURSES

PRACTICAL COMPUTING
SERIES OF 1 DAY COURSES
Beginners; Business applications; programming. £25 per day (lunch inc.)
DETAILS
COMPUTER WORKSHOP
TEL: 01-778 9080

MAGAZINES

DRAGON USER

To make the most of your Dragon you need **Dragon User** — the independent magazine for Dragon owners. To make sure that you receive a copy of Dragon User regularly subscribe direct to us. A year's subscription costs £10 for 12 issues (overseas rates available on application). Send a cheque or postal order made payable to Dragon user, and accompanied by your name and address, to Dragon User, Subscription Department, Oakfield House, Perrymount Road, Haywards Heath, Sussex RH16 3DH.

EDUCATIONAL SOFTWARE

VIC:20 MATHS-MAN (unexpanded). 4 functional educational program. Age 5 upwards. Only £2.50 from S. YALDEN, 14 Back Lane, Thrussington, Leicester, LE7 8TD.

DEALERS

SPECTRUMS SERVICE AND REPAIRS
MAIL ORDER OR CALL IN
HUGE
selection of software and full range of accessories. SAE for lists.
Enfield Communications, 135, High Street, Ponders End, Enfield, Middx.
TEL: 01-805 7434.

AUCTIONS

MICRO COMPUTER AUCTIONS

REGULAR MONTHLY AUCTIONS FOR ALL MICRO HARD AND SOFTWARE. SEND NOW FOR ENTRY FORM OR NEXT CATALOGUE.
TO:
Micro Computer Auctions (PCWK)
Northington House
59 Grays Inn Road
London WC1X 8TL
Tel: 01-242 0012 (24 Hours)

FOR HIRE

TO HIRE a computer from Spectrum 48K upwards, please phone or write to Business & Computer Services, 294a Caledonian Road, London N1 1BA. Tel: 01-607 0157.

BOOKS

COMPUTER BOOK Specialists. Dragon, Spectrum, Electron. SAE for full lists. D. A. Armstrong, 30 Octavia St, Kirkcaldy, Fife KY2 5HH.

BODY — POPPING, break dancing. All styles of disco. Teach yourself. SAE for details. Dance Publications, 136 Monkhill Lane, Pontefract WF8 1RT.

WANTED

FAIR DEAL? Why accept a relatively small sum for a program that might earn you many thousands of pounds. We pay high royalties. You retain copyright! We give free appraisal and marketing assistance. Don't hesitate! Send tape and instructions to: 4th DIMENSION, Unit 4, 4th Avenue, Bluebridge, Halstead, Essex.

WANTED
YOUR SOFTWARE
WIGHTSOFT will pay top royalties for good software for VIC 20, CBM 64 and SPECTRUM
We want original games; arcade and adventure, utilities and educational programs
Send your programs, or for more information, contact:
WIGHTSOFT
OLD MILL FARM
BLACKWATER
NEWPORT
Isle of Wight
Tel: 0983 528763

VISIONARY VOLTAGE
Requires M/C arcade and advernture game program for: Commodore 64, VIC 20, Spectrum and BBC Electron. Also programmers capable of translating between the above (based in London Area/Midlands.) Please send cassettes with loading instructions, and details to:-
Visionary Voltage
34, Bendemeer Rd,
Putney
London SW15

WANTED
Second hand Spectrums and Commodore 64's
— 10% discount on all 48K Spectrums in July and August only.
NEWELL DATA SERVICES LTD.,
114, Fortress Rd.,
London NW5.
01-267 9037

AGENTS WANTED
To supply hardware/software to clubs, homes, schools, etc.
!up to 25% commission.
£20.00 worth of free software with your first accepted order.
Send for details to Home Base Micro Supplies: 4 Queenswood Avenue, Northampton.

WANTED
computer games for Commodore '64.
For information, please ring; Katie on:
ESHER (0372) 68654

SUNSHINE
is seeking authors for new titles to add to its highly original and successful book range. Experienced and first time authors are invited to submit manuscripts, ideas or fields of interest. Full details of what we can offer from **David Lawrence, Book Editor, Sunshine, 12-13 Little Newport Street, London WC2R 3LD.**
Sunshine: Publishers of Popular Computing and Dragon User.

THIS SPACE FOR SALE
£18
TELEPHONE:
***PCW* CLASSIFIED**
01-437 4343 Ext 206

FOR SALE

HARDWARE/SOFTWARE for Atari, BBC, Acorn, Vic20, Commodore 64, Genie, Oric, Memotech etc. Send large s.a.e. to I.D. Hasilka, 13 Marlthorp Road, Fulham, London SW6 6QA.

ZX81, printer, recorder only £35. Phone 01-556 1841 (after 6pm).

SPECTRUM 48K with interface one, microdrive, four cartridges, fuller box, microline matrix printer with Kempston interface, green screen monitor, word-processor, Pascal, Forth and Basic compilers plus books, software. Cost over £800 – £410. Phone 01-556 1841 (after 6pm).

BBC 'B' with prism modem micronet rom, speech synthesiser, lightpen and interface, opus, 100K disk and many games. Worth £1,000. Offers or swap. Tel: 061-244 1888 (eves).

SEIKOSHA AP100A printer. Excellent condition. Manual, BBC cable, spare ribbon. Best offer within one week over £110. Call Colin Frith 029578512.

BACK ISSUES – Discount price 1983/4. Monthlies + weeklies (not specialist, exc. BBC). Phone 01-980 1934. Enter mystery prize draw if one or more bought.

AMSTRAD CP464 ram/rom disassembler. Dual window display, dump option, plus other facilities. Detailed instructions. £4.95 from Aerosoft, 90, pentre close Cwmbran, NP44 7LR.

SINCLAIR QL recent model offers Brighton 778896 after 6.00 before 8.30pm will consider part exchange with Spectrum 16/48K.

DRAGON 32. Two joysticks lots of games and books £135 ono. 01-398 2072.

Computer Swap
01-437 4343
Free readers entries to buy or sell a computer.
Ring 01-437 4343 and give us the details.

Spectrums for sale

48K SPECTRUM, cassette recorder £130.00 software, Hobbit, Backgammon, Vu-File Vu Calc Games Designer Flight Simulator £50 the lot or buy individually. Tel: Michael Guildford 576192 evenings.

48K SPECTRUM + microdrive, interface I, Currah Speech Synthesiser all under guarantee, plus 2 books, 20 programs, 3 microdrive cartridges. Cost £440 sell for £250. Tel: 01 441 3067 ask for Chris.

48K SPECTRUM one week old with over £200 of software and magazines. Accept £200 ono. Tel: Yateley 870740.

SPECTRUM SOFTWARE for sale. Games Designer £11.50. Dungeon Builder £7.50. Both hardly used. Also complete volume 2 (1983) of Popular Computing Weekly £12. Telephone Llanelli (05542) 2132 (evenings or weekends).

48K SPECTRUM. Tape recorder and over £200 of software. Sell for £200 or swap for CBM 64 (guaranteed) and tape unti. Tel: Manchester 223 9430.

SPECTRUM SOFTWARE (48K) Black Crystal, Oracle's Cave £4.00 each, Urban Upstart, Ad Astra, Manic Miner £3.00 each, Smuggler's Cove, Castle, £2.50 each. Telephone 0227 831637 (evenings).

48K SPECTRUM + cassette recorder + books + games. £140. Can deliver in London 01 328 1579.

48K SPECTRUM Originals Penetrator Timegate Galaxians Lunar Jetman 13 each or swap for Quill. Phone 0294 65793 after 4pm and ask for Clarke.

