POPULAR Computing WEEKLY

35p 2 December 1982 Vol 1 No 33

## This Week

**Dragon software**
John Scriven reviews some of Dragon's latest cartridges and cassettes for the Dragon 32. See page 12.

**ZX81 spiral**
Simon Cross presents a machine code routine to print a character in a spiral from the edge of the screen to the centre on page 24.

**Spectrum unifile**
Week three in our series on building a unifile program for storing and managing data. See page 23.

**Database**
David Kelly talks to Tony Bastable about the making of Database — Thames TV's answer to The Computer Programme. See page 11.

**Spectrum Suntrap**
Can you protect your moon base from the Krugs? Find out in Mike Moscoff's new game for the 16K Spectrum. See page 8.

## News Desk

# Atari in new action

ATARI has continued its campaign against alleged infringements of its rights by taking legal action against Commodore in the US.

A preliminary injunction has been granted to Atari in a case involving possible infringement of patents held by the company. Atari filed suit in October, claiming that a joystick controller sold by Commodore in the US for use with the Vic20 computer competes unfairly and is a copy of an Atari design.

Atari won the injunction after a hearing before Federal judge Robert Owen, held in the southern district of New York. In so doing Atari has forced Commodore to stop manufacture and sale of the Vic20 add-on.

Commodore chairman, Irving Gould, commented "We sold a very small quantity of the joystick controller and discontinued its sales four months ago because it was not profitable."

No date has so far been fixed for a hearing of the full trial.



*Clive Sinclair, ready to review Timex contracts.*

# Timex strike over — but doubts remain

PRODUCTION of the ZX81 and ZX Spectrum microcomputers has been restarted at the Timex plant in Dundee, following an eight day strike.

About 3,500 of the factory's 4,000 employees, including all assembly-line and maintenance workers, had been on strike since November 10. They agreed to return to work on November 18.

The strike was called after the suspension of five men at the plant. With most of Sinclair's ZX81 and Spectrum micros being assembled in Dundee, the stoppage had serious implications for the company.

"The strike happened at a bad time for us," said a Sinclair spokesman. "We were confident that, in the short term, we had sufficient supplies, but it was very frustrating, given that we had only just been able to clear our

Continued on page 5


## Classified

**Computer Swap 01-930 3266**

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

**VIDEO GENIE 16K** level II Basic including Microsoft editor/assembler plus manuals and various books, assorted software and excellent 9in Green Screen Monitor, £275. Tel: 021 745 5684.

**ZX SPECTRUM 16K,** £120 ono. Tel: 01-668 2779 evenings only.

**SINCLAIR PRINTER** for sale complete with seven rolls of paper, £60. Tel: Halifax (0422) 244562 after 7 pm.

**ACORN ATOM,** 12K Ram plus 12K Floating Point Rom, PSU, Joysticks, three books, magazines and over 30 programs on cassettes. £160 ono. Tel: Maidstone 53748.

**VIC20,** cassette, 8K Ram pack, many books, 30 magazines plus Joystick, seven months old, £200. Tel: 903 0459.

**ZX81 1K VERSION,** one month old, still under guarantee, still in original box, excellent condition, unwanted gift, £40. Tel: 051-426 7650.

**CHRISTMAS SALE**
All ZX81-16K cassettes at ***HALF PRICE.***
Send SAE for full details
**AQUARIUS SOFTWARE**
**53 Towncourt Crescent Petts Wood, Kent BR5 1PH**

**48K CASED NASCOM II** Nassys Nasgra 8E proms cassette recorder, fan cooled, 8 amp PSU. Many manuals and games, £325 ono. Tel: (08444) 5088 evenings, 01-575 5757 ext 263 days: Mr Mawy.

**JUPITER ACE USERS GROUP**
Newsletter, software, advice on add-ons.
S.A.E. for details.
**Remsoft, 18 George Street, Brighton BN2 1RH**

**ATARI VCS,** very good condition complete with Combat and Space Invader cartridges, £75 ono. Tel: Longfield (04747) 6498 evenings.


Continued on page 28

BATTLESTAR IS COMING

# AMAZING LOW PRICES

**VIC20 £129.95 (Incl. VAT £149.95)**
**CBM64 £259.95 (Incl. VAT £299.95)**

The VIC20 represents great value for money. A truly expandable computer system. Ideal as a home micro with a large number of educational and games programs available. With additional memory expansion, it becomes suitable as a small business system ★ memory expansion to 32K ★ high resolution graphics ★ 16 screen colours and 8 border colours ★ plugs into your TV or monitor ★ add disk drive and printer for impressive small business system.

**CBM Software**

Adventure Games:
- Adventureland ..... 23.95
- Pirate Cove ..... 23.95
- Mission Impossible ..... 23.95
- The Count ..... 23.95
- Voodoo Castle ..... 23.95

Game Cartridges:
- Sargon 2 Chess ..... 23.95
- Omega Race ..... 23.95
- Avenger ..... 18.95
- Star Battle ..... 18.95
- Jelly Monsters ..... 18.95
- Super Lander ..... 18.95
- Road Race ..... 18.95
- Rat Race ..... 18.95

Game Cassettes:
- Blitz ..... 4.49
- Hoppit ..... 4.49
- Race ..... 4.49
- Strategic Advance ..... 4.49

Education Programs:
- 'O' level English ..... 9.49
- 'O' level Maths 1 ..... 9.49
- 'O' level Maths 2 ..... 9.49
- 'O' level Biology ..... 9.49
- 'O' level Chemistry ..... 9.49
- 'O' level Physics ..... 9.49
- Junior Maths (4-7yr) ..... 4.49
- Junior Maths (7-11yr) ..... 4.49

Home Programs:
- Quizmaster ..... 9.49
- Know Your IQ ..... 9.49
- Know Your Personality ..... 9.49
- Menu Planner ..... 9.49
- BBC Mastermind ..... 9.49
- Mastermind Data tapes ..... 1.99

**CANNIBAL — A FANTASTIC NEW GAME FOR ONY £4.50**

Note: Many more cassette and cartridges available — please ask for our complete list.

| | Price (Inc. VAT) |
|---|---|
| **SINCLAIR ZX81** | **£47.95** |
| LOWEST PRICE EVER! | |

**VIC Accessories**

| | |
|---|---|
| C2N Cassette | 39.95 |
| Printer | 209.95 |
| Floppy Disk Drive | 289.95 |
| 3K RAM Pack | 27.95 |
| 8K RAM Pack | 39.95 |
| 16K RAM Pack | 69.95 |
| Joystick | 6.75 |
| Paddles | 12.95 |
| Intro to Basic 1 | 13.95 |
| Intro to Basic 2 | 13.95 |

**VIC Books**

| | |
|---|---|
| Learn Prog. With VIC | 1.95 |
| VIC Revealed | 9.95 |
| Prog. Ref. Guide | 9.95 |
| Get Acquainted VIC | 5.95 |
| ZapPowBoom Arcade Games | 7.95 |
| VIC Innovative Comp | 6.95 |

**BUG BYTE Software**

| | |
|---|---|
| Asteroids | 6.50 |
| Cosmaids | 6.50 |
| Vic Gammon | 6.50 |
| Vic In The Wall | 6.50 |
| Vic Panic | 6.50 |
| Vic Chess | 6.50 |

| | Price (Inc. VAT) |
|---|---|
| **ZX81 Accessories** | |
| 16K RAM Pack | 29.95 |
| ZX Printer | 59.95 |
| Sanyo Recorder | 28.95 |

**RABBIT Software**

| | |
|---|---|
| Myriad | 9.49 |
| Frogger | 9.49 |
| Space Storm | 6.45 |
| Cosmic Battle | 4.45 |
| Rabbit Base | 14.49 |
| Rabbit Writer | 19.49 |
| Ski Run | 4.49 |
| Dune Buggy | 4.49 |
| Night Crawler | 9.49 |
| Space Freeks | 9.49 |
| Skramble | 9.49 |

**AUDIOGENIC Software**

| | |
|---|---|
| Alien Blitz | 7.50 |
| Amok | 6.50 |
| Golf | 7.50 |
| Boss | 13.95 |
| Bonzo | 7.50 |
| The Alien | 7.50 |
| Kosmic Kamikaze | 7.50 |
| Minikit | 7.50 |
| SeawolfBounceoutVictrap | 8.50 |
| Blockade | 6.50 |
| Tomb of Drewan | 11.95 |

Fast mail order service to anywhere in the UK. Pay by cheque or credit card or ask for credit terms (typical APR = 29.8%)

**Yorkshire Microcomputers Ltd.**
28 Ramshell Road,
Scarborough YO11 2Q
Telephone 0723-78136

# CAMPBELL SYSTEMS

The very best in machine code for
**Spectrum** and **ZX81**

**SPECTRUM 16K GULPMAN.** Game of the xxxMAN variety with 15 mazes, four chasers, laser defence, nine grades, nine speeds, demo mode, choice of joystick control. "An extraordinarily good program" raves Boris Allan for *Popular Computing Weekly*. We think you will agree. £5.95.

**SPECTRUM 48K MASTERFILE.** Business/domestic filing and reporting system. So flexible it is equally usable for your mailing lists, catalogues, stock control . . . applications are endless. Fully user-defined data and report display format, dynamic variable-length file, records, and data items. Menu-driven, with powerful search facilities, sorting, total/average, update, multiple independant files, printing. Yes, we aim to support Microdrive when Uncle delivers. Nearly all the 8K we use is machine code, so you get 32K per file. Comes with example file and 12-page manual. £15.00.

**SPECTRUM SPDE** Disassembler and Editor, fast self-relocating development tool. Shows all Z80 op codes and operands. £5.95. We used it to develop the above.

**ZX81 16K GULP II.** Almost identical spec to Gulpman. £4.75.

**ZX81 16K-64K.** THE FAST ONE is the predecessor to Masterfile and it's in use all over the world now. Specification very similar to Masterfile. £12.

All programs supplied double-recorded and mailed 1st class by return. Prices include VAT and postage within Europe. SAE for full list.

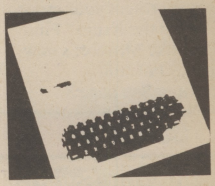
**CAMPBELL SYSTEMS**
**(Dept PCW)**
**15 Rous Road, Buckhurst Hill**
**Essex IG9 6BL, England**

# MICROTANIC
## COMPUTER SYSTEMS LTD.

## BOOKS SOFTWARE COMPUTERS

**ZX81** **BBC** **ATARI 400/800**

Interfaces available for the following computers which will enable you to use the Sinclair Printer with your computer. VIC, ACORN ATOM, BBC MICROTAN. Price £29.95 inc. VAT.



## DRAGON 32 GOES FORTH

We stock a large selection of software and books.

Please write or telephone for catalogue, stating relevant machine.

The FORTH language is NOW AVAILABLE on the DRAGON 32 — Create and run your programs up to 10 to 12 times faster than BASIC. AVAILABLE ON TAPE. £24.95 inc. VAT.

