40 Rock

POPULAR Computing WEEKLY

35p 19-25 May 1983 Vol 2 No 20

This Week

Vic20 software

Mike Grace casts his eye over another collection of arcade games for the Commodore Vic20. See page 14.

Llamasoft

David Kelly talks to Jeff Minter — the man behind Llamasoft and one of the top Commodore programmers in both the US and UK. See page 13.

The Pit

Paul Sellin presents the first part of his three-part text adventure for the 16K Spectrum on page 20.

New releases

All the latest software from a host of companies including DK'Tronics' *Spawn of Evil*. See page 49.

★STAR GAME★

Star Swarm on Spectrum. See page 10.

News Desk

Psion and Sinclair head into Rom

THE Psion/Sinclair partnership is heading into Rom.

Cartridge software for the Sinclair Spectrum should be available for the machine some time in late Summer.

The Psion/Sinclair cartridges will be priced at about half the current price for Rom software. Commented a Sinclair spokeswoman, "Some of the programs will cost less than £10."

In order to run the programs with the Spectrum a special Sinclair adaptor is required, but this will cost under £20. When the adaptor is launched, a range of Rom Programs from Psion will also be available.

Psion's managing director, David Potter, confirmed that his company had been developing cartridge programs

Continued on page 5

Psion managing director, David Potter

Rabbit takes a leap forward

NINE new games for the Vic20 and five new titles for the Commodore 64 have been announced by Rabbit Software.

The company, traditionally a specialist in Commodore software, is also diversifying to produce a range of programs for the Spectrum, available in June, and BBC machines.

To support this increased production Rabbit is in the process of setting up its own tape duplication plant using £80,000 worth of equipment supplied by Tape Automation in the US.

The Vic titles are: *Paratrooper*, with high-resolution graphics on the basic machine, *The Catch*, trapping marbles, *Pakacuda*, a sort of underwater Pac-Man, *Critter*, farming cherries, *Race Fun*, driving cars, *Anti-matter Splatter*, protecting the universe, *English Invaders*, shooting down nouns, adjectives and verbs for the 7- to 10-year-old, *Cyc-*

Continued on page 5

Classified Classified Classified Classified

Computer Swap 01-930 3266

Free readers entries to buy or sell a computer. Ring 01-930 3266 and give us the details.

TEXAS T199/4a + leads + some tapes, manual, two months old, still under guarantee, £140. Tel: Wigan 713824.

UK 101 8K with CE1 monitor and extended monitor tape, for £60. Tel: (Shaw) 0706 844869.

SHARP PC 1500 + 8K Ram + 4-colour printer-plotter, £275. Tel: 460 5637.

TEXAS
TI 99/4A
CASSETTE LEADS
£4.95
INCLUDING POST AND PACKING
Single Recorder only
Orders to:
Clares, 222 Townfields Road, Winsford, Cheshire CW7 4AX
Tel: Winsford 51374

VIC20, C2N cassette unit, 8K store board, six cartridges, £70 software, books, mags, joysticks, £250. Tel: 01-594 5800.

SWAP Voodoo Castle for the Count. Tel: 01-805 6641 (6 pm).

WANTED, Oric, 16K. Tel: 01-886 7222.

ORIC 1
CASSETTE LEADS
WITH MOTOR CONTROL
DIN to DIN or
DIN to JACKS
£2.95
Orders to:
Clares, 222 Townfields Road, Winsford, Cheshire CW7 4AX
Tel: Winsford 51374

NEWBRAIN AD, beginners' guide and tape, technical notes, all immaculate, offers around £230. Tel: Worthing 207201 any time.

OVER 20 SPECTRUM GAMES FOR SALE, including Hobbit, Penetrator, Flight Simulation, Black Crystal, Schizoids etc. Tel: 061-881 3651 (Tony).

ATTENTION ALL
DRAGON 32 and TANDY COLOR USERS!!
"Color Computer News"
Our latest magazine from the USA, full of hints, ideas and software.
PLUS FREE UK SUPPLEMENT with Dragon compatibility chart and free advisory service
Send £2.25 (and 57p sae) for sample issue to ELKAN ELECTRONICS (Dept. FREEPOST, 11 Bury New Road, Prestwich, Manchester M25 6LZ. Telephone 061-798 7613
(24-hour service)

WANTED, VIC20 SUPER EXPANDER, programmer's aid cartridge, Stack super-charger or Audiogenic Buti cartridge. Tel: 061-368 6935 after 6 pm.

Continued on page 44

★★ADVENTURE COMPETITION—WIN A 64★★

32K* RAM PACK FOR YOUR COMMODORE VIC20

SPECIAL OFFER

CHOOSE ANY *ONE* OF THE FOLLOWING 'GEMINI' SOFTWARE CASSETTES REQUIRING 32K MEMORY EXPANSION:

1 — DATA BASE MANAGEMENT
2 — STOCK CONTROL
3 — MAILING LIST
4 — INVOICE STATEMENTS
5 — HOME ACCOUNTS
6 — COMMERCIAL ACCOUNTS

AND ADD A 32K RAM PACK BY PLUS 80
(rrp £69.95 for both)

ONLY £59.99 (INCL)

PLUS 80 LTD
31-33 LOWER ROAD
HARROW
MIDDX HA2 0DE
01-423 6393

(Generous dealer discounts)

**Gives 28159 bytes*

ALLOW 10-14 DAYS DELIVERY

NAME .....
ADDRESS .....
.....

32K RAM PACK with Software ☐
1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐
32K RAM PACK on its own at £49.99 ☐
SOFTWARE on its own at £19.95 ☐
1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐
16K RAM PACK at £37.99 ☐
I ENCLOSE CHEQUE/PO FOR £.....

POPULAR Computing WEEKLY

19-25 May 1983 Vol 2 No 20

SUNSHINE

The Team

Editor
Brendon Gore

News Editor
David Kelly [01-930 3271]

Software Editor
Graham Taylor [01-839 2504]

Production Editor
Lynne Constable

Editorial Secretary
Caroline Owen

Advertisement Manager
David Lake [01-839 2846]

Advertisement Executive
Alastair Macintosh [01-930 3260]

Classified Executive
Diane Davis [01-839 2476]

Administration
Theresa Lacy [01-930 3266]

Managing Editor
Duncan Scot

Publishing Director
Jenny Ireland

Popular Computing Weekly,
Hobhouse Court, 19 Whitcomb Street,
London WC2 7HF
Telephone: **01-839 6835**
Published by Sunshine Publications Ltd.
Typesetting, origination and printing by
Chesham Press, Chesham, Bucks
Distributed by S M Distribution
London SW9. 01-274 8611. Telex: 261643
© Sunshine Publications Ltd 1983

Subscriptions
You can have *Popular Computing Weekly* sent to your home:
UK Addresses
26 issues **£9.98**
52 issues **£19.95**
Overseas Addresses
26 issues **£18.70**
52 issues **£37.40**

How to submit articles
Articles which are submitted for publication should not be more than 3,000 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.

All submissions should be typed and a double space should be left between each line. Please leave wide margins.

Programs should, whenever possible, be computer printed.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your program returned you must include a stamped, addressed envelope.

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.

This Week

News 5
Sinclair goes into Rom

Letters 7
Oscar-9, Computing classes

Star Swarm 10
A game for Spectrum by R Sharod

Street Life 13
Jeff Minter of Llamasoft

Reviews 14
Mike Grace looks at Vic20 software

Programming 17
Voida on BBC

Spectrum 20
The Pit by Paul Sellin

Dragon 22
Block graphics by Peter Forward

BBC in education 28
Orbits by Nick Butler

Open Forum 31
Six pages of your programs

Adventure 41
Tony Bridge looks at Sorcerer's Castle

Peek & poke 43
Your questions answered

New releases 49
Latest software programs

Competitions 51
Puzzle, Top 10, Ziggurat

Editorial

British Telecom is to computerise its directory enquiries service. The contract, worth £25m, has been awarded to Standard Telephones and Cables, despite strong competition from ICL, IBM and DEC.

This development may not seem immediately relevant to micro users, but it is indicative of the way that computers are forcing themselves into every aspect of public and private life. A year ago, computers were scarcely mentioned outside the specialist press — now there are radio and TV micro shows and regular computer columns in *The Times* and *The Standard*.

Cars are now advertised on the strength of their microprocessor controls. Football and election results are forecast with the aid of computers. Even books are now being written on computers, with the help of word-processing packages and disc systems.

In short, there is a far greater public awareness of computers than ever before. Micros are 'hot' in every sense of the word.

But, despite this computer awareness, industry is taking a long time to adapt to changed circumstances. British Telecom's directory enquiries service will not be completely computerised until 1986.

Computer awareness is one thing, computer acceptance is another.

Next Thursday

Find out if you can bomb the enemy submarines as your warship patrols the ocean. You have 20 depth charges and the deeper the enemy submarine, the more points you score if you hit it! Depth Charge — next week's Star Game for the Vic20 by Robert Irvine.

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 **£9.98** ☐ 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., Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.

Sell your unwanted Software!

80% of original price paid!
Any home micro!

Special opportunity to get into games programming will be enclosed with details sent!

Spectrum 16/48K - ZX81 - VIC 20 - Commodore 64 Dragon 32 - BBC A/B - Oric - Acorn Atom - Lynx and Newbrain.

Send for full details to:

COMPUTERHOUSE

FREEPOST
ILFORD
ESSEX IG1 2BR

Name _____

Address _____

_____

_____

_____

PCWk

Heading into Rom

Continued from page 1

for some time. "We have so far organised six items, but by the time the interface is launched we will have others ready," he said.

Sinclair's managing director Nigel Searle commented, "Obviously everyone is working on solid-state software — we wouldn't want to stick only with cassette material indefinitely."

It is possible that the Sinclair move has been prompted by an increase in software piracy and home-taping. David Potter estimates that piracy could be costing his company as much as £2.9m — 30 percent of its turnover — each year.

Rabbit leaps forward

Continued from page 1

lons, avoiding alien fighters, and *Escape MCP*, fleeing the 6502's CPU.

The games for the 64 are: *Pakacuda, Cyclons, Centropods* — a sort of Centipede game — *Escape MCP* and *Annihilator*. Rabbit has also produced the first of a range of business programs for the 64 — *Infomast*, a programmable database.

All the programs with the exception of *Infomast* are priced at £5.99. *Infomast* costs £91.

The games are available through Lasky's, Curry's Micro C, and Commodore dealers. Also, in the next few weeks, the games for the Commodore 64 will be sold through W H Smiths.

Rabbit director, Heather Lemont commented: "We feel we now have a good grasp of the Vic and 64 so we want to cover a wider range of machines.

"The Spectrum has now come down to a price where it is available to almost everybody and so it seemed a natural first choice."

Rabbit Software was formed in 1981 and began by selling games for the Apple and Pet machines. The company now has 12 full-time employees and its games for the Commodore machines are distributed throughout the world.

Kempston goes soft with new company

KEMPSTON Microelectronics is moving into software.

The company, which sells a range of add-ons for the Sinclair machines, follows other companies such as DK 'Tronics and Quicksilva who have also diversified in a similar way.

The software operation will be run as a separate company — Kempsoft — and will both distribute existing programs from smaller houses and generate its own software. To begin with all material will be for the Spectrum.

Kempsoft's first task will be to distribute the new game from Ultimate Play the Game called *Jet Pac*. The first offerings under its own banner will be *Android 1* and *Conversion Tapes 1 and 2*. These latter two titles will convert big-selling games from other suppliers so that they can be operated using the Kempston Competition Pro Joystick.

The first conversion tape will allow joystick operation of Imagine's *Arcadia*, Psion's *Flight Simulation* and (with Melbourne House) *Horace Goes Skiing*, Melbourne's *Penetrator*, Bug-Byte's *Spectres* and Mikrogen's *Space Zombies*. *Conversion Tape 2* will work with a further seven titles including DK 'Tronics' *Centipede*.

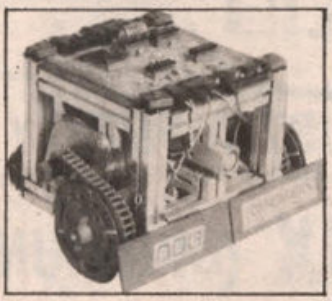
To complement Kempston's Centronics interface for the Spectrum, Kempsoft will produce a word-processing package and a number of business programs.

"Software will become an increasingly important part of what we do," said Kempston's managing director, Ab Pandaal. "We will be shortly appointing a manager for Kempston Microelectronics, leaving me free to concentrate on Kempsoft.

"A full-time programmer will be taken on and I am currently on the look-out for games that we can sell through our existing dealer network."

As part of Kempston's expansion, both companies will be moving to new premises in the next four weeks.

More cash for school micros



COMPUTERS in education get another boost as the Department of Industry's Micros in Schools programme gets a further £8m.

Some £3m of this is to go to secondary schools to provide additional colour monitors and simple control devices, such as the Economatics BBC Buggy three-wheeled robot.

The remaining £5m will go to colleges of further education to supply computer-controlled machine tools.

Timex sit-in continues

WORKERS involved in the sit-in at the Timex plant in Dundee have rejected a 10-point plan proposed by the company to solve the dispute.

The sit-in by 350 workers, now in its seventh week, was prompted by proposed compulsory redundancies at the plant (see *PCW*, April 14). The industrial action has halted work on the pilot production line for the Sinclair flat-screen tv.

Under the rejected company plan Timex had agreed to make no compulsory redundancies for a period of 90 days; however, union representatives are seeking agreement on a procedure for reallocation of employees after the 90-day period.

In an official statement, Sinclair Research commented that the rejection of the company's plan was "very serious". Timex is now expected to continue with its legal move to evict the workers from the Milton plant.

● Sinclair Research is concerned that the production of its £50 flat-screen tv shouldn't be delayed because of international competition from similar products manufactured in Japan and the Far East. Sony, Casio, Seiko and Hitachi all have miniature tv products at an advanced state of development.

Texas follows suit with TI 99/4A package deal

TEXAS Instruments has now joined the growing band of price cutters reacting to the Sinclair Spectrum price drop three weeks ago.

Every purchaser of the TI 99/4A microcomputer between now and the beginning of July will receive a pair of joysticks, the *Beginner's Basic Tutor* cassette, the *Connect Four* Rom cartridge and either the TI *Speech Synthesiser* or the TI cassette recorder, entirely free.

This package deal is similar to the combination announced by Commodore two weeks ago for the Vic20.

The offer adds equipment with a recommended retail price of £105 to the TI 99/4A machine which sells for around £150.

● Timex has cut the US cost of the ZX81 American equivalent, the TS1000 — it is now down to £33.50.

AWESOME GAMES SOFTWARE FROM * LLAMASOFT *

- NEW FROM THE DESIGNER OF GRIDRUNNER
- SO GOOD IT WILL BLOW YOUR MIND!!
- SO FAST IT WILL BLOW YOU AWAY!!

- The BIGGEST ADVANCE in Video Games design since Defender hit the Arcades!
- Experience Laser Zone-an utterly NEW, TOTALLY ORIGINAL MASTER-PIECE of Video Games Design!!
- Learn to control two spaceships at once. FEEL THE EXHILARATION as, after long hours of practise, you control the two ships so that they function as a SMOOTH, CO-OPERATIVE TEAM!!

LASER ZONE

- LASER ZONE. Quite simply the BEST VIC-20 Game in existence!!
- Feel the RAW POWER as you lunge for the Electro Button and BLAST your enemies into expanding clouds of SPACE JUNK!!
- Laser Zone requires a Joystick, 8 or 16k, and DEDICATION!!
- FEEL THE HUMILIATION as a carelessly -aimed BLAST SLAMS into the side of your last remaining ship!!
- Designed and Programmed by Jeff Minter for the VIC-20 with 8 or 16k Ram Pack. If you don't yet have the memory, LASER ZONE IS THE ONLY EXCUSE YOU NEED TO BUY IT!

£6.00

- A COMMODORE 64 version will be available soon.

* LLAMASOFT * NOT JUST A PRETTY PACKET

LLAMASOFT presents **MATRIX (GRIDRUNNER 2)**

FOR VIC-20 (8K) and Commodore 64

MATRIX

Jeff Minter has taken Gridrunner — the game that topped bestseller charts in USA and UK — and created an awesome sequel — **MATRIX.**

Graphically superb, it features multiple screens, new aliens and attack waves, mystery bonuses, renegade humanoids, de-flexor fields, diagonal tracking, countdown/ panic phase and much, much more . . .

Packed into 20 mind-zapping zones and accompanied by incredible sonics.

N.B. MATRIX REQUIRES A JOYSTICK

FOR VIC-20: £6.00 **FOR C64: £8.50**

MATRIX ENTER THE ZONE OF EXCELLENCE

LLAMASOFT SOFTWARE
49 MOUNT PLEASANT,
TADLEY, HANTS.
07356 4478

LETTERS

The Sky at Night . . .

I am writing to you to make a few comments about an article which you published in your 21-27 April issue, regarding the tracking of our amateur radio satellite, UOSAT.

First, concerning factual problems in the text, please note the following:

1) The title "The Sky at Night" and references to astronomers are irrelevant — UOSAT carries no astronomical experiments and passes overhead (anywhere on earth) during the afternoon as well as overnight.
2) The frequency given of 145.8 MHz is incorrect — the actual VHF beacon frequency is 145.825 MHz.
3) It is unlikely that a general-purpose portable aircraft/marine band receiver will be suitable for UOSAT reception — the satellite will require a narrow-bandwidth frequency-modulation (nbfm) communications receiver for adequate reception. Indeed, unless one of these is used in conjunction with a directional antenna, this program is unnecessary!
4) Synthesised voice downlink data is only one of many data formats transmitted — others of interest to your readers may be 1200 bd, 600 bd, 300 bd and 110 bd ASCII, 45.5 bd RTTY and 10 and 20 wpm morse code.
5) Elevation is the *angle* above the horizon.
6) Guildford 571281 is the main University of Surrey telephone number. The UOSAT office/command station houses an extremely busy team of engineers who have been inundated, since the publication of your article, with requests for orbital data which can more conveniently be supplied by the recorded message which we have provided on Guildford 61202.

Secondly, the program and text data themselves have a number of flaws:

1) "Azimuth" and "Elevation" in the first line are both spelt incorrectly.
2) The orbital parameters used in the program appear to be based on expected data supplied *before* the satellite was launched in October 1981! Since atmospheric drag causes these parameters to change, we supply weekly updates on Guildford 61202, so the program data supplied is most unsatisfactory. This is the main reason for the "Accumulative error now significant" exit at line 1420.

   Since Guildford 61202 only gives one set of equator crossing longitudes and times for each day, the program as published appears only to be capable of producing beam headings for two of the 15 orbits daily, before this line causes it to fail! Allowance for drag would allow the program to run (accurately) for a whole week's worth of predictions.
3) The equator crossing time and bearing supplied in the test data are totally fictitious and can not occur in practice. Due to the sun-synchronous properties of the UOSAT orbit, a bearing of 320° will be seen at approximately 12:30 GMT.
4) I have not been able to run the program to test for numerical inaccuracies or incorrect formulae — both common in programs of this type — due to the recent demise of our ground-station Spectrum.

Your readers may be interested to know that AMSAT-UK can supply sets of programs, orbital data and technical information to help track and observe the whole AMSAT-OSCAR series of satellites, as well as a number of weather satellites. They can obtain a list of publications by sending a stamped addressed envelope (AMSAT-UK is a volunteer-run organisation subject to the same large surges of requests as ourselves) to:

AMSAT-UK,
94 Herongate Road,
Wanstead Park,
London E12 5EQ

I hope that this information is of use.

R M A Peel, G8NEF
Spacecraft Engineer (Software)
Dept of Electronic and Electrical Engineering
University of Surrey

Our thanks to Mr Peel for his corrections and additions to "The Sky at Night" article and our apologies to the UOSAT team for any inconvenience caused by printing the main University of Surrey telephone number.

We would be extremely interested to hear from any of our readers who have succeeded in receiving data from UOSAT OSCAR-9.

Computing classes

With reference to the enquiry in *Popular Computing Weekly*, volume 2, Number 11, concerning computing classes, I have been running classes since last November in North Berwick using the BBC Model B micro.

These classes have covered the range of activities from computer appreciation to programming in BBC Basic. The age range has been from 8 to over 70 years old and one course included a grandmother who was determined to be a step ahead of her grandchildren. The normal course length is 10 to 20 hours.

Ian Goodall
14 Ware Road
North Berwick
East Lothian EH39 4BN

Software protection

With regard to your editorial in the edition of 28 April, may I make the following points on behalf of the Computer Trade Association:

We realised from the start that the specific needs of the software companies in relation to the question of software protection could not effectively be met by the association whose general aims are the "advancement and promotion of the Computer Trade". It has also been recognised that there is a danger in having too many bodies trying to do the same thing.

It was clear at our last meeting that what was needed was a single body to act for and on behalf of the software houses to deal with the specific subject of software protection. With this in mind the association is actively supporting steps for the setting up of such a body which will be an affiliated group to the association. Such a group will concentrate on the specific tasks which need to be carried out in relation to the question of software protection. Plans for such a group are now well developed and it will certainly be in existence within the next couple of weeks. It will have its own staff and be working in close liaison with other bodies dealing with similar problems, particularly in the video industry.

The formation of such a group reflects a positive move by the association and its members to tackle the difficult problem of software protection. It also means that the association as a whole can spend a greater part of its effort carrying out its main aims; that is, the general improvement of the computer trade and the service it provides to the public.

May I also ask you to make it known to your readers that the association does run a complaints service and should they have any complaints about service, supply, etc, they should write to me and the matter will be looked into. The association is quite prepared to take up complaints from the public against both members and non-members.

Incidentally, it may interest you to know that there are plans for the future to set up affiliated groups for both dealers and manufacturers.

Nigel Backhurst
General Secretary CTA
108 Margaret Street
Coalville
Leicestershire LE6 2LX

Programs needed!

Help. Programmers everywhere, I need educational programs!

I have just purchased a 48K Spectrum for use in a hostel for mentally handicapped adults, but I am unable to find any suitable teaching programs to use with them. If you feel that you can help, I require programs in the fields of maths, spelling, recognising colours, improving co-ordination, etc.

Because of the group that the programs are intended for, they need to be fun to use and should make full use of colour, sound and graphics.

P Barrow
Piper House
2B St Marks Road
London W11

STARTECH

Absolutly the lowest prices!

VIC 20 16K RAM PACK

£28.95

Including VAT and Postage and Packing.

Tick for further information

☐ VIC 20 PRODUCTS

☐ COMMODORE 64

All prices subject to availability or change without notice.

PLEASE SEND ME

VIC 20 16K RAM PACK

Qty	Price	TOTAL
	£28.95	

(24hr. ANSAPHONE SERVICE)

Name _____

Address _____

I enclose Cheque, P/O for .....

CREDIT CARD ☐ ACCESS ☐ BARCLAY CARD ☐

POR.C.W.5.83

STARTECH 208 Aigburth Rd, Aigburth, Liverpool L17. 051 727-7267

CHAMPIONS!

The smash hit
FOOTBALL GAME
for the
DRAGON 32, SPECTRUM 48, BBC B and ZX81 16k

available on cassette for £5.95 (ZX81 £5.45) by return of 1st class post from

PEAKSOFT
7 HAWTHORN CRESCENT
BURTON-ON-TRENT
(0283) 44904

COULD YOU BE THE NEXT BRIAN CLOUGH?

Take your team from the 4th Division to the European Cup! Features 4 divisions, promotion, relegation, transfers, injuries, suspensions, weekly results and league tables, reserve team, crowd trouble, and all the fun, drama and frustration of managing a league club.

If you don't give two hoots for football, you'll be hooked. If you're a fan, you'll be playing all night! One of the most entertaining games currently available — it's the one that we play!

LIONHEART (Dragon only) £5.45 — Unique, two-part romp. Arcade-style action as you assemble your army, pursued by the ruthless Prince John, switches to colourful graphics adventure as you land in the Holy Land to mount your Crusade against the Sultan Saladin.

DEATH'S HEAD HOLE (Dragon/BBC B) £5.45 — Our highly-acclaimed adventure. Lead a mission of mercy into a Mendips pothole. When you discover who's down there, you'll wish you'd stayed at home! "Breaks new ground in home computer simulations" — Dragon's Teeth.

DON'T PANIC! (Dragon only) £3.45 — Two classic adventures at an incredible price, to launch our new Bargain Bytes series. Features Towers of Death and The Ice Kingdom. Villains and hazards galore.

HANG IT! (Dragon only) £5.45 — 1,000 (yes, 1,000!) posers on British place names in this family word game. Set your own problems option.

All prices include post and packing. We GUARANTEE same day despatch by first-class post. Clip the coupon, or simply note your name, address, computer and programs required on the back of your cheque.

Computer..... Please send me .....

.....

Name.....

Address .....

.....

DRAGON SOFTWARE
all machine code

VULTURES — NEW (uses one joystick)
FAST MOVING GALAXIAN TYPE GAME in full colour with Hi Res graphics and sound. A flock of vultures guard their eggs. As they swoop towards you try to kill them, but watch out. Just when you think you have killed them all, the eggs hatch!
SUPPLIED ON CASSETTE **£6.95**

DGT2
THREE Fast moving Arcade style games in full colour, with Hi Res graphics and sound. "Very addictive . . . any single one of these is worth a fiver, so £6.95 for all 3 is a bargain" (From PCW Review) SNAKES, LANDER and INVADERS. (No joysticks).
3 ON ONE CASSETTE **£6.95**

EDITOR/ASSEMBLER + MONITOR
Two Pass Global type. Supports standard Motorola mnemonics and Addressing modes. Powerful Debug Monitor. Recommended for the serious user.
SUPPLIED ON CASSETTE WITH USER INFORMATION **£28.75**

DISASSEMBLER
Written in position Independent Machine Code, will run anywhere in RAM. The ideal tool to have around.
SOLD ON CASSETTE **£11.85**

SPECIAL OFFER
Buy Editor Assembler and Disassembler together and save £5.60.
Cost of both as one purchase £35.00

Cheques/POs payable to
J. MORRISON (MICROS) LTD. (PCW1)
2 Glensdale Street, Leeds LS9 9JJ
ALL ORDERS DESPATCHED BY RETURN FIRST CLASS POST.
Callers and Trade enquiries welcome.
Tel: (0532) 480987

BONKA
ADDICTIVE Arcade style game in full colour. Climb the ladders and dig holes to trap the "Meanies" before they kill you. 4 selectable speeds and choice of 1 to 9 Meanies to start. NO JOYSTICKS NEEDED.
SUPPLIED ON CASSETTE **£7.95**

DGT4
THREE arcade style games with Hi Res graphics and sound.
PTERODACTYL, TORPEDO RUN and HORNETS. NO JOYSTICKS NEEDED.
Excellent value for money.
3 ON ONE CASSETTE **£6.95**

CHESS
Hi Res display of board and pieces. 8 selectable levels of skill. CURSOR control move selection (No numbers/letters to enter). Supports CASTLING and EN PASSANT.
SUPPLIED ON CASSETTE **£7.95**

J. MORRISON (MICROS)

MAD MARTHA

For 48K SPECTRUM

GRAPHIC ADVENTURE

from MIKRO-GEN

Poor little Henry is the hen-pecked hero of this domestic tale.
One night Henry can take no more. He steals his wages from his wife's purse, sneaks out of the house being careful not to wake the baby or trip over the cat, and heads for the bright lights to have some fun. Trouble is he runs out of money. His only way to raise some cash is to gamble his few remaining pounds on the spinning wheel of the roulette table.
Just as Henry is getting into his evening at the tables his wife — Mad Martha — has noticed his absence. Realising Henry has absconded with the housekeeping she sets out after him with an axe.
Guess what part you play in this happy tale? That's right, you're Henry. Watch out for that axe!

* *Accepts full English sentences* *
* *Draws each location in hi-res* *
* *Save game feature* *
* *Hundreds of witty replies* *
* *Includes three arcade type games as part of the adventure* *
* *Accepts multi-line commands* *
* *Three skill levels* *

Access or Visa Card holders telephone (0344) 27317 (9am-6pm)

Mad Martha £6.95 plus 40p per order for post & packing

Name_____ Address_____

MIKROGEN, Dept MMB, 24 Agar Crescent, Bracknell, Berkshire, RG12 2BK

Star Swarm

A new game for the 16K Spectrum by Richard Sharod

The object of this game, for the 16K Spectrum, is to shoot down the aliens which appear in formation at the top of the screen. Each alien will fall out of formation and try to pass you. Points are awarded for the destruction of each alien, but points are also deducted from your score for each alien that passes you.

If you crash into an alien, you will lose one of your three lives.

When you clear a formation, another will appear at the top of the screen. When you have cleared six formations, you will be moved to a star-base where you will have to shoot a mother ship. Sharp shooting is needed here to gain a high bonus.

Controls are: 6 — left, 7 — right, 0 — fire.

Program notes

The program includes two machine code routines which are used to create sound effects. The codes for these routines are held in the first two data statements.

The program uses all 21 user defined graphics. It is advisable to enter and run lines 10-31 before the rest of the program, so that you can see them.