48K SPECTRUM for sell: in excellent condition, software and books. For quick sell £110. Cash only. Please write to Peter Liu 318 Streatham High Road London SW16 6HG.

48K ZX SPECTRUM plus Alphacom 32 printer, only 2 months old. Inc Manic Miner, Jet Set, Sentinal, Death Star, Assembler, White Lightning Sprite Development package and mini compiler also sound effect gen + mags. Sell £210!!!! Clevedon, Avon 878500.

SPECTRUM 48K + printer + joystick + I/F 2 + £400 software + data-recorder + 10 Spectrum books + extra printer paper + dustcover + many more extras. Value £750. Sell for £300 ono. Contact. L. Allison, 28 Belmont Crescent, Stranraer, Wigtownshire, 299 7BP.

SPECTRUM 48K + £100 worth of s/ware. Printer, 5 rolls of paper. Cassette recorder, and programmable joystick interface. £210.00 ono. Tel: 01 478 4256 (Azhak).

SPECTRUM 48K still under guarantee, tape recorder interface II, 2 joysticks and £450 worth of s/w (originals) + books + mags. £220 ono. 0482 711399.

SPECTRUM 48K, Kempston joystick interface cassette recorder, £500 (all originals) games inc. Pascal Compiler, Hobbit, Atic Attack, Fighter Pilot, Valhalla, Flag £200 ono. Tel: Steve 01 361 0146 (7pm).

SPECTRUM PRINTER. V.g.c. Boxed, manuals, hardly used. £35. Tel: 8425 10 (Greenhith) after 4pm.

SPECTRUM 48K little used immaculate conditon. Boxed. V.G.C manuals, leads etc. Perfect working order. Bargain sell £75.00. Tel: Newark (0636) 706326. Post if cannot collect.

SPECTRUM ADD ON's for sale fuller master unit £40.00 Kayde light pen £15.00 kepmston interface joystick £15.00 micro drive cateriges £4.00 each alphacom printer £45.00 tel 01—6830963

SPECTRUM 48K with keyboard, fuller master unit and printer with 5 rolls printer paper. Also £100 S/W and three books good condition, £300 o.n.o. Tel Stuart (0977) 792719 after 6 p.m.

WILL Swap my original specturm software for Currah micro speech. must be in good condition with manual etc. Please write Gordon Craig 19 Finlow Terrace, Fintry, Dundee DD4 9NQ

SPECTRUM ORIGINALS: J/S Willy, Blue Thunder, trashman, stunters, millionare all £4.00 Nightflite II Sliker puzzle, Codename Mat, £4.75 Tel: 0495 214185 private sale.

SPECTRUM ORIGINALS: Atic Atac £4 Manic Miner £4 time gate £4 gnasher £1 spectipede £1 (All £12) inc. PP 50p Tel: Southend (0702) 586841

I would like to get in touch with a pen friend to exchange spectrum programs and information, Write to Vincent Brestwood, 27 Sembawang Road, Singapore 2677.

SPECTRUM 48K Plus kempston joystick and interface plus software, books, and magazines worth over £150.00 (including ant attack, forest and beyond basic) £200 o.n.o. will sell seperately Tel: (0254) 37606.

48K SPECTRUM, ZX Micro drive inteface I, ZX Printed, Light pen, printer paper plus £150 of software including flight simulation and checked flag. £300. Tel: — 657 —4999 after 6pm.

ORIGINAL SPECTRUM Software for sale planetoids £2, spectral invaders £2, dictator £3, battle of Britain £3, VU3D £5, Flight simulation £4, forth £7. Tel: 0865 — 241406 after 4p.m.

FOR SALE Unused spectrum stonechip progreamable joystick interface (cost £25) 10 months guanantee unwanted gift £13 Tel: Martin on Bettisfield 523 any weekday after 4.30p.m.

SPECTRUM: Swap espionage island and knights quest (Mine) for any level 9 game or any mysterious adventure (digital fantasia) Phone 0574 — 2274 and ask for Paul.

48K SPECTRUM (Issue B) with manuals Leads etc. (£75 max) and printer (£18 max). Both to be in good working condition write to Asif, 17 Oakfield Rd, Rugby CV22 6AU.

SPECTRUMS Wanted not in working order just PCB for projects good price paid Mr. Seago Tel: 0502 66289.

48K SPECTRUM Brand new. used only once To check if working still in box. All leads, manual etc, with horizons tape (stil sealed) any offers £110) Tel: 0362 4497.

SPECTRUM Penpal wanted to exchange hints tipe and ideas, can swap software please write to Steven Carrett, 139 Paignton Road, Millbrook, Southampton, Hants S01 4BD Tel: 0703 787429.

SPECTRUM 48K Interface 1 and microdrive all brand new £200 o.n.o. or will split. Tel:Tome (0742) 388675.

48K SPECTRUM Plus cassette recorder and cover 23 original software titles including the prize, JSW, Trashman, Hobbit. Also book and manuals £200 or swap for CBM64 or electron phone 02367 33142.

48K SPECTRUM Plus cassette recorder, machine code books, manuals over 23 original software titles including JSW, Hobbit, Maanic Miner etc Only £200 or swap CBM64 phone 0236733142.

48K SPECTRUM B/W Television, cassette recorder (WH Smith), joystick and interface Lightpen loads of softwars packs of mags, books (M code) buyer must collect, 5 Garston Way, Great Barr, Birmingham B43 5JT.

48K SPECTRUM recorder amplifer printed attaché case kempston joystick books mags. £150 good software little use in good conditions cost £400 £195 o.n.o. Tel Sherborne (0935) 812009 eves.

Commodores for sale

VIC 20 computer, complete With instruction books, cassette recorder and nine games. In excellent condition sell £130 or swap for 48K ZC Spectrum. Must live within 50 miles from Birmingham phone 054 36 3306.

VIC 20 + cassette + Superexpander, software, mission impossible cartridge, reference guide + manuals also Sinclair printer + interface with 5 rolls of paper all boxed excellent condition will sell for £220.00. Telephone West Chiltington 3151.

CBM 64 software at half price or swap. Pipeline, Scubadive, SpaceShuttle, Transylvanian Tower, Labyrinth, Spritemaker 64, Quickthinking. Also CBM Joystick £5. Tel: 01 318 4880 after 6pm.

CBM 64/VIC 20 digital thermometer, features: deviation max. 7°C, supply over 7000 yards possible, 2 or 4 temperatures can be measured simultaneous. £12.50/39, -DM incl. postage by: K. Wilting, Heekweg 59, 4400 Münster (West Germany).

C64 CASSETTE plus games swap for Atari plus cassette and games not 400 may swap for different micro cannot deliver write to Nigel Brewin 77 Bateman Road Leicester LE3 9HF.

VIC 20 + 16K switchable ram pack. Lots of Software including JetPac, Skyhawk and Shifty. Total cost over £350 sell for £150 ono. Phone 540 9254 after 5.00pm. Ask for Stephen.

VIC 20 software for sale. All original. Includes many games, Database, Vicpro, etc. Will sell for ½ to ⅔ of the R.R.P. Ring Shrewsbury (0743) 60890. After 6pm. (Ask for Michael).

COMMODORE VIC 1515 printer + 120 sheets of paper, good condition. Will accept £120 ono. Tel: East Kilbride (03552) 24377.

VIC 20 (UNEXPANDED) user defined graphics aid create your own invaders etc. Cassette £4.95 cheque or PO to Barbain Software 39 St Johns Place, Oakley, Basingstoke Hants, RG23 7JG.