**MICROTAN 65** **VIC** **ACORN ATOM**

SHOWROOM:
16 Upland Road,
Dulwich, London SE22

MAIL ORDER:
235 Friern Road,
Dulwich, London SE22

**TELEPHONE: 01-693 1137**

POPULAR Computing WEEKLY

2 December 1982 Vol 1 No 33

## The Team

**Editor**
Brendon Gore

**News Editor**
David Kelly [01-930 3271]

**Sub-editor**
Ninette Sharp

**Editorial Secretary**
Theresa Lacy

**Advertisement Manager**
David Lake [01-839 2846]

**Advertisement Executive**
Alastair Macintosh [01-930 3840]

**Managing Editor**
Duncan Scot

**Publishing Director**
Jenny Ireland

*Popular Computing Weekly*,
Hobhouse Court, 19 Whitcomb Street,
London WC2
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 1982

**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
Timex strike ends.

**Letters** 7
Moody blues, cube rotation.

**Suntrap** 8
A new game for 16K Spectrum by Mike Moscoff.

**Street Life** 11
David Kelly talks to Tony Bastable of Database.



**Reviews** 12
John Scriven looks at the latest Dragon software.

**Open Forum** 14
Six pages of your programs.

**Spectrum** 23
Unifile — modules 3 and 4.

**Programming** 24
A spiral printing routine for the ZX81 by Simon Cross.

**Dragon** 26
Hex dump, spacecraft lander.

**Peek & poke** 27
Your questions answered.

**Competitions** 31
Puzzle, Ziggurat, Top sellers, Losers.

## Editorial

Micros and the disabled are, at first sight, an odd juxtaposition of man and machine. Why, after all, should someone who is mentally or physically handicapped, want to play Space Invaders?

Yet the link between micros and the disabled is not really so surprising. Microcomputers can enable the handicapped to forget about their disabilities for a while. In some cases, micros can even be used to help the disabled to overcome some of their limitations.

More importantly, perhaps, micros treat all their users the same. The colour of your skin, the number of your arms and legs, even your ability to speak, matters not to the micro.

Many of the problems suffered by the disabled are worsened by the attitudes of those around them. All too often, handicapped people are regarded as being mentally sub-normal simply because they are physically handicapped.

Most people, for example, on meeting a disabled person in a wheelchair will talk to whoever is pushing the chair, rather than to the person who is sitting in it.

It is a sad reflection on the world we live in that micros can seem more humane to the disabled than their human counterparts.

## Next Thursday

**Have you got what it takes to be an astronaut? Could you pilot a spacecraft through the solar wind? Find out in Lunar Lander — the definitive game for 16K Spectrum and 1K ZX81.**

**Also next week, a tape index program for the Vic20 by John Ingham and a survey of Atari software.**

## 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.

# NEWSOFT PRODUCTS

## 16K SOFTWARE FOR SINCLAIR ZX81 AND SPECTRUM

### 3D SPECTRAL MAZE

Fast action. 3D maze. Superb plot and draw routines. Make this specially commissioned program one that you must see.
SPECTRUM ONLY

### SECRET VALLEY

A complex role-playing adventure with great graphics and full sound effects!
ZX81 OR SPECTRUM

### TIME BANDITS

Two programs for the price of one! Side A has five fast action games. Practice them now before running Side B or you will not survive long in this magical adventure.
*"Perhaps the most original of the new graphic adventure games (Eric Deeson, Your Computer, November).*
ZX81 OR SPECTRUM

### THE GREAT WESTERN

Arcade Adventure in the Wild West. Shoot the Moose, hunt the gold or fight the Indians. You have to be fast to survive the journey.
ZX81 OR SPECTRUM

### ROULETTE

The Original Microcomputer Roulette. The only program to allow all legal bets within 16K. Excellent graphics. Can be used to test any system!
ZX81 OR SPECTRUM

### The Black Dwarfs Lair

An impossible chase through the underground tunnels of the Black Dwarfs Caverns. Virtually unbeatable. Try it if you dare.
SPECTRUM ONLY

Cassettes £4.95 each — £8.00 for any two.
Please specify which version required — ZX81 or Spectrum

**NEWSOFT PRODUCTS**
**12 WHITE BROOM ROAD, WARNERS END**
**HEMEL HEMPSTEAD, HERTS, HP1 3PU**

# GEMINI SOFTWARE

## ZX81 (16K) SPECTRUM (48K) STARTREK

Features an 8 x 8 Galaxy, Klingons and Starbases, short and long range scans, Torpedoes and Phasers, Computer etc.

PLUS Normal or Hyperdrive: choose your speed but watch the energy level.

Galaxy Map: keep track on where you have been. Also, shows whether any Klingons remain there, and where the starbases are.

Visual display of Enterprise's position and movement.

Visual display of photon torpedo.

Messages from crew members.

5 levels of play. And much more.

Cassette plus full instructions.

ZX81 £4.95
Spectrum £5.95 (colour and sound too)

Good software wanted.

**GEMINI SOFTWARE**
**36 BADMINTON ROAD, LEICESTER LE4 7RQ**
***TEL: (0533) 64915***

# NEED MORE ZX81 MEMORY?

**WHY WAIT** ANY LONGER, WHEN YOU CAN HAVE THE BEST 16K RAM PACK AVAILABLE **NOW** FROM GROUND CONTROL? Built to high-quality standards using a unique design of **custom moulded plastic case** and **gold-plated edge connector**, the RAM PACK clips on to the ZX81 tightly, ensuring no "wobble" or disconnection problems. A switchable **keyboard sounder** is available inside the case as an extra, enabling faster entry of programs from the keyboard and less eyestrain, due to the decreased amount of time necessary referring to the screen to verify data entry. The sounder operates in fast mode and gives a beep every time a key is pressed. The RAM PACK is memory mapped from 16384 to 32767, the same as the Sinclair 16K RAM.




**PRICES.** All inclusive for UK.

**16K RAMPACK (S) ..... £24.95**

**16K RAMPACK ..... £19.95**

European postage add £2. Others add £5. Mail order only. Please make cheques, etc, payable to GROUND CONTROL and send with orders to: Dept POC

Please send SAE or IRCs with any enquiries for the above or details of our 16K RAM and I.O. BOARD still available at £32 for kit version.

Same-day despatch for cash, P.O. or credit card orders, five days for cheques. **Access and Barclaycard** accepted.

Ground Control

**Ground Control**
**Alfreda Avenue**
**Hullbridge**
**Essex SS5 6LT**
**ENGLAND**

**Telephone No: 0702 230324. 10 am to 6 pm**

## Timex strike comes to an end

Continued from page 1

Spectrum order back-log."

Stocks of the ZX81 machines are probably quite substantial, since for some time production has exceeded UK demand, and a large proportion are exported.

Since the strike began, the only Spectrum microcomputers being manufactured have been those assembled by Thorn/EMI subsidiary, Datatech, at Feltham. Thorn/EMI began assembly in September as a second source to reduce the then lengthening delivery times on Spectrum orders.

Sinclair Research is currently investigating alternative manufacturing arrangements.

Clive Sinclair had commented that if the strike was prolonged then the Timex contracts would have to be reviewed.

A Sinclair spokesman said "We are currently involved in serious discussions with other manufacturers. It would obviously be a very major move to switch our production from Timex, but we also have to be prepared to act if necessary. We do regard the situation, resulting from circumstances completely beyond our control, as very serious."

Timex has two plants in Dundee. If Sinclair were to take their manufacturing contracts elsewhere there is concern that Timex would be forced to close one of its sites, leading to possible redundancies.

## Computer show

THE Which Computer? show is being held at the National Exhibition Centre, Birmingham, on January 18-21. Entrance costs £3 and is limited to over 18s only. For more information, telephone 01-747 3131.

## Prestel service to be expanded

BRITISH Telecom is to extend the areas of the country where its Prestel service can be received.

Work, to be completed by the start of 1984, will mean that 92 percent of telephone users will be within a local call of the Prestel scheme. At present only 62 percent can access the system at low cost.

## Lynx leaps into High Street

THE much awaited Lynx microcomputer is to go on sale in high street stores in the second week of December.

Camputers' micro will be stocked by Dixons, Laskys and Spectrum Computer Centres, following agreements reached last week. A large proportion of Dixons shops, about half Laskys outlets and all the 60 Spectrum Centres will be selling the Lynx.

Michael Stern, Chairman of the Spectrum Group, commented "Our technical people think it is a very fine machine at the right price. It is British made and it has got everything going for it."




The first batch of 3,000 machines is now being assembled and will be ready for testing by the end of November. Production is planned to continue at 3,500 units per month, but will be increased if demand for the micro is sufficient. The Lynx will sell for £225 including VAT.

## Stacking the deck for Vic

STACK Computer Services has produced a 40/80 column card for the Vic20 microcomputer.

It enables programs to be written and executed in either a 40 or 80 column format, while retaining the full Vic character set. The card is intended mainly for word processing applications and displays in black-and-white. Full editing, as on the standard Vic display, is possible with both upper and lower case characters, graphics symbols and reversed field.

Stack's Roger Parkinson explained: "The card contains a Rom sitting in the auto-start position so that, when you switch on your Vic, it overwrites the 22-column Vic screen and generates its own complete memory-mapped screen."

Because of the way the card has been designed the Stack 40/80 screen and the standard Vic screen are held in different areas of Ram. It is possible to program data to appear on either screen, although a second tv is required to view the 22-column Vic display. On the Stack screen it is possible, using simple key combinations, to switch between the 40 and 80 column display modes.



*Stack's 40/80 column card.*

The Stack 40/80 column card, which can be used with the unexpanded Vic and with most expansion options, is priced at £115 including VAT.

The add-on has been accorded official Commodore approval and will initially only be available to VicSoft members. It will be available for normal Commodore retailers from December 31.

## Thorn/Emi forms computer division

THORN/EMI has combined its information technology interests to form a single division to concentrate on computer services. Colin Southgate has been appointed as chief executive of the new IT division.

The company is expanding rapidly into the computer field, following its acquisition of Software Sciences and Datasolve from BOC earlier this year and the success of its Datatech subsidiary.

Within the last 10 weeks it has taken over some manufacturing and assembly work on the Sinclair ZX Spectrum and has also produced software for the Atari and Vic20 machines.

## New Acorn micro held back until '83

ACORN'S new Electron microcomputer will not now go on sale until next year.

"The company has, if you like, grown up" commented an Acorn spokesman. "The machine will not be offered for sale until we have built up substantial stocks. The Electron is ready apart from the ULAs and, as we have discovered in the past, the time that will take is anybody's guess."

Planned to sell for around £150, the new machine will feature a calculator type keyboard (similar to that on the Sinclair Spectrum), 32K Ram and graphics capabilities similar to Acorn's BBC Model B micro.

The Electron was originally scheduled for launch before Christmas.

## And then there were three

ORIC Products has announced that a third version of the Oric I microcomputer is to be produced.

A 32K model will now join the planned 16K and 48K versions. The machines, in order of memory size, will cost £99.95, £139.95 and £169.



## Possum's help for handicapped

ONE of three versions of the Spectrum microcomputer designed to help the physically disabled.

The machines have been developed, in collaboration with Sinclair Research, by Possum Controls, specialists in aids for the disabled. The Expanded Keyboard model (above), has been produced for people with gross movement or tremors.

Other versions use a light to scan a replica of the Spectrum keyboard to select keys.




COMPLETE your SPECTRUM with our Multi-purpose Sound Generator and Joystick-port Board!! With one low-cost purchase you can obtain the following outstanding improvements to your ZX SPECTRUM:

- THREE CHANNEL sound effects. PROGRAM three independent sounds with music, gun shots, explosions etc.
- AMPLIFICATION of the standard sound output.
- PROVISION of JOYSTICK PORTS to allow simple connection of one or two suitable joysticks (see below).

The 'ADD-ON' uses the amazing AY-3-8910 SOUND Chip, which gives you an enormous range of sound effects. The output and volume of each channel can be separately controlled, with gun shots, explosions, drums etc., produced under the 'sound envelope'. MOST IMPORTANT TO NOTE—the CHIP is 'processor independent.' This means that sounds can continue to be produced without any noticeable effect on the speed of your program!!

The 'ADD-ON' contains its own speaker and amplifier chip and is supplied with a cassette containing sound demonstration routines and some sample sounds.

The 'ADD-ON' simply plugs straight onto the back of your SPECTRUM. No soldering is required.

The 'ADD-ON' is offered at the incredibly low price of £19.50 + VAT.