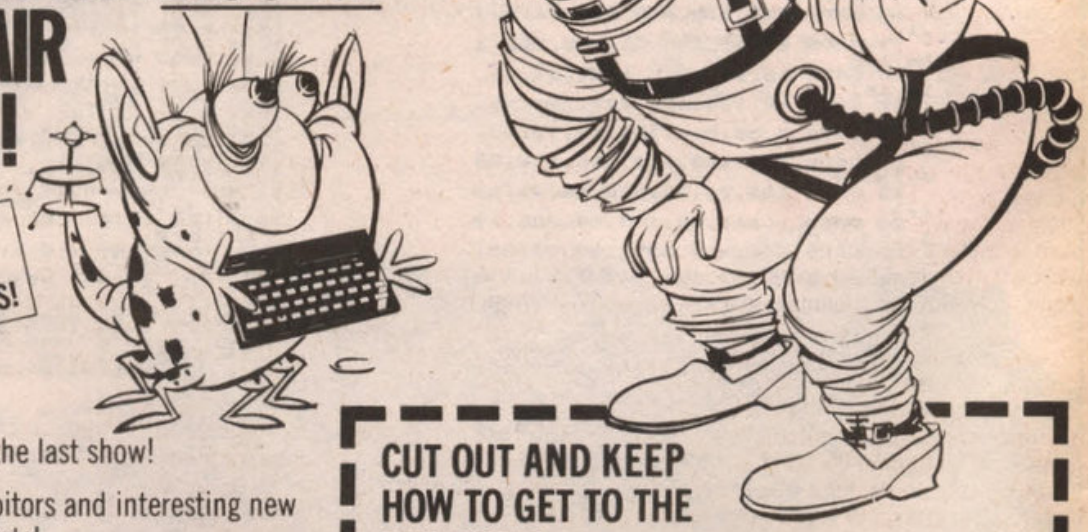
NB. Great care should be taken to ensure that the data is entered correctly.

```
  1 REM
          "STAR-SWARM"
written by Richard Sharod

  2 RESTORE : CLEAR 32399
  3 LET n$="SPECTRUM": LET v=17
50: FOR a=32400 TO 32459
  4 READ n: POKE a,n
  5 NEXT a
  6 DATA 6,1,197,33,15,0,17,40,
0,229,205,181,3,225,17,16,0,167,
237,90,125,254,255,32,237,193,16
,230,201,0
  7 DATA 6,1,197,33,0,3,17,1,0,
229,205,181,3,225,17,16,0,167,29
7,82,32,240,193,16,253,201,0,0,0
,0
  10 FOR z=144 TO 164: FOR f=0 T
O 7: READ a: POKE USR CHR$ (z)+f
,a: NEXT f: NEXT z
  11 DATA 65,67,78,248,76,70,3,0
  12 DATA 2,130,226,62,96,194,12
8,0
  13 DATA 64,224,224,64,64,64,22
4,0
  14 DATA 2,7,7,2,2,2,7,0
  15 DATA 146,84,0,214,0,84,145,
0
  16 DATA 170,170,255,248,14,3,1
,1
  17 DATA 85,85,255,31,112,192,1
28,128
  18 DATA 48,125,215,199,109,56,
16,16
  19 DATA 12,190,235,227,182,28,
8,8
  20 DATA 3,30,241,121,14,19,33,
64
  21 DATA 192,120,143,156,112,20
0,132,2
  22 DATA 128,71,60,225,60,71,13
1,1
  23 DATA 1,226,60,135,60,226,19
3,128
  24 DATA 8,4,127,227,127,72,36,
18
  25 DATA 16,32,254,199,254,18,9
6,72
  26 DATA 248,137,15,60,35,17,8,
4
  27 DATA 31,145,240,60,196,136,
16,32
  28 DATA 129,67,36,28,48,96,66,
68
  29 DATA 129,66,100,56,12,6,66,
34
  30 DATA 201,147,166,140,152,18
0,226,193
  31 DATA 147,201,101,49,25,45,7
1,131
  60 GO SUB 3000
  70 LET sc=0: DIM a$(12): LET a
$="[illegible]"
  71 LET hit=0
  72 LET li=3
  75 BRIGHT 1: INK 5: PAPER 0: B
ORDER 0: CLS : LET f=1
  80 IF f>12 THEN GO TO 1000
  81 PRINT INK 5;AT 0,20;"SCORE=
";sc
  82 PRINT AT 0,0;: FOR q=1 TO l
i-1: PRINT "[illegible] ";: NEXT q
  85 LET a=15
  86 LET b$=a$(f)+a$(f+1)
  87 PLOT 0,16: DRAW 10,-10: DRA
W 228,0
  88 DRAW 10,10: DRAW 0,-16: DRA
W -248,0: DRAW 0,16
  89 PRINT AT 2,10;: FOR l=0 TO
hit: PRINT "
  90 FOR z=0 TO 20 STEP 1: PRINT
 AT z,15;"[illegible]": RANDOMIZE USR 324
30: PRINT AT z,15;"  ": NEXT z
  91 PRINT INK f/2; BRIGHT 1;AT
2,10;b$;" ";b$;" ";b$;" ";b$;" "
;b$;
  95 PRINT AT 2,10;: FOR l=0 TO
hit: PRINT "  ";: NEXT l
  96 LET x1=10: LET y1=10
 100 LET x=2: RANDOMIZE : LET d=
INT (RND*15): LET l=INT (RND*15)
: LET y=l+d
 110 PRINT AT 20,a-1;" [illegible] "
 120 PRINT AT x1,y1;"  "
 140 LET a=a+(INKEY$="7" AND a<2
7)-(INKEY$="6" AND a>2)
 160 IF INKEY$="0" THEN GO SUB 2
50
 170 LET x=x+1: LET y=y+(RND<.4
AND y<28)-(RND>.6 AND y>1)
 175 IF x=20 THEN LET sc=sc-10*f
: PRINT AT 0,26;"  ";AT 0,26;s
c: PRINT AT x,y;"  ": GO TO 300
 180 PRINT INK f/2;AT x,y;b$
 185 IF x=19 AND y=a THEN GO TO
600
 186 IF x=19 AND y=a-1 THEN GO T
O 600
 187 IF x=19 AND y=a+1 THEN GO T
O 600
 190 LET x1=x: LET y1=y
 195 BEEP .01,(x/2*f/2)-20
 200 GO TO 110
 250 LET t=a: FOR g=19 TO x1 STE
P -2: PRINT AT g,t;"[illegible]";AT g,t;"
  ": NEXT g: PRINT AT g,t;"[illegible]":
RANDOMIZE USR 32400: PRINT AT g,
t;"  "
 260 IF t=y OR t=y+1 OR t+1=y+1
OR t+1=y THEN GO TO 500
 270 RETURN
 300 LET hit=hit+1
 310 IF hit>=5 THEN LET hit=0: L
ET f=f+2: PRINT AT 20,a-1;"  "
;AT x,y;"  ": GO TO 80
 320 GO TO 95
 500 FOR h=1 TO 3: PRINT AT x,y;
"[illegible]": RANDOMIZE USR 32430: PRINT
 AT x,y;"  ": NEXT h
 510 LET sc=sc+10*f
 512 PRINT AT 0,25;"     ";AT 0,
26;sc
 515 LET hit=hit+1
 520 GO TO 310
 600 PRINT AT 20,a-1; FLASH 1; I
NK 6; PAPER 0;"[illegible]";AT 19,a-1;"
[illegible]": FOR f=1 TO 10: RANDOMIZE
USR 32430: NEXT f
 610 LET li=li-1
 620 IF li<>0 THEN GO TO 75
 630 IF sc<v THEN GO TO 650
 640 LET v=sc: PRINT AT 10,1;"YO
U HAVE REACHED THE HI-SCORE"
 645 PRINT AT 15,5;"PLEASE ENTER
 YOUR NAME": INPUT "NAME>";n$
 650 CLS : PRINT AT 10,10;"HI-SC
ORE=";v;AT 12,12;"BY ";n$
 660 FOR f=-50 TO 50 STEP 1: BEE
P .1,f: NEXT f
 670 GO TO 60
1000 CLS
1001 LET k=1000
1010 PLOT 24,24: DRAW 0,100
1011 PLOT 232,24: DRAW 0,100
1012 PLOT 40,52: DRAW 0,84
1013 PLOT 216,52: DRAW 0,84
1014 PLOT 56,40: DRAW 0,68
1015 PLOT 200,40: DRAW 0,68
1016 PLOT 72,45: DRAW 0,52
1017 PLOT 184,48: DRAW 0,52
1020 PLOT 0,8: DRAW 88,8: DRAW 0
,-8: DRAW 80,0: DRAW 0,8: DRAW 8
0,0
1030 PLOT 24,24: DRAW 48,24
1040 PLOT 232,24: DRAW -48,24
1050 PLOT 24,124: DRAW 48,-24
1060 PLOT 232,124: DRAW -48,-24
1070 PRINT AT 0,5;"[illegible]";sc;AT
 0,17;"[illegible]";k
1080 FOR f=2 TO 20: PRINT AT f,1
5;"[illegible]": RANDOMIZE USR 32400: PRI
NT AT f,15;"  ": NEXT f
1090 LET a=15: LET c=+1: LET x=3
: LET y=0
1200 PRINT AT x,y-1;"  ";AT x+
1,y-1;"  "
1205 LET k=k-5: PRINT AT 0,23;k;
"  "
1210 PRINT AT 20,a-1;" [illegible] "
1220 LET a=a+(INKEY$="7" AND a<1
8)-(INKEY$="6" AND a>12)
1230 BEEP .01,y+2
1240 IF INKEY$="0" THEN GO SUB 2
000
1250 LET y=y+c
1260 IF y>28 THEN LET c=-1
1270 IF y<2 THEN LET c=+1
1280 GO TO 1200
2000 RANDOMIZE USR 32430: IF a<>
y THEN RETURN
2010 FOR f=19 TO 3 STEP -1: PRIN
T AT f,a;"[illegible]": BEEP .1,f+2: PRIN
T AT f,a;"  ": NEXT f
2020 FOR f=1 TO 10: PRINT AT x,y
;"  ";AT x+1,y;"  ": RANDOMIZE U
SR 32400: PRINT AT x,y;"[illegible]";AT x
+1,y;"[illegible]": NEXT f
2030 LET sc=sc+k: PRINT AT 0,11;
sc
2031 IF v<sc THEN LET v=sc
2035 PRINT AT x,y;"  ";AT x+1,y;
"  "
2040 FOR f=20 TO 2 STEP -1
2050 PRINT AT f,a;"[illegible]": BEEP .1,
f: PRINT AT f,a;"  ": NEXT f
2060 CLS : PRINT AT 10,8;"[illegible]
[illegible];AT 15,6;"[illegible]
[illegible]
2070 LET li=li+1
2080 BEEP .2,RND*40
2090 IF INKEY$="" THEN GO TO 208
0
2100 GO TO 75
3000 INK 5: PAPER 0: BORDER 0: C
LS : PRINT INK 5; PAPER 1;AT 0,0
;"[illegible]
[illegible]"
3010 PRINT '" SCORE  10  30  50
  70  90  110"
3020 PRINT '"" SHIP  [illegible]
  [illegible]"
3030 PRINT '""   Hitting the abov
e ships will     gain you the abo
ve points."
3040 PRINT ''"   However letting
 them past       will lose you po
ints."
3050 PRINT ''"   You have to kill
  off as many    aliens as you ca
n before you     reach the star-b
ase."
3085 PRINT INK 5; PAPER 1; FLASH
 1;AT 21,0;"[illegible]
[illegible]"
3090 BEEP .02,RND*40
3100 IF INKEY$="" THEN GO TO 309
0
3110 CLS
3120 PRINT '"    When you reach t
he star-base     you will have to
  shoot a        mother ship."
3130 PRINT '''      [illegible]  Mothe
rship": PRINT "      [illegible]"
3140 PRINT ''"   Bonus point are
 avalible,       so sharp shooti
ng is needed     to gain high po
ints."
3150 PRINT ''"   You get an extr
a ship after     hitting the mot
hership."
3160 PRINT ''"    6 Left  7 Righ
t  0 Fire"
3170 PRINT INK 5; PAPER 1; FLASH
 1;AT 21,0;"[illegible]
[illegible]"
3180 BEEP .1,RND*40
3190 IF INKEY$="" THEN GO TO 318
0
3200 RETURN
```

ZX MICROFAIR

THERE'S ROOM FOR EVERYONE AT THE BIGGEST ZX MICROFAIR OF ALL TIME!

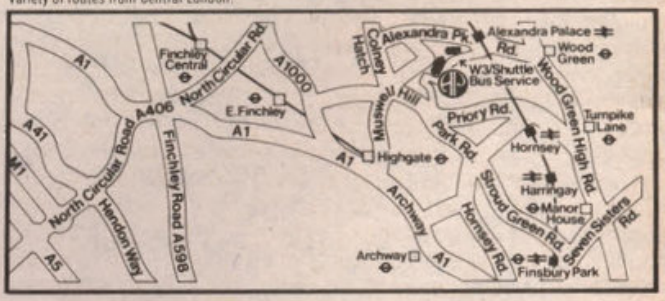


EVERYTHING FOR THE SPECTRUM, ZX81 AND MOST POPULAR MICROS!

- BIG — Twice as big as the last show!
- BIG — Even more exhibitors and interesting new computer products!
- BIG — Plenty of space to move, eat, drink and relax!
- BIG — Biggest value from any exhibition — admission £1 (50p for kids under 14)!
- BIG — Choice of hardware, software, books, peripherals, programs — even a bring-and-buy sale!
- BIG — Exhibition hall in parkland — big space — big car park!
- BIG — Big choice of "how to get there" — rail, road, bus, tube, foot — see right!
- BIG — Big day out for all the family!
- BIG — Big savings on most manufacturers' "show offers".

CUT OUT AND KEEP HOW TO GET TO THE BIG SHOW.

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



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!
From any part of the U.K. enquire from Kings Cross Travel Centre, London N1 9AP (phone 01-278 2477) about special day trips to the ZX MICROFAIR!

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

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!

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

- BRITISH RAIL ALEXANDRA PALACE
- Suburban change for B.R. Suburban service — HIGHBURY ISLINGTON
- KINGS CROSS
- VICTORIA
- Link with W3 bus to exhibition — WOOD GREEN
- FINSBURY PARK
- KINGS CROSS
- Piccadilly Line — HEATHROW / OXFORD CIRCUS

Come to the big one...

7th ZX MICROFAIR

ALEXANDRA PALACE, SATURDAY, JUNE 4th 1983

SATURDAY JUNE 4th at ALEXANDRA PAVILION, ALEXANDRA PALACE, WOOD GREEN, LONDON N22. FROM 10am to 6pm.

Advance tickets available from: Mike Johnston, 71 Park Lane, Tottenham, London N17 0HG. Adults £1.00. Kids (under 14) 50p.
Please make cheques payable to ZX MICROFAIR and enclose S.A.E.

Galloping llamas!

***David Kelly** talks to a man who is hooked on llamas – Jeff Minter*

Llamasoft is an unusual animal. It is now one of the top independent Commodore Vic20 and 64 software houses, but it is still basically a one-man company.

Jeff Minter began programming the Vic20 when he was forced to spend an unhappy few months lying on his back recovering from a nasty virus infection. After this enforced break in his college course in maths and computing — which he didn't care for very much anyway — he decided not to return, but to push on with his galloping Llamasoft venture.

As to the reasoning behind his company's choice of name he says, "I like Llamas", to which there are few answers. And to prove the point he sports a knitted pullover with repeated motif looking uncommonly like the mountain-loving ruminant.

Jeff, who recently celebrated his 21st birthday, formed the company just over a year ago to sell his games. However, his interest in micro-computers goes back further. At sixth form college he started by studying double-maths A-levels which he hated. "So they put me on an English course — and I used to write code during the lessons," says Jeff. "I was only allowed to borrow the 6502 book from the library for a week so I had to learn it quick!

"I did some programming on the 8K Pet. That was in the days when an Apple with high-resolution screen was heaven and having more than 8K was a dream."

While at college Jeff programmed a graphics Rom for DK'Tronics and then started thinking about Vic20 programming. "It was cheap, and it had colour. It's very strange — one of the last things I remember on the day I fell ill was stumbling into a shop in Oxford asking if they had a Vic."

Brain-damaged

In April last year, Llamasoft was getting orders worth £15 to £20 a week. "Now we are banking about £5,000 a week which, for a one-man operation, is really nuts." Jeff shakes his head, slightly bemused.

Jeff is, first and foremost, a programmer. And like so many programmers, he is a science fiction fanatic — his book shelves are crammed with garish covers from Asimov to Herbert.

The arcades also attract him. He spends a good deal of time there and actually has his own arcade machine of *Space Firebird* – a version of *Phoenix* — in his work room. Jeff reckons you have to be an arcade junkie to write good computer games: "Eugene Jarvis who wrote *Defender* for Williams said once that to come up with good games ideas you have to be a bit brain-damaged — and he has a point."

"The first game I produced was a version of *Defender* and I solemnly swear not to copy an arcade game again. I am now totally against the idea of arcade copies — you can do just as well without imitating other people's ideas. I can't really see what is the fun in sitting down and coding something that has already been done.

"Most of the software houses today only seem to be interested in putting everything in a special box. I went up to one recently who spend £40,000 a month on advertising. They said, 'This game will be the top seller in two months time.' To say that before the game has even been written is incredible."

At the Pet show last June — Llamasoft's first public appearance — Jeff's version of *Defender* was seen by Jay Balakrishnan, founder of HES, one of the big US software houses, and he took up the American rights to the program calling it *Aggressor*. Since then HES has taken *Grid Runner* from Jeff which has become a number-one best seller. Sixty per cent of Jeff's income now comes from the US, just from these two games.

At the beginning of April Jeff concluded a deal with HES to write games for them: "Originally they wanted me to write 10 games a year — we settled on four. That is much more realistic — I can then afford to sit down and tweak at each program until it is just right before I hand it over.

"The 64 is going to be massive in the US. It is rumoured that the price may drop to under $200 and all the big Atari companies like Broderbund are converting their material for it.

"I first saw the machine at last year's Pet show in June. Then HES brought an American machine over for me in September. It is a great machine — just about anything you can do on the Atari you can do on the 64. Although it has fewer colours it has more sprites — more moveable graphic characters. And sprites are *the* way to go.

"Most arcade machines — *Phoenix* for example — are just machines that can handle 64 multi-coloured sprites. The 64 has 8 sprites but you can improve on that. By interrupting the screen scan you can, theoretically, have 256 but I find that 64 is more convenient. Otherwise all the interrupts slow down the processor."

When coding a program Jeff uses a modular approach: "I may get the ships moving one day, something else the next, but it is vitally important to de-bug each module every time I come to the machine. Then at the end I tie all the sections together with a start loop. I keep notes as I go along, sticking little *Remark* fields as I go. Nothing is so incomprehensible as your own code a month later.

"My next big game will be called *Matrix*. When I have got it right for the Vic, it will only take a few days to convert it to the 64 because only the screen access and

sound routines will need to be changed.

"Nobody writes in pure hex anymore. I still do a fair amount of work using the standard mini-assembler cartridge on the Vic. Although you cannot define labels on it, it is useful for de-bugging or for writing little routines that are machine-specific.

"Most of the time though I use the Commodore 64 assembler — a standard Pet assembler converted for the 64."

Doodling along

Jeff has a great deal of admiration for other programmers and believes that in the future it is the writers not the publishers who will attract attention. "In America it is already going that way — companies are starting to push names. HES is now pushing me and Tom Griner who did *Choplifter* for the Vic. He is only 17 and is very strong on coding and does a lot of very good conversions.

"*Star Raiders* on the Atari is the best game I've ever seen. To get that inside an 8K Cartridge is a great programming achievement. I think it is a capital crime that nobody knows who wrote it because Atari keep their programmers quiet. Whoever wrote it deserves to be very rich and have his feet kissed every morning. That game is evil!"

Jeff is really a software house manager by default. His interest is programming, but the idea of working for someone else does not appeal. Also, the idea of expanding and becoming an employer of other games writers doesn't seem right to Jeff: "I just want to carry on doing my own thing. When graphics get really complicated I might need a specialist — a cartoonist. Or I can see myself joining a programming team — but really I'm just doodling along getting the next game out."

Matrix will be ready in time for the Chicago show in June. "It's nearly working now — there is only one small bug to sort out. Occasionally, when you shoot a camel its bum gets left behind!"

Jeff plans to convert *Laser Zone* to the 64 and produce a sequel to *The Attack on the Mutant Camels* called *The Camel's Revenge*.

Meanwhile Jeff is hooked on *Matrix*. "By the time I demonstrate it in the States I want to be very good — I don't want anyone beating me out there!" ■

Staying cool . . .

***Mike Grace** picks his way through another selection of Vic20 arcade games*

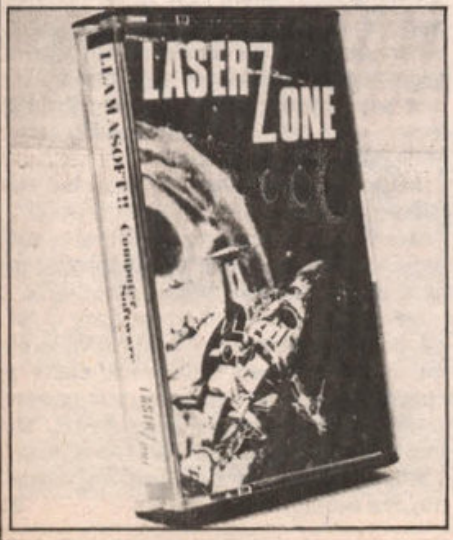
I bought my Vic20 just after the very first machines had become available. Initially I was frustrated by a lack of software and, apart from those appalling 'games' in the back of the User Guide and a couple that appeared in early magazines, I was left stranded for several weeks before the first of Commodore's range of cartridges became available. I can well remember the day I saw the first software — after parting with what seemed like a fortune (£19.95 to be exact) I hurried eagerly home with my own version of *Space Invaders.*

Regular readers will know I have a distinct dislike for the wham bam shoot 'em up style of game, preferring the more gentlemanly and skilful art of the adventure game or the game of chance. But, in those halcyon days of 1982 *Space Invaders* was all I had and I sat entranced, finger on the firing button, as wave after wave of . . . well, you know the game and if you're reading this you probably know the fascination.

So, in tribute to those early days, I thought I'd devote this review to the shoot 'em up type of game (or shoot 'em down in some cases). If you are already about to flick to the next page with a grimace of disgust or a tired yawn — stick with it, you may be in for a few surprises!

Let's start with *Abductor* by Llamasoft (who have one Jeff Minter — a programmer extraordinaire who is obviously going places). This cassette is priced at £6 and is for the unexpanded Vic, a fact hidden away on the instruction sheet. It would have been better to have the memory required displayed more prominently on the cassette itself or on the packaging.

On *Loading*, I was faced with a very low-resolution graphics drawing of an animal (presumably a llama) and the slightly twee remark that it was *lloading* (not a spelling error but a link to the double l in llama). But enough of the frivolity — on with the game.



Basically, you are in control of a plasma cannon which patrols along the bottom of the screen, guarding a few matchstick men you must protect. The baddies are a fleet of objects that fly about and try to pick up your men and take them off, whereupon you lose. Your aim is to blast the baddies out of the sky, either before they reach your crew, or at least before they get your man to the top of the screen. If you manage to get them before they actually get the man away he will fall safely to the ground and remain as bait for another fleet of baddies. Needless to say, each succeeding wave of the enemy gets harder to stop.

The game is fairly straightforward to play, and I liked the fact that with relatively little trouble you can exchange your insignificant cannon for a much more impressive (and double firing) one. I found the flight patterns of the aliens very stereotyped (but they still beat me as often as not) and their ability to appear as if from underground a little sneaky. But, one aspect of the game I felt was cheating, was the fact that it was impossible to rescue the poor little man at the extreme edge of the screen, either left or right.

"Blast as fast as you can!"

The instructions were good, the cover reasonable and I liked the tips given which include the classic remark *Stay cool,* as well as more mundane advice such as *Blast as fast as you can* and *Be accurate.* What did depress me was the comment that awesome players will be looking for a score of 15,000 or more — my own score was pitiful!

The next game I *Loaded* was *Power Blaster* from Romik, also for the unexpanded Vic, at £9.99. It seems only a couple of months ago I was bemoaning the fact there was so little software for the 16K expanded Vic — now it seems almost the reverse. Anyway, *Power Blaster* is an excellent example of lack of kilobytes not reducing originality, and is one of the best games I've played yet from Romik. *Loading* reveals the now traditional blue background and letters in Romik style, and after about six pages of totally unnecessary background spiel we get down to the game.

A maze-like structure is filled with dots (bombs planted by the baddies) and galloping Martians. You are in control of a spaceship which is free to move around the maze, wiping out the bombs by firing blasts at them, and killing Martians before they get close enough to touch you.

Like all these games, it's much easier to play than to explain. Unlike quite a few it's also more interesting to play, partly because the score for bombs actually decreases if you aren't firing and destroying more (so you can end up with a minus score if you aren't careful) — and you only have one life. Let a Martian get you and zappo! You're dead.

I liked the originality of this one, and the noise made by firing the gun seemed more satisfying than usual. One unique feature was the ability to enter hyperspace to escape the Martians. Pressing the fire button at the same time as moving the joystick forward makes your ship disappear and reappear somewhere else at random. Unfortunately, in the excitement of the game, I found myself doing this by mistake, but practice gradually made this happen less often. The graphics weren't exceptional, but more than adequate and the Martians seemed slightly lovable little guys (even if they *were* baddies).

Let's stick with Romik for the next tape, *Time Destroyers* by Clifford Ramshawe,

the same price but needing expansion of 3,8 or 16K. Romik has tended to standardise the keys if you're not using a joystick — full marks for that, and they've selected sensible keys as well, using A,S,D,F1 and F7 for the various directions and for Firing — but how anyone plays with keys once they've used the joystick is beyond me. And as with almost all these games there are various levels of skill, although *Time Destroyers* just adds more baddies whereas other games such as *Power Blaster* tend to increase speed as well.

Once the instructions are passed, the game goes on *Loading* for a long while — the screen fills with disturbing garbage which might put a few people off — then finally clears and asks which level you'd like to play. I picked 1 as usual, and found I was in another of those games where my spaceship is skimming over the surface of a planet with aliens swooping in to bomb, while all I can do is fly along trying to shoot them first. As I've said before I'm hopeless at this sort of game, but if I try to remain dispassionate how does this version differ from others?

Well, for a start this time the aliens are trying to airlift atomic powerplants from the surface of Mars, so you have to zap them out of the sky before they can get the powerplants away and turn from green meanies into purple super-meanies. As the skill levels increase you meet spidercraft, buzzers, magnetrons and the mothercraft! But the basic essence of the game is the same, you just fly along trying to kill them before they kill you. You have three lives, rather unimaginative bolts of power, but your ship will turn round and go the other way if you miss out on a baddie. Sadly, I wasn't inspired by this Romik version.

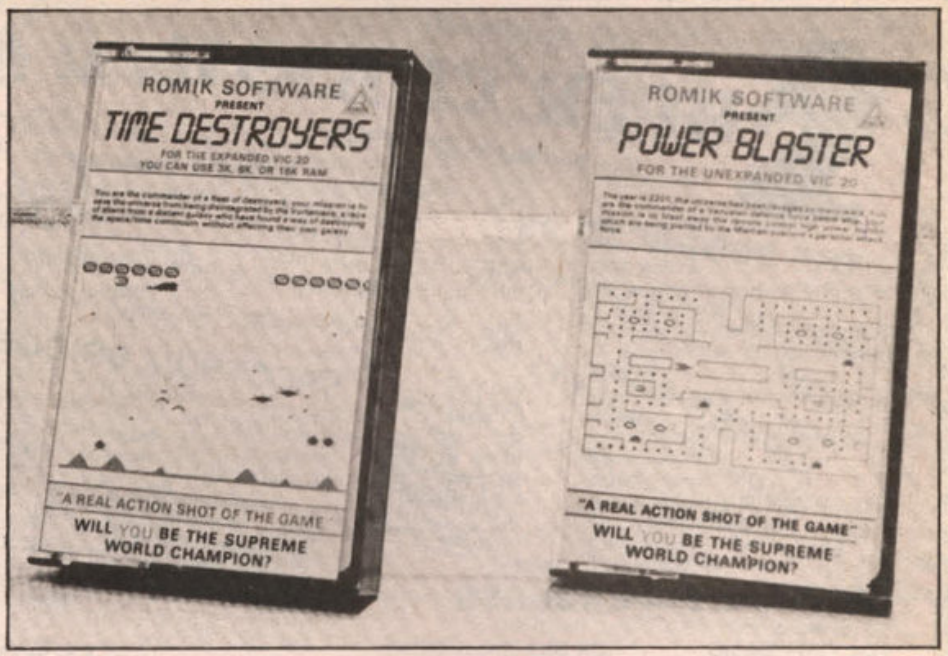
"Blast 'em when you see 'em!"

With my trigger-finger feeling a bit sore, I moved on to another Jeff Minter goody from Llamasoft called *Laser Zone*. This is quite the most skilful zap game I've seen, requiring a high degree of concentration. This time you have two spaceships to control, one on the horizontal and one on the vertical axis of a board shaped like a graph. The ships can only move along their lines, and to make it even harder each ship must be positioned over a small mark to enable it to fire. Thus, if the horizontal ship is over a firing mark while the vertical isn't then only the horizontal ship will fire, whilst if both are over marks then both will fire.

By a neat trick of joystick control, it is possible to make one ship or the other tilt through 45 degrees to fire — a deadly cunning manouevre if you can get it right. The purpose of this is to blast the aliens (looking like a bunch of fugitives from a horror movie) before they can get either of your ships.

The game is so hard to play that you actually get a training program in ship movement (essential prior to serious playing) and then you're off. This game must be the best I've seen of this type yet, and almost converted me away from the adventure game.

The packaging is far superior to most software at this price (£6) and the instructions are clear, concise and extremely helpful. Once again we get some good Minter tips to help us, like *Blast 'em when you see 'em,* and there are 31 skill levels! There are other goodies in this game, but I've said enough. I recommend this game highly, and for those of you who do buy it I'll let you find out the extra thrills for yourself. Not an easy game to master — but terrific fun getting there.



And what game have I left to last? Another firepower game, to be sure, but one with a neat twist. This is *Kaktus* from Audiogenic at £7.95 (needs 8K expansion) and is perhaps the neatest twist on the Invaders type whilst retaining the basic concept. This time you are a gopher (and to their credit the people who write the instructions actually say 'believe it or not' before telling you that). You are mainly underground, firing a cannon through holes in the ground at wasps and hornets who are trying to get at a cactus that you must save from destruction. Occasional moles zoom along and try and block up your holes to stop you firing and buzzards drop nasty eggs on you, but through it all you just keep firing.

Of course, the rationale is plain ridiculous (after all, have you ever heard of a gopher firing a cannon?) but as usual that doesn't matter one little bit. All that matters is that you keep your finger on the firing button. It's a good game, fast and furious, with reasonable graphics and a level of skill that doesn't keep the idiots like me from giving up at the start. I found it not as skilful as *Laser Zone* but in some ways more enjoyable — and it was a welcome change not to be zapping aliens out of a black Martian sky.

And so we pause, exhausted and tired, right index finger still twitching, eyes strained and heart pumping. I'm definite in my own mind that the standard of Vic software is increasing in quality, not in leaps and bounds, but in small and sure stages, with one or two gems still standing out of the crowd. I feel even the zap and pow games are getting better as well, and I'm not so superior about them as I used to be. But most of all — I'm flaked. ■

Firm	Program	Cost	Value (1-10)
Llamasoft Software 49 Mount Pleasant Tadley Hants	*Abductor* *Laser Zone*	£6.00 £6.00	5 9
Audiogenic Ltd PO Box 88 Reading Berks	*Kaktus*	£7.95	8
Romik Software 24 Church Street Slough SL1 1PT	*Power Blaster* *Time Destroyers*	£9.99 £9.99	7 4

CP SOFTWARE

SUPER CHESS II

For Sinclair 48K SPECTRUM

THE BEST AT £7.95

● Six levels of play ● Plays a variety of openings e.g. French Defense, Sicilian Defense, Ruy Lopez, Queen's Gambit etc. ● Self play mode ● Analyse mode ● Enhanced end-game play ● Recommended move option.

Specialists in high quality, intelligent games

CP Software

Spectrum Software

NOW for the JUPITER ACE Superchess II £11.95

SEE US AT THE 7th ZX MICROFAIR ALEXANDRA PALACE SATURDAY JUNE 4th 1983

SPECTRUM BRIDGE TUTOR

Improve your Bridge with Spectrum Bridge Tutor. Uses the Acol bidding system including Blackwood and Stayman conventions. Each of the 40 hands illustrates a particular aspect(s) of the bidding and play. Following the card play is an explanation of those aspects highlighted in the hand. The correct bid and play must be made in order to progress but a help feature is included.

For 16k and 48k Spectrum – **Beginners (40 hands) £5.95**
Advanced (40 hands) £5.95

ORIGINAL SUPERCHESS

10 levels of play, plus many features
16k ZX81 £4.95 **48k Spectrum £4.95**

NOW

16k SUPERCHESS £6.95

The best 16k Spectrum Chess program. 3 levels of play with playing strength similar to the 48k version's first three levels. Analyse mode, plays several openings e.g. Queens Gambit, Ruy Lopez, plus more features. Runs on 16k and 48k Spectrum.

COLOSSAL CAVES (Adventure 1 by Abersoft)

Enter the Colossal Cave, discover the treasure left by the wizard. On your travels you will meet dragons, snakes, trolls and other denizons of the underworld. Be warned, this adventure can be addictive. Includes a save facility so that the adventure can be continued from the point reached when saved.
48K Spectrum £7.95

ZX DRAUGHTS

10 levels of play, very fast
48k Spectrum £5.95

BACKGAMMON

Very popular
48k Spectrum £5.95

SPECTRUM FORTH

FORTH – 10 times faster than Basic, much easier than machine code. If you want to discover the advantages of Forth or are already converted, Spectrum FORTH is the ideal package. It is cassette based and includes Spectrum Forth, a sample Forth program and comprehensive user documentation. It has all Forth structures and allows full use of the Spectrum's colour, hi-res graphics. Specify 16k or 48k when ordering.

16k version, about 114 new words can be defined **16k Spectrum £9.95**
48k version, about 1000 new words can be defined **48k Spectrum £9.95**

SNAIL LOGO

An implementation of turtle style graphics. Regardless of age, SNAIL LOGO is an ideal way to explore the concepts of form and design and to learn the associated programming procedures, or just to have fun creating interesting patterns. SNAIL LOGO supports standard Logo commands, e.g. Procedures, Repeat, Parameters, Replace, it includes syntax checking and an editor plus other detail features.

★ Speech from the Spectrum 48k

SOFTALK I 'Multiwords' 70 plus words £5.95
SOFTALK II 'Spacegames' 80 plus words £5.95

★ BEEPER AMPLIFIER

Plugs directly to the Spectrum's EAR or MIC socket. Battery powered (not supplied) **£5.95**
or SAVE £1 when ordered with any program
Please add 35p for p&p.

UK Prices include post & packing. Despatch within 48 hours of receipt of order.
(For orders outside UK add 80p for postage). Send SAE for catalogue
Send cheque or postal order to:

CP SOFTWARE, Dept.W4,17 Orchard Lane, Prestwood, Bucks. HP16 0NN

Also available from:
Buffer Microshop – Streatham, London
Philip Copley – Ossett, West Yorks
Georges – Bristol
Screen Scene – Cheltenham
WH Smith – Computer Branches
ZEDXTRA – Kinsen, Bournemouth
Computers of Wigmore Street, London
Fal-Soft Computer – Falmouth

TOP RATES PAID FOR HIGH QUALITY PROGRAMS – .
SEND YOUR MATERIAL FOR EVALUATION AND PROMPT REPLY.

All along the line . . .

***Keith Wardle** presents a line control game for the BBC A and B*

This program *Voida* is a game for the BBC micro which Runs on both Model A and B.

The objective of the game is to control a diagonally moving line, while avoiding oncoming vertical lines. To change the direction of your line simply press any key.