VIC 20 + cassette unit 16K Ram switchable, cartridge, £35 of softwre, Intro to Basic 1. worth over £250 sell for £160 ono. Tel: (0532) 520855, Box

COMMODORE 64 software, Skramble £5, Radar, Rat Race Cartridge £6, Revenge of the Mutant Camels £5, Hektic £1.50 Jungle Story £1.50. Ring 01 204 2456.

VIC 20 16K C2N, super expander, Intro to Basic, Omega Race, Cosmic Cruncher, Sargon Chess, Avenger, Adventure Land Voodoo Castle, Myriad, Arcadia, Mastermind games designer, books. Around £130 or sold separate. Tel: 01 427 8993.

VIC 20, C2N, 16K switchable rampack, two cartridges, 11 cassette games, plus other tapes, Quickshot Joystick, m/c book + Assembler and monitor, some mags. Sell £210 ono or swap CBM 64, 061-798-9226 after 7.30pm.

VIC 20 C2N, 32K memory, Vickit, Stack programmable joystick with adaptor, Commodore joystick, light pen, Ram pinboard, Gorf, Superlander, Arcadia, Kong etc, books. £150. Phone 0928-32521, evenings.

16K VIC starter pack, under 1 month old + over £100 of softwre including Arcadia and Jet Pac + Programmer's Reference Guide. Worth over £300, selling for £175 ono. Tel: 01 658 4186 Ask for Errol.

COMMODORE 64, Simon's Basic cartridge. Hardly used, with corrected manual. Cost £50, will accept £30 ono. Tel: 0656 55050 ask for Robert (after 4pm).

VIC 64 GOODIES, complete system being split, disc printer RS 232 modem + interface etc. Tel: Royston (Herts) 47050. Alan. Can deliver London-Home Counties.

CBM 64 + C2N cassette recorder. Programmers Reference Guide. Very good condition. £170 ono. Tel: 01 536 0216.

VIC 20, intro to Basic I + II. Cassette deck, joystick. 16K switchable ram pack. S/w. books £200. Tel: 461 627 Hoddesdon.

1541 CBM disc drive £200 + easy script s/w. Contact Mr Adams. Tel: 431 668 7272.

VIC 20 + cassette, recorder + games, books. £110. Tel: Belfast 752358.

COMMODORE 64, still under guarantee + C2N cassette unit + £150 of s/w, books, joystick. Sell £250 ono. Tel: Wellington 3923 (Somerset).

VIC 20, C2N cassette deck, 16K switchable RamPack. About £100 of games. Intro to Basic, + loads of mags. £150 ono. Tel: Langley Mill 718257.

FOR SALE CBM printer plotter — used once, newish manuals, leads etc. £75.00 Tel: 01 840 3610.

VIC 20 starter pack + switchable memory 38/16K + games. £125 ono. Tel: Stevenage 68509 (Mr Newland).

VIC 20, 6 months old, 20 games, C2N recorder, CBM joystick + intro to Basic part I + 20 books, bargain £120 ono. Tel: Oakley 5490970.

BUSINESS APPLICATION Commodore 64 5224 0031 0420 9286.

VIC 20 + cassette deck + joystick + s/w mags. All as new. Upgrade £149. Can post. Suit beginner. Tel: 01 892 6575.

CBM 64 + cassette recorder + s/w. Sell £210. Tel: 0244 815 076.

CBM 64 with C2N cassette recorder plus software will swap for Atari 800XL with 1010 program recorder. Tel: St Helens (0744) 815076 anytime. Thank you.

VIC 20 computer + tape recorder and joystick plus one cartridge and ten tapes bargain for £110 or swap for 48K Spectrum phone Alan Millom (993) 3272.

CBM 64: Simon's Basic (Brand new) £40 ono. Ultisynth £10, Space Pilot, Cybotron, Killer Watt, Son of Blagger, Super Pipeline, Boogaboo, Revenge and Attack of Camels, Aztec Challenge £5.00 each. Tel: Graham, Wakefield 252046.

CBM/PET COMPUTER. Built in VDU. Full 32K ram. Large amount of software and books. Hobby use only. Excellent condition. Might swap for BBC etc. or £195 cash! (0244) 675717.

VIC 20 16K Ram, C2N cassette recorder (all still boxed) joystick Introduction to Basic 2. £140 worth of software and books value £350. Sell for £199. Tel: Manningtree (020639) 5451.

ZX81s for sale

ZX — 81 16K for sale. Manual + all leads + many books. All in good cond. £15 + £1 50 P+P write to K.L. Chan, 9 Cornmarket, Thame, Oxon. OX9 3DX.

PRINTER for ZX81. ASR33 Teletype Complete with interface and software ready to run. Very cheap single sheet or roll. Buyer collects. £65.00 Phone Chappenham 653682.

16KZX81 + 12 Games + magazines + over 30 games (not on tape) Barginonly £45. tape recorder vgc £12 Tel: Northwood (65)24751. Week days after 4pm.

ZX81 brand new unopened plus 16K ram pack also £85 worth of original S/W offers? Tel: Dorking 887619 Guy.

ZX8116K, FD Keyboard, software worth over 7100, also a speech unit with full instructions all leads and some books, £98 the lot Tel: Ath 884558.

ZX81 16 RAM Printer Sinclair Learing LAB 12 Tapes including, space Raider, 3D Defender flight simulation £70 ono N.London 01 367 2010.

ZX81 with 16k Ram, power pack, leads, manual, All boxed plus book, magazines and software. sell for £35 ono write to A.S. Uppal 61 Topsham Road, Smethwick, Warley, West Midlands.

16KZX81 for sale with leads, manual and a machine code manual also £40 of S/W including black crystal sell all for £45 Phone Jonathan 01 540 0268.

MONOLITH ZX81 ECR 81 Enhanced Data recorder with certificate tape. Automatic levels. Trouble — free saveing and loading. Perfect Little used, £26 00 Phone Hampton—in—Arden 2189 (West Midlands).

16K ZX81 for sale plus 40 software tapes. ZX printer, joystick interface. All guaranteed plus more bargain at £100 phone 0604 410093 after 7p.m. ask for M. Hasker.

16K ZX81 Filesixty keyboard, sound unit and over £50 of software. £50 o.n.o Tel: Hudds (0484(30518.

Dragons for sale

DRAGON 32 + 3 joysticks, lightpen, magazines, dustcover & software. Less than one year old. £150. Tandy CGP-115 colour, graphics Printer. £95. Together £240. Tel: (01)- 360 3443.

DRAGON 32 FOR SALE. Books, over £100 worth of software, 1 joystick. All worth £320. Sell for £180 or nearest offer. Ring Peter on Rugby (0788) 81083. (Evenings after 6pm please).

DRAGON 64 with tape recorder three joysticks four games inc The King and dust cover all boxed and in excellent condition (6 months guarantee) £250 ono Tel: Stockton (0642) 551154.

DRAGON 32 SOFTWARE mace assembler cartridge and manual data sheets for Motorola chips Quick Reference machine code booklet two games Pimania Dragon Trek £35.00 sell separately for offers Hastings 433795 pm.

110 DRAGON programs (worth £700) from Microdeal D. Data etc. plus Texas TI994A computer + joysticks + £60 Texas software. All for only £100 ono may split. Phone Asif. Blackburn 0254 672068.

DRAGON 32, 2 joysticks, 1 cartridge, 16 Dragon User mags, 9 games, 2 books, all manuals. ONLY £99 phone Simon on 837471 (Stockwood).

DRAGON 32 MAGAZINES, serious software and games, one joystick, books all leads reduced for a quick sale only £50 phone (evenings) (0453) 45515 and ask for David.