**COMPLETE YOUR SPECTRUM NOW!!**

**JOYSTICK KITS £3.95 + VAT**
To complement our exciting new 'ADD-ON' for the SPECTRUM we are offering low-cost Joystick Kits. Each one contains a potentiometer-joystick, a fire-button and a suitable connector.

**NEW ORIGINAL SPECTRUM SOFTWARE**
—from PROGRAM POWER—using the 'ADD-ON' to great effect!!

**CABMAN** (Machine Code) £3.95 + VAT
You are the owner of a fleet of yellow taxis. A rival firm competes with you, trying to steal your fares and run you off the road, if they can. Ten skill levels determine the number of opposing taxis, the speed at which they drive and the amount you earn per completed journey. MAXIMISE your earnings before you lose your entire fleet. This program is FIRST CLASS.

**ATTENTION MACHINE CODE PROGRAMMERS!**
We can now offer SPECTRUM versions of the ASSEMBLER and DISASSEMBLER programs from ACS Software. The ZX81 versions have proved extremely popular.

ULTRAVIOLET (Assembler) ____ £6.95 + VAT
INFRARED (Disassembler) ____ £5.95 + VAT

**BOOKS**

SPECTRUM
Over the Spectrum ____ £6.95
Cambridge Colour Collection ____ £6.95

ZX81
Mastering Machine Code on your ZX81 ____ £7.50
NOT ONLY 30 Programs ____ £6.95
Getting Acquainted with your ZX81 ____ £5.95
49 Explosive Games for the ZX81 ____ £5.95
Making the most of your ZX81 ____ £5.95
Byteing Deeper into your ZX81 ____ £4.95
The Explorer's Guide to the ZX81 ____ £4.95

**BBC, DRAGON & ACORN DEALERS**

MICRO POWER
8/8a REGENT STREET, CHAPEL ALLERTON, LEEDS LS7 4PE
Tel: (0532) 683186

NOTE: We stock (and market) PROGRAM POWER SOFTWARE for the BBC, ACORN, SPECTRUM and DRAGON 32. Send S.A.E. for appropriate catalogue.

All programs are now available at all good dealers or direct from MICRO POWER LTD.

Please add 55p order P & P + VAT at 15%

VISA

**WRITTEN ANY PROGRAMS? WE PAY 20% ROYALTIES FOR DRAGON, SPECTRUM BBC, ATOM PROGRAMS**

POWER MICRO POWER PROGRAM POWER PROGRAM MICRO POWER PROGRAM POWER MICRO POWER PROGRAM
PROGRAM POWER



## THE BBC MICROCOMPUTER SPECIALISTS

VAT INCLUDED WHERE APPLICABLE IN ALL PRICES

### SOFTWARE FOR THE BBC MICRO

MISSILE CONTROL the first implementation on the BBC Micro of the popular arcade game (32K) ..... £9.00
MAZE MAN an authentic version of the popular arcade game (32K) £6.00
BALLOONS a highly original game that soon becomes compulsive playing (32K) ..... £6.00
DISASSEMBLER the memory dump routine includes a scrolling back in memory facility (16K) ..... £5.00

MISSILE CONTROL, MAZE MAN & BALLOONS use the Keyboard or Joysticks for control

### 30+ PROGRAMS FOR THE BBC MICROCOMPUTER

This Book contains program listings, with explanations and tips on using the BBC Micro
GAMES UTILITIES GRAPHICS & MUSIC
Most programs will run on Models A & B
Edited by C. J. Evans, various Authors.
A pair of cassettes with all the programs is available.

**BOOK £5.00** **BOOK & CASSETTE SET £9.00**

### CASSETTE LEADS for the BBC Micro

The BBC Micro comes with an incomplete cassette lead

7 Pin Din to 2 × 3.5mm & 1 × 2.5mm minijacks ..... £4.00
7 Pin Din to 5 Pin Din & 2.5mm minijack ..... £4.00
7 Pin Din to 7 Pin Din ..... £4.00
7 Pin Din PLUGS ..... Two for £0.65
6 Pin Din PLUGS (for RGB socket) ..... Two for £0.65
5 Pin Din PLUGS (360' for RS232) ..... Two for £0.65

RS423 TO RS423 (BBC Micro to BBC Micro)

Two metre cable ..... £4.00
Four metre cable ..... £6.00

### QUALITY DISK DRIVES

Single drive 140 track, single-sided
1X 100K ..... £200.00
Dual Drive, 40 track, single-sided 2X 100K ..... £350.00
Dual drive, 80 track, double-sided, 2X 400K ..... £799.25
All drives are cased with own P.S.U. for reliability, and include connecting cables and utilities disk. Delivery ..... £4.00

### TELEVISION/MONITOR LEADS

Phono plug to Co-ax with high quality cable 3 metres ..... £3.00
BNC Plug to Phono plug (i.e. BBC Micro to Rediffusion TVRM) ..... £2.20

### PRINTER CABLES

BBC to 36 way Centronics Type connector ..... £17.50
BBC to 25 way D Type (for use with RS232) ..... £9.50
BBC to 40 way edge connector (Centronics 739) ..... £20.00
TORCH to 36 way Centronics Type connector ..... £20.00

### Blank C30 Computer Cassettes

Ten for £4.00
Computer graphics design pads 100 sheets ..... £4.00

### BBC UPGRADE KITS

RAM UPGRADE (100ns) ..... £23.00
KIT A Printer & I/O Port ..... £9.50
KIT B Analogue Port ..... £8.00
KIT C Serial I/0 & RGB ..... £10.00
KIT D Expansion Bus/Tube ..... £7.50
Full Upgrade Kit ..... £58.00

All components full specification

### STAR DP8480 PRINTER From £250 inc VAT

80 CPS: 80/96/132 COLS
BIDIRECTIONAL LOGIC SEEKING
TRACTOR WITH FRICTION FEED

CENTRONICS ..... £217.39 + £32.61 VAT = £250.00
RS232 ..... £235.00 + £35.25 VAT = £270.25
High Res Graphics option to allow BBC Screen dumps ..... £15.00/£20.00
(23HR SECURICOR DELIVERY FOR PRINTERS £8.00)

VAT included where applicable
*Send SAE for full Price List*
*POSTAGE: Add 50p per order or as stated*

## C.J.E. Microcomputers

**Dept POW, 25 HENRY AVE, RUSTINGTON, W. SUSSEX BN16 2PA. (09062) 6647**

## Moody Blues instrumental

Clive Sinclair has really started to rub salt into the wounds with his new "Musical Answering Machine". Last week, I telephoned twice, the first time I was serenaded with "It's Impossible" and the second time it was "You Are The Sunshine Of My Life!"

All readers will now want to think up their own ideas for songs which they feel may sum up the true Sinclair. How about — "I Can't Get No Satisfaction"! Remember also "Yesterday Man?"

*G C Smith*
*94 South End Road*
*Rainham*
*Essex*

## Pie in the sky when you die

I have just read your editorial (November 4) and I couldn't agree with you more! I received my Spectrum on October 30 at 1.50 pm. On October 31 at 9.00 pm I was in the middle of programming it when the screen went blank and my Spectrum joined it's many brothers in the Great Computer Room in the sky.

So, after 17 weeks wait I had my Spectrum alive and working for less than two days. I know that things aren't meant to last these days, but incorporating a self-destruct mechanism that activates after a few hours is going a bit far, don't you think? Or has "Uncle Clive" been watching too many "Mission Impossible" videos.

Seriously though, as a programmer by trade I know computers have teething problems but this is turning into a farce and a very unfunny and painful one at that. It will take more than a free cassette and a voucher for ZX printer paper (as if I would ever trust Sinclair with my money again) to compensate me for the feeling of utter disappointment and then anger when my Spectrum died. Up until then I was very pleased with it and thought it almost worth the 17 weeks wait.

I suppose I will have to wait weeks for a replacement now. Still, it will make a nice new-year present for me.

*B J Lowry*
*63 Cavendish Crescent*
*Hornchurch*
*Essex*

## With a crack of the whip

While there is still time, I claim to have cracked the Sinclair micro-drive problem. One track spiral in like gramophone record.

*L Hewson*
*35 Haroldslea Drive*
*Horley*
*Surrey RH6 9DT*

## Angling into correct formulae

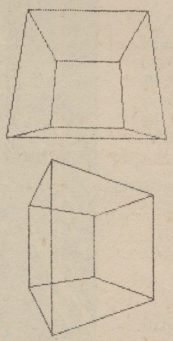
In your issue dated October 28, Andrew Esmond's formulae are incorrect. They only work for a rotation of 45° as sin 45° = cos 45°. Any other angle put through his formula gives some very obscure graphics. The correct formulae are:

$x = x \cos\theta - y \sin\theta$
$y = y \cos\theta + x \sin\theta$

Here is a program for the Spectrum which allows a cube to be rotated in three directions using *Inkeys:*
0 — around
7 — up
8 — right.

I have also improved the perspective so that there is a continuous decreasing in scale for any value of *z*. Variable *RO* is the angle through which the cube is rotated and *s* is its size. Deleting line 1010 can give some very interesting graphics.

*A Howes*
*23 The Hazels*
*Wigmore*
*Gillingham*
*Kent ME8 0SE*



```
  1 PAPER 0: INK 6: BORDER 2
  2 POKE 23609,50
 10 LET s=35
 12 LET ro=15/180*PI
 30 LET MX=256: LET MY=176
 40 LET CX=MX/2: LET CY=MY/2
 70 DIM X(8): DIM Y(8): DIM Z(8
 80 DIM A(8): DIM B(8)
100 LET M=8
140 LET X(1)=s: LET X(2)=s: LET
 X(3)=-s: LET X(4)=-s: LET Y(1)=
s: LET Y(2)=-s: LET Y(3)=-s: LET
 Y(4)=s
220 FOR F=1 TO 4
230 LET X(4+F)=X(F)
240 LET Y(4+F)=Y(F)
250 LET Z(F)=s
260 LET Z(F+4)=-s
270 NEXT F
300 GO SUB 1010
310 IF INKEY$="" THEN GO TO 310
320 IF INKEY$="0" THEN GO SUB 1
340: GO SUB 1010
330 IF INKEY$="7" THEN GO SUB 1
140: GO SUB 1010
340 IF INKEY$="8" THEN GO SUB 1
240: GO SUB 1010
400 GO TO 310
1010 CLS
1011 FOR F=1 TO 8
1020 LET sf=100/(Z(f)+100)
1040 LET X=X(F)*sF+CX
1050 LET Y=Y(F)*sF+CY
1060 IF (X>MX OR X<0) OR (Y>MY O
R Y<0) THEN GO TO 1090
1070 LET A(F)=X: LET B(F)=Y
1090 NEXT F
1095 GO SUB 2000
1096 RETURN
1140 FOR F=1 TO 8
1177 LET y=y(f)*COS ro-z(f)*SIN
 ro
1178 LET z=z(f)*COS ro+y(f)*SIN
 ro
1180 LET y(f)=y: LET z(f)=z
1190 NEXT F
1200 RETURN
1240 FOR F=1 TO 8
1277 LET x=x(f)*COS ro-z(f)*SIN
 ro
1278 LET z=z(f)*COS ro+x(f)*SIN
 ro
1280 LET x(f)=x: LET z(f)=z
1290 NEXT F
1310 RETURN
1340 FOR F=1 TO 8
1377 LET x=x(f)*COS ro-y(f)*SIN
 ro
1378 LET y=y(f)*COS ro+x(f)*SIN
 ro
1380 LET x(f)=x: LET y(f)=y
1390 NEXT F
1410 RETURN
2010 PLOT A(1),B(1)
2020 DRAU A(2)-A(1),B(2)-B(1)
2030 DRAU A(3)-A(2),B(3)-B(2)
2040 DRAU A(4)-A(3),B(4)-B(3)
2050 DRAU A(1)-A(4),B(1)-B(4)
2060 PLOT A(5),B(5)
2070 DRAU A(6)-A(5),B(6)-B(5)
2080 DRAU A(7)-A(6),B(7)-B(6)
2090 DRAU A(8)-A(7),B(8)-B(7)
2100 DRAU A(5)-A(8),B(5)-B(8)
2110 PLOT A(5),B(5)
2120 DRAU A(1)-A(5),B(1)-B(5)
2130 PLOT A(6),B(6)
2140 DRAU A(2)-A(6),B(2)-B(6)
2150 PLOT A(7),B(7)
2160 DRAU A(3)-A(7),B(3)-B(7)
2170 PLOT A(8),B(8)
2180 DRAU A(4)-A(8),B(4)-B(8)
3000 RETURN
9000 FOR f=1 TO 8: PRINT x(f),y(
f): NEXT f
```

## Programming for real uses

At last somebody has put into words my thoughts on computers in the home. I am, of course, referring to your editorial of October 14. You say that we are uncertain of how computers can be used in industry, commerce and the home. Well, computers are being used increasingly for real applications in industry and commerce. But few, if any, computers are being used in the home for anything but games machines. This must be better than using "dedicated" games machines, such as Atari and Intellivision, as the users of home computers will also get experience of programming.