You start the game with three lives — one is lost each time you hit an oncoming line. Speed increases as the game progresses. If required, difficulty can be increased by adding the following lines:

115 FOR R% = 1 TO (either 2 or 3)
145 NEXT

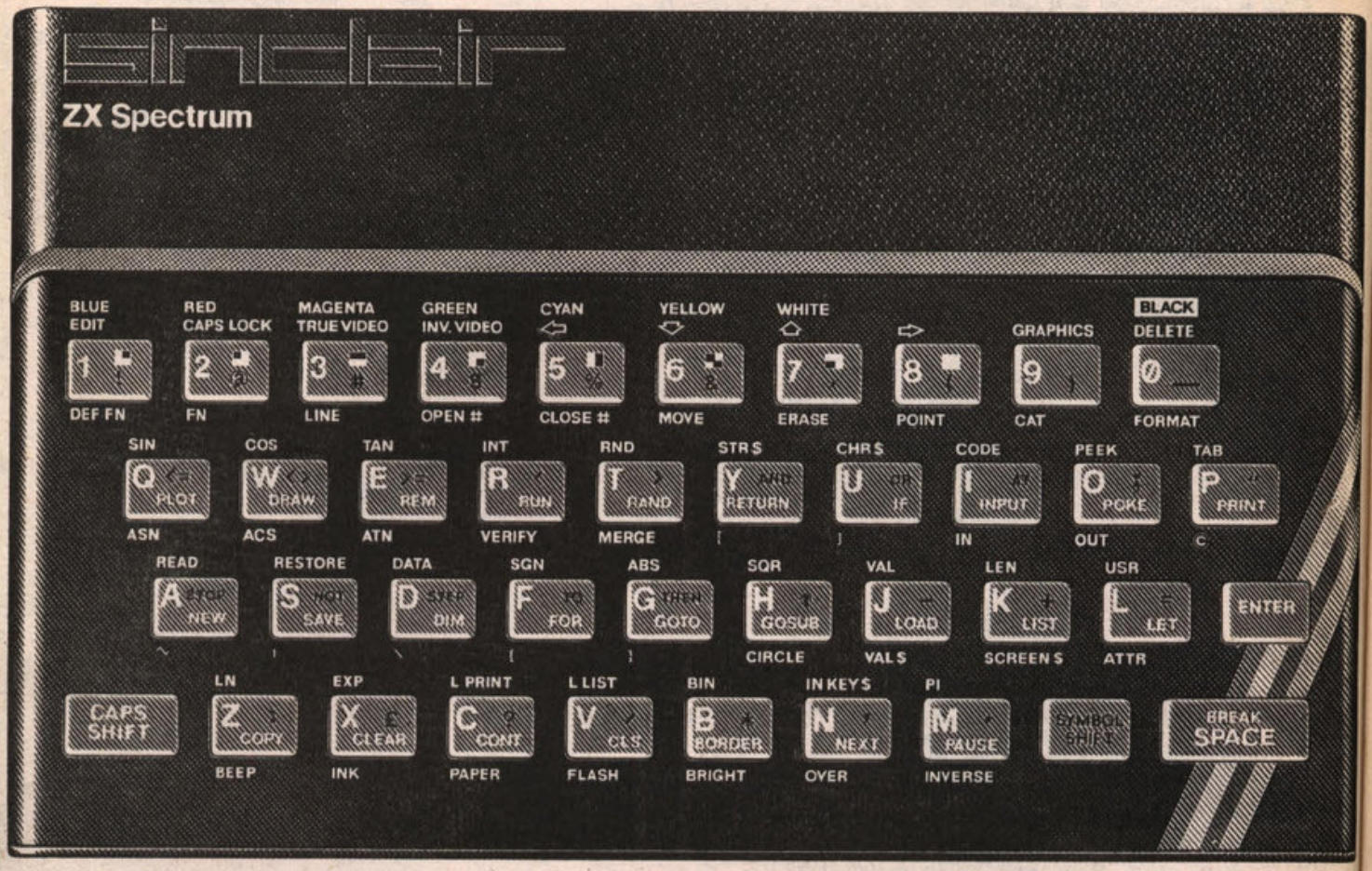
At the end of the game your score is displayed. To restart the game, press the red f1 key.

Line description

10	Select MODE 7 for introductory text.
20	Delete cursor.
30	Print text (lines 340-540)
40	Set up function key 1 to restart game.
50	Select MODE 4 for game display.
60	Delete cursor.
70	Set Z% (position of diagonal line).
80	Set Y% (how much to move Z%).
90	Set K% (score) to zero.
100	Set L% (number of times vertical lines have been hit) to zero.
110	Start game loop.
120	Pick random number.
130	Move graphics cursor.
140	Draw vertical line.
150	Scroll screen downwards.
160	Check to see if diagonal line has hit vertical line.
170	Calculate delay period (low if score is high and vice versa).
180 190 200	Execute delay.
210	Has a key been pressed?
220	If so change direction.
230	Clear buffers.
240	Move graphics cursor to present position of diagonal line.
250	Calculate new position of diagonal line.
260	Is diagonal line off right hand side of screen?
270	Is diagonal line off left hand side of screen?
280	Draw new section of diagonal line.
290	Make a sound.
300	Add 1 to score.
310	Continue if not hit three times.
320	Otherwise print score.
330	End program.
340-540	Introductory text. ■

```
L.
  10 MODE7
  20 VDU23;8202;0;0;0;
  30 PROCTEXT
  40 *KEY1|MG.50|M
  50 MODE4
  60 VDU23;8202;0;0;0;
  70 Z%=640
  80 Y%=32
  90 K%=0
 100 L%=0
 110 REPEAT
 120 A%=RND(39)*32
 130 MOVEA%,982
 140 DRAWA%,1006
 150 VDU30,11
 160 IF POINT(Z%,520)=1 THEN L%=L%+1:SOUND2,-15,123,1
 170 J%=(800-K%) DIV 100
 180 B%=TIME
 190 REPEAT
 200 UNTIL TIME>=B%+J%
 210 P%=INKEY(0)
 220 IF P%<>-1 THEN Y%=-Y%
 230 *FX15,0
 240 MOVEZ%,512
 250 Z%=Z%+Y%
 260 IF Z%>1248 THEN Y%=-Y%:Z%=1248
 270 IF Z%<32 THEN Y%=-Y%:Z%=32
 280 DRAWZ%,544
 290 SOUND0,-12,1,1
 300 K%=K%+1
 310 UNTIL L%=3
 320 PRINTTAB(5,9)"Score = ";K%
 330 END
 340 DEFPROCTEXT
 350 PRINTTAB(12,7)CHR$131CHR$141"V O I D A"
 360 PRINTTAB(12,8)CHR$131CHR$141"V O I D A"
 370 P%=INKEY(750)
 380 CLS
 390 PRINT''''CHR$133"In this game you are the diagonally"
 400 PRINTCHR$133"moving line and must avoid the oncoming";
 410 PRINTCHR$133"lines. To change direction all you need";
 420 PRINTCHR$133"do is press any key."
 430 PRINT'CHR$130"You are given three lives to"
 440 PRINTCHR$130"start with and each time you"
 450 PRINTCHR$130"collide with the oncoming"
 460 PRINTCHR$130"lines a life is lost and a"
 470 PRINTCHR$130"sound will occur."
 480 PRINT'CHR$134"At the end of the game your"
 490 PRINTCHR$134"score will be displayed"
 500 PRINT'CHR$131"To restart the game Press the red key"
 510 PRINTCHR$131"marked"CHR$129"f1"
 520 PRINT'''CHR$136"Press any key to start the game"
 530 R=GET
 540 ENDPROC
```

Sinclair ZX Spectr



The growing range of Spectrum Software

You'll know already that the Spectrum has generated an enormous range of peripherals and independent software. Our own range is growing very fast and is shown in the Sinclair Software Catalogue – *free* with every ZX Spectrum.

rum-news!

16K now £99·95

Previously £125.

48K now £129·95

Previously £175.

ZX Printer now £39.95

Previously £59.95

How to order your ZX Spectrum
Access, Barclaycard or Trustcard holders – call 01-200 0200 24 hours a day, every day. By FREEPOST – use the coupon below. Please allow up to 28 days for delivery. 14-day money-back option.

At last, a 16K colour computer with graphics for under £100!

Why have we done it?

Partly because the sheer volume of Spectrums sold (over 300,000 so far) has brought down unit production costs.

And partly, of course, because we hope you'll buy a Sinclair computer – and not some competitor's promise! We've all heard about colour computers breaking the £100 barrier. Here's the computer that's done it. A colour computer with advanced graphics that's fully supported, and widely available.

Right now, you can order a Sinclair Spectrum at these prices direct from Sinclair on the order form below. And to make it even easier to handle high-level computing at the lowest possible price, we've cut the cost of the printer, too. At £39.95, it's almost unbelievable!

At prices like these, there's really no reason to wait.

sinclair
ZX Spectrum

Sinclair Research Ltd., Stanhope Road, Camberley, Surrey, GU15 3PS.
Tel: 0276 685311. Reg. no: 1135105.

To: Sinclair Research, FREEPOST, Camberley, Surrey, GU15 3BR. **Order**

Qty	Item	Code	Item Price £	Total £
	Sinclair ZX Spectrum – 16K RAM version	3000	99.95	
	Sinclair ZX Spectrum – 48K RAM version	3002	129.95	
	Sinclair ZX Printer	1014	39.95	
	Printer paper (pack of 5 rolls)	1008	11.95	
	Postage and packing: orders under £90	0028	2.95	
	orders over £90	0029	4.95	
			Total £	

Please tick if you require a VAT receipt

*I enclose a cheque/postal order payable to Sinclair Research Ltd for £

*Please charge to my Access/Barclaycard/Trustcard account no.

*Please delete/complete as applicable.

Signature PLEASE PRINT

Name: Mr/Mrs/Miss

Address

POC 905

FREEPOST – no stamp needed. **Prices apply to UK only.** **Export prices on application.**

The Pit — part one

***Paul Sellin** presents* The Pit – *a three-part text adventure for the 16K Spectrum*

Writing an adventure game is not nearly as difficult as it may appear, as long as you always remember to keep the different parts of the program in their own separate blocks. It is always a good idea to keep a list of where each section starts, together with a note of all the variables, strings and their uses.

The program printed here is called *The Pit* and is a text adventure game, written to fit into a 16K ZX Spectrum. There is no reason why the program cannot be typed into any other machine, as long as any differences in the Basic, such as *Print At, Drawing* and String Slicing are taken into account.

In order to write an interesting program within the memory available, various space-saving ideas are used. The most obvious of these is the use of multi-statement lines, which on the Spectrum can be of any length, although in practice they are nearly always brought to an end by an *If . . . Then* statement. Other machines whose Basic includes *If . . . Then . . . Else* can of course get round this problem if even longer lines are required.

Throughout the length of the game, the computer stores a 'map' of the playing area in a character array. In this program the game can be played on four levels, each of 20 rooms by 10 rooms. This means that the array is dimensioned by the command *Dim(4,10,20)*, which can be thought of as four pages of a book, each one containing 10 rows of letters and each row containing a line of 20 letters.

The player enters on 'page one' and moves around the rows or columns on that page. Line 100, after *Clearing* out the User Definable Graphics to make more memory available, calls sub-routine 9000, which initialises the main array. After printing up the title and credits, the computer dimensions the array and then proceeds to fill it with the monsters and nasties which you will come up against later.

The *For . . . Next* statement, using *z* as the control variable, makes the program fill

```
 100 CLEAR PEEK 23732+256*PEEK 2
3733: GO SUB 9000: CLS : PRINT "
You are now in The Pit.","": LET
 s=20: LET p=20: LET d=20: LET i
=20: LET fl=10: LET l=0: LET si=
1: LET ar=INT (1+RND*4): LET p$=
" ": LET y$=" "
1000 POKE 23692,255: IF INKEY$<>
"" THEN GO TO 1000
1002 LET p$=INKEY$: IF p$="" THE
N GO TO 1002
1003 IF INKEY$="m" THEN GO SUB 9
200
1004 IF INKEY$="f" THEN GO TO 27
00
1005 IF INKEY$="t" AND y$="the R
une Staff4" THEN PRINT "Ready to
 Teleport.","": GO TO 2200
1010 LET oy=y: LET ox=x: LET y=y
+(p$="6" AND y<10)-(p$="7" AND y
>1): LET x=x+(p$="8" AND x<20)-(
p$="5" AND x>1): IF s<1 THEN GO
TO 9800
1011 IF CODE p$<53 OR CODE p$>56
 OR (oy=y AND ox=x) THEN GO TO 1
000
1015 PAPER 5: PRINT "You move "
; : IF p$="7" THEN PRINT "north."
1017 IF p$="6" THEN PRINT "south
."
1018 IF p$="5" THEN PRINT "west.
"
1019 IF p$="8" THEN PRINT "east.
"
1020 PAPER 7: PRINT '"You are at
 ";x;" ,";y: LET z$=a$(z,y,x): RE
STORE 1500+CODE z$: READ o$,e: I
F o$="x" THEN GO TO e
1532 PRINT '"You have found ";o$
: GO TO e: DATA "an empty room",
1000
1542 DATA "x",2000
1563 DATA "x",2800
1596 DATA "some loot",2400
1599 DATA "an ancient chest",250
0
1602 DATA "some flares",2900
1609 DATA "x",3000
1616 DATA "an unscrupulous  Trad
er",3500
2010 LET a$(z,y,x)="m": RESTORE
2030: FOR h=1 TO 1+RND*6: READ p
$: NEXT h: PRINT "You have found
... "'TAB 3;;p$(1 TO LEN p$-1): I
```

'pages' one to four in turn (throughout the program the variable *z* is used as the level or 'page' number which the player is on). *o$* contains the five characters which will be put on to the array first. The *For . . . Next* loop containing *h* slices *0$* to produce one of its five characters each time round, so when *h=1* then *p$=o$(1)* or £ and when *h=2* then *p$=o$(2)* or *f*, etc up to *h=5* inclusive.

There is a second loop inside the *h* loop made by the *For . . . Next* statement containing *e* as its control variable. For each count of *h* this loop is set up to count *e* from 1 to a number between 8 and 13. For every loop of *e* one space in the specified page of the main array *a$* is filled with the character present in *p$*. This puts the characters *£,f,t,c,?* into a random position on that page any number of times between 8 and 13.

Next, the monsters must be added. The *e For . . . Next* loop is set up again, this time to increment *e* from 1 to between 20 and 25 (ie, there will be more monsters on each page than any of the other five characters). After that has finished looping, the *e* loop is set up a final time to add between 3 and 6 *, or gems per page.

When the *e* loop has finished, it means that one of the four pages has been filled with varying numbers of the seven characters. When the computer meets the *Next z* command, it increases *z* to two and repeats the whole process, filling up page 2, and so on until *z* is greater than 4.

Notice that when calculating the random positions in the array, *1* is added to *Rnd+9*, etc, to prevent a low value of *Rnd* from producing a result of zero — this would cause the program to crash when the computer tried to find the part of the array with a subscript of zero.

Just before the subroutine *Returns* to line 100, it sets up the variables *z, y* and *x*, which record the player's position. These variables will always be used for the 'page' number *(z)*, row number *(y)* and column number *(x)* respectively.

At the start of the game the player is placed at position 10 of the first row of page 1. Also notice that that position in the main array is made empty, or equal to a space, so that the room with the entrance will not contain any monsters.

On returning from the subroutine, the variables which will be used to keep note of the player's condition throughout the game are set up. These are *s* for strength, *p* for psi power (for spells, etc), *d* for dexterity and *i* for intelligence, all initially set at 20. The game ends if your strength *s* ever drops to zero or below.

The other variables are: *fl*, the number of flares you carry, *l* the amount of loot you have, *si* whether you have sight or not (*si* =1 or 0) and *ar*, your armour, ranging from 1 (weak armour) to 5 (strong armour). *p$* and *y$* are string variables used later in the game.

So now we have set up the game ready to play, with a complete map of the area in the computer's memory and the players poised to enter. Next week we shall create the most dangerous part of an adventure game, the monsters . . . ■

● *The Pit* has been split into three parts. Enter part 1 of the program now and *Save* it on tape. Part 2 will be published next week. You will need to enter all three parts of the program before Running it.

```
F p$="nothing0" THEN GO TO 8000
2013 IF y$=" " THEN PRINT '"It's
 yours!": LET y$=p$: GO TO 8000
2015 PRINT '"You already have ";
 INVERSE 1'y$( TO LEN y$-1); INV
ERSE 0'"Do you want to swap it f
or the"; INVERSE 1'p$( TO LEN p$
-1); BEEP .3,24: PAUSE 1: PAUSE
0: IF INKEY$<>"n" THEN PRINT "It
's yours!": LET y$=p$: GO TO 800
0
2030 PRINT "OK.": GO TO 1000: D
ATA "the Avril stone5","nothing0
","the Gem of Grune1","the orb o
f Zot4","the Rune Staff4","the f
lame of Plathe2"
2200 INPUT "Co-ords to teleport?
 (x,y)";x,,y: INPUT "Level?";z:
IF l>1500 AND y=1 AND x=10 AND z
=1 THEN GO TO 9900
2210 IF x<1 OR y<1 OR x>20 OR y>
10 OR z<1 OR z>4 THEN BEEP .5,-1
6: GO TO 2200
2215 BEEP 2,24: GO TO 1020
2400 BEEP .05,12: BEEP .05,12: B
EEP .1,24: LET e=1+INT (RND*30):
 LET l=l+e: PRINT "You have foun
d ";e'': LET a$(z,y,x)=" ": GO T
O 8000
2505 LET a$(z,y,x)="m": PRINT FL
ASH 1;"Anything to do?": PAUSE 1
: PAUSE 0: IF INKEY$<>"o" THEN P
RINT "OK.": GO TO 1000
2510 RESTORE 2530: FOR h=1 TO 1+
RND*8: READ x$: NEXT h: PRINT "Y
ou have found... "'TAB 3;;x$: IF
 x$<>"nothing" THEN IF x$( TO 5)
<>"a set" THEN GO TO 2540
2514 IF x$="nothing" THEN GO TO
1000
2515 LET e=12-INT (RND*16): PRIN
T "To what do you want to add yo
ur bonus?": PAUSE 0: IF INKEY$="
i" THEN LET i=i+e: GO TO 2520
2516 IF INKEY$="d" THEN LET d=d+
e: GO TO 2520
2517 IF INKEY$="s" THEN LET s=s+
e: GO TO 2520
2518 IF INKEY$="p" THEN LET p=p+
e: GO TO 2520
2519 PRINT "OK.": GO TO 1000
2520 PRINT "You got ";e;" bonus
points!": LET p$=" ": LET a$(z,y
,x)="m": GO TO 8000
```

Direct access . . .

***Peter Forward** explains how to access block graphics from the keyboard*

All 16 graphic blocks can be printed on demand, in any of eight colours, together with cursor movements, directly from the keyboard.

The Dragon 32 block graphics can normally only be accessed using the rather cumbersome *Print Chr$( )* function, which makes the construction of games, figures and screen layouts time-consuming, and is particularly difficult for novice programmers. This machine code utility allows the direct entry of block graphics into print statements and strings.

The Basic program in Figure 1 should be typed in, paying particular attention to the contents of lines 60000 to 60050. It is a good idea to *Save* a copy of the program at this stage, just in case you have made an error which will cause the computer to 'hang up' when the program is Run.

After Running the program, the graphics mode can be entered at any time by pressing *Shift* ↑. The keys *1* to *8* will select the print colour, the keys *A* to *P* will input the 16 graphics blocks and keys *Z,X,V* and *Q* the cursor movements.

To enter graphics in your print statements, type in the normal way, then when graphics are required operate the *Shift* ↑. Next, type in the graphics and before closing the quotes operate the *Shift* ↑ again to return the keyboard to its normal mode to finish your program line. The *Shift* ↑ can be used at any time to toggle into, and out of, the graphics mode. However, operating *Return* will always reset the keyboard for normal operation.

When in the graphics mode, the space bar and the ← (delete) key still retain their normal functions, but other keys will be ignored.

The inclusion of cursor movements (keys *X,Z,V,Q*, being *Down, Up, Left, Right*) allows you to design complete figures such as chess pieces, invaders, etc, directly into the program line. Once the complete figure is given a string label, simply print it on demand using the *Print* or *Prints@* functions. If you overwrite your drawing, then due to the Basic interpreter, the cursor will print a space on your masterpiece. Don't worry — when your program is Run or *Listed*, you will see that all is well!

The Basic program is used to *Load* a machine code routine into the protected high memory of your computer — it assumes that your own program will start at line 40 onwards. This utility uses the fact that on entering the printout routine in Rom at *B54AH* there is a jump to Ram at *0167H* which normally contains an *Rts* (return from subroutine) instruction. Line 30 of the Basic program modifies this to jump to the new routine that you have entered starting at *7D01H*, which modifies the key value. A full listing is given in Figure 2.

Note that in line 10 the '200' should be modified to allow the string space required by your program. Also, the reserved memory space from *7E00H* to *7FFFH* is available for your own machine code routines, or to extend the above program to include other key controlled functions. ■

FIGURE 1

BASIC PROGRAM LISTING :keyboard graphics routine for DRAGON 32

```
1 REM *** KEYBOARD GRAPHICS-PETER FORWARD-COPYRIGHT 1983 ***
10 CLEAR 200, 32000
20 FOR T = 32001 TO 32226:READ A$:B$="&H"+A$:C=VAL(B$):POKE T,C:NEXT
30 POKE &H167,&H7E:POKE &H168,&H7D:POKE &H169,&H01:POKE &H7DF3,&H3F
59999 END
60000 DATA 81,0D,26,04,7F,7D,F2,39,81,20,26,01,39,81,08,
          26,01,39,81,5F,26,06,73,7D,F2,86,00,39,7D,7D,
          F2,26,01,39,81,41,25,0A,81,50
60010 DATA 22,46,BB,7D,F3,39,12,12,81,32,26,04,86,4F,20,
          32,81,33,26,04,86,5F,20,2A,81,34,26,04,86,6F,
          20,22,81,35,26,04,86,7F,20,1A
60020 DATA 81,36,26,04,86,8F,20,12,81,37,26,04,86,9F,20,
          0A,81,38,26,04,86,AF,20,02,86,3F,B7,7D,F3,86,
          00,39,F7,7D,F4,81,58,26,11
60030 DATA FC,00,88,C3,00,20,10,83,05,FF,22,48,FD,00,88,
          20,3D,81,5A,26,11,FC,00,88,83,00,20,10,83,04,
          00,25,E2,FD,00,88,20,28,81,51
60040 DATA 26,11,FC,00,88,C3,00,01,10,83,05,FF,22,1E,FD,
          00,88,20,13,81,56,26,12,FC,00,88,83,00,01,10,
          83,04,00,25,E2,FD,00,88
60050 DATA F6,7D,F4,86,00,39,B6,00,89,B7,7D,F5,86,0D,BD,
          B5,4D,B6,7D,F5,B7,00,89,86,00,F6,7D,F4,39
```

continued on page 25

More exciting programme than Top of the Pops, Luxembourg and Radio 3 all rolled into one.

Composer is an exciting new music program for VIC 20 owners.

Pop in the program and you'll see two staves of music appear on your screen, all ready for the notes of your new hit-tune. (Even without previous musical experience you'll be surprised how easy it is!)

Use the keys on the top row of the keyboard and as they play you'll see them appear as notes on the screen. You can put in sharps and flats by using the shift key, and change the length of any note just as you would on a piano.

When you're happy with your tune, you can play all of it back and even store it on your tape recorder.

Very soon you'll have a whole concerto or catchy album track.

And if that sounds good just listen to the price. £11.50 for the complete program.

Send in the coupon right away. Ready to start on your next big hit!

COMPOSER. THE MUSIC PROGRAM FOR VIC 20.

Available soon from all good software dealers.

OR SEND FOR FULL PROGRAM DETAILS
From MMS Ltd.,
Goddard Road, Whitehouse
Industrial Estate, Ipswich,
Suffolk, IP1 5NP.
Tel. No. 0473 462721.

Send this coupon to: Marketing Micro Software Ltd., FREEPOST, Ipswich IP1 5BR.

QTY	PROGRAM	PRICE	TOTAL £
	Composer	£11.50	
		Plus P&P	0.50
		Total (VAT inclusive)	

Prices apply to U.K. only. Export prices on application.

FREEPOST – No stamp needed in UK.

I enclose a cheque/postal order payable to: Marketing Micro Software Ltd.

£ _____

OR Please charge to my Access/Barclaycard

No [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

Signature _____

PLEASE USE BLOCK CAPITALS

Name _____

Address _____

_____

_____

PCW 19/5

Co. Reg. No. 1694320.

FITNESS SOFTWARE

Can your micro make you fit?

DIET ANALYSIS PROGRAM

Calculate your optimum calorie intake. Analyse your present diet. Does it match your optimum? Are you gaining or losing weight?
Discover the proportions of fat, protein and carbohydrates in your daily food and compare them with your 'ideal' diet, the average Western, Third World and sportsmen's diets. For slimmers, carb-loading athletes, sedentary workers watching their fat consumption, diabetics, or anyone with a calorie ceiling.

SINCLAIR SPECTRUM, BBC, NEWBRAIN
Cassette — £7.95 inc p+p

PERSONAL BEST

Compare your personal best (PB) over almost any distance with times at other distances. Enter your personal details and predict your time for the MARATHON. Estimate your training mileage for a target time. Link your PB to the great performances of all time.
What would happen if you doubled your training mileage; halved it; lost 10lbs in weight? Play around with the figures. Make your running scientific.
A must for all runners, joggers and aspirants.

BBC, SINCLAIR, SPECTRUM, NEWBRAIN
Cassette — £7.95 inc p+p

EARLGATE COMPUTERS

PO BOX 24, WOKINGHAM, BERKS RG11 1PE

AT LAST

THE TEXAS PROGRAM BOOK

Vince Apps

35 programs for games, home and business use with the
TI 99/4A £5.95
Written for the home user these games are both fun and educational.
Now you can enter a **3D maze, run a horse race,** and even **help a Penguin to save it's eggs.** You can test your skills with **anagrams,** do **metric conversions** and **run your own filing system** and **home accounts.**
Available through bookshops everywhere or cheque or p.o. Orders to

PHOENIX PUBLISHING ASSOC
14 VERNON ROAD BUSHEY
HERTS WD2 2JL

Price £5.95 plus 50p post.

NAME.....
ADDRESS.....
.....
.....post code.....

Kiltdale

At Kiltdale we don't treat computer program duplication as a side line. We are the specialists.

Since we started three years ago, we have developed a dedicated data duplication service that is second to none.
We developed specialist machinery and installed it in a clean air environment. Couple this with our tape, specially formulated for data. Add rigorous quality control and our product and service speak for themselves. No job is too large or too small. So if you are looking for data cassette duplication, why don't you call us?

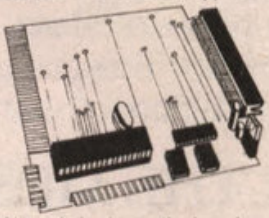
Kiltdale Ltd.
Liddington Industrial Estate,
Leckhampton,
Cheltenham,
Glos.
Tel: (0242) 25458

QUITE SIMPLY THE BEST

---

fb tronics
SPECSPANSION

A combined 4-slot motherboard and 24-line bi-directional programmable portboard, supplied with a comprehensive User Manual.
A software programming aid, on cassette, is also available.
Plugs directly into the Spectrum, no extra connectors required. ZX printer and other periphrals can be plugged onto the board's edge connector.
Port connections via edge pins, either solder direct or, we recommend, use sockets which can be supplied.



On Board +5 volts regulator.
Built in address decoding available at three of the motherboard slots for up to a further 12 ports. Manual gives details of addressing.
Provision for 4 additional cards, either your own or, coming soon, RS232/ centronics interface, A to D converter, relay box interface, Joysticks.

Upgrade in stages, the board can be supplied drilled only to take the additional connectors later on with one or more of the connectors fitted as required.

Prices:	
Port/motherboard drilled only	**£18.50**
Port/motherboard fitted with additional connectors (up to 4), per connector, add	**£3.50**
Motherboard connectors loose, per connector	**£3.00**
Port sockets, per set of 6	**£1.40**
Programming Aid cassette	**£3.50**

For boards, add 80p postage and packing; for other items, add 40p. Orders dispatched within 48 hours.

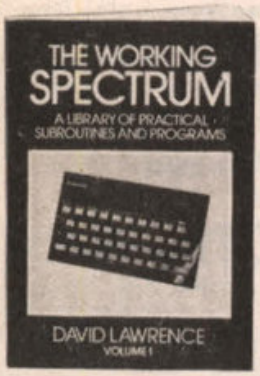
F B Tronics, Unit 2, Park Brook Industrial Estate, Park Street, Lye, Stourbridge, West Midlands, DY9 8SS

FIGURE 2 - MACHINE CODE LISTING : Keyboard graphics routine

```
7D01   START     81 0D          CMPA #0D
                 26 04          BNE SPACE
                 7F 7D F2       CLR 7DF2
                 39             RTS
         SPACE   81 20          CMPA #20
                 26 01          BNE DELETE
                 39             RTS
         DELETE  81 08          CMPA #08
                 26 01          BNE TOGGLE
                 39             RTS
         TOGGLE  81 5F          CMPA #5F
                 26 06          BNE TEST
                 73 7D F2       COM 7DF2
                 86 00          LDA #00
                 39             RTS
         TEST    7D 7D F2       TST 7DF2
                 26 01          BNE KEY
                 39             RTS
         KEY     81 41          CMPA #41
                 25 0A          BLO COLOR2
                 81 50          CMPA #50
                 22 46          BHI CURSOR
                 BB 7D F3       ADDA 7DF3
                 39             RTS
                 12             NOP
                 12             NOP
         COLOR2  81 32          CMPA #32
                 26 04          BNE COLOR3
                 86 4F          LDA #4F
                 20 32          BRA COLOR
         COLOR3  81 33          CMPA #33
                 10 83 05 FF    CMPD #05FF
                 22 48          BHI NEWLINE
                 FD 00 88       STD 0088
                 20 3D          BRA EXIT1
         UP      81 5A          CMPA #5A
                 26 11          BNE RIGHT
                 FC 00 88       LDD 0088
                 83 00 20       SUBD #20
                 10 83 04 00    CMPD #0400
                 25 E2          BLO ADDLINE
                 FD 00 88       STD 0088
                 20 28          BRA EXIT1
         RIGHT   81 51          CMPA #51
                 26 11          BNE LEFT
                 FC 00 88       LDD 0088
         ADDONE  C3 00 01       ADDD #01
                 10 83 05 FF    CMPD #05FF
                 22 1E          BHI NEWLINE
                 FD 00 88       STD 0088
                 20 13          BRA EXIT1
         LEFT    81 56          CMPA #56
                 26 12          BNE EXIT2
                 FC 00 88       LDD 0088
                 83 00 01       SUBD #01
                 10 83 04 00    CMPD #0400
                 25 E2          BLO ADDONE
                 FD 00 88       STD 0088
         EXIT1   F6 7D F4       LDB 7DF4
         EXIT2   86 00          LDA #00
                 39             RTS
         NEWLINE B6 00 89       LDA 0089
                 B7 7D F5       STA 7DF5
                 26 04          BNE COLOR4
                 86 5F          LDA #5F
                 20 2A          BRA COLOR
         COLOR4  81 34          CMPA #34
                 26 04          BNE COLOR5
                 86 6F          LDA #6F
                 20 22          BRA COLOR
         COLOR5  81 35          CMPA #35
                 26 04          BNE COLOR6
                 86 7F          LDA #7F
                 20 1A          BRA COLOR
         COLOR6  81 36          CMPA #36
                 26 04          BNE COLOR7
                 86 8F          LDA #8F
                 20 12          BRA COLOR
         COLOR7  81 37          CMPA #37
                 26 04          BNE COLOR8
                 86 9F          LDA #9F
                 20 0A          BRA COLOR
         COLOR8  81 38          CMPA #38
                 26 04          BNE COLOR1
                 86 AF          LDA #AF
                 20 02          BRA COLOR
         COLOR1  86 3F          LDA #3F
         COLOR   B7 7D F3       STA 7DF3
                 86 00          LDA #00
                 39             RTS
         CURSOR  F7 7D F4       STB 7DF4
         DOWN    81 58          CMPA #58
                 26 11          BNE UP
                 FC 00 88       LDD 0088
         ADDLINE C3 00 20       ADDD #20
                 86 0D          LDA #0D
                 BD B5 4D       JSR B54D
                 B6 7D F5       LDA 7DF5
                 B7 00 89       STA 0089
                 86 00          LDA #00
                 F6 7D F4       LDB 7DF4
                 39             RTS
```

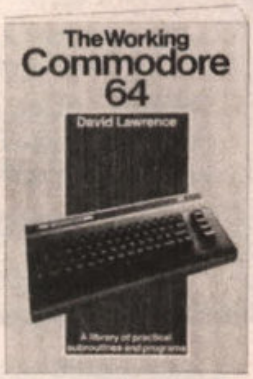
7DF2 = GRAPHICS TOGGLE 7DF3 = COLOUR ADD 7DF4 = B STORE
7DF5 = A STORE

Better books from Sunshine



A collection of sophisticated Basic programs and subroutines including Unifile, Renumber (handles Gotos and Gosubs) education, accounts, games and scores of essential routines. Put your Spectrum to work with what must be the most comprehensive Spectrum book. 248pp **£5.95***

Some of the more advanced programs in this collection include a word processor and text editor, a music and sound synthesiser, a sprite editor and a program which allows you to enter high resolution graphics mode. This is not available in the standard Basic. 160pp **£5.95***



This computer has capabilities far beyond most other computers in this price bracket. With this collection of Basic programs and routines David Lawrence introduces word processing, music and shows you how to mix text and high resolution graphics. As with the other books in this series, each program is built up out of re-useable subroutines. 160pp **£5.95***

*Available through W H Smith's and computer dealers

Trade/dealer enquiries welcome

SUNSHINE

Please send me

☐ **The Working Spectrum** at £5.95 each

☐ **The Working Commodore 64** at £5.95 each

☐ **The Working Dragon 32** at £5.95 each

I enclose a cheque/ postal order for £_____

payable to **Sunshine Books** 19 Whitcomb Street, London WC2 7HF

Name _____

Address _____

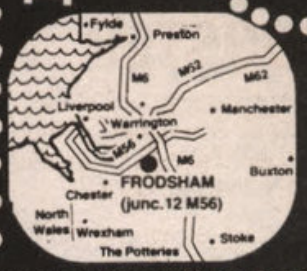
_____

Signed _____

We can normally deliver in four to five days

northern computers

THE COMPUTER CENTRE OF THE NORTH



THE showroom for all the leading micros

easy parking off the M56 (junc 12) * VIC 20 * VIC 64 * BBC micros * Newbrain * Acorn Atom * Books * Apple 11e, 111 * Dragon * Electron * Games * Sinclair Spectrum, * IBM P.C. Secondhand computers * EASY PAYMENTS ALL ACCESSORIES SALES AND SERVICE *

northern computers

Churchfield Road,
FRODSHAM
Cheshire WA6 6RD

TEL: FRODSHAM (0928) 35110

* UNBEATABLE PRICES *

WE WILL PURCHASE AND PUBLISH YOUR PROGRAMS Call Steve Rhodes for details

TOWN NATHAN

Dragon Byte

Home Computers Software and Games

51a Queen Street
Morley
Leeds
Tel: 0532 522690

ZX SPECTRUM now under £100

Ring for more information

Last Chance

10 Ash Road
Headingley
Leeds 6
Tel: 744235

Home computers, software board games, role-playing games and books

At Last's place we make you offers you can't refuse . . .