DRAGON 32 + best s/w + books etc + joysticks + cassette. Worth over £385, sell for £100. Genuine reason. Call or write — Mr. M. O'Donnell, 5 Worthington Close, Runcorn Cheshire.

DRAGON 32 + joystick, s/w, including The King, Dragon Hawk, Ring Of Darkness, Frogger, Pedro + more. £100 ono, + books, mags, Tel: (0978) 780620.

DRAGON CARTRIDGES For sale, chess, beserk, skingg, vazar commander, polaris megabug poltergeist dinowars, ghost attack rail runner,. All ten for £60 phone 0 — 8211710 after 5 pm

DRAGON 32 Boxed, 2 cassette recorder, 3 joystick, + quickshoot, dirt cover £200 of S/W all original Inc cartridge and Tutorial workstation all leads. £200. ono. Tel 01 858 4672 after 4pm

COMPUTER SWAP

Computer Swap entries are limited to 30 words. Either fill in the accompanying form and send to Computer Swap. *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD or telephone 01-437 4343.

All software offered through computer swap must be in original condition and for private sale only.

It cannot be swapped.

Warning: It is illegal to advertise pirated software.

COMPUTER SWAP

Please write your copy in capital letters on the lines below.

Name.....

Address.....

.....

Telephone.....

DRAGON Disc drive and Dos used twice £100 ono must collect Telephone 0698 — 385165 of write 38 Moss Rd Wigshaw starthclyde Scotland.
DRAGON 32 + joysticks, light per magazines, games & utilties software. less than a year old £150. Tandy CGP-115, colour, graphics Printer £95 Sell together for £240. Tel: 01 — 360 3553.

For sale

QUICKSHOT JOYSTICK and interface (Spectrum) boxed. Unused. (Won't fit in my case). Bargain £18. Tel: Churston 842209.
FIRST 14 issues Micro User, Acorn Users March to Nov. 1983, First 3 A&B Computing Magazines, Programming BBC Micro — Williams, Basic BBC programming- Cryer & Cryer As new half price. Tel: (0484) 39295.
EVERY ISSUE 'Your Computer' magazine May 1981 to present plus many other mags. Also Dragon software, cheap. Phone Ware (Herts) 68264. Wanted Ikon Ultradrive for Dragon.
TI99/4A Home computer. V. good condition plus cassette recorder and leads with five cassette games £80 ono. Tel: 061-861-8835 after 6pm or weekends ask for room L5.
TRS 80 32K L2 with expansion interface monitor and cassette recorder plus lots of software including Mission Impossible, Invasion Force, Pyramid. £295 ono. Write to M. Hurer Brenthurst, Barnet Rd., Arkley, Herts. EN5 3LW.
TEXAS 16K computer complete with TV, all leads, books, games, beginners Basic cassette, etc. Only 4 months old. Phone 01 890 1502 Mr Clark.
DRAGON 32, cassette recorder, £80 Tel: 0494 33950 (eve only).
THREE VIC TAPES issues I, II, III and escape the MLP. Sell £1.50 each or altogether £5.00. Tel: 0908 568765.
2 OF MATRIX printer, 24 coloumn graphics double side width character. Parnelle or serial, suit most computers. Tel: Harrington 83097.
SHARP PC 1500 with printer/cassettle interface + 8K Ram module manual £250. Tel: Dave Crewe. Tel: day — 01 540 8300 ext 3045 Eves 01-866 5309.
COMPLETE ZOOM —Pascal disk, utility for C64 £18 or swap for Oxford Pascal. Ring Mick 01 828 2333 ext 249 day.
OSBOURNE I double density. Masses of xtra s/w £25. Tel: 01 485 1468.
TRS 80 model I level II, 48K monitor, tapes dual disc, word processor and other programs. Home business use. May split £480 ono. Tel: 0695 632 989.
SILVER REED interface 44 £65.00. Tel: 01 603 2935.
TWO 48K TRS 80 model I. Twin disc drives £600 each. Tel: 061 205 0516.
TRS 80 I. 16K monitor, cables, s/w. £130 ono. Some programs inc: Database £10. Tel: Welwyn Garden City 24591.
JUPITER ACE + forth manual as new £50. Tel: Chesterfield 0426 71997.
CASIO PB100 pocket computer with cassette interface printer. Ram expansion + case. £60. Tel: 01 808 9002.
TRS 80 model 3, level II. 16K cassette £300 ono. Tel: 021 704 9000. Office hrs. Miss Nickleburgh.
ORIC I 48K 5 months old. Only used few times. As new. Inc: 2 programs books + selection of tape s/w £83.00 ono. Tel: Clevedon 0272 87632.
LYNX 48K computer 8 months guarantee + Lynx tuner and N.I.L.U.G. mags + some s/w £150.00. Tel: Shrewsbury 245 671.
LYNX 48K £140 ono. Tel: 01 969 8076.
TEXAS S/W for sale. Video chess + Space Invaders. £10 each. Extended Basic £50.00. Voice synthesiser £30.00. All new. Tel: 01 992 6548.
SEIKOSHA GP100A printer. Condition as new. Bargain at £120. Tel: 01 935 5832.
SINCLAIR ZX interface 2 Joystick port/ cartridge socket. Not needed as I am not an avid games player! Quick sale only £15 phone (01) 319 1572 after 5pm.
96K LYNX £150.00 ono. All leads 2 manuals. Tel: Shaw 841 996 after 6pm.
48K LYNX complete with Joystick interface + £70 of s/w + demo + 4×C15 cassettes, Lynx Computing book and N.I.L.V.G memership £130.00. Must collect. Southend (0702) 524958.
ZX PRINTER with 10 rolls of paper £35. Tel: 0625. 877496.
LYNX 98K. Some software as new £180. Tel: 0970 828 851.
MAPLIN modem kit with box £50 ono. Rotherham 549235.
CYTRON, DUNGEON builder, Quill, Super chess 3, selection for sale. Originals only. Tel: Shrewton (0980) 620114.
LYNX 48K WITH MANUAL + lead serial interface pack. Inroductory books £99.00. Tel: Coggeshall (Essex) 0376 62630.
ELSTON computer cassette recorder perfect condition. Sell write BBC leads. £20. Can post. 01892 65 75.
SPECTRUM 48K (3 months old) under guarantee + s/w (chequered flag and others) + books worth £30. Mint condition. Sell £10. Tel: 01 223 3816.
SHARP MZ80K, micro, plenty of s/w games + utilities + books. Excellent condition £190 ono. Tel: 0229 37853.
TEXUS T199/4A 16K cassette interface cable £50. Tel: 01 642 3816.