The number of really useful programs for the home computer owner can probably be counted on the fingers of one hand. I exclude from the term 'useful', the numerous home accounts and telephone index programs, which are really a poor substitute for pencil and paper.

However, in the very same issue, you published two excellent utility programs for the Spectrum. But, you awarded the "program of the week" accolade to yet another game.

It is up to somebody such as *Popular Computing Weekly*, as one of the most widely, and certainly the most frequently read of all home computer magazines to invite your readership to submit ideas and programs for real uses in the home. Hopefully, this will stimulate more thought and invention in this field, thus really bringing us into the computer age, by making it a tool and not a toy.

PS. Thank God Citizen Pain has gone, but I have noticed lately that A.R.T.H.U.R. is getting rather boring. . . .

*A Maclure*
*5 Kynaston Place*
*The Grove*
*Witham*
*Essex CM8 2UA*

**Our sentiments exactly, though do not forget that games can be fun.**

**We are always on the lookout for real applications for home micros, as well as for games.**

**So, if you have an excellent utilities program, or a novel application, now's your chance to send it in.**

# Suntrap

**A new game for 16K Spectrum**
**by Mike Moscoff**

YOU control a laser station, protecting a moon base from the dreaded Krugs. The Krugs, traditionally evil, have vowed to wipe out all Yoomans.

When run, the program displays brief instructions. Reply 0 or 1 to the query about difficulty level required. Wait one minute while variables are assigned and the screen is drawn.

The game starts with a bleep. Use keys 5, 6, 7 and 8 to move your sights (left, down, up and right). Use keys 0 or 1 to fire. The game ends when all your power is gone.

How it works:

| | |
|---|---|
| 900-990 | Displays the instructions. |
| 700-790 | Sets up all variables, and defines special characters. |
| 800-890 | Draws the screen. |
| 70 | Prints the score. |
| 100-140 | Moves your sights. |
| 150-190 | Fires yours laser. |
| 200-220 | Explodes alien if hit. |
| 300-340 | Moves the alien. |
| 343 | Fires the alien laser. |
| 360-390 | Sets up a new alien. |
| 600-690 | End of game routine. |

To test the program, first enter lines 30, 35, 45-220, 700-790, 870-890, and Run. This should define all variables, print score, move your sights (keys 5-8), and fire the laser (keys 0,1). Then add lines 40, 300-385. The alien should move randomly from left to right and hits should be registered. Finally, add lines 20, 600-690, 800-850, 900-985.

**Enhancements**

The speed can be improved slightly by:
(1) Deleting all Rem statements.
(2) Deleting *Beeps* in lines 130, 160, 175, 330 and 343.
(3) Deleting all the fancy visuals.
(4) Using machine code.

The end routine (lines 600-690) could be improved by adding:

```
620  LET r$="" : LET r$= ('try harder' AND
     sc<200) + ('well done' AND sc>199
     AND sc<400) + ('excellent' AND
     sc>399)
630  PRINT AT 12,12 ; r$
```

Also, a 'High score' could be added:

```
975  LET hi=0
635  IF sc > hi THEN LET hi = sc : PRINT AT
     14,12 ; 'HIGH SCORE!' ; AT 15,16 ; hi
```

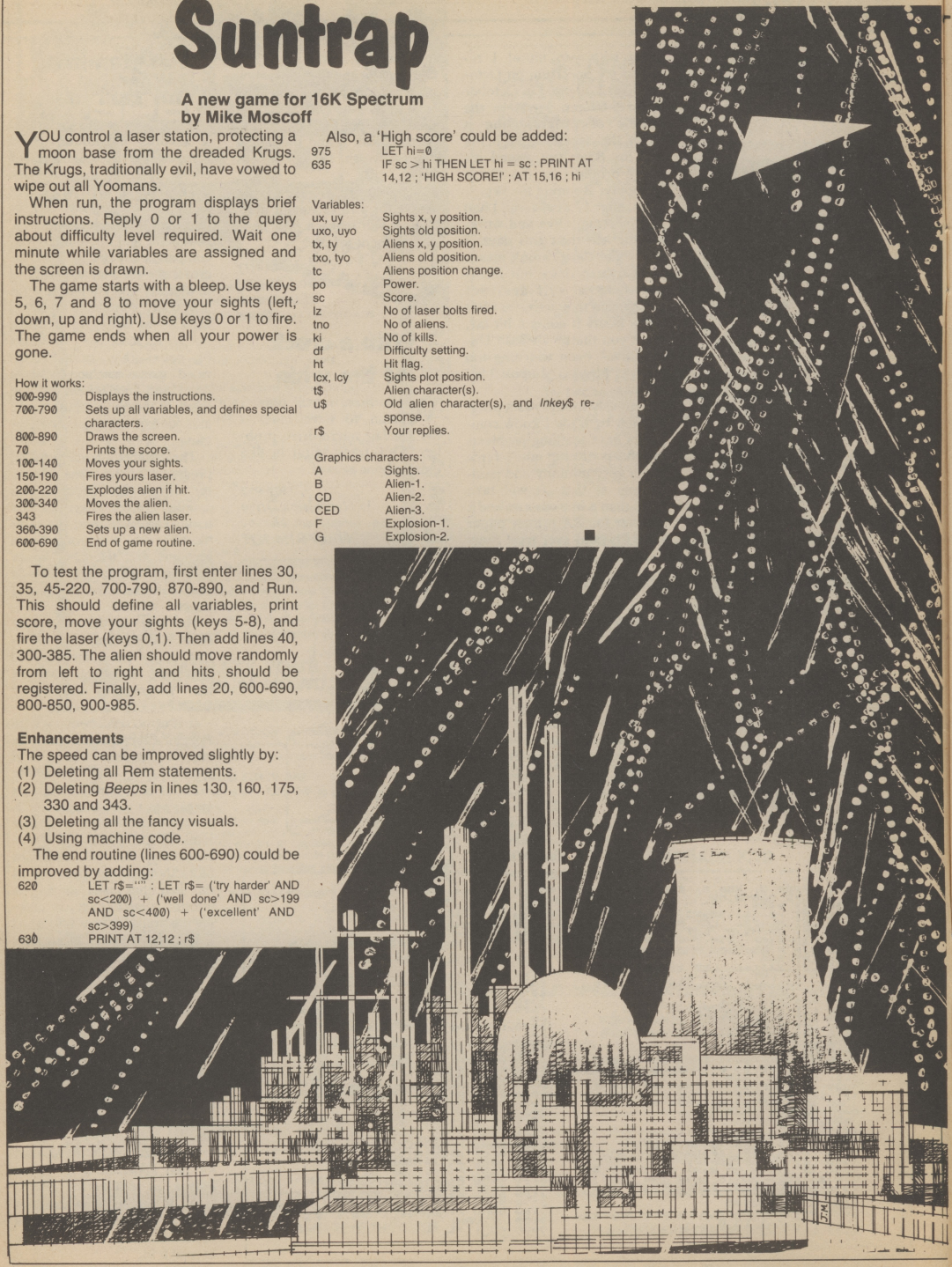
Variables:

| | |
|---|---|
| ux, uy | Sights x, y position. |
| uxo, uyo | Sights old position. |
| tx, ty | Aliens x, y position. |
| txo, tyo | Aliens old position. |
| tc | Aliens position change. |
| po | Power. |
| sc | Score. |
| lz | No of laser bolts fired. |
| tno | No of aliens. |
| ki | No of kills. |
| df | Difficulty setting. |
| ht | Hit flag. |
| lcx, lcy | Sights plot position. |
| t$ | Alien character(s). |
| u$ | Old alien character(s), and *Inkey$* response. |
| r$ | Your replies. |

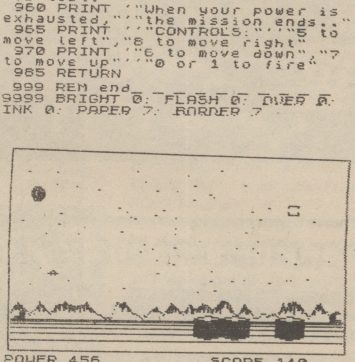
Graphics characters:

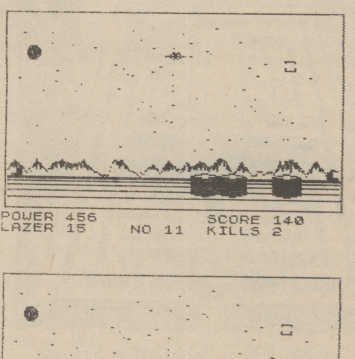
| | |
|---|---|
| A | Sights. |
| B | Alien-1. |
| CD | Alien-2. |
| CED | Alien-3. |
| F | Explosion-1. |
| G | Explosion-2. |