We're worth a visit because:

★ We've probably the best range of software in the North — and we're improving all the time.

★ We've a growing range of computers, peripherals, upgrades and books.

★ We've the biggest range of Citadel figures for leagues around.

★ We've board and adventure games for all ages from TSR, Games Workshop, Avalon Hill, Victory Games, GDW, Yaquinto, etc, etc.

PROGRAMMERS — Assassin Software needs your marketable programs. Give us a call

AMAZING NEW PRODUCT TELESOUND 84 SPECTRUM SOUND BOOSTER

Telesound 84 outputs the computer sound direct through your unmodified TV set. Sound effects then can be controlled from a whisper to a roar. Three easy snap-on connections eliminate soldering.

Telesound 84 measures 2½ x 2 x 1½ cm. and requires no separate power supply. This unique device (patent pending) uses some of the very latest ultra miniature components and costs only **£9.95** inclusive of post, packing, etc.

Full instructions with connection diagrams are supplied so that the unit can be fitted in minutes without any previous experience.

Cheques/PO to

COMPUSOUND

32 Langley Close

Redditch, Worcs. B98 0ET

Please state your computer when ordering

★★ VIC20 AND COMMODORE 64 OWNERS ★★

HARDWARE (P&P £1)

32K Ram pack switchable to 3K, 16K and 24K	£69.95
16K switchable to 3K	£44.95
16K Ram pack	on offer at £27.50
3K Ram pack	£19.95
Quickshot joystick	£11.95

VIC20 SOFTWARE (P&P 50p)

Audiogenic Wordcraft	on offer at £99.95
Buti Plus	£39.95
Super Expander, Machine Code Monitor	each £34.95
Gortex and the Microchips	£12.95
Sargon Chess, Choplifter	each £24.95
Alien, Mole Attack, Rat Race, Super Slot, Tank Attack	each £10.95
Krazy Kong, Grid Runner	each £6.00

64 SOFTWARE (P&P 50p)

Easy Script	£75.00
Introduction to Basic — Part 1	£14.95
Gortex and the Microchips	£12.95
Grid Runner	£8.50
Rox, Bomber	each £4.95
Attack of the Mutant Camels	£8.95
Monopolee, Adventure Pack 1	each £9.99
Sprite Editor	£4.95
Krazy Kong, Cavern Run	each £8.99
Star Trek, Panic 64, Frog 64	each £7.00
Motor Mania, Renaissance	each £8.95

BOOKS (P&P 75p)

Zap! Pow! Boom!	£7.95
Innovative Computing	£6.95
Computes Book of the Vic	£12.95
Vic Revealed	£9.95
Mastering the Vic20	£5.95
Vic for Children	£5.95

Send cheque, postal orders or credit card number to:

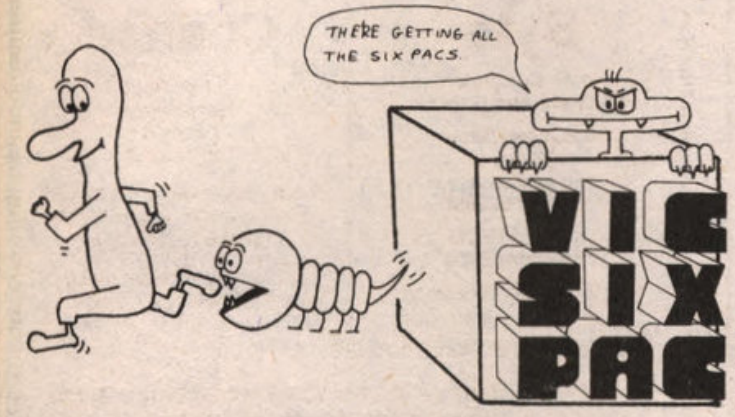
RAM ELECTRONICS (FLEET) LTD.

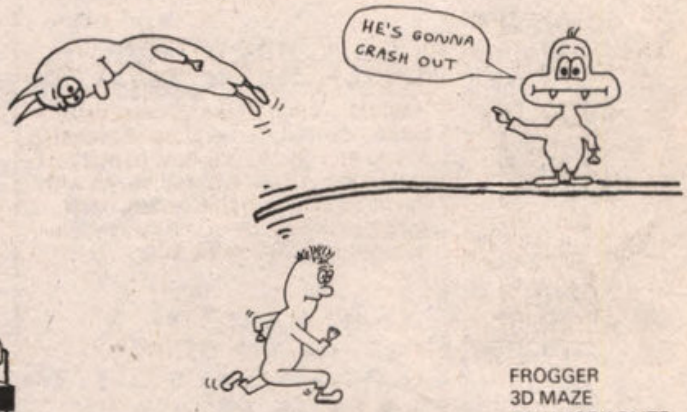
Dept. PCW, 106 Fleet Road, Fleet, Hants GU13 8PA

Telephone (02514) 5858 (closed all day Wednesday). Callers welcome

All prices include VAT at 15% (excluding books)
Overseas orders add £2 P&P
TRADE ENQUIRIES WELCOME

VIC·20 GAMES





£9.95 FOR SIX GAMES

FROGGER
3D MAZE
NEW YORK BLITZ
ROBOT MOUSE
SPACE SHUTTLE
BUG DIVER

MONEY BACK GUARANTEE

NOW FOR THE FIRST TIME IN UK.....

Six famous arcade quality games use machine code, Hi-res multi-color grafix, exciting sound effects, for any VIC-20, keyboard or joystick.

Available now in UK direct from manufacturer only thru our **super fast mail order service,** or 24hr credit card sales line. All games supplied on cassette with written money back guarantee.

pcw 3

Please rush my VIC SIX PAC

Debit my Access/Visa card (delete as necessary)

Card Number

I enclose cheque/PO for **£9.95**

Name

Address

0460 40744 (24hrs)

Galactic Software

LAMBROOK RD. SHEPTON BEAUCHAMP. SOMERSET. TA19 0LZ

Heavenly bodies . . .

***Nick Butler** plots the orbits of Earth, Venus and Mercury around the sun*

This program is designed to show the orbits of the three planets closest to the sun — Mercury, Venus and Earth (together with its orbiting moon). The program is written for a BBC model B, but you can adapt it for a model A by changing line 140 to mode 4 and line 470 to *Gcol 0,1*.

The sizes of the planets relative to each other are approximately correct, although the sun is out of proportion.

The time taken for the orbit of each planet is: Mercury — 88 days; Venus — 255 days; Earth — 365 days (the moon orbits the Earth once every 30 days).

The main section of the program is contained in lines 200-330. Line 210 calculates the Earth's position, which is printed by line 230. The procedures to print the moon, Venus and Mercury are called in lines 240-260. A 1/10 second delay is called in line 270 while lines 280-300 over-print the moon, Venus and Mercury in their logical inverse colours; ie, black. Finally, line 310 over-prints the Earth.

Program notes

150 Calls procedure which sets all variables and defines characters.
160 Calls procedure which asks whether you want to plot the courses.
170 Causes characters to be printed at the graphics cursor.
180 Calls procedure to draw the Sun.
200- 330 Draws Earth. Calls procedures to draw and erase the Moon, Venus and Mercury. Erases Earth.
270 Causes a pause (10/100 sec) before continuing — to increase or decrease the speed of action, change the number.
350- 410 Procedure to draw the moon (relative to the Earth).
460- 540 Procedure to draw the Sun (uses Plot 85 for speed).
560- 650 Procedure to initialise all variables used.
670- 770 Procedures to draw and delete Venus.
790- 840 Procedure to delete the moon.
860- 960 Procedures to draw and delete Mercury.
980-1040 Procedure to ask whether the courses of the planets should be plotted or not.

Variables used

EDX — Degrees from Earth's starting point (this is automatically set back to 0 when it has completed each orbit).
PX — 'X' position of Earth.
PY — 'Y' position of Earth.
P — Variable for course plotting option.
MOX — 'X' position of the moon.
MOY — 'Y' position of the moon.
MX — Degrees from moon's starting point.
POX — 'X' position of Venus.
POY — 'Y' position of Venus.
MEX — 'X' position of Mercury.
MEY — 'Y' position of Mercury. ■

```
>cC
   10 REM ***********************************
   20 REM *                                 *
   30 REM *          O R B I T S            *
   40 REM *                                 *
   50 REM *  (Earth,Moon,Venus,Mercury)     *
   60 REM *                                 *
   70 REM *               ***               *
   80 REM *                                 *
   90 REM *          by N.Butler            *
  100 REM *                                 *
  110 REM ***********************************
  120 REM
  130 REM
  140 MODE1
  150 PROCinit
  160 PROCask
  170 VDU 5
  180 PROCsun
  190 REM   ** MAIN LOOP **
  200 FOR EDX=0 TO 360 STEP 2
  210 PX=640+550*SIN(RAD(EDX)):PY=512+190*COS(RAD(EDX))
  220 IF P=1 PLOT 69,PX,PY
  230 MOVE PX,PY:PRINTCHR$(225)
  240 PROCmoon
  250 PROCvenus
  260 PROCmercury
  270 PROCwait(10)
  280 PROCdelmoon
  290 PROCdelvenus
  300 PROCdelmercury
  310 MOVE PX,PY:PRINTCHR$(225)
  320 NEXT EDX
  330 GOTO 200
  340
  350 DEFPROCmoon
  360 GCOL3,1
  370 MOX=PX+60*SIN(RAD(MX)):MOY=PY+30*COS(RAD(MX))
  380 MOVE MOX,MOY:PRINTCHR$(226)
  390 MX=MX+24
  400 GCOL3,3
  410 ENDPROC
```

```
420
430 DEFPROCwait(T)
440 TIME=0:REPEAT UNTIL TIME>T:ENDPROC
450
460 DEFPROCsun
470 GCOL0,2
480 FOR S=1 TO 20:PLOT 69,RND(1280),RND(1024):NEXT S
490 MOVE 640,510
500 FOR S=0 TO 360 STEP 20
510 MOVE 640,512:PLOT 85,640+50*SIN(RAD(S)),512+50*COS(RAD(S)):NEXT S
520 GCOL3,3
530 ENDPROC
540 MX=0
550
560 DEFPROCinit
570 VDU 23,225,&3C,&7E,&FF,&FF,&FF,&FF,&7E,&3C
580 VDU 23,226,&00,&00,&18,&3C,&3C,&18,&00,&00
590 VDU 23,228,&38,&7C,&7C,&7C,&38,&00,&00,&00
600 VDU 23,227,&00,&3C,&7E,&7E,&7E,&7E,&3C,&00
610 MX=1
620 PLX=0
630 MERC=0
640 VDU 19,3,6,0,0,0:GCOL3,3
650 ENDPROC
660
670 DEFPROCvenus
680 POX=640+362*SIN(RAD(PLX)):POY=512+134*COS(RAD(PLX))
690 MOVE POX,POY:PRINTCHR$(227)
700 IF P=1 PLOT 69,POX,POY
710 PLX=PLX+3.2
720 ENDPROC
730
740 DEFPROCdelvenus
750 POX=640+362*SIN(RAD(PLX-3.2)):POY=512+134*COS(RAD(PLX-3.2))
760 MOVE POX,POY:PRINTCHR$(227)
770 ENDPROC
780
790 DEFPROCdelmoon
800 GCOL3,1
810 MOX=PX+60*SIN(RAD(MX-24)):MOY=PY+30*COS(RAD(MX-24))
820 MOVE MOX,MOY:PRINTCHR$(226)
830 GCOL3,3
840 ENDPROC
850
860 DEFPROCmercury
870 MEX=640+212*SIN(RAD(MERC)):MEY=512+79*COS(RAD(MERC))
880 MOVE MEX,MEY:PRINTCHR$(228)
890 IF P=1 PLOT 69,MEX,MEY
900 MERC=MERC+8
910 ENDPROC
920
930 DEFPROCdelmercury
940 MEX=640+212*SIN(RAD(MERC-8)):MEY=512+79*COS(RAD(MERC-8))
950 MOVE MEX,MEY:PRINTCHR$(228)
960 ENDPROC
970
980 DEFPROCask
990  PRINTTAB(10,3)"O R B I T"
1000 PRINT'''"  Do you want the orbits of the planets traced out (Y/N)"
1010 PATH$=GET$
1020 IF PATH$="Y" P=1:CLS:ENDPROC
1030 IF PATH$="N" P=0:CLS:ELSE GOTO 990
1040 ENDPROC
```

HIRE ZX81/SPECTRUM PROGRAM TAPES

Make the most of your computer by hiring from the original and still the only software library offering all these features:

- Over 900 tapes stocked, offering more than 120 different programs from 39 suppliers (all with their permission)
- Includes arcade, adventure and simulation games, business and home utilities, graphics, education and much more
- Up to 40 maker's original copies of very popular tapes enable us to maintain good service
- Descriptive catalogue helps you choose
- **FREE** quarterly, illustrated magazine posted to all members
- Full-time staff of three offer you a friendly, efficient welcome & service
- Fortnight's hire for £1.40 inc p/p
- All tapes guaranteed loadable; help given with associated problems
- Overseas branches being set up (Malta already operating)
- You may switch from ZX81 to Spectrum membership if you upgrade
- Free member-to-member advertising in our magazine
- Send SAE for details, or join on money-back no-risk approval today

S-L

The SINCLAIR OWNERS' SOFTWARE LIBRARY
Warren Road, Liss, Hants GU33 7DD.

Please send me on money-back approval my magazine, descriptive library catalogue and order form, on the understanding that if I'm not delighted with your service within 28 days you will refund my money in full.

NAME.....

ADDRESS.....

.....

Please enclose cheque/P.O. for £8.50 (year's ZX81 membership)/ £9.50 (Spectrum). Overseas £2 extra in each case. PCWK

THE WINGED AVENGER

INCLUDES THE NEW VERSION. FAST ARCADE ACTION. NOW MUCH TOUGHER. THREE WAVES, SOUND, SEVEN SKILL LEVELS, HIGH SCORE, REFUELLING, RAPID FIRE, SMART BOMBS and LASER SHIELD. RAVE REVIEWS for the ORIGINAL now EVEN BETTER. ALSO FAST ZX81 VERSION AVAILABLE. NOTED as EXCELLENT by the INTERNATIONAL BUREAU OF SOFTWARE TEST. PCW "ONE OF THE BEST". HCW "ONE OF THE WINNERS". 16K ZX81 and ALL SPECTRUMS. **JUST £4.50.** POST FREE OR CHECK OUT THE BETTER DEALERS.

WORK FORCE

DO NOT PASS GO

Is a complete simulation of "THAT BOARD GAME"; you know, PARK LANE and all that. Up to SIX players can compete with the MICRO doing all the work. Acts as DICE THROWER, BOARD, RENT COLLECTOR, UMPIRE, BANK, RULE BOOK, ACCOUNTANT and ESTATE AGENT. Complete with instructions and GARRY'S MAGIC GRAPHICS. The ULTIMATE in FAMILY GAMES. DON'T MONOPOLISE YOUR MICRO. TAKE A TRIP FOR **£6.95.** 48K SPECTRUM. Also 16K ZX81. POST FREE. OR ASK YOUR DEALER. **WORK FORCE, 140 WILSDEN AVENUE, LUTON, BEDS.**

THE Computer Fair

Personal computers
Home computing
Small business systems

Sponsored by Practical Computing and YOUR COMPUTER

EARLS COURT 16-19 JUNE 1983

Thursday: 1.00 pm-6.00 pm
Friday & Saturday: 10.00 am-6.00 pm
Sunday: 10.00 am-5.00 pm

Admission Prices
Adults: £3.00 Children under 16 and OAPs: £2.00
See copies of Practical Computing and Your Computer for reduced price voucher.

Advance Party Bookings
For groups of 20 people or more: Adults: £2.00 Children: £1.00
(plus one free ticket per 20 sold for the organiser or teacher)

Super Savings from British Rail
all inclusive tickets available from:
The Travel Centre Kings Cross Station London NW1 9AP Tel: 01-278 2477

Further information from:
The Exhibition Manager, The Computer Fair '83
Reed Exhibitions, Surrey House, Throwley Way
Sutton, Surrey SM1 4QQ

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. We will pay the *Program of the Week* double our new fee of £6 for each program published.**

Paint

on Spectrum

This machine code routine can be used to fill in a shape on the screen with pixels of a specified colour.

To enter the hex code into the memory, the following *Basic* program should be used:

```
10 FOR f=32300 TO 32456
20 INPUT x
30 POKE f,x
40 NEXT f
```

Next run the program and type in the hex numbers, pressing *Enter* after each. When all the code has been entered, it is best to

Save "Paint" *Code* 32300,120

before attempting to use the routine.

To use the routine, x and y co-ordinates must be given for the position from which colouring is to begin; that is, a point inside your shape. Therefore it is necessary to:

Poke 32500,x co-ordinate

Poke 32501,y co-ordinate

The colour of the pixels is set by:

Poke 32502,attribute (see page 116 of manual)

Having done all this, and drawn your shape, type

Randomize usr 32300

and watch as your artwork is coloured in.

The routine will stop colouring when it can move no further up or down from the original pixel, and will work on the 16K or 48K Spectrum.

The following program incorporating the routine might appeal to modern-art lovers.

```
10 BORDER 0:PAPER 7:INK 0:CLS
20 FOR f=1 TO 50
30 LET x=RND*253+1:LET y=RND*172+1
40 PLOT x,y:DRAW RND*253+1-x,
   RND*172+1-y
50 NEXT F
60 FOR f=1 TO 30
70 LET x=RND*253+1:LET y=RND*172+1
80 IF POINT (x,y)=1 THEN GOTO 70
90 POKE 32500,x:POKE 32501,y
100 POKE 32502,57+INT(RND*7)
110 RANDOMIZE USR 32300
130 NEXT f
```

```
32300  58 244 126
32303  95
32304  58 245 126
32307  87
32308  58 246 126
32311  50 143  92
32314  75
32315  66
32316  66
32317 205 128 126
32320  75
32321   4
32322 120
32323 254 174
32325 210  93 126
32328 197
32329 213
32330 205 206  34
32333 209
32334 193
32335 197
32336 213
32337 205 213  45
32340 209
32341 193
32342  60
32343  61
32344 254   1
32346 194  61 126
32349  66
32350  75
32351 205 128 126
32354  75
32355   5
32356 120
32357 254   1
32359 218 127 126
32362 197
32363 213
32364 205 206  34
32367 209
32368 193
32369 197
32370 213
32371 205 213  45
32374 209
32375 193
32376  60
32377  61
32378 254   1
32380 194  94 126
```

```
32383 201
32384  75
32385 197
32386 213
32387 205 229  34
32390 209
32391 193
32392  12
32393 121
32394 254 255
32396 210 164 126
32399 197
32400 213
32401 205 206  34
32404 209
32405 193
32406 197
32407 213
32408 205 213  45
32411 209
32412 193
32413  60
32414  61
32415 254   1
32417 194 129 126
32420  75
32421 197
32422 213
32423 205 229  34
32426 209
32427 193
32428  13
32429 121
32430 254   1
32432 218 200 126
32435 197
32436 213
32437 205 206  34
32440 209
32441 193
32442 197
32443 213
32444 205 213  45
32447 209
32448 193
32449  60
32450  61
32451 254   1
32453 194 165 126
32456 201
```

Paint
by G R Barnes

COMPUSENSE

P.O. Box 169
Palmers Green
London N13 5XA

SOFTWARE FOR DRAGON 32

BARCLAYCARD VISA

Telephone: 01-882 0681 (24 hr) and 01-882 6936
Offices at 286D Green Lanes (9.45-6.00 Mon-Fri)

HI-RES upgrade to a 51 by 24 display — cartridge £25.30

Just plug this cartridge into your DRAGON, switch on and you have a 51 column by 24 line display with true lower case characters. This amazing software uses the high resolution mode to draw the characters on the screen and allows you to use BASIC almost as normal. In fact there are a number of extensions to BASIC to allow you to use the many additional features • mix graphics and text on the same screen • select any of nine standard ASCII character sets for FRENCH, SPANISH, GERMAN, ITALIAN, BRITISH, USA, SWEDISH, DANISH or JAPANESE • redefine any of the 244 characters • SPRITE GRAPHICS MODE enables any character to be an 8 by 8 dot sprite • a more responsive keyboard with AUTO-REPEAT • extra shift gives the missing characters to the DRAGON keyboard • leaves about 19,500 bytes for BASIC • switch between HI-RES and normal modes at any time • BLACK on GREEN, BLACK on WHITE, GREEN on BLACK or WHITE on BLACK • 32 by 16 compatibility mode for existing programs • Hi-res is a must for serious programming.

DASM an easy to use 6809 machine code assembler cartridge — £18.95

• Specially designed for convenient use on the DRAGON • Does not use a separate editor • Ideal for producing machine code routines to be called from BASIC • Includes a 6809 Reference Card.

Type your assembler program just as you would a BASIC program and use BASIC to call DASM. When DASM has assembled your program it returns to BASIC where you can check for errors and execute the program immediately if required. The source program is saved and loaded using the normal CSAVE/CLOAD. The assembled program may be saved to tape using CSAVEM (this can easily be done automatically in BASIC when the assembly has finished).

DASM is a two pass symbol assembler which allows labels of any length (the first five characters and the last character are used). All the 6809 mnemonics and addressing modes are supported plus comprehensive assembler directives for defining constants reserving memory, directing output to screen or printer. Errors detected by DASM are reported with easy to understand messages.

DEMON Machine Code MONITOR — cartridge £18.95

DEMON gives you access to the inside of your computer. It features a real time display of memory location in both hexadecimal and alphanumeric codes, a full screen editor for memory and register contents and multiple breakpoints. There are 12 commands designed to assist in debugging and running machine code programs (or BASIC programs with PEEK and POKE).

DEMON, unlike inferior products, has its own documented input and output routines which means that it does not interfere with BASIC. DEMON can be called from a BASIC program and will return control to the BASIC program. A user manual and a 6809 Reference Card are included.

DASM/DEMON — cartridge £30.45

Combines DEMON and DASM in one cartridge. The ideal combination for developing machine code programs on the DRAGON.

DECODE BASIC Converter — cartridge £18.95

DECODE converts BASIC programs between TANDY COLOUR format and DRAGON 32 format. Simply CLOAD the "foreign" program from tape, EXEC the cartridge and the program is converted. The same cartridge will work on a DRAGON 32 and a TANDY COLOUR (Extended BASIC).

GAMES ON CASSETTE

CC POKER £7.95
Join Rocky, Harry and Sam for a captivating game of 5 card Draw. Excellent graphics and sound effects. May turn you into a card sharp overnight. Five levels of difficulty.

SPACE RACE £7.95
A fast action arcade game with 16 levels of difficulty. Chase and destroy the marauding aliens. Use joysticks or keys. Includes a High Score league table.

C-TREK £7.95
An enjoyable and easy to play space adventure game with comprehensive instructions.

PIRATES AHOY £7.95
A humorous nautical adventure game. Solves the riddles and direct the pirate to the treasures.

DESERT GOLF £7.95
Play a round on the Nevada course. High resolution display and good sound effects.

PLEASE ADD 50p POSTAGE ON ORDERS FOR SINGLE CASSETTES
BOOKS NOW IN STOCK

35 Programs for the Dragon 32	£4.95	Enter the Dragon	£5.95
The Working Dragon 32	£5.95	Load and Go with your Dragon	£5.50
Programming the 6809 (Zaks)	£12.50	The MC6809 Cookbook (Warren)	£6.25

Postage on books: add 50p per book — maximum charge £1.00

We support our software!

Send SAE for details of our current upgrade details for cartridge software.
This service is available direct from Compusense.

SEND LARGE SAE FOR OUR LATEST CATALOGUE
By Mail Order — or ask your Local Dealer

GEM SOFTWARE (BISHOP'S STORTFORD) LTD

for LYNX, DRAGON, SPECTRUM and ZX81 Software

MONSTER MINE by W. E. MacGowan. Escape from the mine with as much money as you can, but don't get closed in or caught by the prowling monsters. An addictive machine code game, with superb graphics and save facility. Price (LYNX and DRAGON) **£7.95.** Price (SPECTRUM and ZX81) **£4.95.**
SULTAN'S MAZE by Christopher Hunt. Enter the 3D Maze in search of the Sultan's jewels, but beware, your strength may run out, or you may come face-to-face with the Mad Guardian. A multi-difficulty game with fantastic graphics and sound. Price (LYNX and DRAGON) **£7.95.**
CHARACTER GENERATOR by John Line. A program for the programmer, allowing creation and saving of character sets/shape tables and subsequent inclusion into users Basic program. Demonstration program and full ASCII character set included. Price (DRAGON) **£9.95.**
GEMPACK IV by W. E. MacGowan. Two great machine code games, with full colour graphics. In **Sea Harrier** you must land your plane on the aircraft carrier, after dispersing the clouds with chemical bombs, but don't hit the ship! In **Sub Chase** you must depth charge the wolf pack without being sunk. Both with four levels of play from easy to kamikaze! Price (LYNX and DRAGON) **£7.95.**
CHATEAU by Pete Allen. A new type adventure, in which you must wander the Count's old mansion in search of treasure! Of course, when the Count died and hid his treasure, he also left lots of unpleasant surprises for those brave enough to try and seek out his riches!! Come face-to-face with Ghouls and Ghosts, Vampires and Trolls; do you run or fight? Will the mysterious Travel Agent suddenly appear and whisk you away to far-off places? Where can you find the key or the lamp? Is the clock booby-trapped? Will you die a cold and lonely death, or will you win through to claim the fantastic treasures of The Chateau? Price (DRAGON) **£7.95.**
FUNMATHS I by Peter Chase. Improve your maths while you play these five great games! In **Number Race** you must beat the computer, or a friend, to exactly 100 by eating the numbers. **Maths Maze** asks questions as you work your way around the maze. **Chemist** is a game of ratios, where you mix two chemicals, trying not to get blown-up! **Dragon** exercises your skill at expressing co-ordinates — you have to find the Dragon, hidden in a grid. Last, but no means least, **Simon** tests your memory for tunes/colours/numbers. Price (DRAGON) **£9.95.**
LYNX COMPUTING BOOK by Ian Sinclair. Excellent book, which the beginner will find an invaluable aid, in helping to unravel the LYNX's many varied features!!

All titles available mail order or Access
All cassettes despatched by return of post

GEM SOFTWARE
UNIT D, THE MALTINGS, SAWBRIDGEWORTH, HERTS
Telephone: (0279) 723567
TRADE ENQUIRIES WELCOME – PLEASE RING FOR DEALER PACK

Dragon Dungeon

LATEST DRAGON SMASH HIT!

Just in stock. The roughest, toughest arcade game to hit the Dragon scene to date.

'Drone' is a 3-D simulation, which takes place inside your computer. Driving your Databank (which can accelerate, brake, super-thrust, fire Logic Canons and Pulse Lasers through an optional on-screen sighting system), your mission is to search out and destroy the evil Rom Guardian.

As you race through the countless Memory Tunnels and Grid Zones, you will be attacked by deadly Bugs and Drones and may be deflected to your doom by the Bytes. Many other perils and problems!

Supplied with keyboard overlay and full Operations Manual. Training mode under the supervision of T.R.O.F.F., the talking Robot Commander.

£8.75 post-free

P.O. Box 4, Ashbourne, Derbyshire,
DE6 1AQ. Tel: (0335) 44626

OPEN FORUM

Cards

on Commodore 64

This short program for the 64 deals four hands from a standard pack of 52 cards randomly.

Program notes

21-24	Allocate suits
25-26	Reduce X to between 1 and 13
30-70	I and II to 13 to AKQJ
100-400	Prints the card

Variables

Z Number of cards dealt
K(I) Flag for card selected
IfK(X) = I then new X is found
IfK(X) = 0 then this X is selected and K(X) = I

```
1 PRINT"□"
2 POKE53280,0:POKE53281,3
3 GOSUB2000:PRINT"□"
5 PRINT"■NORTH","■EAST","■SOUTH","
  ■WEST"
6 PRINT" ──────" ," ──────"," ──────","
  ──────"
7 Z=0:DIMK(52):FORI=1TO52:K(I)=0:NEXT
10 X=INT(RND(1)*52+1)
14 IFZ=52THEN1000
15 IFK(X)=1THEN10
16 K(X)=1
21 IFX/4=INT(X/4)THENS$="H"
22 IF(X+1)/4=INT((X+1)/4)THENS$="D"
23 IF(X+2)/4=INT((X+2)/4)THENS$="C"
24 IF(X+3)/4=INT((X+3)/4)THENS$="S"
25 FORI=1TO3:IFX<14THEN30
26 X=X-13:NEXT
30 X$=STR$(X)
40 IFX=11THENX$=" J"
50 IFX=12THENX$=" Q"
60 IFX=13THENX$=" K"
70 IFX=1THENX$=" A"
100 IFS$="C"ORS$="S"THEN400
200 PRINT"■ "X$S$,:Z=Z+1:GOTO10
400 PRINT"■ "X$S$,:Z=Z+1:GOTO10
1000 PRINT:PRINT:PRINT:PRINT"
     ■■ HAND DEALT"
1010 PRINT:PRINT:PRINT:PRINT"
     ■■ANOTHER? (Y/N)"
1020 GETA$:IFA$=""THEN1020
1030 IFA$="Y"THENCLR:PRINT"□":GOTO5
1040 IFA$<>"N"THEN1020
1050 PRINT"□":END
2000 PRINT"                ■■D  E  A  L"
2010 PRINT"                ■■■■■■■■■■"
2020 PRINT"   THIS PROGRAM WILL DEAL
     FOUR RANDOM          HANDS OF CARS
2030 PRINT:PRINT:PRINT:PRINT"■■■
     PRESS ANY KEY"
2060 GETA$:IFA$=""THEN2060
2070 RETURN
```

Cards
by N F Leigh

Space Blitz

on BBC

This program is for model B. The idea is similar to Blitz but with the complication of anti-aircraft missiles.

The missiles become ever more difficult to avoid as you reach more and more screens. Ten points are scored for each block hit, anti-aircraft missiles score a random number between 20 and 40.

On each screen the city gets larger, and a free ship is awarded for every thousand points.

Program notes

50-100	Speed of flash and store high score.
120-200	Screen array and set up variables.
210-260	Set up city, Z = number of blocks.
380-490	Free ship and and move ship.
480-640	Ship crashed? and move shot.
590-620	Block hit? Bomb hit missile? Ship hit?
700-860	Increase score, decrease ships. Messages.
870-1080	Move missile.
1120-1160	Instruction, missile points.
1200-1240	Print block of city; reset variables if ship hit.

VDU 23;8202;0;0;0; turns off the cursor.

My highest score is 2885.