WANTED

HIGH QUALITY daisy printer ie: Shinwar Daisy step 2000. Cash paid. Tel: 01 986 0666. Eves.
SPECTRUM S/W for swap or sell. All
SWAP TWO QUICKSHOT II joysticks for 2 competition pro joysticks will pay postage write to 7 Turner Road Norwich NR2 4AD.
original games inc: Moonalert, Sabre Wolf, Blue Thunder, Caesar The Cat, Tutankhamum, Scuba Dive, Trashman. Phone for details 041 771 1164.
48K SPECTRUM for around £50. Tel: Bobby on Dunstable 63230.
SWAP 48K SPECTRUM s/w (Atic Atac Oracles Cave, Games Designer) Tape recorder for Atari 800 CV 400 48K. Tel: 061 766 3494.
WANTED SPECTRUM computing cassette/magazines and 2 Armstrong. 1 Chestnut Drive, Holme On-Spalding-Moor, York YO4 4HW.
WANTED ANY RECORDINGS in Basicode will come to some arrangement tel John 061 792 1122 after 7pm.
WANTED TI-99/4A software. Spectrums, extended Basic, Terminal emulator etc. For sale TI-99/4A Chess Module £12 also Atari Game Cartridges £8 each tel 01-992 6548.
WANTED BBC B 1.2 o/s sensible price will be paid for the right machine phone Weybridge 49669 after 4pm.
QUICK! PLEASE SWAP my 48K Spectrum + Spectrum, tape recorders, manuals etc magazines + well over £300 worth of software for your CBM 64 + tape recorder. Phone please please!
WANTED CGL M5 software and hardware will swap Sanyo Sportster for Basic F or Falc also Yamaha CSO1 Synth for 32K Ram or what have you Sean — Kylemore, Connemara, Co. Galway, Ireland.
SWAP £150 of Spectrum software (Hobbit, Ant Attack, Zzoom, Manic Miner, Compiler, Maziacs, Speech, C. Flag etc plus Kempston joystick and interface for 16K ZX81 + extras. Phone evenings (0244) 890139.
WANTED 1.2AMP power-pack supplied with ZX-81 printer. And unwanted softwares, for ZX-81 or Spectrum. Preferable business — softwares or mind games. Telephone Tony 01-659 5083. 31 Melbourne Court, Anerley Rd, London S.E.20
WANTED 14" colour portable T.V. or same size colour monitor. Also printer for Spectrum, not Sinclair. Tel: 01 952 9548.
SWAP CBM 64 games, Hobbit, Neoclypse, Mr Wimpy, Hunchback, Siren City, Cosmit Split, For Valhalla and
others, Maria Jones — 63 Downshaw Road, Ashton-upon-Lyme, Lancs.
WANTED: COMPUTERS, equipment, cable, sockets etc. for computer club. Cash offers made. Phone Chris on (0788) 832468 or write: Mr C. Haine 4, Cord Lane, Easenhall, Rugby, Warwickshire CV23 0H2.
SWAP TI99/4A, as bought, perfect condition, plus cassette lead, software, and books, for 16K Spectrum, or 16K VIC 20 plus recorder. Preferably Tyneside area. Phone (0632) 553158 after five. Ask Ian.
SMALL ENGAGED MODEL railway layout some rolling stock + engine to swap for ZX printer. Tel: 310 1376 Woolwich.
SPECTRUM + S/W to swap inc: Pole Position, Match Point — 01 937 1811.
FRUIT MACHINE — electric slot 1P + 10P ex pub. Swap for a Spectrum Dragon, Electron or Spectrum + s/w. Must collect — Nantwich nr Crewe — 0270 628502.
WANTED 48K SPECTRUM — extras unnecessary. Tel: 021 742 1446.
48K SPECTRUM WANTED. BBC model: good price paid. Tel: 0305 053408.
OSBOURNE WANTED, preferably model II. Very good condition. Super Brain and also printer — tel: Mr Laru — 0203 418938 office hours. Kendworth 0926 55064 eves.
SWAP BBC LIGHT pen + s/w for Acornsoft Aviator or sell for £10.00. Tel: S. Patel 43 Whernside, Ashton-under-Lyme, Lancs Ol6 8NY.
WANTED: ANY PRINTER with dot-addressable graphics and parallel interface for use with TRS-80. Contact Nigel on 0966-33441 ater 7pm.
SWAP 48K SPECTRUM + Seikoshia MKII Graphics Printer + interface + word processor + portable TV + cassetts + software for Commodore 64 + cassette + software or will sell 30 Brown Cres Sutton in Ashfield Notts.
EXCHANGE, TWO 1/12m scale model electric racing cars for radio control, for CBM 64 s/w. Or sell £25 each. P/ex against disc or printer. Tel: Keith on Scunthorpe (0724) 851132.
WANTED BBC model B micro swap for Vic 20 + £20 of accessories. 01 949 7464.

Diary

Event	Dates	Venue	Admission	Organisers
Electron and BBC Micro User Show	Aug 31-Sept 1 10.00am-6.00pm Sept 2 10.00am-4.00pm	UMIST Manchester	£2.00 adults £1.00 children	Database Publications 061-456 8383
Games Day 84	Sept 1 10.30am-6.00pm Sept 2 10.00am-5.00pm	Royal Horticultural Society's New Hall, Greycoat St, London SW1	£1.25	Games Workshop 01-868 3713
Hampshire Computer Fair	Sept 6 11.00am-9.00pm Sept 7 10.00am-5.00pm	Guildhall, Southampton	Trade – free public – £2.00	Testwood Exhibitions 0703 31557
Walthamsoft 84	Sept 8 10.00am-5.00pm	Main Exhibition Hall, Waltham Forest Technical College, Forest Rd, London E17	£1.00	London Exhibitions and Promotions 01-554 8039
ZX Microfair	Sept 8 10.00am-6.00pm	Alexandra Palace, London N22	£1.00 adults 50p children (in advance)	ZX Microfairs 01-801 9172
Personal Computer World Show	Sept 19-22 10.00am-7.00pm Sept 23 10.00am-5pm	Olympia 2, Hammersmith Rd, London W6	£3.50	Montbuild Ltd 01-486 1951
Livingston Computer Fair	Oct 6-7 10.00am-5.00pm	Peel House Ladywell Livingston W Lothian	£1.00 adults 50p children	Itec/W Lothian Computer Club 0506 39048

MEGA-BIX

In *Paranoid Pete*, Pete is paranoid because of his concern for wheat and the way it is so easily decimated by Mega-Wibblies. This is agrarian commitment of the highest level.

Pete looks vaguely like one of those Weetabix characters and his job is to dig in the seed which is falling from the harvester spaceship and protect both it and himself by bashing the roving Mega-Wibblies. There's lots of colour and graphics in the game, but it isn't fundamentally very sophisticated. This is perhaps why Ubik have stressed its appeal to younger players. Simplicity can be a virtue.

If you're five, you may well love the game; if you're 15 you won't be impressed. Technically it's nothing special.

Program *Paranoid Pete*
Price *£5.50*
Micro *Spectrum*
Supplier *Ubik*
66 Rothwell Road
Gosforth
Newcastle upon Tyne
NE3 1UA

FOR SCHOOLS

I think, he says sticking his neck out, waiting for it to be chopped off, that *Pilot — Plus/64* is the first appearance of this language on the Commodore 64. In fact, I can't recall having seen another version on any home micro other than the BBC.

Pilot is supposed to be as good a language as Basic for learning with and is particularly suitable for things like tests and other things with a list-like structure.

The booklet you get with the program gives you enough information about the language to enable you to actually do some programming of your own, as opposed to referring you to reference works on the subject.

Although it could be useful for writing things like adventure games, I suspect that mostly this is a package for use in schools rather than for the average punter, hence, partly, the price £26.

Program *Pilot-Plus/64*
Price *£26*
Micro *Commodore 64*
Supplier *Sigma Press*
5 Alton Road
Wilmslow
Cheshire
SK9 5DY

GO WEST

An adventure for adventurers and ZX buffs of long standing is *The Quest for the Holy Joystick*. It's text only and Quilled, but with a nice line in in-jokes and references to the flotsam and jetsam of computer life.

One of the first locations you'll come to is the ZX Computer Fair at Alexandra Palace at which you will find such obscure reference points as 'The Sunshine stand' and 'Tony Bridge' (who he?). Here, too, you will discover one of my favourite bits, 'West there is a very famous adventure' it says. You go west and well... buy it for yourself.