■



```
  9 REM SUNTRAP.3 M.Moscoff ---
 20 GO SUB 900: REM info
 30 GO SUB 700: REM set vars
 35 GO SUB 800: REM draw screen
 40 GO SUB 300: REM t move
 45 GO SUB 100: REM u move
 50 IF ht<>1 THEN GO SUB 100
 69 REM score ----------------
 70 PRINT INK 5; OVER 0;AT 19,6
;po;" ";AT 19,25;sc;AT 20,6;lz;A
T 20,15;tno;AT 20,25;ki
 80 IF po<0 THEN GO TO 600
 90 GO TO 40
 99 REM u move ---------------
100 LET uxo=ux: LET uyo=uy
101 LET u$=INKEY$
105 IF u$="" THEN RETURN
106 IF u$="0" OR u$="1" THEN GO
TO 150
107 IF u$<"5" OR u$>"8" THEN RE
TURN
110 LET ux=ux+(u$="8" AND ux<29
)-(u$="5" AND ux>2)
120 LET uy=uy+(u$="6" AND uy<13
)-(u$="7" AND uy>2)
125 IF ux=uxo AND uy=uyo THEN R
ETURN
128 REM graf AB
130 PRINT INK 7;AT uyo,uxo;"□";
INK 6;AT uy,ux;"□": LET po=po-1
: BEEP .005,20-uy: RETURN
149 REM u fire ---------------
150 INK 5: LET po=po-10
155 LET lz=lz+1: LET lcx=ux*8+4
: LET lcy=(22-uy)*8+4
160 FOR n=1 TO 2: BEEP .04,6: B
EEP .02,12: PLOT 8,56: DRAW lcx-
8,lcy-56: PLOT 247,56: DRAW lcx-
247,lcy-56: INK 7: NEXT n
169 REM graf G
175 INK 6: FOR n=1 TO 2: PRINT
AT uy,ux-1;"※": BEEP .03,24: I
NK 7: NEXT n
180 IF NOT (uy=ty AND ux)=tx-df
AND ux<tx+df+LEN t$) THEN INK 5
: RETURN
199 REM hit -----------------
200 OVER 1: LET ht=0: LET ki=ki
+1: LET sc=sc+100-LEN t$*10
209 REM graf F GF F
210 FOR n=1 TO 4: PRINT AT uy-1
,ux-1;"\※/";AT uy,ux-1;"※※";AT
uy+1,ux-1;"/※\": BEEP .1,36: BEE
P .05,6: INK 7: NEXT n: LET ht=3
220 RETURN
299 REM they move ------------
300 IF ht=1 THEN GO TO 360
302 LET tyo=ty: LET txo=tx
305 LET u$=t$: LET tx=tx+1
310 IF ty>=12 THEN LET tc=-1
311 IF ty<=4 THEN LET tc=1
312 LET ty=ty+tc+(INT (RND*2) A
ND ty<14)-(INT (RND*2) AND ty>3)
314 REM graf B CD CED
315 LET t$="": LET t$=("▲" AND
tx<9)+("▲" AND tx>=9 AND tx<18)
+("▲" AND tx>=18)
330 PRINT INK 4;AT tyo,txo;u$;A
T ty,tx;t$: BEEP .2,-12
339 REM they fire ------------
343 IF ty>6 AND RND<.7 AND ((tx
>12 AND tx<21) OR tx=24) THEN IN
K 2: FOR m=1 TO 2: FOR n=-1 TO 2
: PLOT tx*8+12,175-(ty*8)-12: DR
AW n*3,-40: BEEP .003,30: NEXT n
: INK 7: PRINT INK 6;AT 21,0;"INNER LOCK": LET po=po-9: NEXT m
355 IF tx<=27 THEN RETURN
359 REM new t ----------------
360 PRINT INK 7;AT ty,tx;t$: LE
T tno=tno+1: LET tx=2: LET ty=7+
INT (RND*6): LET tc=1: LET ht=0
375 LET t$="▲"
380 PRINT INK 4;AT ty,tx;t$
385 RETURN
599 REM end of game ----------
600 FOR n=0 TO 74: INK n/10: BE
EP .06,n-50: PRINT AT 10,8;"- MI
SSION ENDED -": NEXT n
640 FOR n=0 TO 74: BORDER 7-n/1
0: BEEP .05,n-20: NEXT n
650 INPUT INK 6;TAB 6;"ANOTHER
MISSION? ";u$
685 IF u$="n" THEN GO TO 9999
690 RESTORE : GO TO 50
699 REM set initial vars -----
700 INPUT INK 2;"Difficulty?: 0
(hard) or 1 ";r$: IF r$<>"0" THE
N LET r$="1"
705 LET df=VAL r$
710 LET ux=10: LET uy=10
715 LET uxo=ux: LET uyo=uy
720 LET tx=4: LET ty=2: LET txo
=tx: LET tyo=ty: LET tc=1
730 LET po=999: LET sc=0: LET k
i=0: LET lz=0: LET ht=0
740 LET t$="▲": LET tno=1
750 FOR n=USR "a" TO USR "g"+7
760 READ d: POKE n,d: NEXT n
770 RETURN
780 DATA 255,129,0,0,0,129,129,
255,0,0,0,24,36,255,36,0
786 DATA 0,0,2,7,9,255,9,2,0,0
32,224,144,255,144,64,112,32,210
,255,126,255,126,1,189
790 DATA 16,56,16,8,230,0,20,18
,149,86,40,251,62,20,74,145
799 REM draw screen ----------
800 BORDER 0: PAPER 0: INK 7
805 OVER 0: CLS
810 PLOT 3,26: DRAW 247,0: DRAW
0,144: DRAW -247,0: DRAW 0,-144
811 LET gy=54: LET gc=6
812 FOR n=1 TO 6: PLOT 5,gy
813 DRAW 243,0: LET gc=gc-1: LE
T gy=gy+gc: NEXT n
815 FOR n=1 TO 70: INK 2+RND*6:
PLOT 10+RND*230,70+RND*90: DRAW
RND,0: NEXT n: INK 7
820 LET gc=1: LET gy=54
821 FOR n=5 TO 247: LET gy=gy+g
c+INT (RND*3)-1: PLOT n,gy: DRAW
0,-(RND*(gy-55) AND gy<154)
822 IF RND<.1 THEN LET gc=-gc
823 IF gy>61 THEN LET gc=-INT (
RND*2.5)
824 IF gy<54 THEN LET gc=INT (R
ND*2.5)
826 NEXT n
828 PRINT INK 5;AT 15,1;"▟";AT
15,30;"▙"
830 FOR m=0 TO 60 STEP 20
832 IF m=40 THEN NEXT m
834 FOR n=38 TO 51: PLOT 140+m,
n: DRAW 20,0,.7: NEXT n: DRAW -2
0,0,.7: NEXT m
850 FOR n=1 TO 5: CIRCLE INK 4;
23,140,n: NEXT n: OVER 1
860 REM graf AB
870 PRINT INK 6;AT uy,ux;"□"
880 PRINT AT ty,tx;"▲"
885 PRINT AT 19,0;"POWER";AT 19
,19;"SCORE";AT 20,0;"LAZER";AT
20,12;"NO";AT 20,19;"KILLS"
890 BEEP 1,9: RETURN
899 REM info -----------------
900 BORDER 7: PAPER 7: INK 0
905 OVER 0: CLS
910 PRINT AT 0,10;"- SUNTRAP -"
915 PRINT '''"You control a laz
er station""protecting a moon b
ase from""the dreaded KRUGS"
930 INPUT "More...";r$: CLS
950 PRINT "You use up your limi
ted amount""of POWER, firing th
e laser,""and moving the tracki
ng sights."
955 PRINT '''The base is shielde
d by an""energy field.""This a
lso takes power to sustain""eve
ry time the base is hit,""power
is lost."
960 PRINT '"When your power is
exhausted,""the mission ends."
965 PRINT '"CONTROLS:""'"5 to
move left","6 to move right"
970 PRINT '"6 to move down", "7
to move up""'"0 or 1 to fire"
985 RETURN
999 REM end
9999 BRIGHT 0: FLASH 0: OVER 0:
INK 0: PAPER 7: BORDER 7
```



5th ZX MICROFAIR

AUTOMATA Ltd. (P)
65a Osborne Road
Portsmouth PO5 3LR
England

# PIMANIA

THE ADVENTURE GAME THAT'S FOR REAL ! £6,000 PRIZE!

Will you be the first to locate the Golden Sundial of Pi in time and space, and be rewarded with the original? Exquisitely crafted by the winner of the De Beers Diamond International Award, from gold, diamond and the most precious of the earth's riches.

PIMANIA ... where saxophones turn into hanglders, where music meets madness, and where the Pi-Man rules supreme! He'll talk with you, he'll befriend you, he'll betray you, he'll even do the Hokey Kokey! Animated cartoon graphics! Full musical score! Spectacular colour and sound effects! Includes free hit single "Pimania", with vocals by Clair Sinclive and the Pi Men!

It could take you a week to play, it could take you a lifetime! PIMANIA, the best evidence that computer gaming has come of age ... an adventure enthusiast's dream! (Computer & Video Games)

An investment at £10 (48K Spectrum) £8 (16K ZX 81)






*SPECTRUM MONITOR
*SPECTRUM EDITOR/ ASSEMBLER
*ZX81 SCREEN KIT 1
*ZX81 ZX-MC *ZX81 REMLOAD

FAST MAIL ORDER-SEND TODAY!

**SPECTRUM MONITOR. Machine Code Debug/Disassembler**
• Enter, Run, Debug machine code programs • Compatible with Basic • Breakpoints and Registers Display • Disassembly to screen and/or ZX Printer • 16K and 48K versions on one cassette + 30 page manual. **£7.50**

**SPECTRUM EDITOR/ASSEMBLER. A powerful and essential machine code programming aid.**
16K & 48K on same cassette with full documentation. Major features include:
EDITOR with Auto Line Numbering: 40 Column screen display, tabulated into fields for easy reading: 5 character Label Names: simple Line Editing and Cursor Control: SAVE/LOAD Text Buffer to cassette: output to ZX PRINTER.
TWO-PASS ASSEMBLER accepts all Z80 mnemonics (plus many unpublished mnemonics): Decimal or Hex numbers: simple arithmetic on operands: Assembler Directives — ORG, END, DEFB, DEFW, DEFS, DEFL, EQU, DEFM.
WE CANNOT FULLY DESCRIBE THIS IMPORTANT UTILITY HERE AND ASK YOU TO SEND A S.A.E. FOR COMPLETE DETAILS OF THIS AND ALL OUR PROGRAMS **£8.50**

**ZX81 SCREEN KIT 1. More power to your screen in all your Basic programs**
BORDERS any size, anywhere on screen, SCROLL in all 4 directions, CLEAR and REVERSE PART OF SCREEN, FLASHING CURSOR anywhere on screen — simulates INPUT. DATA FILES SAVE AND LOAD Basic variables. Double Speed. 880 bytes machine code for INSTANT RESPONSE. Becomes part of Basic Program. **£5.70** 4K to 64K

**ZX81 ZX-MC. Machine Code Debug/Monitor**
• ENTER, RUN, DEBUG machine code programs • SAVE, LOAD, VERIFY at double speed • BREAKPOINTS and REGISTERS DISPLAY • Self contained — cannot be used with Basic • Cassette plus 36 page manual. **£7.50** 4K to 64K

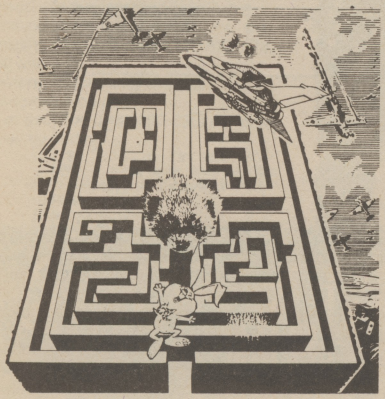
**ZX81 REMLOAD. Machine Code Debug/Monitor**
• A version of ZX-MC without the Save/Load/Verify facility • Compatible with Basic • CREATE A REM LINE of any length • BREAKPOINTS and REGISTERS DISPLAY • Cassette plus 30 page manual **£6.95** 16K to 64K

**SEND S.A.E. NOW FOR DETAILS**
**6 Corkscrew Hill, West Wickham, Kent BR4 9BB.**
Prices include VAT & P&P

PICTURESQUE PICTURESQUE PICTURESQUE PICTURESQUE

## SPECTRUM ARCADE PACK

CITY BOMBER, POLECAT, BREAKOUT, SUBHUNT, CRAZY RACE, FRUIT MACHINE, MISSILE COMMANDER, AND LUNAR LANDING **£5.00**



8 Brilliant Games for only £5.00, incl. p&p

Available now in good computer shops, and mail order from

**ARCADE AGE**
**184 Market Street, Hyde, Cheshire**

# Salamander Software

Software from the south

● **FOR THE DRAGON 32**

**STAR TREK.** A full version of this classic game in realtime. Features Faerie Queen, hyperprobe, tractor beams, time travel and more! Includes 16-page flight manual and requires only one joystick. ..... **£6.95***

**WIZARD WAR.** The mighty mages of the Tri-Suns strive for supremacy in a fearsome battle of skill and strategy! Joystick required ..... **£6.95**

**VULCAN NOUGHTS AND CROSSES.** Pit your wits against the Dragon or your friends in this three-dimensional game of logic! Also features zero player option. ..... **£6.95**

**GAMES COMPENDIUM D1.** A selection of games for all the family, including Blackjack, Donkey-Derby, Kingdom, Lunar-Lander and Hunt the Wumpus! **£6.95**

● **FOR THE BBC MODEL B**

**DRAGON RIDER.** Can you destroy the enemies from the sky before your fiery steed runs out of puff!.... **£6.95**

**TANKS!** Variable wind and terrain make this exciting two-player game a challenge for everyone!..... **£6.95**

Cheques or postal orders payable to
Salamander Software
27 Ditchling Rise
Brighton, East Sussex BN1 4QL
Tel: 0273 686454

Discount for bulk orders and retail: send SAE for catalogue

PLEASE ADD 50p P&P TO ALL ORDERS

* SPECIAL INTRODUCTION OFFER

Programmers wanted: good royalties paid!