PROGRAM OF THE WEEK

```
 10 ENVELOPE1,1,5,5,5,100,0,0,0,5,-5,100,5,127
 20 SOUND0,1,1,30
 40 MODE7
 50 *FX9,3
 60 *FX10,3
 70 ONERRORH%=0:ONERROROFF
 80 IFH%>0THEN100
 90 INPUT"PREVIOUS HIGH SCORE",H%
100 ONERROROFF
110 CLS:GOSUB1120
120 DIMA(19,30)
130 MODE2
140 VDU23,228,66,153,0,165,165,0,153,66
150 Q=0:T=0
160 VDU23,229,16,56,56,56,56,124,130,130
170 J=0
180 XC=0:B=0:C=0:D=0:G=0:F=1:S=0:Z=0:SHIPS=3:WAVE=1
190 K=3
200 *FX11,1
210 FORR=0TO19:FORO=0TO30:A(R,F)=0:NEXT:NEXT
220 VDU23;8202;0;0;0;
230 VDU23,230,255,255,153,153,255,153,153,255,23,255,
    0,240,126,127,126,240,0,0
250 VDU23,231,96,112,120,127,127,255,0,0
260 VDU23,232,0,0,120,248,255,255,0,0
270 COLOUR3:Z=19:FORX=0TO18:PRINTTAB(X,30)CHR$(230);
    :A(X,30)=1:NEXT
280 Y=30
290 Y=Y-1
300 IF Y=12 GOTO370
310 FORX=0TO18:IF A(X,Y+1)=0 GOTO330
320 P=RND(K):IF P<K GOTO340
330 A(X,Y)=0:GOTO350
340 PRINTTAB(X,Y)CHR$(230):A(X,Y)=1:Z=Z+1:SOUND&0010,
    -15,7,1
350 NEXT
360 GOTO290
370 COLOUR1
380 IF XC>1000 SHIPS=SHIPS+1:VDU19,3,10,0,0,0:XC=XC-
    1000
400 VDU30:PRINT" SCORE=";S;TAB(12)"SHIPS=";SHIPS
410 COLOUR0
420 PRINTTAB(G,F)"  ":COLOUR2:SOUND&0010,-10,7,2
430 G=G+1
440 IFG>=19 F=F+1:G=0
450 A$=INKEY$(0):IFA$=" " G=G+1:IFG >=19 F=F+1:G=0
460 *FX15,1
470 PRINTTAB(G,F)CHR$(231)CHR$(232)
480 IF A(G,F)=1 GOTO750
490 GOTO870
500 IF B=1 GOTO540
510 IFA$="Z" GOTO530
520 GOTO370
530 B=1:C=G:D=F:SOUND&0011,-15,253,2
540 N=0
550 COLOUR0:PRINTTAB(C,D)" "
560 D=D+1
570 IF D=31 B=0:GOTO370
580 COLOUR12:PRINTTAB(C,D);CHR$(255)
590 IF A(C,D)=1 GOTO650
600 IF C=Q AND D=T GOTO1170
610 IF G=Q AND F=T GOTO750
630 N=N+1:IF N<3 GOTO550 ELSE GOTO370
650 SOUND&0010,-15,7,4
660 PRINTTAB(C,D)CHR$(228):NOW=TIME:REPEAT UNTIL
    TIME=NOW+20
670 PRINTTAB(C,D)" "
680 A(C,D)=0
690 B=0
700 S=S+10:XC=XC+10:Z=Z-1:IF Z=1 K=K+1:GOTO720
710 GOTO870
720 MODE7
730 PRINT''CHR$(129)"Well done you have destroyed
    that planet,you must now try to destroy a bigger
    planet.":WAVE=WAVE+1
740 NOW=TIME:REPEAT UNTIL TIME=NOW+300:MODE2:VDU23;
    8202;0;0;0;:G=0:F=1:GOTO270
750 NOW=TIME
760 PRINTTAB(G,F)CHR$(228)CHR$(228)
770 A(G,F)=0
```

continued over the page

```
780 SOUND0,1,1,30
790 REPEAT UNTIL TIME=NOW +150
800 SHIPS=SHIPS-1:IF SHIPS=0 THEN MODE7:PRINTCHR$(131)
    "YOU HAVE CRASHED" ELSE PROCBANG:GOTO410
810 PRINTCHR$(129)CHR$(141)"YOUR SCORE IS ";S'CHR$
    (129)CHR$(141)"YOUR SCORE IS ";S:IF H%<S PRINT'
    CHR$(134)"YOU HAVE SET A NEW RECORD":H%=S
820 PRINT"THE RECORD IS ";H%
830 *FX11,66
835 *FX15,1
840 PRINTCHR$(135)"ANOTHER GAME(Y/N)":INPUTQ$:IF Q$=
    "N"THEN END
850 MODE2
860 GOTO180
870 IF J=1 GOTO930
880 J=0:T=11:Q=RND(19)
890 T=T+1:IF A(Q,T)=1 GOTO920
900 IF T<30 GOTO890
910 GOTO500
920 J=1:T=T-1
930 N=0
940 COLOUR0
950 IF A(Q,T)=1 GOSUB1200 ELSE PRINTTAB(Q,T)" "
960 IF WAVE>2 THENQ=Q+SGN(G-Q)
970 IF WAVE=2 THEN Q=Q+(RND(3)-2)
980 IF Q<0 Q=0
990 IF Q>18 Q=18
1000 T=T-1:IF T=0 GOTO1100
1010 SOUND&0011,-14,121,1
1020 COLOUR6
1030 J=1
1040 IF Q=G AND T=F GOTO1090
1050 IF Q=G+1 AND T=F GOTO1090
1060 PRINT TAB(Q,T)CHR$(229)
1070 N=N+1:IF N=2 GOTO500
1080 GOTO500
1090 J=0:GOTO750
1100 J=0:T=0
1110 GOTO500
1120 PRINTCHR$(129)CHR$(141)TAB(12)"SPACEBLITZ"'CHR$
    (129)CHR$(141)TAB(12)"SPACEBLITZ"''
1130 PRINT"You have been called upon to serve "'"the
    empire in the Inter galactic bombingforce."''"You
    have been called out on a dangerous attack
    mission on alien planets"''
1140 PRINT"You must destroy the planet before you
    crash or destroyed by alien anti_attack missiles
    as you dive and circle the     planet's inhabited
    areas"'
1150 PRINT"THE CONTROLS ARE:_"'"Z________DROP ATTACK
    UNITS"'"SPACE BAR-SPEED UP"''CHR$(129)"GOOD LUCK"
1160 X=GET:RETURN
1170 PRINTTAB(C,D)CHR$(228):B=0:J=0:DS=RND(40)+20:S=S
    +DS:XC=XC+DS
1180 SOUND&0010,-15,121,7
1190 PRINTTAB(C,D)" ":GOTO370
1200 COLOUR3
1210 PRINTTAB(Q,T)CHR$(230):RETURN
1220 DEFPROCBANG
1230 PRINTTAB(G,F)"  "
1240 G=0:F=1
1250 ENDPROC
```

Space Blitz
by Stuart Arnell

Morse

on Vic20

This program translates English (or any other language) into Morse Code. It prints the message in English and in Morse Code and also produces the real sound of Morse transmitting.

You can control the speed of the sound, by inputting a value between 1 and 500. We think 1-30 is for the expert, 30-100 medium, and 100-500 for the absolute beginner.

If you want to change speed then input "£" instead of the text. We have put in a little demo in lines 5-19 and hope that it's all right.

Maybe someone will try to connect the Vic to a radio transmitter and try it out "on the air". If so, we would very much like to hear about it.

Program notes:

5-19	Demo part
55-85	Reads and prints the alphabet
85-88	Asks for speed
105-155	Translates English to Morse Code
175-205	Data
225-255	Sound routine

```
0 REM****************
1 REM*MORSE  MONITOR*
2 REM*   (C) 1983   *
3 REM*  J.J. & B.B. *
4 REM****************
5 PRINT"□"
6 FORT=1TO5:PRINT"■■■
```

Bar graph

on ZX81

This program is written for the 16K ZX81. It will draw a line graph or a bar chart with 10 points or 10 bars in the limit 1-40 inclusive. Instructions on how to run the program are included in the program.

The program is well-structured so looking at the listing should enable you to see how it works.

```
    1 REM ************************
    2 REM *******GRAPHS**********
    3 REM ************************
    4 REM **THIS PROGRAM PRINTS**
    5 REM ****OUT LINE GRAPHS****
    6 REM ****AND BAR GRAPHS*****
    7 REM ************************
    8 CLS
    9 LET A=0
   10 PRINT TAB 12;"GRAPHS"
   11 PRINT TAB 12;"------"
   12 PRINT TAB 13;"----"
   13 PRINT TAB 14;"--"
   14 DIM B$(21)
   20 PRINT AT 5,0;" THIS PROGRAM
 WILL DRAW A LINE-";AT 7,0;"GRAP
H OR A BAR CHART AFTER YOU";AT 9
,0;"HAVE TYPED IN THE 10 HIGHTS
OF";AT 11,0;"THE POINTS TO BE  P
LOTTED OR";AT 13,0;"THE 10 HEIGH
TS OF THE BARS."
   25 PRINT AT 15,0;"ALL OF THE I
NSTRUCTIONS ARE";AT 17,0;"CONTAI
NED IN THE PROGRAM."
   30 PRINT AT 21,2;"PRESS ANY KE
Y TO CONTINUE."
   40 IF INKEY$="" THEN GOTO 40
   99 CLS
  100 PRINT "TYPE IN LABEL FOR HO
RIZONTAL
              AXIS AND NEW/LINE."
  110 INPUT A$
  115 PRINT
  116 PRINT
  120 PRINT "TYPE IN LABEL FOR VE
RTICAL
              AXIS AND NEW/LINE."
  140 INPUT B$
  990 REM ************************
  991 REM ****PRINT OUT AXIS*****
  992 REM ************************
  999 CLS
 1000 PRINT "  40"
 1010 PRINT "
 1020 PRINT "
 1030 PRINT "
 1040 PRINT "
 1050 PRINT "  30"
 1060 PRINT "
 1070 PRINT "
 1080 PRINT "
 1090 PRINT "
 1100 PRINT "  20"
 1110 PRINT "
 1120 PRINT "
 1130 PRINT "
 1140 PRINT "
 1150 PRINT "  10"
 1160 PRINT "
 1170 PRINT "
 1180 PRINT "
 1190 PRINT "
 1200 PRINT "   0 1 2 3 4 5 6 7 8 9
 1205 REM ************************
 1206 REM ******LABEL AXIS*******
 1207 REM ************************
 1210 PRINT TAB 15;A$
 1220 FOR Z=0 TO 20
 1230 PRINT AT Z,0;B$(Z+1)
 1240 NEXT Z
 1250 LET A=A+1
 1260 IF A=1 THEN PRINT AT 10,4;"
PRESS ANY KEY TO CONTINUE."
 1270 IF A=1 AND INKEY$="" THEN G
OTO 1270
 1280 IF A=2 THEN GOTO 2500
 1290 IF A=3 THEN GOTO 3500
 1350 CLS
 1360 PRINT AT 0,0;"DO YOU WANT A
 LINE GRAPH (1) OR";AT 2,0;"BARC
HART (2) TYPE IN";AT 4,0;"NUMBER
 OF  CHOICE."
 1370 IF INKEY$="1" THEN GOTO 200
0
 1380 IF INKEY$="2" THEN GOTO 300
0
 1390 GOTO 1370
 1990 REM ************************
 1991 REM ***ENTER LINE GRAPH****
 1992 REM *****CO-ORDINATES******
 1993 REM ************************
 2000 CLS
 2010 PRINT "TYPE IN 2ND PART OF
CO-ORDINATE
              AND RETURN (LIMITS 1
 TO 40)"
 2015 PRINT
 2020 PRINT TAB 8;"1,?";
 2030 INPUT Z
 2034 PRINT Z
 2035 PRINT
 2040 PRINT TAB 8;"2,?";
 2050 INPUT Y
 2054 PRINT Y
 2055 PRINT
 2060 PRINT TAB 8;"3,?";
 2070 INPUT X
 2074 PRINT X
 2075 PRINT
 2080 PRINT TAB 8;"4,?";
 2090 INPUT W
 2094 PRINT W
 2095 PRINT
 2100 PRINT TAB 8;"5,?";
 2110 INPUT V
 2114 PRINT V
 2115 PRINT
 2120 PRINT TAB 8;"6,?";
 2130 INPUT U
 2134 PRINT U
 2135 PRINT
 2140 PRINT TAB 8;"7,?";
 2150 INPUT T
 2154 PRINT T
 2155 PRINT
 2160 PRINT TAB 8;"8,?";
 2170 INPUT S
 2174 PRINT S
 2175 PRINT
 2180 PRINT TAB 8;"9,?";
 2190 INPUT R
 2194 PRINT R
 2195 PRINT
 2196 SCROLL
 2200 PRINT TAB 8;"10,?";
 2205 INPUT Q
 2210 PRINT Q
 2211 IF Z>40 OR Z<1 THEN GOTO 22
50
 2212 IF Y>40 OR Y<1 THEN GOTO 22
50
 2213 IF X>40 OR X<1 THEN GOTO 22
50
 2214 IF W>40 OR W<1 THEN GOTO 22
50
 2215 IF V>40 OR V<1 THEN GOTO 22
50
 2216 IF U>40 OR U<1 THEN GOTO 22
50
 2217 IF T>40 OR T<1 THEN GOTO 22
50
 2218 IF S>40 OR S<1 THEN GOTO 22
50
 2219 IF R>40 OR R<1 THEN GOTO 22
50
 2220 IF Q>40 OR Q<1 THEN GOTO 22
50
 2240 GOTO 999
 2250 CLS
 2260 PRINT AT 10,0;"YOU PUT IN A
 NUMBER OUT OF THE";AT 12,0;"LIM
ITS SO YOU HAVE TO";AT 14,0;"RE-
ENTER  ALL OF THEM."
 2270 PAUSE 500
 2280 GOTO 2000
 2490 REM ************************
 2491 REM *****PLOT POINTS ON*****
 2492 REM *******LINE GRAPH*******
 2493 REM ************************
 2500 PLOT 9,Z+3
 2510 PLOT 15,Y+3
 2520 PLOT 21,X+3
 2530 PLOT 27,W+3
 2540 PLOT 33,V+3
 2550 PLOT 39,U+3
 2560 PLOT 44,T+3
 2570 PLOT 51,S+3
 2580 PLOT 57,R+3
 2590 PLOT 63,Q+3
 2600 REM ************************
 2601 REM *****JOIN UP POINTS*****
 2602 REM ************************
 2610 LET X1=9
```

continued on page 37

DON'T MISS THIS INCREDIBLE OFFER!

50 GAMES

£9·95

YES, 50 GAMES! on cassette for all the following:

FOR YOUR MICRO

GALACTIC ATTACK, SPACE MISSION, LUNAR LANDER, PLASMA BOLT, STARTREK, RADAR LANDING, ATTACKER, GALACTIC DOGFIGHT, ZYON ATTACK, EVASIVE ACTION, OXO, BOGGLES, PONTOON, SKI JUMP, HANGMAN, OLD BONES, THIN ICE, MAZE EATER, ORBITTER, MOTORWAY, FORCE FIELD, NIM, TUNNEL ESCAPE, BARREL JUMP, CANNONBALL BATTLE, OVERTAKE, SITTING TARGET, SMASH THE WINDOWS, SPACE SHIP, JET FLIGHT, PHASER, INTRUDER, INFERNO, GHOSTS, SUBMARINES, ROCKET LAUNCH, PLANETS, BLACK HOLE, DYNAMITE, DO YOUR SUMS, DERBY DASH, SPACE SEARCH, UNIVERSE, RATS, TANKER, PARACHUTE, JETMOBILE, HIGH RISE, THE FORCE, EXCHANGE

only £9.95 inc vat & pp

CASCADE SOFTWARE
CASCADES HOUSE
HARGAM'S LANE
LLANDOGO
GWENT
S.WALES
NP54PA

sinclair SPECTRUM
ZX81 LYNX
DRAGON
ATARI VIC 20
apple (ON DISC & CASSETTE)
ACORN ATOM
BBC A/B
SHARP
ORIC-1
NEW BRAIN

SUPPLY CASSETTE 50 FOR _____ COMPUTER
I enclose cheque/P.O.

Name _____ PCWK2

Address _____

_____

Mail order only.

ORDER NOW!

SPECTROGRAPHICS

for ZX Spectrum (48K)
price £6.90 including Manual

Enables you to exploit the Spectrum's superb graphics potential to the full. Eleven graphics procedures in a single user-friendly program. Hi-res and lo-res sketchpads, eight sizes of text, a mini-text editor, colour WASH and PAINT, etc. Create your own UDG characters in a 4 × 2 array. SAVE your display on tape or PRINT on ZX Printer. ReLOAD displays for editing or updating. Etc. etc!

BUSINESSMEN – *use SPECTROGRAPHICS to prepare point-of-sale adverts.*
TEACHERS – *prepare lesson illustrations at home to show your pupils at school.*
GAMES ENTHUSIASTS – *design invaders, monsters, backgrounds etc. to LOAD into your latest game.*
GRAPHIC ARTISTS – *turn your Spectrum into a colour graphic sketchpad.*
EVERYONE – *have fun with SPECTROGRAPHICS!*

Other GRAPHICS software for ZX81 available.
Send s.a.e. for further details and full list of all our quality games, statistics and Astronomy software.
Prices all inclusive. Full money-back guarantee.

Bridge Software

Dept. PS, BRIDGE SOFTWARE
36 Fernwood, Marple Bridge
Stockport, Cheshire SK6 5BE

We teach you the secret language of tomorrow's world

Since you appreciate the impact computers are making on tomorrow's world, you'll appreciate the key role Camp Beaumont can play in your future.

Because Camp Beaumont's computer boffins using structured courses (basic, advanced and intensive) teach you the secret language that'll give you a head start in tomorrow's high-tech world.

But without tears. Because at Camp Beaumont (for 9-17 year olds) there are over thirty physically stimulating activities also available to help you escape from computer fatigue.

These include: tennis, soccer, cricket, swimming, riding, fencing, canoeing, golf, shooting, judo, archery, gymnastics, fishing, sailing, wind surfing, the creative arts etc. All under the supervision of university-qualified directors, instructors and monitors. And uniquely-equipped public school or country mansion locations in the Lake District, Devon, Dorset and around London and Manchester. Camp Beaumont also run day camps for younger children (5-15 years) offering over thirty play-as-you-learn activities including computers, robotics, and psychobionics. **Write for comprehensive brochure to Camp Beaumont,** Dept. PC/1, Beaumont House, 73 Upper Richmond Road, London SW15 2SZ. Tel: 01-870 9866.

CAMP BEAUMONT

Brings out the computer in you.

Commodore COMPUTER

TO MAKE A SUPER GAME INTO A FANTASTIC GAME YOU NEED SOFTLINK 1.

This will allow you to use a Kempston type joystick with all the following Spectrum games:

Arcadia, Penetrator, Horace Goes Skiing, Spectres, Flight Simulation and Space Zombies.

ONLY £4.95

SPECIAL OFFER

Spectres plus Softlink 1 ..... **£11.00**
Arcadia plus Softlink 1 ..... **£9.00**
Also available: 3D Maze of Gold (with Kempston Joystick Option) **£5.95**
Two great adventures on one tape for your 16K Spectrum.
Time Line and Tasks **£4.95**

A superb adventure for your 48K Spectrum
Magic Castle **£4.95**

Arriving soon, by the author of Softlink 1, Tim Gilbert, the amazing new super game (with Kempston joystick option) for any Spectrum — Hidden City **£5.95**

See this game at the 7th ZX Microfair, Alexandra Palace, June 4

Cheques and postal orders to

BYTEWELL
203 COURT ROAD, BARRY, SOUTH GLAMORGAN CF6 7EN
Tel: (0446) 742491

7th ZX MICROFAIR

```
2611 LET Y1=Z+3
2612 LET X2=15
2613 LET Y2=Y+3
2614 GOSUB 2800
2617 LET X2=21
2618 LET Y2=X+3
2619 GOSUB 2800
2622 LET X2=27
2623 LET Y2=W+3
2624 GOSUB 2800
2630 LET X2=33
2635 LET Y2=V+3
2640 GOSUB 2800
2645 LET X2=39
2650 LET Y2=U+3
2655 GOSUB 2800
2660 LET X2=44
2665 LET Y2=T+3
2670 GOSUB 2800
2675 LET X2=51
2680 LET Y2=S+3
2685 GOSUB 2800
2690 LET X2=57
2695 LET Y2=R+3
2700 GOSUB 2800
2705 LET X2=63
2710 LET Y2=Q+3
2725 GOSUB 2800
2799 GOTO 4000
2800 LET M=(Y2-Y1)/(X2-X1)
2810 LET C=Y1-M*X1
2820 FOR F=X1 TO X2
2830 PLOT F,M*F+C
2840 NEXT F
2850 LET X1=X2
2860 LET Y1=Y2
2870 RETURN
2990 REM ************************
2991 REM ****ENTER HIGHT OF*****
2992 REM ***COLUMN-BAR GRAPH****
2993 REM ************************
3000 CLS
3005 LET A=A+1
3012 PRINT "ENTER HEIGHT FOR EAC
H COLUMN"
3013 PRINT
3015 PRINT "HEIGHT OF COLUMN IS
FROM 1 TO 40"
3020 PRINT
3030 PRINT "TYPE IN HEIGHT OF 1S
T COLUMN"
3040 INPUT Z
3045 PRINT Z
3050 PRINT "TYPE IN HEIGHT OF 2N
D COLUMN"
3060 INPUT Y
3065 PRINT Y
3070 PRINT "TYPE IN HEIGHT OF 3R
D COLUMN"
3080 INPUT X
3085 PRINT X
3090 PRINT "TYPE IN HEIGHT OF 4T
H COLUMN"
3100 INPUT W
3105 PRINT W
3110 PRINT "TYPE IN HEIGHT OF 5T
H COLUMN"
3115 INPUT V
3117 PRINT V
3120 PRINT "TYPE IN HEIGHT OF 6T
H COLUMN"
3130 INPUT U
3135 PRINT U
3140 PRINT "TYPE IN HEIGHT OF 7T
H COLUMN"
3150 INPUT T
3155 PRINT T
3160 PRINT "TYPE IN HEIGHT OF 8T
H COLUMN"
3170 INPUT S
3175 PRINT S
3180 PRINT "TYPE IN HEIGHT OF 9T
H COLUMN"
3190 INPUT R
3195 PRINT R
3196 SCROLL
3200 PRINT "TYPE IN HEIGHT OF 10
TH COLUMN"
3210 INPUT Q
3213 SCROLL
3215 PRINT Q
3220 IF Z>40 OR Z<1 THEN GOTO 32
40
3221 IF Y>40 OR Y<1 THEN GOTO 32
40
3222 IF X>40 OR X<1 THEN GOTO 32
40
3223 IF W>40 OR W<1 THEN GOTO 32
40
3224 IF V>40 OR V<1 THEN GOTO 32
40
3225 IF U>40 OR U<1 THEN GOTO 32
40
3226 IF S>40 OR S<1 THEN GOTO 32
40
3227 IF T>40 OR T<1 THEN GOTO 32
40
3228 IF R>40 OR R<1 THEN GOTO 32
40
3235 IF Q>40 OR Q<1 THEN GOTO 32
40
3238 GOTO 999
3240 CLS
3241 PRINT AT 10,0;"YOU ENTERED
A NUMBER THAT IS OFF"
3244 PRINT AT 12,0;"THE SCALE SO
 YOU WILL HAVE TO"
3246 PRINT AT 14,0;"RE-ENTER ALL
 OF THEM."
3247 PAUSE 400
3248 CLS
3249 GOTO 3010
3490 REM ************************
3491 REM ****DRAW BAR-CHART*****
3492 REM ************************
3500 FOR C=4 TO 3+Z
3510 PLOT 9,C
3515 PLOT 8,C
3520 NEXT C
3530 FOR C=4 TO 3+Y
3540 PLOT 15,C
3545 PLOT 14,C
3550 NEXT C
3560 FOR C=4 TO 3+X
3570 PLOT 21,C
3575 PLOT 20,C
3580 NEXT C
3590 FOR C=4 TO 3+W
3600 PLOT 28,C
3605 PLOT 27,C
3610 NEXT C
3620 FOR C=4 TO 3+V
3630 PLOT 32,C
3635 PLOT 33,C
3640 NEXT C
3650 FOR C=4 TO 3+U
3660 PLOT 38,C
3665 PLOT 39,C
3670 NEXT C
3680 FOR C=4 TO 3+T
3690 PLOT 45,C
3695 PLOT 44,C
3700 NEXT C
3710 FOR C=4 TO 3+S
3720 PLOT 50,C
3725 PLOT 51,C
3730 NEXT C
3740 FOR C=4 TO 3+R
3750 PLOT 56,C
3755 PLOT 57,C
3760 NEXT C
3770 FOR C=4 TO 3+Q
3773 PLOT 63,C
3774 PLOT 62,C
3780 NEXT C
3790 LET S=S+1
4000 PAUSE 500
4005 CLS
4010 PRINT AT 5,1;"(1) TO START
AGAIN "
4020 PRINT AT 10,1;"(2) TO FINIS
H"
4030 PRINT AT 15,1;"ENTER NUMBER
 OF CHOICE"
4040 IF INKEY$="1" THEN GOTO 1
4050 IF INKEY$="2" THEN GOTO 500
0
4060 GOTO 4040
5000 REM ************************
5001 REM ****GOODBYE MESSAGE****
5002 REM ************************
5010 CLS
5020 FOR A=1 TO 21
5030 SCROLL
5040 PRINT TAB A;"GOODBYE"
5050 NEXT A
5060 STOP
9000 SAVE "GRAPH■"
9090 GOTO 1
```

Bar graph
by Neil Simons

Wizard Software

ARCADE GAMES FOR THE DRAGON

SMASH **£7.00**
A super "break out" type game in high resolution graphics. Features include a demonstration mode, 9 bat angles and walls of increasing difficulty from a single wall up to a full three walls. Continuous display of score, best score and balls remaining. RECOMMENDED BY THE MICROCOMPUTER SOFTWARE CLUB.

EVICTOR **£7.00**
A reactive game with machine code for extra zip. Evict the aliens from their self re-generating and defended base. Features lasers, phasers and bombs. 5 skill levels. Also features a demonstration mode.

ALIENS+ **£7.95**
A machine coded Arcade game presented in high resolution graphics. Features 48 invaders, mother ship, 4 defenders per wave, 4 shields + bonus shields. Continuous display of score during game.

Still available:

WIZARD £6.50
SIRIUS IV £6.50
GALLEONS £5.00
FRUITA £6.50
TRIPLET £5.50
BREAKER £3.50

DRAGON STARTREK £8.45

All prices inclusive, mail order, cheques or postal orders to:

WIZARD SOFTWARE, DEPT. PCW, PO BOX 23
DUNFERMLINE, FIFE KY11 5RW

Also available from software retailers
Send large SAE for full program catalogue
Royalties paid for superior quality DRAGON software

EDUCATIONAL GAMES FROM GALAXY

GET YOUR SUMS RIGHT AND SAVE THE WORLD WITH THE

"INVADER MATHS"

Featuring the Galaxy Ants — Sharks — Angels
A two cassette package for Spectrum 16K or 48K
Five levels of difficulty for children from 5 upwards
£8.95

EDUCATIONAL

For all students on computer study courses to "O" level standard

A "CESIL" INTERPRETER

With full instruction booklet for Spectrum 48K
£8.00

All prices include P&P

All cheques and POs to

Galaxy Software

62A WEST STREET, HARWICH
ESSEX. Tel. (02555) 52446

COMPUTER RENTALS LIMITED

140 Whitechapel Road, London E1
Telephone: 01-247 9004

ALL PRICES INCLUDE VAT
DEALER ENQUIRIES WELCOME

DERBY DAY for the 48K Spectrum **ONLY £6.95 inc p&p**
Gambling on any horse in the field up to 5 players can lay bets with Honest Clive Spectrum the bookmaker as the horses circle in the parade ring. Will Clive keep that smile? Watch the race begin as the tape lifts and marvel at the amazingly realistic 3D perspective animation as the riders jockey for position. See the horses and riders in full flight as they pass Spectators and into the home straight past the stands. Hold your breath at the slow motion finish. Sound and Colour is used to its fullest in this 40K plus of superb programming. Not recommended for compulsive gamblers.

Available from W H Smith, Menzies and Prism Microproduct dealers. Also available from Spectrum Computer Group Shops, The Buffer Microshop and all good computer shops.

ZX81, SPECTRUM, DRAGON
BBC AND VIC

SOFTWARE LENDING LIBRARY

We have for hire from **50p** (including postage) programmes for your computer.

£5 for life membership (less than the cost of a single game) brings you the Software Lending Library membership kit including catalogue, news letter.

All tapes lent with full manufacturers permission.

Send a cheque or postal order for **£5** to **Software Lending Library,** PO Box 3, Castleford, West Yorks stating name, address, and computer type.

M & J SOFTWARE

DRAGON COMPANION BOOK **£4.95**
Discover seven extra graphics modes. Study the workings of BASIC with the disassembler. Take complete control of video memory mapping. Increase the processor speed (not a hardware mod.). Append programs from tape. Incorporate useful routines from BASIC in your programs.

DRAGON fig-FORTH **£10.00**
This is a cassette-based implementation and is fully documented.

FORTH ASSEMBLY LISTINGS **£7.00**
6502, 8080/Z80, 6809, 6800, 8086/8088, 68000, PDP-11, 1802. These are standard fig-FORTH assembly listings.

INSTALLATION MANUAL **£5.00**
Necessary for implementing FORTH and its editor.

6502 MACRO ASSEMBLER **£5.00**
This program is written in fig-FORTH and is a structured one-pass assembler. It will work on any fig-FORTH implementation with only one alteration. Control structures include: BEGIN, END, AGAIN, IF, THEN, ELSE, ENDIF, REPEAT, UNTIL, WHILE.

All prices fully inclusive of postage and packing etc. Cheques and POs to:

M & J SOFTWARE
DEPT 5, 34 GRAYS CLOSE, SCHOLAR GREEN
STOKE-ON-TRENT ST7 3LU. Tel: (0782) 517876
(Dealer enquiries welcome)

Alien Alert

on Vic20

This runs on an unexpanded Vic. You are a space pilot and your planet is being attacked. With lightning speed you manoeuvre your gun sight and fire at the rapidly moving alien. Can you survive?

The program makes use of the Vic's hi-res graphic capability with realistic aliens and gun sights.

Controls are:
L = Up M = Down
J = Left K = Right
H = Laser.

Program notes
100-170 Set up hi-res
180-190 Define main variables
200-350 Main control routine
750-770 Explosions and invader sounds.

```
100 REM ***DEFINE CHARACTERS***
110 POKE52,28:POKE56,28:CLR:FORA=7168TO7679:
    POKEA,PEEK(A+25600):NEXT:POKE36869,255
120 REM **DEFINE GUN SIGHT**
130 FORA=7432TO7439:READB:POKEA,B:NEXT
140 DATA24,24,60,231,231,60,24,24
150 REM **DEFINE INVADER**
160 FORA=7439TO7446:READB:POKEA,B:NEXT
170 DATA24,60,126,219,255,126,60,102
180 BU=15:REM ***SET VARIABLES, SCREEN AND
    POKES***
185 PRINT"□"
190 T=T+1:PRINT"□SCORE="SC:A=7680:B=38400:X=
    142:DX=32:POKE650,128
200 REM ***CONTROL ROUTINE***
210 REM **GET CHARACTER FROM KEYBOARD**
220 C=0:REM **I=UP;M=DOWN;J=LEFT;K=RIGHT**
230 C=C+1:GETA$:IFA$="I"THENX=X-22:Y=22
240 IFA$="M"THENX=X+22:Y=-22
243 POKE36875,0:POKE36874,0
245 IFT>100RBU<1THENPRINT"□THE ALIEN'S HAVE
    LANDED":PRINT"YOUR SCORE WAS"SC"WITH
    "XY"TRY'S":END
250 IFA$="J"THENX=X-1:Y=1
253 IFBU<1THEN257
255 IFA$="H"THENGOSUB700:XY=XY+1:BU=BU-1
257 PRINT"■■■■■■■■■■■■ENERGY=  ■■■"BU
260 IFA$="K"THENX=X+1:Y=-1
265 IFX<00RX>506THENX=0:GOSUB600
270 REM **POSITION GUN SIGHT**
275 PRINT"■■■■■■■"SC
280 POKEA+X,33:POKEB+X,2:POKEA+X+Y,32
285 IFC<5THENGOTO230ELSEGOTO290
290 REM **POSITION AND MOVE ALIEN**
295 POKE36878,15:POKE36875,128
300 DX=DX+22:D=INT(RND(1)*3)+1
310 IFD=1THENDX=DX-1
320 IFD=3THENDX=DX+1
330 POKEA+DX,34:POKEB+DX,6:POKEA+DX-21,32:POKE
    A+DX-22,32:POKEA+DX-23,32:POKE36875,0
340 IFA+DX>8164THENGOSUB600:POKE36878,15:FORT
    =1TO3:FORG=128TO255:POKE36874,G:NEXT:NEXT:
    GOTO185
350 GOTO220
600 FORE=0TO21:POKEA+E,32:POKE8164+E,32:NEXT:
    RETURN
700 IFPEEK(A+X)=34ORPEEK(A+DX)=33THENSC=SC+10:
    GOSUB750:BU=BU+1:GOTO190
710 RETURN
750 POKE36878,15:FORL=1TO30:FORM=250TO240STEP-1
    :POKE36874,M:NEXTM:FORM=240TO250
760 POKE36874,M:NEXTM:POKE36874,0:NEXTL:POKE
    36878,0
770 RETURN
```

Alien Alert
by C Anderson

Adventure Competition

Write an adventure game and win a Commodore 64!

***Popular Computing Weekly* is offering a star prize of a Commodore 64 for the best adventure game written for *any* home micro — PLUS — a special prize of a Vic20 for the best essay on an adventure theme — PLUS — for the next 10 runners-up, two Commodore adventure games.**

Each week during May, *Popular Computing Weekly* will publish a coupon — simply cut out any three and send them in with your entry.

The best adventure games are ideally a combination of action and logical riddles. For instance, to open a door, the player should not merely have to find the magic word, but have to solve a puzzle in order to progress to the next location. Good graphics obviously enhance a program — and we'll be looking for a game that makes imaginative use of graphics, although that does not mean that a text-only program will be eliminated.

Other things we will be looking for are the surprise twists that make a program worth coming back to again and again.

And remember, don't make your game too difficult in the early stages — adventuring novices should have a chance to get some way into the game before getting stuck!