Virtually every adventure you can think of, including *Denis* and *The Hobbit*, appears at some point in the game and personally I heaved a sigh of relief for a game, particularly an adventure, that does not take itself too seriously. Not only that, but it seems to function perfectly well as an adventure, too. After an hour I was still none the wiser about the plot but quite entertained. Excellent for those who don't like to take adventuring too seriously.

Program *The Quest for the Holy Joystick*
Price *£4.95*
Micro *Spectrum*
Supplier *Delta 4 Software*
The Shieling
New Road, Swansea
Hants SO3 2PE

Pick of the week

WIDE VOCABULARY

Around a year ago Psion released, under licence, a version of *Scrabble* for the Spectrum that had a vast vocabulary and had us all amazed and impressed. It's still a 'vital' enough program to be included on the special microdrive deal Sinclair have planned for Christmas.

Now the people who issued the licence, Leisure Genius, have issued the Commodore 64 version of the game. It forms part of a planned range of games based on originals designed by Spears and Waddingtons.

The Commodore version of *Scrabble* adopts the same standards as the Spectrum one. The Scrabble board on screen is comparatively small — just big enough for you to read the letters. Up to four can play, one of whom can be the computer. The computer is equipped with 11,000 words which is enough to ensure a reasonable game.

How long the computer spends hunting through its database of words is determined by a skill level set at the beginning of the game. The highest level can take a very long time indeed. As in the Spectrum game, you can see the computer trying out words and checking scores on the screen while you're waiting for it to come to a conclusion.

People always complain if one reviews things by comparing them with something on another machine, so let's just say that *Scrabble* on the Commodore 64 plays a mean game and that any microcomputer can play *Scrabble* is a remarkable thing in itself. As such it's highly recommended to any Commodore owner. But I can't help thinking it a bit odd that it knows no more words and responds more slowly than the Spectrum (48K instead of 64) version.

Program *Scrabble*
Price *£12.95*
Micro *Commodore 64*
Supplier *Leisure Genius*
3 Montagu Row
London W1H 1AB

SIX-PACK

Hardly a new release — but a new concept perhaps. Beau Jolly has bought up the rights to most of the Imagine catalogue and are issuing the games, along with a couple of Liverwire in packs of four and six.

There's little point in reviewing the games (apart from one unseen one called *B.C. Bill* which is also available separately and can be reviewed as such) but given that the Commodore 64 pack, for example, consists of *Arcadia* (very good) *Pedro* (not so good) *Cosmic Cruiser* (very good) *B.C. Bill* (reviewed sepa-

rately), *Invaders (very good)* and *3D Jumpin Jack* (best *Frogger)* — it's obvious you're not getting dross.

Therefore the main consideration is the price —it's £14.99 for the six packs and £9.99 for four.That's around £2.50 a game — most of them previously £5.99 or so. So the packs are an excellent idea for those who've just bought their computer and want a range of games to start off with or aunties who want something to buy as a Christmas present, but are not sure what to choose.

Program *Commodore 64 Pack*
Price *£14.99*
Micro *Commodore 64*
Supplier *Beau Jolly*
19a New Broadway
Ealing
London W5 5AW

BODILY PARTS

Frank N Stein is fun. In fact, although there's really nothing technically astounding about it and neither could it really be said to be original in any way, somehow it does something right and I found myself having many more just one-more-goes than I have had for ages. Since *Jet Set Willy* in fact.

It's a collect and doge game — you collect the bits of Frank N Stein's body, dodge various completely irrelevant and odd objects and wander back and forth. There are various platforms on various levels and you must use a series of springs to bounce from one to another. Frank N Stein's monster's parts have to be collected in the right order and eventually returned to the lab at the top of the screen.

Each screen is different and requires a new strategy: things bounce, wobble and bash you in unexpeced ways and figuring out how to collect all the different bodily parts without getting bashed becomes a matter of some judgement and skill. In the top five within two-weeks of release, I'd say.

Program *Frank N Stein*
Price *£5.95*
Micro *Spectrum*
Supplier *PSS*
452 Stoney Stanton Rd
Coventry
CV6 5DG

UNPARTISAN

Ocean have produced the first reasonable *Track and Field* clone I've seen. It can come as no surprise to discover that it's for the Commodore 64.

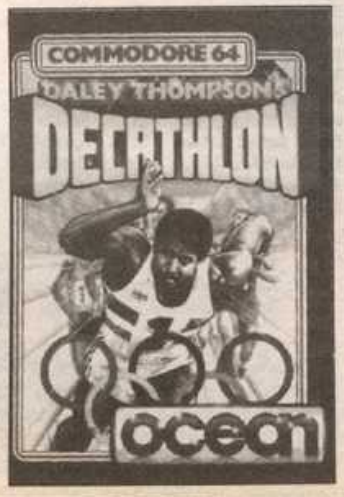
Entitled *Daley Thompson's Decathlon* it is apparently endorsed by your favourite world's greatest athlete and mine, as well as being well . . . good I suppose. It couldn't be said to require the same skills as the real thing, though.

The game also has an extensive soundtrack, which is partly Yellow Magic Orchestra (hope you're paying royalties, lads) and partly a specially composed Olympic anthem-type thing which is actually pretty good.

Like *Track and Field* you race, throw and jump by a mixture of frantic joystick toggling and the fire button — the former to get up speed, the latter to determine the angle of jump (or throw). You can compete against the computer and another player — if you beat the current record the crowd erupts with entirely unpartisan cheers. (Here the program diverges from real life.)

It's not *Track and Field*, of course — the graphics aren't quite up to it. But it's close and there is a little man who comes out to measure your jump with a tape when appropriate.

Program *Daley Thompson's Decathlon*
Price *£7.90*
Micro *Commodore 64*
Supplier *Ocean*
6 Central Street
Manchester M2 5NS



XMAS

Every now and then we get something new for the Texas TI99/4A; the temptation to ignore it is strong, though, since unless they come from Texas themselves they are certain to be in Basic and not good compared with the offerings of other micros. This, I hasten to add, is totally Texas's fault for not making the technical details of the machine more accessible.

Sloopy's Christmas is based on a well-known cartoon character to which Sceptre Software almost certainly don't have the rights. The game has three screens, to get from one to the other you need a password. The first screen has you helping Sloopy's friend to drop in (literally) on his Christmas celebrations, then he has to shoot a turkey and finally drive home safely.

One nice idea is *Musiload;* as the program loads on one tape channel, the other is used to play music — probably like waiting for a plane to take off.

Program *Sloopy's Christmas*
Price *£6*
Micro *Texas TI99/4A*
Supplier *Gamesware*
54 Wycliffe Avenue
Newcastle upon
Tyne
NE3 4RA

BIG DADDY

Quiz programs seem to be what's happening, man, in the wonderful world of computer software — dozens have been released over the past few months giving hours of fun fo all the family (apparently — my family hates them).

What looks like being the big daddy of them all is *Junior Quiz* on the BBC and the Electron. This tape has a machine-code program that formats and organises the questions and 15 files of questions on various subjects from nature spelling.

Aside from the vast number of question available, what also makes this one of the best of its kind is a sensible menu system that lets you choose the style of question you want — multiple choice, yes or no — and add your own questions to the files.

The program's nicely packaged with a clear explanation of what does what and the range of questions should mean it takes quite a while to exhaust.

Program *Junior Quiz*
Price *£10.95*
Micro *BBC/Electron*
Supplier *Kosmon Software*
1 Pilgrims Close
Harlington
Dunstable
Bedfordshire
LU5 6LX

HIGHLIGHTS

Although nothing seems to be able to move *Football Manager* from its position as 'the best football manager game' people still venture into the genre — probably because a lot of programmers also like football.