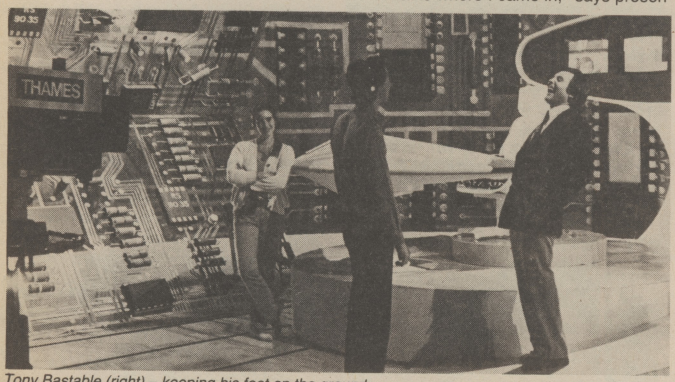
# Television micro vision—tomorrow's world today

***David Kelly** visits Thames TV to watch an episode of Database being recorded.*

"Stand by studio . . . we're going for a take on Items 1 to 4 . . . can we have a clock? . . . stand by VT . . . 30 seconds . . . roll VT . . . 10, 9, 8, 7 . . ."

In the studio control room six pairs of eyes are fixed on the array of monitors. At three, the Academy leader is replaced by blank screens. At zero two of them brighten to show the Thames Television signature and at minus five another episode of the six-part computer programme Database begins.

Each Monday finds the production team in Studio 3 in Teddington where the video-tape links are recorded which join the show together. Database is a magazine-type programme, presented by Tony Bastable. Dealing very much in current affairs for computer enthusiasts, the individual items in each programme are put together at the last minute, at the same time as the week's computer news section is recorded. The first part to record is the 'tasters'. These form a short résumé of each programme's content — shown before the main title — to grab the viewer's attention.




*Tony Bastable (right) – keeping his feet on the ground.*

Database goes out at 11.30 pm on Tuesday evenings on Thames (it is not networked nationally as yet) and at that time of night you really have to catch your audience.

Designed to grab you in this episode were: "Just how intelligent is a computer? Could it replace the doctor with faster and more accurate diagnoses? Do you need to master a computer language to use the huge amount of information it can store? We report on the clergyman who uses *Space Invader*-type games to teach the bible. And if you use the mix facility on your Teletext-equipped television you'll be able to superimpose new pages of information available on Thames' new Oracle service which starts today."

The idea for the programme came from Mike Feldman — Database Associate Producer. "I first had the idea for a sort of Computer Club two years ago. Microcomputers were a growth area and I thought about a series aimed at the home programmer. That idea never happened, but instead we made a short series for children's television called "Living in the Future." I had an Apple at home which I bought for fun and my kids loved it. I based the series on their reactions.

"About this time Thames perceived the need to be active in information technology and proposed the Database series.

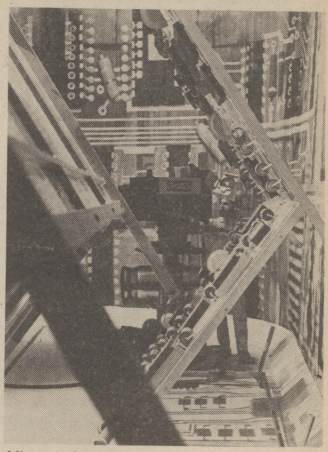
"We were given six half-hour slots," he says. "A great deal of research went in to find out what sort of programme was needed — and we came up with two possible formats. We could have a series dealing generally with computers and with applications and problems arising from them. Or we could have a straightforward programme about how to learn Basic.

"We opted for the former — and chose a magazine format to keep the show lively.

"That is where I came in," says presenter Tony Bastable. "My expertise is in the arrangement of magazine programmes.

"Each episode has a central theme — the first was on cable tv, the one we are doing now is on artificial intelligence. Apart from that the whole series has a central philosophy: that it is not for us to come to terms with the computer, but for the computer to come to terms with us! We aim to demystify the computer, and ask some important questions like: Do we need them? What will they do? And do we need what they do?

"I started off — coming from Thames' motoring programme Wheelbase — with a major advantage: total ignorance," grins Tony. "I ask the sort of obvious questions that the experts assume people know.



*Micros in focus.*

When I first started work on the series I thought 'Why not explain how it works — like you can a carburettor on a car? How does the signal get from A here to the micrcochip B over there?' It was then I discovered it wasn't that easy. Not only could very few people using microcomputers begin to say how they worked — but they didn't care! You put A in here and B comes out there, what goes on in the middle is a complete mystery, but it doesn't matter.

"The important thing, I think, is never to let your feet leave the ground. To never get carried away with the wonders of science and lose sight of the everyday practicality of things. When we went to that dreadful computer controlled house in Milton Keynes it had a tv screen on which you could leave messages. I wrote on it 'Gone to lunch' and pointed out that you could just as well use a pen and paper. If something isn't very good we have said so, but everybody gets a fair crack of the whip.

"One of the things we decided when we started was that we would only consider today's world. Database is a *current* affairs technology programme.

"It has been a long hard slog for us to get Database put on," says Mike Feldman. "Both our series and the BBC's Computer Programme have suffered from scheduling at strange times — the difficulty is to prove that such a programme can attract an audience.

"I hope we have managed to produce a show that is enjoyable to watch. It is difficult to judge audience reaction but the reviews have been favourable and our ratings are going up. We have established that information technology can be both interesting and good television.

"The most important thing to have come out of our series has been the next one. We have been given the go-ahead to do 12 programmes next year.

"What we want," says Mike, "is one programme per month, networked nationally, at 7.00 peak viewing time — but we will have to wait and see!" ■

# Dragon quest

***John Scriven** breathes fire into some of Dragon's latest software.*

Since its appearance in the summer, sales of the Dragon have soared. The reasons why are fairly clear! — it offers 32K Ram, colour, sound, the latest Microsoft Basic and most importantly, it is available at hundreds of retail outlets up and down the country. Along with the machine, Dragon Data has released a wide range of software that is available from the same retailers.

It was not until many months after the ZX81 appeared that Sinclair produced his own software. "Official" Spectrum programs are only just coming on to the market. Acorn also waited for some time before producing BBC software. In this respect, Dragon Data has learned from the experience of previous manufacturers and has attempted to get an early foothold in an important market.

The programs can be divided into two groups, cartridges and cassettes. The cartridges slot neatly into the side of the Dragon and are running within seconds, each time, every time, so are ideal for instant games. They do, however, appear to be rather expensive at £19-£25, although this is a feature shared with Vic and Atari cartridges.

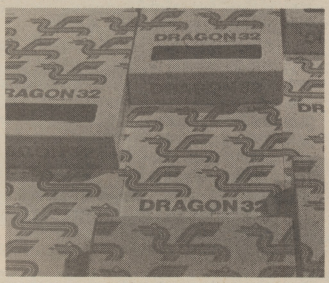
Most of the cartridges contain two single-rail Eproms in a well-constructed box that small fingers will not be able to pry apart and do not wobble when inserted like certain infamous Ram-packs. In defence of the price, it must be admitted that were you to design your own pcb, burn Eproms, etc, then the hardware alone would probably be in excess of £10. You get what you pay for, and in this case it is reliability, ease of loading, and no fiddly leads and cassette levels.

The cartridges are all arcade-type games and several need joysticks to play. *Meteoroids* is a version of *Asteroids*, with one or two advantages over similar games. Firstly, the skill level is selectable (0-15) as is the number of joysticks employed. Secondly, the movement of your spacecraft tends more towards Newton's laws of motion than most variants, which makes the game more difficult — it is easy at higher skill levels to be sent flying off the screen at an uncontrollable speed.

The object of the game is to destroy as many meteoroids as possible before being zapped yourself by deadly flying saucers. Individual and best scores are shown in a league table. My one small criticism is that the display is in black and white (or buff as Dragon Data calls it). It's a pity the game could not have been written in a different mode utilising a wider colour range. At least it does not use the rather emetic green that is the default colour when you switch on.

*Cosmic Invaders* is the standard *Invaders* arcade game that I will not bore you with by describing. (Can there still be people left in the country who don't know the game?) I presume Dragon Data felt their patrons would feel left out if they did not include it in their catalogue, but this is hardly a sparkling version and is not too difficult to master.

*Starship Chameleon* can be played by one or two players and involves destroying enemy rockets by colliding your own craft with them. The interesting difference is that some craft are made of matter and some of anti-matter. If you do not select the correct status of your ship (using the




"fire" button on the joystick) you will explode. Matter/anti-matter states are shown by blue/yellow colour changes.

Red missiles that are "smart", ie home in on you, add to the challenge of the game. Skill levels from 1 to 9 may be selected and scores are shown on screen. My criticism of this game is that the background colour is green and the scores do not show up as well as they might.

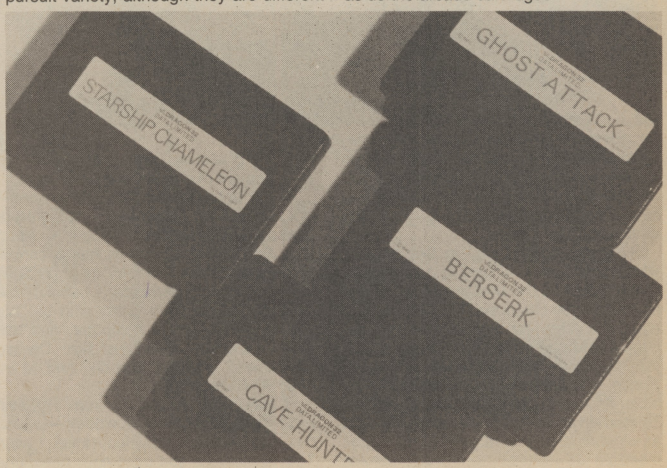
There are two cartridges of the maze-pursuit variety, although they are different enough from the original to avoid threats of legal action flying to South Wales from America.

*Cave Hunters* presents you with a cave maze, always the same, with four bars of gold at the base. The bold cave hunter has to collect them one at a time and deposit them outside the cave. It is not as simple as this, however. Lurking in the cave are creatures who eat you up after pursuing you through the caverns, unless you've just passed over a power pack, when you can for a few seconds destroy them. This game is entertaining and more difficult than it at first appears.

*Ghost Attack* is a rather more familiar game of gobbling up proton pills in a maze while avoiding the attentions of three ghosts (unless you've recently passed over an "energiser"). There are three levels of difficulty, "easy", "hard", and "tuff", and it's certainly fun to play, but you may wonder as I did, if it is indeed worth £5 more than the other cartridges.