For those of you submitting scenarios with your program, think of it as a guide line for a programmer. Draw a map showing location objects and other important details of your adventure, and compile a dictionary of key words that your program will accept.

If you do not want to write a full-blown adventure game, you can still enter the competition by writing an essay (up to 2,000 words) on an original adventure theme. A Vic20 will be awarded to the essay which describes the most original and interesting adventure game.

The competition will be judged by Tony Bridge and *Popular Computing Weekly* editor Brendon Gore.

PRIZES
1. Commodore 64
2. Vic20
3. Two Commodore adventure games of your choice for 10 runners-up

HOW TO ENTER
All you have to do to enter this competition is collect the coupons from three issues of the magazine and send them, together with your entry (stating which machine your game is for) to:
Popular Computing Weekly
Adventure Competition
Hobhouse Court
19 Whitcomb Street
London WC2 7HF

RULES
1. Each entry must consist of your adventure, or essay, together with three coupons, and your name and address.
2. Closing date for the Adventure Competition is 30 June 1983.
3. The judges' decision is final.
4. No employees of Sunshine Publications Ltd, or their families, will be eligible to enter.

Adventure Competition ③

Name .....

Address .....

.....

.....

Tel No: .....

Watford Technical Books

BOOKS FOR YOUR VIC

★ **VIC20 PROGRAMMERS REFERENCE GUIDE**
The indispensable reference from Commodore **£10.95**

★ **VIC REVEALED**
The new corrected and revised edition, goes deep inside the Vic20..... **£10.95**

★ **COMPUTE!'S FIRST BOOK OF VIC**
Programming hints, tips, applications, utilities, games, graphics techniques **£12.95**

ALL PRICES INCLUDE P&P
PHONE ACCESS/VISA ORDERS WELCOME

105 St Albans Road, Watford WD1 1RD
(2 minutes from Watford Junction Station)
Tel: Watford (0923) 23324

BARCLAYCARD VISA

PICOSOFT

NEW **VIC20**
Musicpro: compose, play, modify and save your own tunes. Requires 3K expander..... **£5.25**

NEW **Zombie Island:** cast away on an island inhabited by Zombies. Can you survive by luring them into the potholes or each other. Unexpanded Vic20..... **£3.95**

Crossfire: armed with twin-barrelled lasers can you protect your starbase?..... **£3.95**

Kong: pilot your helicopter to the rescue. Watch out because Kong is none too happy. Unexpanded Vic **£4.50**

NEW **Monster Battle:** fight it out with the monsters in hi res graphics. Unexpanded Vic **£3.95**

Picodata: maintain your address book, collectors records etc. Use Tape/Disk, Printer. Requires at least 8K expander..... **£5.95**

SPECTRUM
Stake Out: find the magic sword before midnight strikes and Count Dracula awakes. 7 skill levels. 16K or 48K Spectrum..... **£4.95**

Send SAE for full list of software available. Dealer enquiries invited
All prices include VAT and First Class Postage
WANTED, we pay high royalties for original software

PICOSOFT, 28 Strathmore Drive, Reading, RG10 9QT

VIC20

USERS SOFTWARE LIBRARY

SIX REASONS WHY YOU SHOULD JOIN

1. Large selection of tapes and cartridges
2. Membership fee only **£10** for 2 years
3. Cassette hire **£1.40** inc. P&P per fortnight
4. Cartridge hire **£2.50** inc. P&P per fortnight
5. All tapes raffled free to members after 15 hires
6. All software hired with manufacturers permission

Send membership fee on full money back approval or ***large*** *SAE for details, postal only*

VIC20 U.S.L.

11 NEWARK ROAD
BREADSALL ESTATE, DERBY DE2 4DJ

SALE **P.&R. COMPUTER SHOP** SALE

IBM GOLFBALL PRINTERS from £70 EACH + V.A.T.

INTERFACE FOR IBM GOLFBALL £40 + V.A.T.
*BRAND-NEW LA36 DEC WRITERS — SALE £200 EACH + V.A.T.
CENTRONIC 779 PRINTERS — £325 + V.A.T.
CENTRONIC 781 PRINTER — £350 + V.A.T.
POWER UNITS, 5-VOLT 6-AMP — £20 EACH
FANS, PCBs, KEYBOARDS AND LOTS MORE
8-INCH IBM FLOPPY DISC DRIVES

COME AND LOOK AROUND

SALCOTT MILL, GOLDHANGER ROAD
HEYBRIDGE, MALDON, ESSEX
PHONE MALDON (0621) 57440

CAMEL PRODUCTS ★ CAMEL PACK

DREAM 81 ★ CRAMIC-81 ★ PIO SP

£19.95 OH, BLOW IT! £14.95

PROMER-81 blows your programs into Eproms from ZX81. TWO or 4K Eproms 2516/32, 2716/32.
Software on tape, with easy user notes assembled and tested £19.95+VAT.

ROM-81 is an Eprom reader with two 24-pin sockets for above Eprom Types. Up to 8K (2 x 2732) program sits in 8K-16K area. User notes give a small transfer routine for loading Basic programs using RAND USR . . . £14.95 + VAT.

UK P&P Free
Europe + 5% Overseas + 10%
Dealer enquiries welcomed

Cambridge Microelectronics Ltd. One Milton Rd. Cambridge CB4 1UY Tel (0223) 314814

PIO-81 ★ MEMIC-81

ROM 81 ★ PROMER-81 ★ BLO PROM 81

Self Adhesive Cassette Labels

★ **CASSETTE LABELS ON ROLLS** - Complete with tractor feed perforations to allow them to be printed in most modern computer printers. Now you can have 'instant' labels, exactly when you need them! Minimum order 500 labels - £11
Cassette labels on sheets - 15 labels per sheet. These labels are suitable for rapid application by hand to cassettes and can easily be printed by any local instant print shop. They are also ideal for use in typewriters or word processors. Minimum order 100 labels - £3.50

★ **SMALL COMPUTER LABELS** - Many micro computer users are finding that they are able to provide a unique and profitable service to businesses in their locality. We manufacture a wide range of small computer labels at very attractive prices. They are used for so many purposes that it is difficult to list them, but price changing, tagging, coding and marking are some examples.

NEW - Sampler pack of all of our different types of label - £20.

All the above prices include VAT & carriage. Excellent quantity discounts.
PLEASE SEND 16p STAMP FOR PRICE LISTS AND SAMPLE LABELS.

Industrial Process SELF ADHESIVE LABELS Superfast

Unit A4
Smeed-Dean Centre
Eurolink Ind. Estate
Sittingbourne
Kent ME10 3RN
Sittingbourne (0795) 28425 (24 Hrs.)

PSSST!

HAVE YOU HEARD??

PROFIT FROM YOUR PROGRAMS

POKE YOUR PIXELS IN THE POST AND LET US HAVE A PEEK

ENORMOUS
ROYALTIES PAID FOR ORIGINAL DEBUGGED GAMES

SEND YOUR CASSETTES AND DOCUMENTATION TO:

INCORPORATED SOUTHERN PRODUCTS LIMITED
27 CINQUE PORTS STREET
RYE, SUSSEX
or TEL: 07974 2225

LEON NOEL

C10 COMPUTER TAPES

☐ Ten cassettes plus library boxes, self adhesive cassette labels and library box index inserts.
Only **£5.00**
Plus **£1.00** for p&p

☐ 20 self adhesive cassette labels.
Only **75p**
Plus **20p** for p&p

☐ 50 Library box index inserts.
Only **75p**
Plus **20p** for p&p

Please make cheque/PO payable to:

LEON-NOEL
24 DUDGEON DRIVE
LITTLEMORE
OXFORD OX4 4QL
Tel: OXFORD 711972

Source of light!

This week, I want to look at two programs from the same source, Mikro-Gen.

The traditionalist will appreciate *Sorcerer's Castle*. The player may make the choice of becoming, for the duration, a warrior, wizard, elf, Hobbit and so on. Several points are then dished out for strength, wisdom, intellect, etc — the good old traditional Dungeons and Dragons Parameters.

A few more points are given to the player, to be distributed as he wishes. Then 60 gold pieces are used to purchase weapons, armour and flares or torches (and you will certainly need some source of light when play starts).

A lengthy wait follows, while the floor plan of the castle is set up — a nice feature of this being the clock that counts down the seconds. It's good to know that the computer hasn't packed up on you!

When the set-up is finished, the player is given information of his whereabouts in the castle. The castle has several levels, each containing 64 rooms (a square of 8x8). A list of weapons and treasure is also available. Now things really start to get interesting! It is possible, of course, to simply thrash about in the dark going from room to room.

But the cautious, or prudent, adventurer will have provided him (or her) self with a torch, or more extravagantly, as they can only be used once, a flare. By shining the light into the next room, the player can safely examine what awaits. In this way, the whole matrix can be mapped out. A floor plan can be called up, but will only show the contents of rooms visited.

Whilst travelling about, various treasures and objects are discovered. These are sometimes booby-trapped for the unwary. A book may be a vital clue, or it may blow up in the adventurer's face — or stick to the weapon hand! However, there are many gems lying about for the taking.

The purpose of all this weird wandering is to find the Sorcerer and beard him in his lair! He is resident in one room of the castle, and many clues are presented to the searcher during the course of his wandering. Whilst the books may be booby-trapped, it is often worth taking the risk to open them, as they may also give the location of the Sorcerer's room.

Now, there are several features of the game, such as the method of travel between levels, and a special extra-fast way of travelling, that I won't detail here — I don't want to give everything away! The program is really a blood relative of that old favourite, *Wumpus*, but doesn't suffer because of that. If you are a renegade from *D&D'ing*, looking for some of the flavour of that game, *Sorcerer's Castle* is well worth a look.

The second program from Mikro-Gen, again for the expanded Spectrum, is *Mad Martha* — a marvellous title for a marvellous adventure. The whole program is really dotty, and a refreshing change from some of the doom-laden programs encountered nowadays.

The player is cast in the role of the poor, hen-pecked, husband of the Martha of the title. Like many of us, he has the purely unselfish and totally reasonable yearning to go and have a good night out — he reckons without his dear wife, however! From the very start, he has troubles, as circumstances do their best to thwart him. First, he wakes up the baby, who starts yelling. Too much noise, of course, will bring "her indoors" running to see what hubby is up to.

Each location is depicted in high-resolution graphics and has an object to be used (at that location or some other), and a puzzle to be solved — in this game, you will not get to the next stage without solving the present conundrum.

So far, *Mad Martha* is a very funny, but otherwise straightforward adventure, but at certain points it makes a u-turn and becomes an arcade game. There are several of these sections, each one different — none of them will take over from *Scramble* or *Defender*, but they are amusing diversions.

I should say now that I haven't had the game long enough to make any significant headway (Martha keeps getting me with her chopper!), but I'm looking forward to getting my own back! If anyone has worked through the adventure, would you send me (in a sealed envelope!) the solution?

Thank you for all the hints and advice you have sent in, regarding *The Hobbit* — they have all been very interesting. Some of you have sent fairly detailed breakdowns of the program, but I have yet to see a complete plan of the adventure. If anyone would like to send me a blow-by-blow description of their wanderings, I would be very grateful.

R W Humpleby, of Hartlepool, is stuck in the Goblin's Dungeon, and so is Dorene Cox of Dagenham — she has had problems in many locations of *The Hobbit*. But don't worry, Dorene, I don't think you've got a dodgy tape!

For these, and any others still stuck at the Dungeon, here is an encoded clue — first type in the little coding program (*Popular Computing Weekly*, 5-11 May, page 33) and then type in this coded message:

sthnrmaoo•rey•rcy•tia•

and then

d•hhigrtoot•uotg

Let me know if you need any more help! One or two of you have mentioned little bugs in the program — one of the most serious will cause the program to hang up and refuse to respond any further. If you key *Caps Shift* and then the number 1, you will have to reload the program — just beware of clumsy fingers!

Jonathan Brennan (13), of Maidenhead, has sent me a few cryptic clues to inform me of his current position in what he says is undoubtedly the best adventure game ever made. "Once captured, I fell for the trap and the Butler had me over a barrel . . . From then on it was lonely on my holiday in the Lake District . . . But I am still having trouble with William Shakespeare . . ." Can you work out where he is now?

Next, some help required! Neil Stubbs, of Mundesly, Norfolk, and Richard Cooke, of Norwich, are both struggling with *Castle of Riddles*, for the BBC-B. They are having trouble in the corridors of doom, the safe and the gallery. If you have finished the game, or can throw some light on the situation, please let me know.

Finally, I'll let Peter Cusimano, of Idle (an apt name, maybe?), have the last word. He says: "I enjoy reading your articles and always turn to your pages last." I don't quite know how to take that, Peter! Anyway, he says, as a final word: "There's no beer on Jupiter!" — Well, Peter, I remember a few good nights down at the Old Red Spot! ■

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*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.

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 1982 PCW Index at £1.20 ☐

I enclose a cheque/postal order for £_____

Name _____

Address _____

_____

_____

Please return to Back Issues, PCW, Hobhouse Court, 19 Whitcomb Street, London WC2H 7HF.

GEM SOFTWARE (BISHOP'S STORTFORD) LTD

UNIT D, THE MALTINGS, STATION ROAD
SAWBRIDGEWORTH, HERTS
Telephone: (0279) 723567/723518

We are a young, fast-growing micro Software House, marketing software for the ZX81, Spectrum, Dragon, Lynx and BBC machines. We are currently looking to expand our range of games, educational and utility programs on these and other, micros.

If you can write top quality software on any popular home computer, get in touch with us, at the above address. You could join our team of freelance programmers and enjoy top royalty payments, with a sure guarantee of good rewards for the right programs.

ABRASCO LIMITED

Require PROGRAMMERS

Part-time and freelance to augment their existing team creating all sorts of software for all sorts of home computers. Call or write and tell us about yourself especially if we can see your work to date.

THE GRANGE BARN, PIKE'S END
EASTCOTE, MIDDLESEX HA5 2EX
01-866 2518

T.I. JOYSTICK INTERFACE

This unique interface enables you to use Atari, Master Point, Le Stick, Wico and Quick Shots Joystick on your T.I. and the Joysticks of your choice and put the thrill back into fast action games.

Single joystick interface **£12.45**
De Luxe double interface **£15.95**

For further details or to order an interface please write to:

GRAHAM MICRO ACCESSORIES
11-13 Long Street, Shoreditch
London E2 8HJ

All items are fully guaranteed. When ordering please state whether you require single or double interface.

TIGER SOFTWARE

DRAGON SOFTWARE

MISSILE DEFENDER

Undoubtedly the finest adaptation of Missile Command available for the Dragon. Save the world if you can! Superb graphics, authentic sound, continuous score, Hi score and laser energy displays. Detailed scoreboard after each round. Five difficulty levels from easy to near impossible!

"More colourful than Microdeal's Defense, with cities wall to wall any missile getting through is certain to zap you!" . . . *Dragon's Teeth.*

Dealer enquiries welcome. Please add 50p P&P.

TIGER SOFTWARE

63 Devonshire Street, Monkwearmouth, Sunderland, Tyne & Wear.

ATTENTION ALL SPECTRUM USERS

— BASIC TRACE —

A 760 byte machine code routine which intercepts each BASIC Statement prior to execution, displaying the line number, statement number, and the statement itself in the lower screen area.

FEATURES INCLUDE:–

- Single step or continuous program execution.
- Trace listings to ZX Printer if required.
- No corruption of upper screen display
- TRACE ON and OFF at will.
- 16K and 48K versions on same cassette.

● ALL THIS FOR ONLY £6.95 INCLUDING P & P FROM: ●

Texgate Computers Ltd.
14 Brook Lane, Corfe Mullen, Dorset BH21 3RD

WANTED

LYNX SOFTWARE

Good quality games, adventures, utilities and educational. Top royalties with author's credit.

For further details ring:

BUS-TECH
on 0705 735310 during office hours
or 07014 53279 out of office hours
or send tapes to BUS-TECH
19 Landport Terrace, Portsmouth, Hants

PENTAGON

FULL SOUND + COLOUR — MACHINE CODE + HIGH RES

DRAGON HAWK (DRAGON 32)

ORIGINAL ACTION-PACKED ARCADE GAME

After dropping missiles, the Hawk will pick up the man and carry him away, kill the Hawk and the man falls for you to catch, while another Hawk attacks. Score more points by killing off the flies that fly across the screen, sounds easy? But in the way, float over ten eggs, hit them by mistake and they hatch into birds which fly down to peck at your heels, or flash in readiness to pounce . . .

This is a quality game and a must for all Dragon users.
£6.95 INC. P&P

Send cheque or PO to: *TRADE ENQUIRIES WELCOMED*

PENTAGON
31 BANKS AVENUE, ACKWORTH, YORKSHIRE WF7 7JU
Tel: (0977) 614280

TWO QUESTIONS

Scott McCall of Dudley Drive, Glasgow, writes:

Q I am a Spectrum owner, and have so far had many happy hours on this fine computer. But I have two questions about it.

(a) Is it possible to get a proper keyboard for it with moving keys at the correct pitch, and with a space bar. I have seen several illustrations in magazines of keyboards for the ZX81, but they all seem to copy the original keyboard. Is it possible to get one which has its own key just for comma and full stop, for example.

(b) Is there any way of interrupting the *Integer out of range* error code for the *Print* and *Plot* commands? Or is there a way of using a routine that would allow for plotting to be done off the screen?

A There are several keyboards on the market, but the only one that matches your needs is made by Dean. This board comes with several extra keys, the functions of which depend entirely on you.

No command presents any special problems to put on a separate key. Like the ZX81, the Spectrum uses eight addresses and five data lines, and these need wiring up normally. The only problem comes with shifted characters where some 'juggling' of the lines is involved to simulate the double statement. Details of how to do this, plus a set of the necessary diodes, are available from Stephen Adams, 1 Leswin Road, Stoke Newington, London N16.

The only way to stop the *Integer out of range* error code is to stop the *Plot* command going off the end of the screen. To do this a routine is needed that searches for the end of the screen, intercepts the *Plot* command before it gets there, and stops it at the last screen location.

SWITCH ON OR OFF

Simon Jones of Edmunds Road, Hertford, Herts, writes:

Q I have a 16K Spectrum and I would like to know if I can switch on or off a relay using the edge connector and the *Out* command (or any other command). If not, would I have to buy an I/O port, or would the ZX expansion module have this facility? I know a little about electronics, so I might be able to make some adjustments to the connector.

A You will need an I/O port for your Spectrum if you want to use a relay. I am not sure what you mean when you say the 'ZX expansion module', but I presume you mean the one that Sinclair intend to supply themselves. If so, this won't be suitable as it is designed for networking and driving a printer.

There are several commercially available ports that will do what you want: R D Labs make a motherboard that has three ports on it. Furnell Engineering, and Kempston also manufacture one. If you really do have confidence in your ability to wield a soldering iron, then Stephen Adams' book *20 Electronic Projects* has plans of how to make your own.

A-LEVEL MATHS

R A Batternill of Ladram Road, Gosport, Hants, writes:

Q First of all thank you for the magazine, it is greatly appreciated. As a relative newcomer to the 'micro scene', (I own a Dragon), I am not yet able to write the programs, I need, as fast as I need them. Could you please tell me where I might find a program in mathematics up to A-Level standard for the solutions on linear and simultaneous equations.

My thanks to G Norton for his x,y plotter, *Popular Computing Weekly*, Vol 2 No1, as it was very useful.

A I am afraid that so far I have been unable to track down any Dragon software to A-Level standard at all. I think that more advanced software will slowly become available, as more people come to realise the potential of this computer.

Unfortunately, it suffers from not being one of the approved micros for use in schools; I do not think that this is any inherant fault of the machine itself, rather a case that it was not in existence when the scheme started. Whether or not it will be included will depend on the government, but if it is not included then I think that will slow the development of such software. I do not know if any reader has a program for what you want but if anyone does, please send it in.

WHAT'S THE ADDRESS?

Gary Hardwicke of Bracken Brough, Brixworth, Northampton, writes:

Q I have had a Vic20 now for about six months and I would very much like to know how to use the user port.

I was told by a friend that numbers could be *Poked* into it to change it to binary. If there was one in the bit a current was sent, and if there was a nought then no current was sent.

If this is true, how do I go about setting up my Vic to control lights and so forth? Will I need a control box, or will ordinary switches do?

Also, what is the address of the user port? Is there any hardware that will help me, or any good books that will give me more information?

A The plans of the user ports, and the various allocations of the individual pins, is a much more involved problem than I am able to cover here. The *Input* and *Output* from a port is always in binary. A current is either present or not. In the same way, the numbers you *Poke* into the port, or anywhere else, are translated into binary for the computer to understand.

There are two books that you should look at. One is Nick Hampshire's book *Vic Revealed*. This contains the mapping and allocation for all the Vic ports. The other is Stephen Adams' book *20 Electronic Projects for the ZX81 and Other Computers*. It is currently being revised to include more information about the mapping for a variety of projects. When you have worked out enough to make use of the ports possible, Stephen Adams' book will supply some interesting projects to try.

UNUSUAL FEATURE!

B Steen of Spicer Lane, Bear Cross, Bournemouth, Dorset, writes:

Q I recently bought Psion's *Flight Simulation* program for my ZX81, which I would recommend to anyone. It has the unusual feature of being able to check to see if it has loaded itself with *Load check* followed by either *Passed* or *Failed*.

I was most surprised to find that this program was recorded onto only one side of the tape, so I decided to make a safety copy. Although the program was copied satisfactorily it stopped at the line:

```
IF USR (102 + PEEK 16400 + 256 *
PEEK 16401) = 0 THEN RUN.
```

If I give the command Run it does — but I have lost the *Load check* facility. Can you tell me how to get it back?

A This I can only assume is software protection in action, as I do not know how the line works and neither can I remember seeing a similar line in other programs. It would seem as though some sort of specific variable has to be defined, and it cannot be defined if the *Save* command is used.

From Psion's point of view, I am sure that you can appreciate their desire to protect their product. I can offer no suggestions — I did not contact Psion as I think they would be justified in not giving me an answer.

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 Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.

CLASSIFIED

Semi-display — £5 per single cc
Trade lineage — 20p per word
Private lineage — 10p per word

CALL *DIANE DAVIS* ON *01-839 2476* FOR SEMI-DISPLAY ADVERTISING

GAMES SOFTWARE

ORIC-1 (48K) SOFTWARE, Hangman, Hi-res/3D Graphics 700+ vocabulary, Sea Patrol, Defend Britain in Wartime!, Demon Driver, Become World Champion! 1—£3.50, 2—£5.00, 3—£5.95, cheques/POs to N. Paget, 12 Heol Croesty, Pencoed, Mid Glamorgan CF35 5LR.

SPECTRUM, Krazy Kong, £3.50. 0708 46948.

CBM64 QUALITY SOFTWARE. Patience £6, Pontoon £5, Maze 64 £5, Adventure (joystick) Haunted Castle £6. C. P. White (Services), 76 Uxbridge Road, Hanwell, London W7 3SU. Trade welcome.

SPECTRUM 16/48K. Amazin' games from Alpha Systems! 10 great Arcade games for the price of one! Breakout, Gobbler, Bomber, Death Squad, Slots, Meteor Swarm and more! All for only £4.50 (inc p&p). Fast delivery. Alpha Systems Control, 2 Busbiehead Cottage, Kilmaurs, Kilmarnock.

19K JUPITER ACE
KRAZY KONG
4 sheets of fast amazing graphics with parasols, mallets, lifts, barrels Kong and a man running up the ladders and girders to rescue his girl!
£5 on cassette from
J. JONES, 5 Turnham Green
Penylan, Cardiff CF3 7DL

COMMODORE 64 Grand Prix cassette. High-speed racing game with sound, oilslicks, machine code, three screens, six skill levels, etc. Send £5 to Nigel Latimer, 57 Bargate, Grimsby, South Humberside.

TI99/4A. GOLD DIGGER, Secret Agent, Password, Flak. Full graphics and sound. P & P free, £3 each or any two for £4. A. Hetherington, 17 Catalina Gardens, Newtownards, Co. Down BT23 4RT.

ACE SOFTWARE. 7 games for the unexpanded Jupiter Ace, only £4. Federation Software, 56 Rawley Crescent, New Duston, Northampton.

ZX81 MONOPOLY 16K
VERY ADDICTIVE
play for hours against your computer
Fast delivery
ONLY £5 inc.
Cheques/POs payable to:
M.P.T., 42 Raedwald Drive
Bury St. Edmunds, Suffolk

FOUR CLASSIC ARCADE GAMES for the BBC Model B (Invaders, Maze, etc), only £7.50 inc. Ganymede Systems Limited, Huntsmans Walk, Rugeley, Staffs. Tel: 08894-78333 (Access). Trade enquiries welcome.

PALACE SOFTWARE
GAMES PROGRAMMERS
Palace software, part of a leading film and video company, is looking for games for Atari 400/800, BBC Model B, TI99/4A Spectrum, VIC 20 and CBM 64 for distribution in the UK, Europe and USA. High royalties will be paid for top quality and highly original material. Send samples to:
Pete Stone, Palace Software, 62-64 Kensington High Street, London W8 (Tel: 01-937 6258)

SPECTRUM 12 GAMES TAPE £4: Pacman, Hangman, Tron, Centipede, Pontoon, Bomber, Tunes, Logo etc. Also Space Tape £3: Defender, Tron 2, Star War, Star Trek, Invaders etc. J. Loach, 8 Cottesford Close, Hadleigh, Suffolk, or Tel: 0473 822284 (after 6 pm).

LYNX 48K SOFTWARE
Labyrinth — 3D Maze Game
Othello — our version of popular board game in fast machine code
Chancellor — run the UK economy for 10 years
£4.75 each inc. p&p. Cheques/P.O. to:
QUAZAR COMPUTING DEPT., PCW
17 TREE CLOSE, PORTSLADE, SUSSEX.

ESTUARY SOFTWARE PRODUCTS E.S.P. 42
A NEW NAME IN THE sinclair SOFTWARE
HITCH-HIKERS
GUIDE TO THE
GALAXY
For 48K Spectrum £8.95
Also for Apple 2 £16.95
LARGE RANGE OF SOFTWARE ON DISPLAY AT OUR SHOP
261 Victoria Avenue
Southend-on-Sea, Essex
Credit card holders may phone in their orders
(0702) 43568

DRAGON POP QUIZ, over 460 titles are contained in this program. Can you match them up with the correct artist? Bargain, £2.50 (inc P & P). 8 Faraday Street, Holderness Road, Hull.

TI-99/4A. Arcade Action, Grand Prix for unexpanded machine, £3.95. Unexpanded TI-99/4A programs wanted for 20% royalties. Send on cassette. Cheques/POs to: Microsonic (PCW), 85 Malmesbury Road, Cheadle Hulme, Cheshire SK8 7QL.

***BBC* 'B' — TOP GAMES**
SUPERGOLF.....£7.50
BUNFUN.....£6.50
OR ORDER BOTH.....£13
CHEQUES – POs TO:
SQUIRREL SOFTWARE
DEPT (3) 4 BINDLOSS AVENUE
ECCLES, MANCHESTER M30 0DV

C.P. DATA SYSTEMS
DRAGON 32
"Enchanted Garden"
(padded cell extra) **£4.95.**
"Alien Attack" £2.95.
Both games post FREE from:
4 MARSTON ROAD, THAME, OXON.

SWAN-TRAP, BBC MODEL (B). The ultimate surround game. Movement in any direction, continuous background, music in two-part harmony, optional obstacles. Invisible explosive eggs, £4.50. Peter Donn, 33 Little Gaynes Lane, Upminster, Essex RM14 2JR.

COSMOS
COMPUTER SOFTWARE
48K ORIC-1
HOPFROG—CITY BOMBER
with machine code for fast-action graphics. Full colour and sound
only £4.95
THE SORCERER (G.P.)
very fast high-quality games with added originals from COSMOS: MISSION III, APPLES, TRON, LANDER + more
only £4.95
Send cheque/PO to:
COSMOS COMPUTER SOFTWARE
65 WOOD CRESCENT
MOTHERWELL, LANARKSHIRE
MU 1HN

48K SPECTRUM DARTS. Five different games, on board scoring with options. Play computer or opponent(s). R. Kerr, 53 Kevookvale Park, Lasswade, Midlothian, Scotland.

YATZEE!! The popular dice game for any Spectrum. Up to six players, £3.50 from M. Dolphin, 8 The Handbridge, Highgate Park, Fulwood, Preston, Lancashire.

SPECTRUM 16K or 48K Squash game and 3D bar graphs to your design, up to 15 columns, save graphs on tape, can superimpose two graphs, for £2.95. Cheques to M. Dennis, The Elms, Hundleby, Spilsby, PE23 5LZ.

CHRISTINE COMPUTING
T99 4A SOFTWARE
NORTH SEA, CODE BREAK
ASTRO-FIGHTER
£3.50 each, **£6.60** for two
£9 for all three
SAE for Hardware/Software Catalogue to:
Dept PCWK, 6 Florence Close, Watford, Herts.

CLASSIFIED ADVERTISING RATES:

Line by line: For private individuals, 10p per word, minimum 10 words.
For companies, traders, and all commercial bodies, 20p per word, minimum 20 words.

Semi-display: £5 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. Cheques and postal orders should arrive at least two weeks before the publication date.

If you wish to discuss your ad, please ring Diane Davis 01-839 2476.

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*, Hobhouse Court, 19 Whitcomb Street, London WC2

EDUCATIONAL SOFTWARE

CRUISE, CRUISE. Here comes Cruise. Cruise Missile trajectory simulated with ZX81/Spectrum graphics. Program printout free with following publications for ZX81/Spectrum. (1) Satellite Spotter program prints positions of communication satellites launched by different countries. Graphic displays (16K Ram). Price £6 = Hard copy. (2) Mathematical Programs with Graphics plots lines, circles, numerical integration. Computes determinants, maxima, series, mortgages. Price £8 = Hard copy. Cash with order only. Blusston, 24 Elm Close, Bedford, Beds MK41 8BZ.

CAN YOU WRITE EDUCATIONAL programs for use by teachers on the BBC model B? If you think your standard is high enough and want to know more about our royalties send example program on cassette to Micro Concept, 22 Allenby Avenue, Grimsby, Humberside.

DRAGON

USERS

Don't just play games, use your brains with our

EDUCATIONAL SOFTWARE

only **£4.95** each

Physics (O level)
Maths (CSE)
Tables (7/11 yrs)
General Knowledge (9/99 yrs)
Biology (O level)
Spelling (9/99 yrs)
Arithmetic (7/11 yrs)

Fun to use, with full colour and sound. Only **£4.95** each on cassette. Cheque/PO to:

MICRO-DE-BUG CONSULTANCY
60 Sir John's Road, Selly Park
Birmingham B29 7ER

PRE-SCHOOL/EARLY SCHOOL CASSETTE, suitable schools/home. Seven educational/stimulating programs for children, 4-44 years. Written by teachers. 16/48K Spectrum. £5 cheque/PO to Essex Software, Dept. W, 16 Huntsmans Drive, Upminster, Essex.

PASS FRENCH "O" LEVEL. 50 verbs in five senses for 48K Spectrum, Random, selective testing or listing of verb in chosen tense. £3.95. W. Thies, 25 Primula Drive, Norwich NR4 7LZ.

UTILITIES

SPECTRUM 48K COPYTAPE

The first complete Copier system for the Spectrum

STILL THE BEST NOW THE CHEAPEST

Copies all Spectrum file tapes (up to 40K), plus Headerless files. Also displays, full file details and easy-to-use (Menu-driven)

£3.95

N. G. Edwards, 25 Dales Drive
Wimborne, Dorset

NB: Users must not infringe copyright

McSAVE FOR DRAGON. How to copy machine code programs. Information sheet from Hobis Software, 12 Larkspur Drive, Eastbourne, Sussex. Price £2.

NEWBRAIN. FULL DISASSEMBLER. Save pounds uncovering Rom mysteries and useful routines. Hex/decimal display, allows screen scrolling, annotation and dumping to peripherals, £4.50 from C. Dixon, 57 Marine Parade, Brighton.

007 SPY. Lets you stop and copy any previously unstoppable Spectrum cassette. On cassette, £2.95. Bobker, 29 Chadderton Drive, Unsworth, Bury, Lancs.

Spectrum Owners

First of all you had to back-up programs by making tape-to-tape copies. Now KEYSOFT present:

THE KEY

100% machine code! Copies any type of program. Order THE KEY for any ZX Spectrum. Only £5.95.

KEYSOFT, Dept PCWk
6 Bruce Grove, London N17 6RA

NB: KEYSOFT advise users not to infringe the Copyright Acts

DRAGON 32 and Tandy colour, "Copycat". This program copies machine code programs. £3 and sae for listing to: Richard Hunter, 1 Greet Park Close, Southwell, Nottinghamshire.

SPECTRUM SPY. Reads header of any program, prints details of start line, how to save, etc. Send £1.70 to G. Murphy, 11 Coneymead, Stalybridge, Cheshire, SK15 1HF.

SPECTRUM DECODER, prints start address, length of any m/c, Basic tape, listing, information, 70p. J. Grain, "Wychwood", School Road, Finstock, Oxford.

SPECTRUM "SNIFFER", reads tapes and prints out program name, length in bytes and start address. Machine Code and Basic! Also gives auto run line number. £2.50 from AWA, 50 Dundonald Road, Didsbury, Manchester.