The Double is for the Commodore 64 and has the immediate virtue of being £2.99. It's far more a management game than *Football Manager* — it doesn't for example, have match highlights graphically displayed. On the other hand there are a large number of options available to you, from changing the formation of the team to spying on your rivals.

It isn't all buying and selling players either; as manager you have to consider things like gas bills, wages and other mundane details. Can you fight your way to the first division without going broke? For a mere £2.99 you can find out.

Program *The Double*
Price *£2.99*
Micro *Commodore 64*
Supplier *Senator Software*
63 Graham Ave
Broxbourne
Herts

Top 10

Atari

1	(2)	Bruce Lee	(Datasoft)δ
2	(1)	The Hulk	(Adventure International)†
3	(3)	Encounter	(Novagen)‡
4	(–)	Popeye	(Parker)*
5	(–)	Planetfall	(Infocom)‡
6	(–)	ACE	(English)
7	(6)	Captain Sticky's Gold	(English)
8	(–)	Rally Speedway	(Adventure International)*
9	(10)	Slinky	(US Gold)
10	(–)	Astrochase	(Parker)*

*Cartridge. †32K cassette. ‡32K disc. δ48K disc.
(Figurees compiled by Calisto Computers, Birmingham 021-632 6458)

Sprectrum

1	(5)	Full Throttle	(Micromega)
2	(1)	Jet Set Willy	(Software Projects)
3	(2)	Jack and the Beanstalk	(Thor)
4	(3)	Tornado Low Level	(Vortex)
5	(6)	Blue Thunder	(Foundry Systems)
6	(10)	Match Point	(Psion)
7	(9)	Chequered Flag	(Psion)
8	(–)	3D Tank Duel	(Real Time)
9	(7)	Lords of Midnight	(Beyond)
10	(–)	Psytron	(Beyond)

(Figures compiles by W H Smith and Son, London)

BBC B

1	(2)	Fortress	(Pace)
2	(6)	Ghouls	(Micro Power)
3	(3)	Micro Olympics	(Database)
4	(–)	Spitfire Command	(Superior)
5	(1)	Overdrive	(Superior)
6	(5)	Mr Whiz	(Superior)
7	(4)	Aviator	(Acornsoft)
8	(7)	Stock Car	(Micro Power)
9	(8)	Star Striker	(Superior)
10	(9)	JCB Digger	(Acornsoft)

(Figures compiled by W H Smith and Son, London)

ZX81

1	(–)	Krazy Kong	(PSS)
2	(2)	Planet Raider	(Novus)
3	(4)	Alien Rain	(CRL)
4	(1)	Krypton Ordeal	(Novus)
5	(3)	Walk the Plank	(Novus)
6	(6)	Black Crystal	(PSS)
	(7)	Flight Simulation	(Psion)
8	(10)	Asteroids	(Quicksilva)
9	(–)	Space Raiders	(Psion)
10	(4)	Football Manager	(Addictive Games)

Two titles tied for 8th position
(Figures compiled by Boots/Websters)

Vic 20

1	(–)	Flight 015	(Craig Communications)
2	(2)	Sub Hunt	(Mastertronic)
3	(1)	Snooker	(Visions)
4	(–)	Golf	(Audio Genic)
5	(–)	Bewitched	(Beau Jolly)
6	(–)	Andes Attack	(Llamasoft)
7	(4)	Undermine	Mastertronic)
8	(3)	Phantom Attack	(Mastertronic)
9	(–)	Crazy Kong	(Interceptor)
10	(5)	Vegas Jackpot	(Mastertronics)

(Figures compiled by Boots/Websters)

Commodore 64

1	(2)	Space Walk	(Mastertronic)
2	(–)	Scramble	(Interceptor)
3	(1)	BMX Racers	(Mastertronics)
4	(5)	Manic Miner	(Software Projects)
5	(–)	Duck Shoot	(Mastertronics)
6	(–)	Sub Hunt	(Mastertronics)
7	(–)	Hareraiser Prelude	(Haresoft)
8	(10)	Flight Path 737	(Anirog)
9	(–)	Chinese Juggler	(Ocean)
10	(–)	Purple Turtles	(Quicksilva)

(Figures compiled by Boots/Websters)

Dragon 32

1	(1)	Pedro	(Imagine)
2	(–)	Chuckie Egg	(A&F)
3	(10)	Cuthbert in the Jungle	(Microdeal)
4	(9)	Ring of Darkness	(Wintersoft)
5	(3)	Hungry Horace	(Melbourne House)
6	(–)	Dragonfly 2	(Hewson)
7	(2)	Hunchback	(Ocean)
	(–)	Dragon Chess	(Oasis)
9	(–)	Space Shuttle Simulator	(Microdeal)
10	(–)	Chocolate Factory	(Minitu)

Two titles tied for 7th position.
(Figures compiled by Boots/Websters)

Books

1	(1)	Commodore 64 Programmers reference Guide	(Pitman)
2	(4)	60 Programs for Commodore 64	(Pan)
3	(–)	Introducing Commodore 64 machine code	(Granada)
4	(–)	Advanced Programming for BBC	(Granada)
5	(5)	Commodore Graphics & Sound	(Granada)
6	(–)	Commodore 64 Disk Systems and Printers	(Granada)
7	(–)	Data Handling on Commodore Made Easy	(Granada)
8	(–)	Advanced Machine Code Programming for Comodore 64	(Granada)
9	(–)	Make Most of Microdrive	(Granada)
10	(3)	Beginners Micro Guide-Spectrum	(Granada)

(Figures compiled by Websters)

Book Ends

CARTOONS

Curiously enough, *The Really Easy Guide to Home Computing, Commodore Edition,* is really easy, as well as being a useful guide.

It's a big book designed for kids which uses a variety of little cartoons to take you slowly through the rudiments of Basic programming, pointing out possible sources of error and showing you exactly how to get each of the graphics characters used for the control codes.

The only problem with the book is that, because of it's thouroughness, it doesn't actually take you very far — the latter pages go only so far as to deal with printing things on the screen in the right position and using control characters.

Still, it ought to be very useful to the absolute beginner who is in no hurry to understand everything at once.

Book *The Really Easy Guide to Home Computing*
Price *£7.95*
Micro *Commodore 64*
Supplier *Century Communications Portland House 12-13 Greek Street London W1V 5LE*

SIMPLE

Following close on the heels of Forth as language of the month is Logo, versions of which are cropping up all over the place — a Spectrum edition was recently released to much acclaim.

Although Logo is supposed to be fairly simple language designed for children to learn quickly there are few simple books about it. One problem is the non-standardisation of versions of the language — among micros only the Sinclair one is supposed to meet the official requirements.

Logo Programming, a book from Century, gets round the compatibility problem by presenting problems for both Apple and Research Machines Logo types with notes covering other differences.

Obviously much of this book concerns itself with turtle techniques and drawing pictures but there is more to Logo than this. Other sections of the book describe the use of Logo to manipulate text and figures, using lists and procedures.