*Berserk,* the last cartridge, is based on a popular arcade game that does not often appear in a version for home computers. Again, it is a shame that the Dragon palette is so limited in high-resolution modes that it only appears in black and white. You control a small man in a series of large inter-connecting rooms. Robots inhabit the maze and you have to destroy them while avoiding their lasers and the electrified walls. As you move off the edge of the screen, another series of rooms appears. There is also the complication of "Evil Orville", a smiling bouncing ball who cannot be destroyed. This cartridge is great fun and the graphics are very good.

There are eight cassettes available. They cover home finance, utility packages, adventure and general games. The first, *Special Selection 1,* contains four games that are designed to tax brain and memory power, rather than hand/eye co-ordination as do the arcade cartridges.




*Some of the cartridges from Dragon Data's software range.*

*Brain* chooses two characters from the keyboard and awards or removes points as a clue to how close you are to success. "This will make your brain ache" states the screen — a reasonably accurate statement until you begin to work out strategies. *Four* is a version of *Connect Four,* played by two players on a large grid — in fact a larger version of noughts and crosses. A reasonable game, but rather simple graphics.

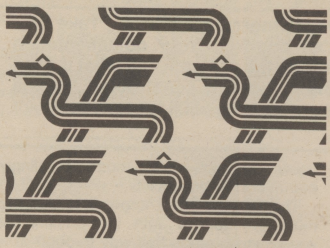
*Horse* is hardly educational, unless you need to be shown the foolishness of allowing animals to control your cash-flow. Up to nine players can bet on their choice and the computer uses pretty graphics to show the race in full colour. *Simon* is the familiar sound/memory game that increases in difficulty by giving you more and more notes to recall in the correct order. Coloured dragons act as an aide memoire.

As a cassette, *Special Selection 1* offers good value, containing four reasonable games. The notes state "look in the listings to get ideas for your own programs and also find how to program for particular effects". It is a pleasant surprise to find games software being put to instructional use and increases the value of the cassette enormously.

*Examples from the Manual* is just what it says — 50 or so small demonstration programs. It seems to rather defeat the object of learning by working through the manual, but if you hate typing then you may find some use for this cassette.

*Graphic Animator* uses joysticks to draw designs on the screen and load them into the page memory. The pages can then be flicked through at a chosen rate to give a cartoon effect. The idea is superb but the joysticks are hypersensitive and the drawing routine so fast that the results are not as clear as would be wished, even with practice and a steady hand. As it is written in machine code, it is not possible to alter from the keyboard so I hope that Dragon Data will rewrite this program as the idea is worth developing. At present, however, this cassette does not represent such good value.

*Personal Finance* is a home money management package consisting of three programs. *Family Budget* uses Dragon's




cassette filing capability to keep track of incomes, standing orders, etc, and allows you to follow the state of your balance. It is more useful than relying on your bank. My manager always waits until the eleventh month before informing me how overdrawn my budget account is!

*Family Accounts* uses one data file to handle up to 20 accounts. This program, although necessarily limited, does demonstrate the possible future use of the Dragon in small business applications, particularly when the larger memory becomes available.

*Family Address* also uses a single data file to hold up to 80 names, addresses and phone numbers. The program finds names swiftly and if you cannot spell, will patiently go through all the entries starting with a particular letter. The business potential is again demonstrated, but it did occur to me that it was still a lot quicker to look up numbers in my address book. All three programs are menu-driven and the cassette is good value.

*Special Selection 2* also uses the file-handling system in a couple of programs, *Database* and *Dragon.* Another program, *Index,* shows how two files can be manipulated. *Dragon* is a rather weak version of *Hangman,* but does show how different words may be loaded separately which would be a useful facility in an educational situation.

The best program on the cassette, however, is *Music.* This prints out a stave and allows you to enter notes, play them, alter their time and pitch values and even store them as data on a tape to be incorporated in your own programs. Another tape that is good value for money.

*Computavoice* is quite an amazing tape. When I first acquired a Dragon, I was disappointed with the sound — it is not as steady and pure as the amplified Spectrum sound and can in no way compete with the sophisticated BBC facilities. I therefore viewed this cassette with some suspicion.

A machine code routine contains the working section and can be incorporated in your own programs to sneer at inferior games players or encourage children using learning packages. There is a demonstration program in Basic that will speak the numbers one to nine as you press the relevant keys. The quality cannot approach the standard of specialist hardware like Mutek's Voxbox or any of the Texas speech synthesisers, but at less than £8, if offers excellent value.

It also teaches the principles of phonemic voice production. In other words, it is no good typing in "FIVE" as a speech string, or you get something like "FEVEH". If you enter "F<16EV" then it is almost recognisable. As with all Dragon software, the documentation is excellent and the tape is easier to use than may appear from the above.

I have left the two adventure programs until last as I have to admit to being an addict to this sort of program. *Quest* contains elements of *Kingdom* as well as *Adventure.* You start off with 10 men, an assortment of equipment and the objective of storming Moorlock's Citadel.

A map of your progress appears and reveals ruins, caves and castles, as well as gangs of soldiers, wizards, pilgrims and ogres, as the game progresses. You can be friendly towards these groups, run away or fight them. This is the way to increase the size of your army until it is sufficiently large to attack the Citadel. Various pieces of equipment can be acquired in this way, or by haggling for them in several cities you can visit. I will say no more — this game is very entertaining and is likely to prove a favourite longer than many of the arcade games.

*Madness and the Minotaur* is a purely textual adventure (ie no graphics). The object is to explore a labyrinth, collecting treasures and avoiding monsters by using spells and objects you may encounter on the way. It is well thought out, rather difficult and, as with *Quest,* it is the sort of software that needs a Government Health Warning on the side. If you can cope with the prospect of struggling through the tunnels until 3 am, then you will certainly enjoy this cassette. My one criticism is that you cannot *Save* the game during play, so it's necessary to start from the beginning each time.

That concludes the first dip into the Dragon's lair. Many more software houses are starting to produce programs for this machine. Apart from a few minor points, Dragon Data has set a high standard for the others to follow. ■

| Cartridges | Joystick | Cost* | Value (1-10) |
|---|---|---|---|
| *Berserk* | Y | £19.95 | 8 |
| *Meteoroids* | N | £19.95 | 7 |
| *Cosmic Invaders* | N | £19.95 | 6 |
| *Ghost Attack* | Y | £24.95 | 7 |
| *Cave Hunter* | Y | £19.95 | 8 |
| *Starship Chameleon* | Y | £19.95 | 7 |
| **Cassettes** | | | |
| *Dragon Special Selection 1* | | £7.95 | 8 |
| *Dragon Special Selection 2* | | £7.95 | 9 |
| *Quest* | | £7.95 | 9 |
| *Madness and the Minataur* | | £7.95 | 8 |
| *Graphic Animator* | | £7.95 | 5 |
| *Computavoice* | | £7.95 | 9 |
| *Examples from manual* | | £7.95 | 5 |
| *Personal Finance* | | £7.95 | 9 |

*Cassettes usually these prices — Cartridges available at up to 10 per cent discount at some outlets.

**_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.**

## Colour Graphics

### on Vic 20

Multicolour graphics is a function which has not really been explored to the full on the Vic20 computer. Since this function is easily accessible, I decided to write a program to demonstrate it.

My program is one of moods. It begins with a gentle mixture of red and white on a plush, red background. The feeling here is one of calm and tranquility. This is swiftly followed by a profusion of much stronger colour, in multi-colour mode, startlingly beautiful in its complexity.

The flashing effect appears to become more pronounced with the addition of sound which starts half-way through at a fairly low pitch and builds up into a crescendo, ending in a resounding crash. Of course, there is no actual difference in the power of the swiftly-changing graphics, despite the illusion, but the effect on the viewer is one of exciting expectancy.

After this mind-blowing interval the mood once again reverts to the sudden calmness of slowly-changing colours. This signifies the end of the program, but my inclusion of a _Goto_ enables the program to re-run itself automatically.

An escape may be engineered by depressing any key during the colour sequence on the green background. This brings about a crashing sound and the program is at an end.

### Program notes

| Line(s) | |
|---|---|
| 100 to 140 | Set up sound registers |
| 150 | Print title |
| 151 | Set up Graphics Mode |
| 152 to 153 | Set up foreground/background colours and multi-colour Mode |
| 220 | Choose random colour for the square. |
| 310 | Provide user with an escape from the program |
| 490 to 600 | Define Graphics characters |
| 1000 to 1050 | Choose Graphics characters to be displayed |
| 2050 to 2500 | Subroutine to place characters or colours on to screen |
| 4000 to 4010 | Crash subroutine |

```
100 POKE36874,0
110 POKE36875,0
120 POKE36876,0
130 POKE36877,0
140 POKE36878,0
150 POKE36879,42:PRINT"■■■** VIC KALEIDOSCOPE **■":FORI=1TO2000:NEXT:PRINT"□"
151 POKE36869,255:GOSUB490:GOSUB1000
152 POKE36879,29
153 POKE646,10
180 Z=38400:Q=Z+21
190 E=Z+484:R=Z+505
200 FORJ=0TO10
210 FORI=0TO12
220 X=INT(RND(1)*8+INT(RND(1)*8+1))
230 GOSUB2050
310 GETA$:IFA$<>""THEN350
320 NEXT
330 FORK=1TO200:NEXT
335 NEXT:POKE36878,15:FORI=0TO240:POKE36879,I
340 FORJ=0TO125:NEXT:POKE36876,I:GOSUB3000:POKE36875,I:POKE36874,I:POKE36877,I
350 NEXT:GOSUB4000:POKE36879,29:PRINT"■";:POKE36879,27
360 POKE36869,240:END
490 POKE56,28:POKE52,28:RESTORE:FORI=0TO39:READA:POKE7168+I,A:NEXT
500 DATA0,0,0,0,0,0,0,0
510 DATA240,240,240,240,15,15,15,15
520 DATA255,129,189,165,165,189,129,255
530 DATA255,61,61,61,61,61,61,255
540 DATA170,170,170,170,170,170,170,170
550 FORI=7208TO7215:POKEI,INT(RND(1)*255+1):NEXT
600 RETURN
1000 Z=7680:Q=7680+21
1010 E=7680+484:R=7680+505
1020 FORJ=0TO10
1030 FORI=0TO12
1040 X=INT(RND(1)*5+1)
1050 GOSUB2050:NEXT:NEXT:RETURN
2050 POKEZ+J*23+I,X
2060 POKEQ+J*21-I,X
2070 POKEZ+J*23+I*22,X
2080 POKEQ+J*21+I*22,X
2090 POKEE-J*21+I,X
2100 POKER-J*23-I,X
2110 POKEE-J*21-I*22,X
2120 POKER-J*23-I*22,X
2500 RETURN
3000 POKE36878,INT(I/15):RETURN
4000 POKE36874,0:POKE36875,0:POKE36876,0
4001 POKE36879,29:POKE36877,200:FORI=
     15TO0STEP-.1:POKE36878,I:FORJ=0TO20:
     NEXT:NEXT
4010 POKE36877,0:RETURN
```

**Colour Graphics**
*by William Stenning*

## Asteroids

### on BBC Micro

This game for the A and B model BBC computer system runs in MODE 5 with full colour, sound and user definable graphics. The day's high score and your score are displayed after each game.

Full instructions are enclosed in the listing. The game uses VDU5 with fast-moving graphic action. High scores, so far, range in the 3000s. The game is addictive (according to my class mates).