SPECTRUM KOPYKAT £4.95

100% machine-code. Enables almost any Spectrum program or data-file to be backed-up on to a fresh tape.
Programs over 41K (8.5K for 16K models) can now be copied with ease
Plus: FREE Tape-header Reader program.
Both programs on one cassette, only £4.95.
IMMEDIATE DESPATCH. Send cheque/PO to:
MEDSOFT, 61 Ardeen Road, DONCASTER DN2 5ER

IT CAN EVEN COPY ITSELF

ADAM ADAPTORS eliminate expansion problems on the ZX Spectrum (16K). ADAM I allows use of 16K/64K Ram pack. ADAM II allows use of 16K Ram pack **PLUS** memory-mapped devices (disc, Eproms, etc) up to 16K. Works with microdrive, printer, etc. on ALL models. Plugs in between Ram pack and Spectrum. NO soldering or going inside the case. ONLY **£9** including VAT and postage.

STEPHEN ADAMS, 1 LESWIN ROAD, LONDON N16

TAPER, a cheap but very effective tape copier for the 16/48K Spectrum, hex. dump £1.20, tape £1.90. Full details included. R. Thomas, 9 The Copse, Lindfield, Sussex.

SPECTRUM PROGRAM COPIER. Make backup copies of protected programs (for personal use only). Full details and program listing — basic and machine, £1 + SAE. Ball, 190 Slag Lane, Lowton, Warrington.

TELETEX ON YOUR SPECTRUM. ZX text lets you create your own personal teletext system. Similar to Ceefax and Oracle. Capacity 900 pages. Full colour, graphics, flashing, inverse video, 24-hour clock with alarm, even the engineering test pages — it's all here! Cassette £4.95 complete with sample system. Full instructions and 12-month guarantee. Send cheque/PO (or SAE for details) to: Iain Stewart, 17 Torry Drive, Alva, Scotland FK12 5NQ.

TAPE COPIER for the professional — makes multiple copies of all Spectrum (18K/48K) programs (Basic-M/Code-Data). Easy to use. MB Guar. £4.95. L. Evans, 16 Stonepit Drive, Cottingham, Market Harborough, Leics.

HARDWARE

PROM SERVICES

ZX HARD and SOFTWARE

ZX81	
8K Eprom Board & Eprom 1 or 2	£20.00
Eprom 1 40 routine toolkit	£10.00
Eprom 2 Rapid load/save	£10.00
Eprom 4 20 routine m/c monitor	£10.00
Eprom 5 Z80 disassembler	£10.00
Motherboard — 3 slot	£15.95
Graphics board inc 4K of Eprom	£24.50
SPECTRUM	
Eprom board	£19.00
16K Ram Pack adapter	£6.95
Motherboard — 3 slot	£16.95
I/O board (Spectrum or ZX81)	£16.00
Audio board (Spectrum or ZX81)	£21.00

Many other ZX products available SAE for list.

EPROM SERVICES, 3 Wedgewood Drive
Leeds LS8 1EF. (0532) 667183

NYLON DUST COVERS for micros and peripherals. Apple II/IIe, £4.95 (with two disk drives £5.95); Atari, Vic20, Dragon, £2.80; Epson MX80 printer, £3.95; Paper Tiger 445/60, £4.95; 12in monitor, £5.50 (state make). Enquiries/orders to CSM Enterprises, 10 Queensgate, Chorley, Lancashire PR7 2PX. Tel: Chorley 72703.

★ LYNX MUSIC-MASTER ★

Now LYNX music is easy! Full two-octave stave on screen; compose; copy; replay; change tempo, etc. Cassette and full instructions **£4.95.**

ALBASOFT, 180 Terregles Avenue
Glasgow G41 4RR

DUST COVERS available for any computer, printer etc., BBC, TI, Epson, £3.95. Dragon, Atari, Vic20, £2.95. Sharp MZ80AK, £4.95. For others please phone or write to Sherborne Designs, Victory House, 8A The Rank, North Bradley, Trowbridge, Wilts. Tel: 02214 4425. Also made to measure service. Dealer enquiries welcome. Access and Barclaycard.

VIC20 OWNERS
DON'T BE ROBBED

Make your Vic20 guard you and your property while you are asleep.
A 16 line Interface Kit, each line fully programmable and independent of the other 15.
Many other uses. Software examples provided with kit. **£19.95** inc VAT, P&P.

Cheques etc, to Cleveland Interface, 18 Chelmsford Avenue, Fairfield, Stockton, Co. Cleveland.

SPECTRUM 48K UPGRADE, only £16 inc p&p. Send cheque/PO to N.M.C. Computers, 1 Downing Point, Dalgety Bay, Fife, Scotland, KY11 5YT. Issue 2 only.

COMPUTER COMPATIBLE CASSETTE RECORDERS

AC/DC tap counter, jack and din sockets, **£24.95** inclusive of VAT and p&p. Cheques/POs to Jay-Dee Communications, 182a Water Street, Port Talbot, S. Wales.

BRAND NEW COMMODORE 64s. Cost £345, my price £295 including VAT and postage and packing (save £50). You can't buy cheaper! Send cheques to: R. Bhattacharya, 3 Wensley Close, Harpenden, Herts, AL5 1RZ (or SAE for details).

CLUBS

SWAP UNWANTED SOFTWARE through our exchange club. **FREE MEMBERSHIP.** Send SAE for details A + P (Software) Services (PCW), 142 Broadstone Way, Bradford, Yorkshire.

PROGRAMMERS. Keep your software copyright and still earn real money. Join our marketing and advertising club. Send tapes and enquiries to: Loophole Software, Arkwright House, Alexandra Road, Llandrindod Wells, Powys.

SPECIAL OFFER to Spectrum owners. Save money by joining our fantastic software club. We offer a wide selection of software (all originals) and books, free of charge. Simply return your order within 28 days and all you pay is the postage. It's too good to be true. Don't miss this opportunity. Send SAE now for list plus details to: Microsoft, 103 Minstead Road, Erdington, Birmingham.

DEALERS

COMMODORE 64 + Vic20
SOFTWARE AND HARDWARE FROM
NOLANSCO ELECTRONICS

Large selection of cassettes and cartridges available, including Forth, Gridrunner, Educational programs, etc.

Phone Karen
Biggleswade (0767) 316702

EAST LONDON

WIDE RANGE OF SOFTWARE FOR SINCLAIR, VIC20, TRS 80 AND OTHER MACHINES.

M. FOREMAN
79 Mitcham road, London E6 3LT
Tel: 01-471 7040

COMPUTERS COMPUTERS COMPUTERS

Send for our special prices on ORIC1 (new Rom), Vic20, Atari 400/800 and Commodore 64. They are too good to miss! Plus numerous add-ons and peripherals and large selection of discount software for the above + ZX81, Spectrum and Dragon.

Why wait send now! For a catalogue

SM SOFTWARE, FREEPOST (no stamp required). Rotherham S66 0BR or Tel: (0709) 530549 anytime with your requirements or for a catalogue.

A RETAILER for Sinclair accessories in the North of England. We are situated near the M1 and M62 motorways. As well as a complete range of hard and software, our service department can repair, modify or fit a wide range of accessories. Hours of business 10 am — 8 pm Tuesday to Saturday inclusive.

TELEPHONE PHILIP COPLEY ON 0924 272545
6 WESTLEY ST, OSSETT, W. YORKS

PLEASE RING FOR DETAILS OF OUR MAIL ORDER SERVICE

ZX81 High Res Graphics Unit
£32 (excl. VAT)
Tel: William Haynes **01-969 0819**
Tools for Living
Notting Dale Technology Centre
191 Freston Road, London W10 6TH

Cheque/PO (add 15% VAT) plus 75p p & p

COMMODORE 64
£264.00 (excl VAT)
64 Programmers Ref Manual **£15.95**
+ **£16.95 p&p**
Tel Chris Gurney, Dave Walsh or Floyd Paterson
Tel: 01-969 4658 or send SAE
Image Science Micro Computers Ltd
189 Freston Rd, London W10 6TH
or cheques P/P (add 15% VAT) and £8 for p&p Securicor delivery
Prestel Frame 4820000 (a) for latest software and hardware information and prices.

DRAGON SALES AND SERVICE
West Devon Electronics
15 Station Road, Horrabridge, Devon
Tel: Yelverton (0822) 853434
Fast reliable service. Open some evenings. All repairs carried out in our own workshop.

ENFIELD COMMUNICATIONS
VIC20/64, ZX81, SPECTRUM BBC, DRAGON
GAMES: EDUCATIONAL, BUSINESS
Full range of software and accessories
MPF II 64K colour and sound **£269** inc. VAT
Send SAE for full list to:
ENFIELD COMMUNICATIONS
135 HIGH STREET
PONDERS END, ENFIELD
MIDDLESEX. Tel: 805 7434

BOOKS

MEDICAL SOFTWARE BOOKS. Microcomputer Programs in Medicine £55. Introduction Computers in Medicine £10. Clinical Laboratory Microprocessing £20. Enlander, 328 Main Street, Center Moriches, NY 11934.

MAGAZINES

DRAGON 32 or TANDY TRS-80 Colour? Lots of programs — lots of useful hints and information EVERY single month in **"RAINBOW"**, an exciting new 200-page magazine from USA. Send £2.25 (plus large 57p s.a.e.) for sample issue to **ELKAN ELECTRONICS (Dept. PCW), FREEPOST, 11 Bury New Road, Prestwich, Manchester M25 6LZ or telephone 061-798 7613 (24-hour service).**

The Color Computer
FOR ALL DRAGON 32 AND TANDY COLOUR USERS. Brand-new, glossy, full-colour magazine from USA — first class, high quality programs and articles from top writers.
★ With free UK supplement for Dragon 32 users and free advisory service ★
Send **£2.25** (plus 57p sae) for sample copy
ALSO AVAILABLE FROM ELKAN ELECTRONICS
"Colour Computer News"
"Rainbow"
★ FREE BOOK with two annual subscriptions ★
ELKAN ELECTRONICS, FREEPOST
11 Bury New Road, Prestwich, Manchester M25 6LZ or phone 061-798 7613 (24-hours)

FOR HIRE

HIRE A COMPUTER, £1.25 per week, £45 deposit for ZX81. B.S.C., 292 Caledonian Road, London N1 1BA. Tel: 01-607 0157.

COURSES

CALEDONIAN computer consultants provide programming consultancy and training courses in Basic, held regularly for beginners upwards. 292 Caledonian Road, London N1 1BA. Tel: 01-607 0157.

COMPUTER HOLIDAYS
Winchester
Adult/family summer holidays at King Alfred's College.
Beginners welcome. Individual help.
For Brochure send s.a.e. to:
Computer Holidays, 43 Byron Ave., Winchester, SO22 5AT

ACCESSORIES

CASSETTE LABELS PRINTED, self-adhesive, any amount. Sae samples. Six-Jays, Swanpool, Falmouth, Cornwall.
DISKS, Continuous labels etc, at discount prices. Call for lists Amersham (02403) 7540, Luton (0582) 412215.

SERVICES

REQUIRE A PRINTER LISTING FOR YOUR VIC20 PROGRAM. Send your program on tape, and I will return with listing. £1.60 + 60p per additional listings. Cheque/postal order to: S. Fensome, 73 Blackfriars, Rushen, Northants. All tapes will be returned by recorded delivery.

SOFTWARE

VIC20 SOFTWARE
All the Imagine Software Cassettes including : Arcadia, Whacky Waiters, Catcha, Snatch. All for either the expanded or unexpanded computer at only **£5.00** each!!
(inclusive of postage and packing)
Send cheques/POs to:
RULE COMPUTERS
30 TYLERS ACRE ROAD, CORSTORPHINE, EDINBURGH EH12 7HZ
(Tel: 031-334 7261)

SPECTRUM 64 PRINT, amazing software that gives 64 characters per line instead of 32, prints anything from your Basic program, cassette, 48K or 16K, £4.60. K. Ahmed, 28 Magpie Hall Lane, Bromley, Kent.

HEBREW — עִבְרִית for 16/48K Spectrum
Complete Hebrew Input/Output system, allows input from any point on the screen. Fast display of Hebrew text with vowels (in m/c).
Only **£7.50**
HEBREW HANGMAN GAME
Only **£5.75**
MYB SOFTWARE (Dept P)
23a St Andrew's Road
London NW11 0PH

DRAGON SOUND SYNTHESIZER. Disappointed with the Dragon's sound? This machine code and Basic program allows you to invent your own fantastic sound effects, eg, laser, siren. Once created the effects can be used in your own programs. Easy to use. Requires joystick. On cassette. £3.95. C. Woods, 37 Marlpit Lane, Sutton Coldfield, West Midlands, B75 5PH.
SPECTRUM: Nine unusual programs, Guarantee and money-making opportunity, £4 (instructions only sae). Spectrum/Kempston/Epson interface, £1. RTL, Westowan, Porthtowan, Truro.

MUSIC AT YOUR FINGERTIPS
PLAYER TRANSFORMS YOUR *UNEXPANDED* VIC20
INTO A MUSICAL KEYBOARD
PLAY/COMPOSE — RECORD — REPLAY
Choice of TEMPO, VOLUME. Dozens of TONE options. Truly original software for only **£4.95** (inc). Send cheque/PO to **SYNCHRO-SOFT, 57 Swinside Drive, Belmont, Durham, DH1 1AF**

SOFTWARE LIBRARIES

ATARI VCS 400/800 OWNERS
Why not join our extensive library and hire the latest games at the cheapest rates (state machine owned)? For details, send SAE to: **Southern Computer Software Library, 22A Quarry Road, Hastings, Sussex TN34 3SE.**
Tapes stocked with permission of publisher.

THE NATIONAL ASSOCIATION OF VIC20 OWNERS
★ **SOFTWARE LIBRARY**
★ **MONTHLY NEWSLETTER**
★ **SOFTWARE EXCHANGE**
★ **ADVICE and INFORMATION**
SAE FOR DETAILS: THE N.A.V.O.
21 CHACELEY WAY, SILVERDALE, NOTTINGHAM

FOR SALE

48K SPECTRUM + ZX printer + £220 worth of the best software. Everything excellent condition. Total package worth £400 (also seven rolls of printer paper). Will accept £230 ono. Tel: (0844) 208224 (after 6 pm).
ZX81, 16K, DK'Tronics keyboard, graphic, Rom, u.d.g., Q-save, over £150 of software including black crystal recorder, £145 ono. Telephone 01-366 7263.
ZX81, 16K, software, manual, leads, cost £100. Swap for £100 plus worth of original Spectrum software. Mr Pujara, Cavendish Hall, Beckett Park, Leeds.
FOR SALE, Vic20 super expander, £20; 'Super Lander', £14. Tel: 0481 27469.
TEXAS TI99/4A, perfect condition, with cassette leads, £130. Southampton 766153.
ZX SPECTRUM, 16K, still in box complete, £90. Phone 7393547.
TRS 80, Model I, Level II, 16K, cassette deck, tapes, including editor, assembler and manuals, £150. Tel: 0533 884385.
EXCHANGE/SELL BBC B programs, including Database, W/Processor, Beebtrek, Galaxian, Centipede, Dragon Rider, Apollo, others. Write: Hoe, 46 Grosvenor Road, Skegness, Lincs.
VIC20 + 8K + cassette deck, 2 Rom cartridges + books (no user manual) + magazines + games cassette, £195 ono. Tel: 0204 71439, after 6 pm.
ATARI 400, 16K, program recorder, basic, assembler, joysticks, manuals, books, perfect condition, £220. Tel: Letchworth 70331.
COMMODORE PET 2001, 32K, with Epson TX80 printer and Commodore cassette drive, £475, working system lightly used, plus books, programs, offers. Tel: Howard 01-353 1545.
DRAGON 32, boxed, joysticks, dust cover, £50 software, dozens of listings, tips, £190. Tel: 01-254 1221, evenings.
FOR SALE: Dragon 32, good condition, £80 worth of software, £150. Tel: Martin Stoney, 01-500 2386.
ACORN ATOM, 12K Ram, 12K Rom, books, cassettes, £100. Tel: 01-586 0092.
DRAGON 32 Starship, Chameleon cartridge for sale, £12. Tel: 061-764 4918.
VIC20, 16K, cassette deck + joystick, books, eight months guarantee + loads of software including Krazy Kong and Defender, £200. Tel: Tilbury 77329.
ZX81 1K, plus tapes, £25 ono. Tel: 021-705 5815.
JUPITER ACE FOR SALE, £65. Tel: Chesterfield (0246) 70730 after 6 pm.
48K SHARP MZ80K, in unmarked condition, with many software tapes, still under warranty, £275 ono. Tel: (0286) 880851 (evenings) or (0286) 4121 ext 364 (office hours).
DRAGON 32K, tape recorder, software, leads, manuals, £150. Tel: 01-876 0795.
VIC20, 16K Ram, C2N cassette, fully boxed, including £175 worth of software, joystick, magazines, £250 complete. Telephone Cheltenham 28021.
VIC20 3K, 8K, 16K ZX printer and interface, £150 of software including Anirog, Imagine and Bug-Byte, Books and magazines, will sell £300 ono. Tel. (Epping) 849 2458.
SHARP MZ80K 48K, Basic tape and manual, £250. Tel: o1-603 6759.

WANTED

WANTED, BBC (B) computer, £300. J. Campbell, 10 McPherson Street, Bellshill, Strathclyde.
WANTED used Dragon joysticks, cash waiting. Telephone Lincoln (0522) 751271.
WE ARE currently looking for original, preferably debugged games and utility programs. Anything from ½K to 24K is acceptable. If you have any programs that fit those criteria write to: Bamby Software, Leverburgh, Isle of Harris, PA83 3TX.

WANTED
USED AND BROKEN ZX81s
£8 paid for your non-working 1K ZX81 (£10 if you include PSU, manual and leads). £20 paid for working ZX81s. £10 paid for working 16K Rampacks.
Send to Telford Electronics, 26A Bradford Street, Shifnal, Shropshire Tel: (Shifnal) 46008.

NEW COMPANY seeks quality software for Spectrum/BBC microcomputers; to market and distribute on a nationwide basis. Very high returns possible. Send tapes for evaluation to Loophole Software, Arkwright House, Alexandra Road, Llandrindob Wells, Powys.
ZX81. New owner wants to buy your unwanted software. Interested? Phone Rainham (Essex) 22950 after 6.30 pm or weekends.
DRAGON USER wishes to swap Microdeal light pen and games for other software. Phone John after 5 pm on Upminster 21639.

Computer Swap 01-930 3266

Free readers entries to buy or sell a computer. Ring 01-930 3266 and give us the details.

Spectrums for sale

SPECTRUM 48K, boxed as new, with printer, approximately £50 of software, selling £100. Tel: 500 0375.

SINCLAIR ZX SPECTRUM 16K + software, tape recorder, £60 ono. Tel: Battle 2717.

GAMES including Hobbit, Penetrator, Orbiter, Arcadia, Scizoids etc, £15 if buy all, will give pen watch free. Tel: 061-881 3651. (Tony).

SPECTRUM 48K, 2 months old, all leads and manual, 6 software cassettes (Hobbit, Timegate etc), 2 computer books, ZX printer, Kemp joystick, Chatter Box speech synthesiser, £250 ono, will swap for BBC A and pay difference. Tel: Bridgend 0656 55839.

SPECTRUM 16K, boxed, all leads and manual, over £50 of software and books, £100 ono. Tel: Milton Keynes 311824, office hours Mr Amos 311687.

48K SPECTRUM, software including Hobbit, Pimania plus books and magazines, cost £240, will accept £180. Tel: 041-427 1460.

48K SPECTRUM, 1 month old, over £300 software including Hobbit and Penetrator, £350 ono; printer in need of repair, £15, quick sale. Tel: 01-731 0900 (after 7 pm).

16K SPECTRUM, £20 software, quick sale, £80 ono. Tel: 01-361 0146.

SPECTRUM 16K, boxed, 5 months old + Ferguson cassette player, software and magazines, £100. Tel: Chelmsford 400642.

SPECTRUM 32K RAM, unused, issue 9, £32. Tel: 0926 641040 (after 6 pm).

ZX81s for sale

ZX81 and Memotek 16K, with Zonx 81 sound unit, tapes, all leads and instruction manual, £80. Tel: St Ives 69350.

32K ZX81, Memotek Ram, small selection of software, all as new, cost £90, sell for £70 ono. Tel: 021-550 3579. (West Midland).

ZX81 plus 19 1K programs, good condition, £30. Tel: Sunderland 483646.

ZX81, still under guarantee, 16K Sinclair expansion pack, 2 tapes (1 16K and 1 1K), £70. Tel: Harlow 0279 28609.

ZX81 16K, leads and manuals, File 60 keyboard, lots of good games, £65. Tel: Sheffield 666849.

ZX81 16K, 1 month old, fully boxed, £35 of games, £75. Tel: Chorley 78339.

ZX81, 16K, DK'Tronics keyboard, 4K graphic Rom, Q Save tape recorder, 10 master cassettes, 1 book + magazines, £145. Tel: 01-363 6231.

16K ZX81, + DK'Tronics keyboard + motherboard, £100 software including Mazeman, Scramble + machine code book, £120. Tel: 01-722 7425 after 6 pm.

16K ZX81, with Hempston Klik keyboard + keyboard bleeper, new ZX printer, all in fitted carrying case. Also cassette player, 4 rolls of printer paper, learning lab, books, magazines and programs, complete ZX package, £150. Tel: 061-796 7549.

ZX81 + 16K RAM + manuals + leads, £40. Tel: 051-924 3713.

ZX81 + 16K RAM, book, 2 leads, £50 ono. Tel: 01-370 4620.

16K ZX81 + £60 of games and Basic manual + all leads for £65 ono. Tel: Horley 3013.

16K ZX81, power pack, leads, keyboard, manuals, books, £50. Tel: Minehead 5587.

16K ZX81, 9 tapes, good condition, £65. Tel: Cambridge 871534.

ZX81, 16K RAM, printer, Maplins keyboard, DK'Tronics graphics Rom, £70 software, £165 ono. Tel: Jonathan Fleet 02514 4529.

ZX81 + Memotec 16K RP, software, still under guarantee, excellent condition, £60 ono. Tel: 051-632 1236.

ZX81 1K, 2 months old, excellent condition, including leads, power supply etc, cassettes, magazines, £40. Tel: 0604 405809 (after 5 pm).

ZX81, 16K, 7 months guarantee, software, fully boxed, £65. Tel: Enfield 363 0996.

16K ZX81, including DK'Tronics keyboard + graphics Rom, all leads + manuals included, £100 software including Galaxians, Space Invaders etc, £110 ono. Tel: Staines 50522.

Dragons for sale

DRAGON 32 + joysticks + software, boxed and fully guaranteed, less than 4 months old, unwanted gift, £190 ono. Tel: 03574 325.

DRAGON 32 + tape recorder, both guaranteed + box + joysticks, 1 cartridge, 6 cassettes, leads + manual, £180. Tel: Porthcawl 6472.

DRAGON 32 + joysticks, 2 cartridges, books, tape lead, £210 ono. Tel: 01-904 4040.

Tandys for sale

TRS80 plus interfeed and over 50 programs, good condition, £50. Tel: Sunderland 483646.

TRS80 MODEL 1, Level 2, monitor, cassette recorder, etc. 01-407 2667.

TRS80 MODEL 1, 16K, RS 232, lower case + monitor, £200. (Can be seen Wimbledon or Elephant and Castle.) Tel: 01-946 9779 evenings

TRS80 MODEL 1, 48K, disc drive, green screen monitor, assembler, compiler, books + software, £400. Tel: 0417 474068.

VIDEO GENIE ED3003 with manuals + box + £150 of software, £150. Tel: 01-950 3158.

Commodores for sale

VIC20 cartridge for sale. Tel: 08956 38564.

VIC20 + cassette unit + 16K + 3K expansion unit, well over £1,000 software, including 2 game cartridges, joystick, loads of games + books + magazines, value £1,350. Must sell quickly for only £450!!! ono. Tel: Ruislip (08956) 38564.

VIC20 16K memory expander, cassette recorder, joystick, introduction to basic, 2 Rom cartridges + selection of software, £280 ono. Tel: 01-317 0999.

VIC20 games cassette including Night Crawler, Amok, Alien Blitz, Blitz, Space Freaks, Cosmiads, Vicmen, Scramble, £22 the lot. Tel: Stafford 663166.

COMMODORE Vic20 + cassette drive, software + introduction to basic, part 1, £130. Tel: 01-393 8550.

VIC20 + cassette unit, super expander, joystick + £60 software, £180. Tel: Hook Norton 737224.

VIC20 Robert Carrier menu planner £5; Sub-space Striker, £3.50; Vic Revealed £5. Tel: Newport (Isle of Wight) 525737.

VIC20 + CASSETTE UNIT + 16K and 3K expansion unit + joystick + well over £1,000 of software, consisting of 95 per cent cassette based software (mainly games) + 5 per cent books and magazines etc. Also 2 games cartridges, all in good condition, value a hell of a lot, price far, far less, £450. Tel: Ruislip (08956) 38564.

VIC20 CARTRIDGES for sale, including Gorf, Sargon 2, Chess, £15 each. Also Rat Race, Starbattle, Jellymonsters, Alien and many many more, £11 each. Tel: 574 4122 after 6 pm.

64K RAM EXPANSION for Vic20, £80. Tel: Penketh 2601.

VIC20 + CASSETTE PLAYER, 16K, 3K super expander, programs, reference guide and Vic revealed, software and joystick, £250. Tel: Ripley 810217.

VIC20 C2N CASSETTE, 8K Ram, £100 of cassette software, £120 cartridge software, programmers reference guide, Commodore Computing magazines, £235 ono. Tel: Buxton (Derbyshire) 78029.

VIC20 COLOUR COMPUTER + cassette, good condition including Demo cassette etc, £125. Tel: Bishops Stortford 57011.

VIC20 PLUS SUPER EXPANDER, still under guarantee, programs and software etc, £130 or nearest offer. Tel: 01-800 9517 after 5 pm.

COMMODORE VIC20, with C2N tape unit, complete, dust cover set, excellent £20 joystick, all manuals, Road Race plug-in cartridge as well as much tape, software included, original Bug-Byte, Vic Men, Blitz, excellent condition, £200 ono. Tel: Padgate 810490 after 5 pm.

VIC20 + CASSETTE DECK, Blitz, Frogger and Domino, all boxed, swap for Dragon 32. Tel: 061-941 2553.

VIC20 GAMES to swap or sell games from Audiogenic, Llamasoft, Rabbit and many more. Tel: 0442 58200.

VIC20, AS NEW, 8K, C2N cassette recorder, joystick, £16 books + £60 well-known games, £200. Tel: Aberystwyth 611341 after 5 pm.

VIC20 + C2N, 16K Ram, £100 ono. Tel: Taunton 88726 anytime.

VIC20 + CZN + 16K, over £1,000 of software, 95 tapes, joystick, books, magazines, excellent condition, value £1,400, yours for £450 ono. Tel: Ruislip (08956) 38564 (4.30 pm).

PIRATE COVE CARTRIDGE, £17. Tel: N. Rodgers, 0742 344427 daytime.

BRAND NEW COMMODORE 64s, price £345, sale price £295 (a saving of £50). 10 for sale. For details write to "64s Offer", 3 Wensley Close, Harpenden, Herts AI5 1RZ.

VIC20, cassette, 35607 motherboard, 8K Ram, expansion, machine code monitor, manuals, books on machine code + Basic joystick + over £300-worth of software, including Jelly Monsters, Sargon II, Chess, Star Battle, Avenger + Alien, £350 ono or swap for BBC model B. T. Wilson, 21 Chentonfield, Fulwood, Preston, Lancs PR2 3WH.

VIC20 + cassette with 3K Super-expander + 8K Mission Impossible + Radar Ratrace, Vic Revealed, Intro to Basic part 1, Mastermind, Backgammon + other software, best offer secures. Tel: 01-952 4397.

FREE VIC20 + C2N + 16K + 3K expansion units + well over £1,000 software, consisting of 95 per cent cassette based software (mainly games), two game cartridges, joystick, books and mags. Value approx £1,400 all this for nothing provided that the introduction manual is purchased for £450. Tel: Ruislip 08956 38564.

SWAP VIC20 C2N cassette recorder, software and programing kit, all under guarantee, in very good condition, for your Atari 400 + cassette. Rec, basic cartridge and software. Tel: Peterborough 242811.

8K COMMODORE VIC20 + Starbattle + Mission Impossible, intro to basic part 1, Vic revealed, loads of tapes, £140. Tel: 0492 623275.

VIC20, boxed, three months old, £85 ono. Tel: 07072 68496.

COMMODORE PET 3016 16K 12-inch, screen took kit chip model, cassette deck manuals + dust cover, software progs, £225. Tel: 0203 465472.

VIC 8K Ram, cartridge + 8K software, £25. Tel: Harpenden (05827) 5232 eves.

Ataris for sale

ATARI VCS, 4 cartridges including PacMan, good condition, £65. Tel: (Formby) 07048 70531.

ATARI OWNER wishes to sell, buy or swap programs. Tel: Winterbourn 776072.

ATARI VCS + 11 cartridges, £150. Tel: 0434 604272 anytime.

ATARI 800, 32K, cassette, manuals, £300 of software, £350. Jim Franklin, tel: 01-995 4998.

SWAP ATARI 6 games for 16K Spectrum. Tel: 01-672 4624.

ATARI VCS + PacMan + Video Chess, mint condition, boxed as new, £80. Tel: 348 5668 after 6 pm.

ATARI 400 16K including program recorder, 2 joysticks, Asteroids, Basketball, Star Raiders, Centipede + Basic cartridges, 2 books, all leads, offers. Tel: Dave, 051-427 4927.

ATARI VCS + PacMan + Asteroids + Berserk + extra paddles, £110. Tel: 01-582 1869 (after 6 pm).

ATARI 400 48K, cassette recorder, joysticks, basic + manuals, service guarantee on hardware, over £400 of cassette games, software including well known arcade games, superb, £350 for quick sale. Tel: 0702 201637.

ATARI VCS with paddles, joysticks, Invaders, Asteroids, Combat cartridges, almost new, offers around £60. Tel: Leicester 0533 884852 after 6 pm.

ATARI 800 48K, cassette recorder, with joysticks, £70 of software, 4 months old, almost new, £399. Tel: 021-357 2487.

ATARI VCS + all accessories + Space Invaders + Combat cartridges, £55 + many other cartridges from £8 up. Tel: Slough 20735 after 6 pm.

ATARI 400 with 48K + Inhome keyboard + basic, £200. Tel: home 274 7897; work 353 6566.

Acorns for sale

BBC MODEL B, OS 1.2 + disc interface + disc drive, cassette player + manual + leads, etc, also tons of software including machine code monitor with Rom, only £699 — will sell disc separately. Tel: Uxbridge 0895 35129.

BBC MODEL B + monitor + cassette recorder, software, books, 7 months old, open to offers. Tel: Mansfield 550372 after 6 pm.

BBC B, 32K, 3 months old, recorder, joystick, books, magazines, software, £390 ono. Free delivery up to 30 miles. Tel: Godalming 23436 (6 pm).

ACORN ATOM, 2K Ram, 12K Rom, floating point, all leads + power supply, manual, software, recent manufacturer service, £150. Tel: Southampton 736258 after 6 pm.

ACORN ATOM, 12K and 12K Ram, Ross utility Rom, external power supply, games, books, cassette deck, complete, £150. Tel: (0793) 823183.

For sale

CASIO FX502P Personal Computer, complete with manuals, cassette, interface, etc, £50 ono. Tel: 531 2892.

VIC20 software, to swap or sell, one Vicmen, Tomb of Dwin, Vic Rescue, Lazerzone, Martian Invader, Myriads. Tel: 031 6617477.

MANSION ADVENTURES, and Star-traders, swap for any other adventure game. Tel: 707 0083.

FOUR VIC20 CARTRIDGES, worth £85 new, sell for £50. Tel Newark 0636 706326.

JUPITER ACE, brand new, £60. Tel: 051 4286281.

ITT 20/20 (Apple) 48K — 1 disc drive, £500 ono. Tel: 204 7032 weekday evenings.

COMMODORE 64 GAMES — Startrek, Othello, Backgammon, Drafts, Pontoon and Synth, machine code side scroll, prices range from £2.95 to £5.95. Tel: 748 8178 after 5 pm or weekends any time.

TRS 80 MODEL 1, level 2, 4 months old, nearly £300 worth of software and cassette recorder plus soundbox, books, manuals, price £250. Tel: 021 705 3469 after 5 pm.

DO YOU WRITE MACHINE CODE? On the backs of envelopes? If so why not use our coding sheets at only 3p each or £2.50 for 100. Send cheques/POs to: M. A. Valentine, 101A Underdale Road, Montmoor, Shrewsbury, Shropshire SY2 5EF.

SEIKOSHA GP100A PRINTER, six months old, excellent condition (owner has upgraded!), Centronics parallel, used with a Dragon 32, previously £180 (present price £240). Tel: Rustington (W. Sussex) 09062 72845.

BORIS MULTI-LEVEL CHESS COMPUTER, mint condition, with free chess set and power supply, £125 ono. Tel: Aylesbury 27357.

ORIC SOFTWARE for sale. Tel: 445 5989.