Book *Logo Programming*
Price *£6.95*
Micro *General*
Supplier *Century Publishing Portland House 12-13 Greek Street London W1V 5LE*

This Week

Program	Type	Micro	Price	Supplier
Zorakk the Conqueror	Ad	BBC	£7.95	Icon
Space Station Alpha	Arc	BBC	£7.95	Icon
BBC Basic	Ed	BBC	£14.95	John Willey
Arts Designer	Ut	BBC	£7.95	Pica
Squash	Ut	BBC	£9.75	Pica
Bruce Lee	Ad	Commodore 64	£14.95	US Gold
Jolly Jack	Ad	Commodore 64	£6.95	Harbour
The Dallas Quest	Ad	Commodore 64	£14.95	US Gold
Zim Zala Bim	Ad	Commodore 64	£9.95	Melbourne House
Double Trouble	Arc	Commodore 64	£6.95	Creative Sparks
Havoc	Arc	Commodore 64	£9.95	Dynavision
Spitfire Ace	Arc	Commodore 64	£9.95	US Gold
Love Bytes	S	Commodore 64	£5.95	Harbour
Nato Commander	S	Commodore 64	£9.95	US Gold
System 1500	S	Commodore 64	£12.95	Craig Communications
Dragonfire	Ad	Spectrum	£7.95	Cheetahsoft
Rogue Ship	Ad	Spectrum	£7.95	Alan Pywell
Sherlock	Ad	Spectrum	£14.95	Melbourne House
The Final Mission	Ad	Spectrum	£5.50	Incentive
Beach Head	Arc	Spectrum	£9.95	US Gold
Bear George	Arc	Spectrum	£6.95	Cheetahsoft
Kokotoni Wilf	Arc	Spectrum	£5.95	Elite
Moonsweeper	Arc	Spectrum	£7.95	Cheetahsoft
Stagecoach	Arc	Spectrum	£6.95	Creative Sparks
System 1500	S	Spectrum	£9.95	Craig Communications
Analyser	Ut	Spectrum	£35.00	Number One
Class List	Ut	Spectrum	£3.00	P Nethercot
Fuel Consumption	Ut	Spectrum	£2.00	P Nethercot
Integrated Bus. Sys.	Ut	Spectrum		Hestacrest
Russian	Ut	Spectrum	£1.00	P Nethercot
School Fund	Ut	Spectrum	£3.00	P Nethercot
Spec. Sound Effect	Ut	Spectrum	£7.95	MFM
Double Trouble	Arc	Spectrum	£6.95	Creative Sparks
Adults Only	S	Vic20	£5.99	Sophisticated Games
Spectrumiser	Ut	ZX81	£6.50	James Paton

Key: **Ad** — adventure/**Arc** — arcade/**Ed** — education/**S** — strategy-simulation/**Ut** — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to: This Week, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

The right question

It is traditional to think of technological development as something which responds to a need.

Society needs a means of communicating quickly over great distance and the postal system is born. The horses used by the post office get tired, the carriages are slow and so new carriages are developed which are light and fast, yet reliable, but still not fast enough. The postal industry is quick to adopt the new technologies of transportation; cars, motorcycles, aircraft, and so on, but society demands more.

Alexander Bell, Guglielmo Marconi, and a great number of other inspired workers were busy creating answers to this particular problem. Now we are all communicating like mad with our telephones, radios, televisions, and modems.

Have the temerity to mention that you would like to watch the Olympic games live from half-way around the world and someone is only too pleased to stuff up a couple of satellites in geo-stationary orbit to help you out.

This is the traditional view of technological development and, very often, is completely wrong.

It is nonsense to suggest that Orville and Wilbur Wright had any great desire to solve the problem of meeting the world demand for cheap package holidays abroad. They had a huge desire to fly and that was about it. The technologies which they pioneered and the answers they provided were picked up and used to meet a number of diverse needs, to solve a range of problems.

It strikes me that very often the major developments of society follow behind the provision of answers by technologies.

If you are already the owner/user of a home computer then you will probably know exactly what I mean. Did you have a need for the computer before you got your hands on it? Did the computer answer that need? Most people would say no to either one or both of these questions.

We have not yet really started to ask the proper questions of the home computer, but very few people have yet described the thing as a failure. In fact it is my opinion that the home computer is a damn good answer still searching out the right questions.

Some of those questions are beginning to make themselves known now. What do we do for home entertainment when we get fed up with the limitations of the television? What do we do when we want special education at our own pace and convenience? How can we get better control of our home, its various gadgets, the heating systems, the communications systems? What happens when we want expert advice but can't get the attention of (or can't afford or can't understand) the expert?

You can guess what I think the answer is. Can you guess what all the other questions are going to be?

If you can, then you are one of a select band. Not enough people at the moment seem to be devoting themselves to thinking up uses for the micros.

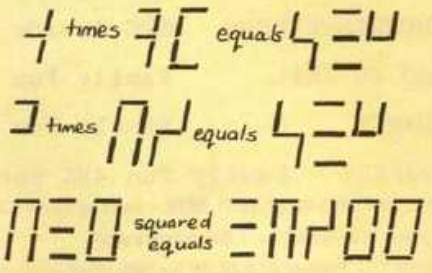
And I must confess I don't know why not. It seems that nobody wants to know because they are all too busy playing games.

What will happen when people begin to get bored with games? **John Cochrane**

Haywire digits

Puzzle No. 122

When Jamie dropped his calculator, the display went haywire. Although it still calculates accurately, the digits that are displayed are shown in a rather curious fashion. For example, here is the result of three multiplications:



Unfortunately, the arrangement of the segments of each digit displayed gives no clue as to the original digit. That is, any segment that is displayed does not necessarily indicate that that particular segment is displayed in the digit — and vice versa.

However, there is one consolation in that the faults are constant and any symbol displayed always represents the same digit whenever it occurs. Also the zero is unaffected and shows as normal.

Can you decipher the displays shown?

Solution to Puzzle No 117

This problem can be worked out in much the same way as it would be done longhand, with pencil and paper. In fact, the reciprocal of 97 is a recurring decimal which repeats every 96 digits, so it would be quite easy to find the millionth decimal place, or any other value above 96, without actually counting them. One solution is: **10** D = 10 **20** N = 97 **30** PRINT "0."; **40** IF N > D THEN GOTO 300 **50** Z = INT (D/N) **60** PRINT Z; **70** D = (D–(Z * N))*10 **80** GOTO 40 **300** D = D * 10 **310** PRINT "0"; **320** GOTO 40

Thus the 91st digit is easily counted off and found to be a '1'.

Winner of Puzzle no 117

The winner is Colin Tame, Estcots Drive, East Grinstead, West Sussex, who receives £10.

Rules

The closing date for Puzzle No 122 is September 15.

The Hackers

PIMANIA-The Cult Adventure		48K Spec	£10
CRUSOE	M/C Adventure	48K Spec	£6
OLYMPIMANIA	M/C Arcade	48K Spec	£6
PIROMANIA	M/C Arcade	48K Spec	£6
PI-IN'ERE	M/C Arcade	48K Spec	£6
PI-BALLED	M/C Arcade	48K Spec	£6
PI-EYED	M/C Arcade	48K Spec	£6
MORRIS/BIKERS	M/C Arcade	Any Spec	£6
GO TO JAIL	Family Fun	48K Spec	£6
DARTZ	Family Fun	48K Spec	£5
YAKZEE	Family Fun	48K Spec/Dragon	£5

THE PIMAN'S GREATEST HITS – amazing stereo L.P. cassette £3 ☐

"I'M A PIMANIAC" – T-Shirts (state size) £5 ☐

JOIN THE PIMANIACS CLUB for 20% off all products, pi-monthly magazine etc. Annual Subscription £5 ☐ U.K. £7 ☐ overseas

I ENCLOSE THE RIGHT MONEY, OR DEBIT MY ACCESS/VISA CARD

CARD NUMBER .....

MY SIGNATURE .....

MY NAME .....

MY ADDRESS .....

.....

..... POST CODE .....

NO EXTRAS! ALL OUR PRICES INCLUDE DELIVERY AND V.A.T.

Send to: AUTOMATA U.K. LTD. 27 Highland Road, Portsmouth, Hants. PO4 9DA

24-HOUR CREDIT CARD HOTLINE (0705) 735242