ORIC 1 — 48K Ram, plus Forth and manuals, plus mags and adventure games. New price £210 — asking price £170. Tel: Nottingham 295074.

ATARI TV GAME, with five cartridges, four months old. Worth over £200. Sell for £100. Tel: 051 9288011.

VIC20 GAMES, Scramble, Myeroid, Tank War, Arcadia, Alien Wars, Star Quest, Sub Space Striker, Incounter, Space Storm, etc, etc, cash offers. Tel: Yateley 872310.

VIC20 CARTRIDGES and cassettes for sale, most at half-price. Tel: 574 4122.

VIC20 Choplifter Rom cartridge, swap for either Commodore machine code monitor or 8K Ram pack. Tel: 021 458 4475.

COMMODORE 64 games, buy or swap or part exchange your Commodore 64 games. We sell Commodore 64 games for £2.95 — £6.95. We have two brand new games, No. 1 Robot Craze, No. 2 3D Starship Entry, each for £6.95. Tel: 01-450 4858.

SWAP DRAGON 32, Alcatraz 2 for Donkey King cassette. Tel: 061 7992036.

TEXAS TI994A with cassette lead. Parsec Rom cartridge, 2 cassettes in original packaging with guarantee, £115 ono. Tel: Sheffield (0742) 361722.

SHARP MZ80K, six languages word processor, 100 program library, £390. Tel: Tewkesbury 297579.

VIC20 PRINTER + Vicwriter cartridge, £160. Tel: Northwich 2155.

PIRATE'S COVE cartridge for Vic20 — swap for other adventure cartridges. Tel: 01-952 4749 after 4.30 pm.

£130 WORTH of Vic software in Bugbyte, Impact, Interceptor and Llamasoft. Will accept £100 or sell separately. Tel: 021-7043915

EXCHANGE YOUR SOFTWARE with me. Send sae to M. A. Valentine, 101A Underdale Road, Montmoor, Shrewsbury, Shropshire SY2 5EF

TANDY mini-disc drives, three available, £195 each or £500 for all three. Tel: 0630 83783.

SWAP BINITONE HI-FI for a 16K or 48K Spectrum. Tel: 061-740 9861.

JACKPOT FRUIT MACHINE, for unexpanded Vic20, four reels, hold, sound + large graphics, just £3.99. Phil Macdonald, 43 Freshwater Drive, Hamworthy, Poole, Dorset.

INTELLIVISION, 11 cartridges, sell £150 or exchange 48K Spectrum, Dragon. Tel: 01-368 8465.

DRAGON 32 games cartridges, Meteoroids, Berzerk and American Football. As new, cost £20 each, will accept £15 each. Tel: 01-878 6936 (Richmond).

BOOK 'BYTEING DEEPER' into YOUR ZX81, including 37 programmes for unexpanded ZX81. As new condition, cost £4.95 new, will accept £2.80 including postage. Tel: Gadebrook (0923) 89482.

GREAT COMMODORE 64 ARCADE + educational games. Prices from £2.49-£6.95. Tel: 01-450 4858.

SWAP ATARI 800 + 410 program recorder, joysticks, manuals, including De-re Atari programmers, etc, 5 months old, for similarly equipped BBC computer. Tel: Eastbourne 641719.

ITT 20/20 (APPLE), 48K Ram, £300. Tel: 01-451 0520.

TI LCD PROGRAMMER CALCULATOR, few hours use only, £32. Tel: 01-451 0520.

SHARP MZ 80K, 48K Ram, 8 months guarantee left, re-set button, excellent condition, £275 ono. Tel: 802 3038.

ABS COMPUTER INSURANCE PROGRAM, central processor with 64K byte (32K words of memory), 10.6 mega-byte disc-drive, high-speed band printer, 240 lines per minute, 3 VDUs, offers. Tel: Slough 25496.

FOR SALE 48K UPGRADE for issue one Spectrum, £25. Tel: 061-225 8054.

SWAP VIC20 + cassette unit + 16K Ram + over £90 of books and software for an Atari 400 + cassette unit + basic cartridge + software. Tel: Gullane 842613.

AVENGER CARTRIDGE for Vic20, £8.50. Tel: Stevenage 811634 after 7 pm.

SWAP JUPITER LANDER + Adventureland for any Audiogenic cartridges. Tel: Pipegate 297.

TI 99 4A with mini-memory line by assembler, extended basics, joysticks, Grammer for Beginners + tape cable, £240. Tel: 01-515 7962.

MENTOR Z80 DEVELOPMENT SYSTEM, including power supply, £65. Tel: 061-428 7312 anytime.

CASSETTE OF UNEXPANDED VIC20, 13 games on it, including Blitz, £5.50. Tel: 207 0926.

VIC20 SOFTWARE, cartridges + cassettes, most half price, including Gorf, Jelly Monsters, Star Battle + Lazerzone. Tel: 574 4122.

SPECTRUM SOFTWARE, all top games on one cassette for £10. Games include Football Manager, Cyber Rats, Maze-man, Battle of Britain, 3D Tunnel, Avenger and many more, for only £10. Tel: 0555 71076.

MANY ARCADE GAMES, £3.50 for each one or £25 the lot, 6 games altogether. Tel: Wilmslow 522375.

JUPITER ACE, two months old, 3K Ram + introduction to Forth + seven extra programs, £70. Tel: Woking 65978.

SWAP SPECTRUM GAMES for others. Tel: 0622 61917 after 4 pm, ask for Ian.

INTELLIVISION with nine Rom cartridges for £160 ono. Tel: 01-310 8109 after 5 pm.

SHARP PC 1211 with manuals, cassette unit + two games tapes, £40. Tel: Mr Rodgers 0742 34427 daytime.

UK 101 8K, cased, £80 ono. Tel: 01-987 1660. Ask for Len, after 6 pm.

Wanted

WANTED, DRAGON COPY-KAT TAPE, exchange anything from my large and varied collection of cassette software. Details Staines 58707 after 6 pm.

WANTED, ONE COPY of the first issue of *Dragon User*, can anyone sell me one? Send to Hugh Barr, Seagull Cottage, Waterloo, Brekish, Isle of Skye, or tel: (04712) 437.

WANTED, MZ 80K, cash for reasonable offer. Tel: (Nelson, Lancs) 0282 68715.

7-SLOT ARFON BOARD with lead for Vic20 in exchange for Stack 4 slot mother board + cash. Tel: Lichfield 53344.

WANTED, ANY BACK ISSUES of computing magazines, preferably for Spectrum. Tel: Rhymney 0685 841561.

WANTED, ZX SPECTRUM 48K, + printer, cash paid. Tel: 09285 63052.

WANTED, GRID RUNNER for unexpanded Vic. Tel: Banbury 720640.

WANTED, 16K RAM for ZX81, £10. Tel: 0249 812038.

WANTED, 16K RAM for Vic20. Tel: 01-205 9649 (after 6 pm).

WANTED, ZX printer for under £20 (condition not important). Tel: Roy, 579 0065.

WANTED, Atari cassette unit + software, especially Defender + Miner 2049er. Tel: Ascot 21160.

DRAGON 32s REQUIRED, £130 for each sound machine, immediate decision, I will arrange collection/despatch. Details to A. Ellis, 22 Turnarean Road, St Austell, Cornwall PL25 5NX.

WANTED: Vic20 with extras, £120 available. Tel: Brenchley 3685 (home), or 01-211 3127 (work).

WANTED to buy or exchange, BBC Model A or B. Dunstable (0582) 68829.

SPECTRUM, 48K, wanted, also software if available, fair price paid for example in excellent condition. Tel: 01-897 6274, evenings.

PARKER Star Wars cartridge for Atari VCS in exchange for Demon Attack. Tel: 04862 70318.

WANTED: BBC B software to swap. Tel: 0256 71 2754.

LYNX, brand new, must be still under guarantee, £170 — £200. Tel: 04 862-70318.

WANTED: ZX Printer. Tel: 0622 61917 after 4 pm.

WANTED any Acetronic cartridges, price depends on age and condition. Tel: Bourne End, Bucks, 23797.

WANTED — Zaxxon game for the Atari 400. Will swap for another game or will pay cash. Tel: 01-989 8138 evenings and weekends.

ZX80s wanted, £10. Tel: 0904 769025.

Cruising/Blind Alley

Cruising

The highest score sent in so far this month is 9968 from Carl Doran of Skidby Mill, N. Humberside. Entries for this month's competition close on May 31.

Blind Alley

The highest score sent is so far is 32465 from Jonathan Farmer of 34 Cramond Park, Edinburgh. Entries for this month's competition close on May 31.

EXTEND SPECTRUM BASIC

WITH

WHITE NOISE and GRAPHICS £5.95

A collection of Machine Code routines to add over 20 extra commands to Basic. These give total control over the screen via a window which can be scrolled (in eight directions), inverted, cleared, bordered and shaded (thus extending the normal range of colours). White Noise produces true explosions, gunshots and other sound effects, includes many other routines. Supplied with a comprehensive manual.

SUPER SOFTWARE PLUS KEEN PRICES MAKE OUR GAMES TAPES FOR YOUR SPECTRUM GREAT VALUE AT ONLY £4.95 EACH

1. **MONGOOSE** and **BEAR ISLAND** — 16K or 48K
   Fast and furious Arcade action
2. **REVERSI** and **POKER DICE** — 16K or 48K
   Games of skill and luck
3. **TIME-LINE** and **TASKS** — 16K or 48K
   Superb 16K Machine Code adventure and mind stimulating games
4. **MAGIC CASTLE** — 48K only
   Gripping adventure in Machine Code, rescue the Princess but beware of vampires and booby traps

SAE FOR FURTHER DETAILS
DEALER ENQUIRIES WELCOME

GILSOFT

30 HAWTHORN ROAD, BARRY
SOUTH GLAMORGAN, CF6 8LE
Tel: 0446 736369

Gilsoft are pleased to announce, that as a result of an agreement with Kempston Micro Electronics, our Softlink I Adaption Tape for the Kempston Joystick will in future be produced and marketed by Kempston's new software firm, Kempsoft. All prospective purchasers should now order this item from:

KEMPSOFT, 180A BEDFORD ROAD, KEMPSTON, BEDFORD

PRACTICAL USES

Author, Adrian Dickens

It seems almost impossible to believe that there could be room for another book on the Spectrum. However, Melbourne House obviously think they have found a gap and have just issued the *Spectrum Hardware Manual* by Adrian Dickens.

This 112 page book is intended for those who like to find practical uses for their micros. It includes instructions for building joysticks and connecting a full-sized keyboard.

The author of the book is not one of the well-known computer "names" who seem to produce dozens of books a year. He is a 21-year-old engineering student at Churchill College, Cambridge.

The book includes full circuit diagrams and discusses the workings of each component.

Book *Spectrum Hardware Manual*
Price *£5.95*
Micro *Spectrum*
Supplier *Melbourne House*
Glebe College
Station Road
Cheddington
Leighton Buzzard
Bedfordshire

BEETLE CHASE!

AWA software is a new name in games software. One of its first releases is a maze game for the Spectrum.

In a vaguely *Pacman*-like scenario, you are chased around a maze by beetles whose eggs you are trying to steal (serves you right, I would say). If you survive, there are more difficult mazes to follow.

Program *Beetlemania*
Price *£5.50*
Micro *Spectrum 16/48K*
Supplier *AWA Software*
50 Dundonald Road
Didsbury
Manchester M20 0RU

MAZE HUNT!

Personal Software Services is one of those software houses still offering new programs for the ZX81.

Ghost Hunt requires you to gobble your way through a maze, chased by ghosts and defending yourself with power pills. No prizes at all for guessing the arcade game on which it is based.

The game requires 16K and is written totally in machine code.

Program *Ghost Hunt*
Price *£3.95*
Micro *ZX81 16K*
Supplier *Personal Software Services.*
452 Stoney Stanton Road
Coventry CV6 5DG

PLANE CRASH

While the ZX81 is well suited to the limited requirements of text adventures, it would not be anybody's first choice for an adventure featuring graphics.

Nevertheless, Computer Rentals has issued precisely that — a graphic adventure for the 16K ZX81.

Called *Escape from Manhattan*, it sounds very much like the scenario for the film *Escape from New York* — the President's plane has crashed in Manhattan, which is not a prison complex, and you have to rescue him.

The game is written by Nigel Taylor whose youth — he is 13 — is becoming the norm these days.

Program *Escape from Manhattan*
Price *£3.50*
Micro *ZX81 16K*
Supplier *Computer Rentals*
140 Whitechapel Road
London E1

GIANT CRABS!

Mysterious Island is a graphic adventure for the 16K Vic which actually involves 30K of program.

The game is split into two halves — you only *Load* part 2 once a secret codeword has been discovered from part 1.

The game features various nasties like giant bees and crabs. For those who complete the game, there is the promise of a "personalised award" from the manufacturers.

Program *Mysterious Island*
Price *£9.90*
Micro *Vic 20 16K*
Supplier *Mr Micro*
69 Partington Lane
Swinton
Manchester M27 3AL

GLOBAL INFO

Information on the entire world, including every sovereign state, language, regime and military alliance, is offered by *World Info* from Wimsoft.

This program is designed for those who need background facts to prepare news stories, articles, essays, etc.

In order to use this program you will also need Cambell Systems *Masterfile* into which *World Info* is loaded as a datafile.

Program *World Info*
Price *£5.00*
Micro *Spectrum 16/48K (16K is reduced version)*
Supplier *Wimsoft*
20 Brookside Road
Wimborne Minster
Dorset BH21 2BL

MOVING ON

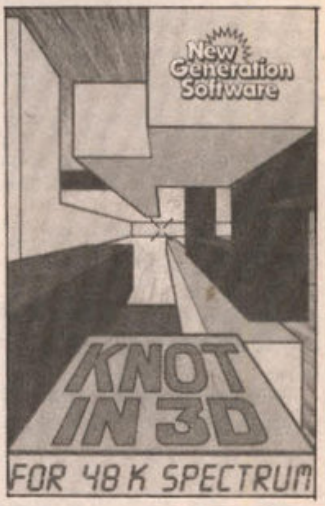
Windrush Micro Systems is a company that has previously specialised in the upper ranges of the 6809 market.

It has now moved into the Dragon market with *Dragon Mace*, a cartridge which is an "Editor/Assembler/Monitor" package.

The cartridge comes complete with an 80-page explanatory booklet. It is intended for those who are proficient at Basic and who wish to move on to assembly language.

Program *Mace*
Price *£29.95*
Micro *Dragon 32*
Supplier *Windrush Micro Systems*
Worstead Laboratories
North Walsham
Norfolk NR28 9SA

A CLEAR PATH



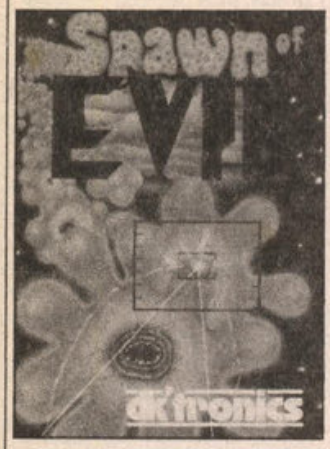
New Generation Software has something of a cult following amongst Spectrum owners. There will be much interest, therefore, in its latest release.

The game is called *Knot in 3D* — a dreadful pun since the game most obviously is in 3D and this fact is crucial to playing the game.

You rush through empty space, leaving a green/yellow trail, while you are pursued by up to four chasers which leave red/blue trails. Since the space is enclosed, the trails become increasingly *Knotted* and it becomes even more difficult to find a clear path.

Program *Knot in 3D*
Price *£5.95*
Micro *Spectrum 48K*
Supplier *New Generation Software*
Freepost BS3433
Oldland Common
Bristol BS15 6BR

EVIL TACTICS



DK' Tronics was, until recently, best known for its range of hardware for the Spectrum and ZX81. However, in recent months it has released a growing range of software.

One of the most recent releases is *Spawn of Evil*. Although this game features both lasers and aliens, it is unlike traditional "shoot em up" games. The instructions alone take up one side of the cassette.

Your objective is to destroy the "spawn" before they have a chance to complete their complex breeding cycle and evolve into their most vicious form.

Doing well in the game is partly a matter of firing lasers and the like, but it is also a matter of seeking out the aliens at their breeding grounds and destroying them at the most opportune moment — a matter of some tactical thought.

The program was written by Don Priestly, author of Bug-Byte's *Mazogs* for the ZX81.

Program *Spawn of Evil*
Price *£4.95*
Micro *Spectrum 16/48K*
Supplier *DK' Tronics, Unit 2*
Shire Hill Industrial Estate
Saffron Walden
Essex

UNUSUAL EXTRAS

The Black Hole is the first release for a new company, Quest Microsoftware, which has just entered the highly competitive Spectrum software market.

Although basically a "spaceship against aliens game", it does offer a number of unusual extras — you have to avoid not only the aliens but also a black hole, which affects the behaviour of your various weapons of destruction.

The game, which has been developed by ex-defence industry programmers is claimed to be very addictive and, as an added incentive, cash prizes are being offered for the highest scores.

Program *The Black Hole*
Price *£5.50*
Micro *Spectrum 16/48K*
Supplier *Quest Microsoftware*
119 The Promenade
Cheltenham
Gloucestershire
GL50 1NW

MONEY-BAGS!

Mysterious Mansion is claimed to be an adventure game with a difference. The difference being that a joystick is used to move yourself around the various locations.

Your objective is to search for 10 bags of money which are hidden around the mansion — danger lurks in the form of several killer ghosts which you must avoid.

Program *Mysterious Mansion*
Price *£5.00*
Micro *Vic20 + 3K*
Supplier *C P White (Services)*
52 Northfield Avenue
West Ealing
London
W13 9SY

BOWLED OUT!

Coppice Software is a Lincolnshire based software company which has branched out from the Apple to the Dragon 32 in supplying software.

The first release in the Dragontree collection is *Bowling*, a computer simulation of the popular tenpin bowling alleys.

The game features the same rules as the original, with "spares" and "strikes" as well as a choice of bowling ball.

Program *Bowling*
Price *£4.95*
Micro *Dragon 32*
Supplier *Coppice Software*
7 March Street
Kirton Lindsey
Gainsborough
Lincolnshire DN21 4PH

BASIC MATHS

Cottage Software specialises in educational software for the BBC. The firm has just issued a range of five cassettes which aim to teach basic mathematical skills to children.

The first of these — *MUL-TABS* — features a multiplication table learning program followed by a test. Incentives to do well are in the form of congratulatory messages and graphics displays.

The other packages offer anything from castles to rabbits to bananas as counting aids for the child.

Program *MUL-TABS*
Price *£7.50*
Micro *BBC A/B*
Supplier *Cottage Software*
Heather Cottage
Selly Hill
Whitby
North Yorkshire

FLIGHT PATH

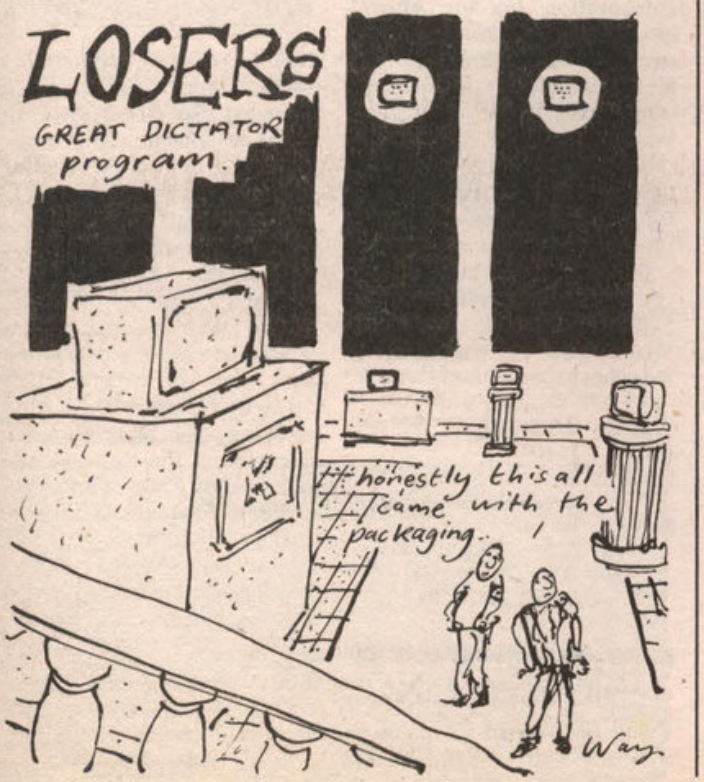
Nightflight from Salamander is one of the first Flight Simulation programs for the Dragon 32.

You are in command of a single-engined light aircraft. Once you have managed to take off, you can manipulate the controls to perform various sophisticated aerial manoeuvres like banks and rolls.

The ultimate challenge is to land the plane successfully using only the landing lights for guidance.

Program *Nightflight*
Price *£7.95*
Micro *Dragon 32*
Supplier *Salamander Software*
17 Norfolk Road
Brighton
East Sussex BN1 4AA

New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 19 Whitcomb Street, London WC2 7HF.



Ziggurat

Brave new world

"The unleashed power of the atom has changed everything save our modes of thinking, and thus we drift toward unparalleled catestrophes," thought Albert Einstein. I am not a member of CND, nor a supporter, but I do think that Einstein's pessimistic views are only too apposite.

I am not a unilateralist, but I do believe in a certain human dignity, a human dignity which seems to have become easily submerged in computing.

Recently I read a letter which complained about an advertisement from a group of "peace" programmers: the author of the letter said that, if he saw such an advertisement again, he would not read this magazine again — politics should play no part in computing. Apart from the fact that to be in favour of peace does not need to be party political — all are in favour of peace — to try to pretend that computing (and information technology) are of no political significance is to be simple-minded.

We cannot disguise from ourselves (or can we?) that computing occurs in the world, is a highly important aspect of that world, and is going to become more important. I suppose that, for those who do not wish to see, there is no relation whatsoever: the Japanese project to produce fifth generation computers, and the reluctance of both the UK and the USA to join them, is not at all political. But, as I said earlier, my interest is not really in people who fool themselves into thinking that politics and computing are unrelated: I wonder what effect computing has had, and is having, upon our dignity as humans.

Some of you may have seen the extremely worrying *Horizon* programme recently, about Artificial Intelligence and the promoters of AI in academia and elsewhere. I was very worried by the attitudes of these supporters; and I was left with the distinctly unpleasant feeling that a fair proportion of them were more in love with their machines than they were with humanity. To hear one highly influential professor, the future with computers would approach perfection, because the computers would provide answers to all our problems.

The machines would not allow us to be so silly as we have been in the past.

If for *machines* we substituted *master race*, it would sound rather silly, even rather extremist: perhaps deluded. Perhaps they are not the only ones who are deluded into forgetting common humanity.

During the Falklands conflict there appeared several repulsive programs; I seem to remember ones with the inspiring titles *Argie-Bargie* or *Bomb Buenos Aires*: titles which were an insult to common humanity. There can be no comparison between that rather good little game (often copied) *Bomber* or *Blitz*, which is not a concentrated expression of spleen, aimed to cash in on a cheap sensation. What self-respect can we have, if we purchase games in such bad taste?

" 'War Plan Alpha-5. This is not a drill.' You must fly through the stiff Russian defences — Mig fighters and surface-to-air missiles — to the target city, bomb it and return home." From: *B-1 Nuclear Bomber*, £11.95 on cassette, by Avalon Hill for Atari.

"Each year you must decide to allocate some resources into massive espionage efforts to locate enemy bases and industrial centres or concentrate effort into producing more engines of nuclear destruction. Victory is determined by population remaining and world political opinion." From: *Nukewar*, £11.95 on cassette, by Avalon Hill for Atari.

Whereas I have enjoyed playing many war-like games (eg, chess, battleships, noughts and crosses . . .), I feel there must be something wrong about the glorification of destruction embodied in some (highly over-priced) games. Compared to these games, even *Space Invaders* seem cuddly.

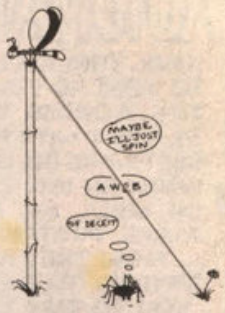
Most computer books, and most computer software, are — in my opinion — overpriced: when will people stop being mesmerised by the computer and when will *value* become a relevant criterion for computer add-ons? Value will become more important, and obnoxious games might not find a market, when people begin to see computers for what they are: very important, but no excuse to forget we are people. ■

Boris Allan

Puzzle

A tangled web

Puzzle No 56



Down at the bottom of the garden, Socrates the spider was looking for lunch. The object of his gastronomic attention was a tender young mayfly, who was dozing on top of a beanpole.

From where Socrates was standing, he could either cross the ground and then climb the beanpole, or he could go a distance of one foot to where a six foot length of cobweb was stretched tightly between the top of the pole and the ground, as in the illustration.

By an unerring instinct, Socrates knew that either way the distances were equal.

What is the height of the beanpole?

***Solution to Puzzle No 51**

The smallest number possible is:
10112359550561799752 80-
898876404494382022471 9

If you tried to solve the puzzle by testing numbers sequentially, then you will still have a long way to go!

The solution is found using long division mathematics, ie:

```
    1
9 ) 9XXXXX . . .
    9
    0X
```

The first *X* must be the first digit in the answer and the long division proceeds until the last number divided is 81; ie, 9 * 9.

The Basic program used is:

```
10 LET A = 9
20 LET N = INT (A/9)
30 PRINT N;
40 IF A = 81 THEN STOP
50 LET A = (A - N * 9) * 10 + N
60 GOTO 20
```

Winner of Puzzle No 51

The winner is: D Warner, Heath Farm Road, Ferndown, Dorset, who receives £10.

Top 10

Dragon

1	(1)	Donkey King	(Microdeal)
2	(5)	Pimania	(Automata)
3	(2)	Dragon Trek	(Salamander)
4	(3)	Champions	(Peaksoft)
5	(—)	Bonka	(Morrison)
6	(8)	Planet Invasion	(Microdeal)
7	(4)	Katerpillar Attack	(Microdeal)
8	(—)	Night Flight	(Salamander)
9	(—)	Star Jammer	(Salamander)
10	(—)	Ring of Darkness	(Wintersoft)

(Figures compiled by Dragon Dungeon, Ashbourne 0335 44626)

Spectrum

1	(7)	Spawn Of Evil	(DK'Tronics)
2	(6)	Assembler/Editor	(Picturesque)
3	(—)	Monitor	(Picturesque)*
4	(—)	M Coder	(PSS)*
5	(—)	Froggy	(DJL)
6	(4)	Knights Quest	(Phipps Associates)*
7	(6)	ETX	(Abbex)
8	(—)	The Hobbit	(Melbourne House)*
9	(5)	Black Crystal	(Carnel)*
10	(—)	Ship Of Doom	(Artic)*

*Requires 48K.

(Figures compiled by Buffer Micro Shop, London 01-769 2887)

Atari

1	(4)	Zaxxon	(Datasoft)
2	(2)	Miner2049er	(Big Five)*
3	(1)	Hellcat Ace	(Microprose)†
4	(—)	Zork 1	(Infocom)‡
5	(—)	Zork 3	(Infocom)‡
6	(5)	Astrochase	(First Star)†
7	(—)	Preppie	(Adventure International)
8	(—)	Pac-Man	(Atari)*
9	(—)	Pharaoh's Curse	(Synapse)†
10	(—)	Protector 2	(Synapse)†

*Cartridge. †32K cassette. ‡32K disc.

(Figures compiled by Calisto Computers, Birmingham 021-632 6458)

Vic20

1	Asteroids	(Bug-Byte)
2	Panic	(Bug-Byte)
3	Alien Blitz	(Audiogenic)
4	Arcadia	(Imagine)
5	Wacky Waiters	(Imagine)
6	Cosmiads	(Bug-Byte)
7	Introduction to Basic Part 1	(Commodore)
8	Amok	(Audiogenic)
9	Blitz	(Commodore)
10	Introduction to Basic Part 2	(Commodore)

(Figures compiled by Boots & Co, London)

BBC*

1	(1)	Rocket Raid	(Acornsoft)
2	(3)	Planetoid	(Acornsoft)
3	(5)	View	(Acornsoft)†
4	(—)	Snapper	(Acornsoft)
5	(—)	Monsters	(Acornsoft)
6	(4)	Wordwise	(Computer Concepts)†
7	(—)	Chess	(Computer Concepts)
8	(—)	Tree Of Knowledge	(Acornsoft)
9	(—)	Logo 2	(Computer Concepts)
10	(9)	Creative Graphics	(Acornsoft)

*All model B.

(Figures compiled by Micro Management, Ipswich 0473 59181)

ZX81*

1	(4)	Do Not Pass Go	(Workforce)
2	(6)	Black Crystal	(Carnel)
3	(8)	M Coder	(PSS)
4	(1)	Froggy	(DJL)
5	(5)	Krazy Kong	(PSS)
6	(—)	Maze Death Race	(PSS)
7	(—)	ZX Compiler	(Silversoft)
8	(—)	The Fast One	(Campbell Systems)
9	(—)	Cosmic Guerilla	(Quicksilva)
10	(3)	ZXAS Assembler	(Bug-Byte)

*All 16K.

(Figures compiled by Buffer Micro Shop, London 01-769 2887)

Books

1	(2)	Enter the Dragon, *Carter*	(Melbourne House)
2	(3)	Mastering the Vic20, *Jones*	(Sigma)
3	(6)	The BBC Micro — An Expert Guide, *James*	(Granada)
4	(1)	Spectrum Machine Language for the Absolute Beginner, *Tang*	(Melbourne House)
5	(9)	Spectrum Hardware Manual, *Dickens*	(Melbourne House)
6	(4)	Assembly Language Programming for the BBC Micro, *Birnbaum*	(Melbourne House)
7	(—)	Vic Programmer's Reference Guide, *Commodore*	(Commodore)
8	(10)	Programming the 6502, *Zaks*	(Sybex)
9	(—)	Compute!'s First Book of Vic, *various authors*	(Compute!)
10	(—)	6809 Assembly Language Programming, *Leventhal*	(Osbourne)

(Figures compiled by Watford Technical Books, Watford 0923 23324)

HE STORY SO FAR...

AUTOMATA UK LTD HAVE THREATENED TO SPREAD FUN & JOY ACROSS THE PLANET WITH THEIR SOFTWARE (ICE CREAM, WOOLLEN UNDIES.... OH, WELL, WE ALL MAKE MISTAKES) ... NOW THEY ARE TRYING TO GET YOU TO BUY THEIR STUFF WITH THESE CRUMMY COMIC STRIPS

WHAT A LOUSY JOB!

ONCE UPON A TIME (AND A MISERABLE TIME 'TWAS), COMPUTER GAMES WERE EXTREMELY VIOLENT, DESTRUCTIVE AND BORING

BLAT! ZOT FDNKS! MAIM! OINK BAFF BLOOP DONG SPLOSH BONK! ZZZ

THEN AUTOMATA CREATED PIMANIA

HOORAY! HALLELUJA!

THE CRITICS GO WILD! PIMANIA IS HAILED AS AN ALL-TIME CLASSIC!

AUTOMATA NOW REFUSES TO RELEASE ITS NEXT ADVENTURE GAME UNTIL IT EVOLVES TO PERFECTION!

BUT FEAR NOT!

AUTOMATA IS HAPPY TO RELEASE NOW ANOTHER

ALL-TIME CLASSIC

AUTOMONOPOLI ... WHICH UPHOLDS EVERY TRADITION OF THE ULTIMATE BOARD-GAME (WHOSE PATENTS HAVE NOW EXPIRED) — WITH ONE BIG DIFFERENCE.... AT LAST, YOUR COMPUTER CAN PLAY, TOO!!

AUTOMONOPOLI

DID SOMEONE MENTION MONEY?

PIMANIA? IS THIS A CLUE?

OH, BOY! WAIT TILL ZX HEARS ABOUT THIS!!

AND IF YOU CAN'T FIND ANY HUMANS TO PLAY AGAINST, WE DARE YOU TO PLAY YOUR SPECTRUM

BUT BEWARE...

IT MAY WELL WIN!!

FOR 48K ZX SPECTRUM (2 to 5 players)

- LARGE SIZE MOVING BOARD DISPLAY
- YOUR SPECTRUM AS 'HONEST BANKER'.
- STATE OF PLAY AT THE TOUCH OF A BUTTON
- SAVE-GAME FACILITY
- VALUE FOR MONEY
- YOUR SPECTRUM IS GIVEN A COOL, CUNNING PERSONALITY ..... CAN YOU BEAT IT?!

HEH HEH...

SNIP HERE → SNIP, SNIP!

PRIORITY ORDER FORM

PLEASE RUSH ME, BY RETURN OF POST, MY COPY OF "AUTOMONOPOLI" FOR MY 48K ZX SPECTRUM.

MY NAME: .....

MY ADDRESS .....

.....

..... POST CODE .....

I AM ENCLOSING £6 FOR "AUTOMATA UK LTD", 65, OSBORNE ROAD, PORTSMOUTH, HANTS, PO5 3LR

(DEALERS & OVERSEAS ENQUIRIES WELCOME. PRICE INCLUDES VAT, PACKAGING & POSTAGE WITHIN U.K.)

RISE TO THE CHALLENGE OF AUTOMONOPOLI FROM AUTOMATA. "WE PUT SOME TING IN COMPUTING!"