The general idea of the game is to collect as many aliens as possible and to deposit them in their yellow bases. Collision with the red asteroids ends the game. This listing works perfectly and will provide a challenge to other readers.

```
  5 H%=0:S%=0
 10 GOTO550
 20 ENVELOPE1,1,-5,5,-5,20,20,20,50,-25,0,-20,100,60
 30 MODE5:A=500:SC=0:VDU19,3,2;0;
 40 VDU23,255,248,252,255,127,63,60,60,60
 50 VDU23,254,60,63,126,255,127,63,62,60
 60 VDU23,253,60,124,126,127,255,254,63,60
 70 VDU23,250,24,24,60,60,126,126,66,66
 80 VDU23,240,60,126,219,255,255,66,126,60
 90 VDU23,241,63,127,255,255,255,255,127,63
100 VDU23,242,252,254,255,255,255,255,254,252
110 G=0:PROCSHIP
120 VDU4
130 COLOUR1:PRINTTAB(RND(20),1);CHR$(RND(3)+252)
140 IFRND(1)>.9THENPROCMAKE
150 IFRND(1)>.95THENPROCMAKED
160 VDU30:VDU11
170 VDU5
180 A$=INKEY$(0)
190 IFA$="Z"ANDA>50THENA=A-48
200 IFA$="M"ANDA<1150THENA=A+48
210 *FX11,1
220 *FX15,0
230 SOUND1,1,100+(SC*5),100
240 IFPOINT(A+32,20B)=1THENPROCDESTROY
250 IFPOINT(A+32,20B)=2THENPROCDROP
260 IFPOINT(A+32,20B)=3THENPROCALIEN
270 G=2:PROCSHIP:S%=S%+1
280 GOTO110
290 DEFPROCSHIP
300 GCOL0,G:MOVEA,200:PRINTCHR$(250)
310 IFSC>0THENMOVEA,144:PRINTCHR$(240)
320 ENDPROC
330 DEFPROCDESTROY
340 VDU4
350 FORA=1TO15:SOUND0,1,A*2,A:NEXT
360 *FX11,0
370 PRINTTAB(10,10);S%
380 *FX15,0
383 IFS%>H%THENH%=S%
390 G$=GET$:GOTO550
400 ENDPROC
410 DEFPROCMAKE
420 COLOUR3:PRINTTAB(RND(20),1);CHR$(240)
430 ENDPROC
440 DEFPROCMAKED
450 COLOUR2:PRINTTAB(RND(18),1);CHR$(241);CHR$(242)
460 ENDPROC
470 DEFPROCALIEN
480 S%=S%+10
490 SC=SC+1
500 ENDPROC
510 DEFPROCDROP
520 S%=S%+(SC*10)
530 SC=0
540 ENDPROC
550 CLS:CLEAR
555 MODE7
560 PRINTTAB(12,2);CHR$(129);CHR$(141);"SALVAGE"
565PRINTTAB(12,3);CHR$(129);CHR$(141);"SALVAGE"
570 PRINTTAB(11,4);CHR$(129);"_____"
580 PRINTTAB(2,6);CHR$(130);"The idea of the game is to collect as"
590 PRINTTAB(1,7);CHR$(130);"many aliens as possible and take them"
600 PRINTTAB(1,8);CHR$(130);"back to thier yellow bases.The only"
610 PRINTTAB(1,9);CHR$(130);"problem is, that if you hit the"
620 PRINTTAB(1,10);CHR$(130);"asteroids, you blow up."
630 PRINTTAB(12,12);CHR$(133);CHR$(136);"[Z MJ"
640 PRINTTAB(10,14);CHR$(134);"HIGH SCORE ";H%
650 PRINTTAB(10,16);CHR$(134);"YOUR SCORE ";S%
660 PRINTTAB(6,20);CHR$(131);CHR$(136);"Press any key to start."
665 S%=0
670 G$=GET$:GOTO20
```

**Asteroids**
*by Duncan Worrell*

## Bin/dec

### on ZX81

This program will convert decimal numbers into binary numbers and vice versa. You are told which letter to enter for the function you need. After you have made your choice the screen is cleared and the program continues with the function you wish.

What the function does is displayed at the top of the screen. Then the number you want is calculated and printed. The program then pauses. Pressing any key will re-run the program.

### Program notes for decimal to binary

60 to 70 reserve space for A$ and B$.
80 waits until a number is input.
90 lets X = your input number so that at line 170, Y is your original number.
100 halves your number.
110 to 115 check the remainder of the result of line 100 and allocates the correct binary digit to A$.
120 removes the remainder after the division in 100.
130 checks to see if the number has been converted to binary.
140 to 160 lets B$=A$ but in reverse to get the correct binary number.
170 prints the decimal number and its equivalent in binary.

### Program notes for binary to decimal

200 waits for you to input your binary number.
210 the decimal counter is set to zero.
220 sets up a loop counter as long as the binary number you have input.
230 searches for the digit '1' in your binary number If it finds one it increases the D counter by its equivalent decimal value.
240 continues this until each digit has been checked.
250 prints its equivalent decimal number.

```
10 PRINT "INPUT D FOR DEC. TO BIN."
20 PRINT "INPUT B FOR BIN. TO DEC."
30 INPUT C$
40 CLS
50 IF C$="B" THEN GOTO 190
55 PRINT "CONVERSION FROM DEC. TO BIN."
60 LET A$=""
70 LET B$=""
80 INPUT Y
90 LET X=Y
100 LET X=X/2
110 IF INT X<>X THEN LET A$=A$+"1"
115 IF INT X=X THEN LET A$=A$+"0"
120 LET X=INT X
130 IF X<>0 THEN GOTO 100
140 FOR A=1 TO LEN A$
150 LET B$=A$(A)+B$
160 NEXT A
170 PRINT Y;"=";B$
180 GOTO 260
190 PRINT "CONVERSION FROM BIN. TO DEC."
200 INPUT A$
210 LET D=0
220 FOR A=1 TO LEN A$
230 IF A$(A)="1" THEN LET D=D+2**(LEN A$-A)
240 NEXT A
250 PRINT A$;"=";D
260 PAUSE 4E4
270 CLS
280 RUN
```

**Bin/dec**
*Anonymous*

# JWV SOFTWARE

**Dept. Specs, 139 Allington Drive, Strood, Kent**

## SPECTRUM SOFTWARE

READ THE REVIEWS
THEN ORDER QUICKLY FOR CHRISTMAS

**STARTREK** — Simply great — 8 x 8 x 8 galaxy **£7.50**
Up to 5 Klingons per quadrant. Real-time Stardates. Klingon Mothership. Terrific graphics and much, much more. 'The ideal game' *PCW* 18/10/82.

**SUB-STRIKE** — 48K of M/C **£7.50**
One bit at a time scroll. Forward and aft torpedos and mines. Avoid fish, octopus, galleons, bombs. Get through the air-locks. Super game.

**FOUR IN A ROW — £5.00**
Nice way to pass the time and improve your mind. Play a friend or Spectrum. Now even better value for money. Free Othello on reverse.

**GREEN WARRIOR**
Can you find your way through the scrolling maze? If you can, try a larger maze. Up to 400 x 32+.

**FREE LISTING OF A SCREEN $ THAT WORKS FOR GRAPHICS!*

P&P included in price for British Isles, else please add £1.00 to order.
*All games have short logo display at start of tape for volume setting.

5th ZX MICROFAIR
DEC WED 8th
NEW HORTICULTURAL HALL, LONDON SW1

***SEE YOU AT STAND 163***

# BEEB BITS

**Orders to:**
**CLARES,**
**222 Townsfields Road,**
**Winsford,**
**Cheshire CW7 4AX.**

FROM

# CLARES

**CASSETTE LEADS** : DIN TO DIN and REMOTE **£2.50**
DIN TO 3 JACKS **£2.50**

**MONITOR LEADS** : BNC TO PHONO **£2.95**
PHONO TO PHONO **£1.50**

ALL LEADS ARE TOP QUALITY AND CARRY AN UNCONDITIONAL GUARANTEE.

**SOFTWARE "GRAFSTIK"** : A SUPERB PROGRAM FOR USE WITH JOYSTICKS. ALLOWS LINES, RECTANGLES, TRIANGLES AND CIRCLES TO BE PLOTTED IN UP TO EIGHT COLOURS. SIMPLY PLOT A START AND END POINT AND THE PROGRAM DOES THE REST. (TRIANGLES NEED THREE POINTS.) THE PICTURE IS STORED IN AN ARRAY AND CAN BE SAVED TO TAPE FOR LATER USE.

**"JOYSTICK GRAPHICS"** : IS SIMILAR TO GRAFSTIK BUT ONLY USES LINE MODE. THIS ALLOWS MORE CONTROL OF THE LINES, SCREEN, SCALE AND ARRAY.

**"JOYSTICK PACK ONE"** : (FREE WITH BEEBSTICK) CONTAINS TWO PROGRAMS, "ZAP" and "SKETCH". "ZAP" IS A REAL TIME SPACE GAME REQUIRING ACCURACY AND SPEED. "SKETCH" IS AN ETCH-A-SKETCH WITH SOME UNUSUAL FEATURES COURTESY OF THE BBC.
ALL SOFTWARE AN INCREDIBLE **£5.75 PER TAPE**

**BEEBSTICK** : AS REVIEWED IN THE NOVEMBER ISSUE OF "BEEBUG" **£29.95**

**PRICES ARE INCLUSIVE OF VAT AND CARRIAGE — NO EXTRAS**

# ABERSOFT

**7 MAESAFALLEN, BOW ST, DYFED, SY24 5BA**

## ZX81 & Spectrum Games

**Chess 1.4:** Ten levels m/c graphic screen display.
***16K ZX81 £8.95***

**Invaders:** Very fast m/c action. Includes mystery ship and increasingly difficult screens.
***16K ZX81 £4.45***

**Mazeman:** A fast action m/c game that reproduces the spirit of the original. The Spectrum version includes excellent graphics.
***16K ZX81 £4.45 – Spectrum £4.95***
Can also be used with AGF joystick.

**Adventure 1:** Based on the original game by Crowther, this game was the start of the Adventure craze. Reviewed Sinclair User, issue 2. Features Save game routine as the game can literally take months to complete.
***16K ZX81 £8.95 – 48K Spectrum £9.95***

See us at the 5th ZX Microfair.

We have full stock of all programs and supply by return of post (which is included in the price)

# BOND SYSTEMS

## FOR SPECTRUM 16K and 48K

The SPECTRUM computer can be used to play games. It can also be used to improve your abilities. Our programs play games which improve your abilities.

**VOCAB FRENCH** AND **VOCAB GERMAN** provide you with a vocabulary of the really useful 700 words, the most commonly used words, derived from word frequency lists; the most frequently used words at the beginning. Find out how much you already know, and how easy it is to put unknown words into your "memory".

| | | |
|---|---|---|
| VOCAB FRENCH | SPECTRUM | £5.00 |
| VOCAB GERMAN | SPECTRUM | £5.00 |

(Spanish and Italian in preparation)

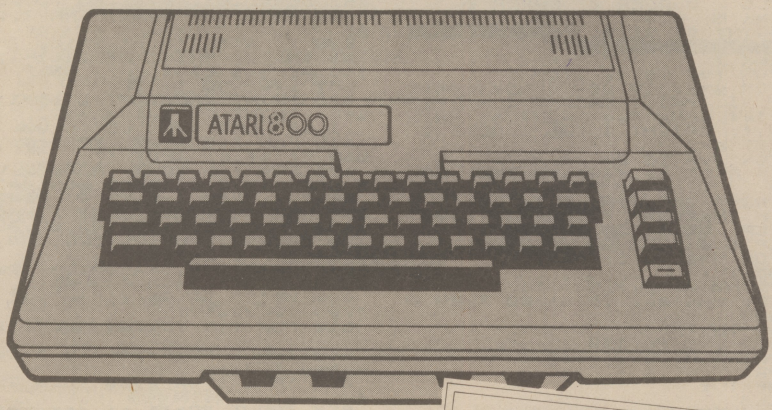
**STAGE 1.** Our **MATHS** does not ask you to type in an answer; that takes time and does not improve your speed.
It presents you with a simple sum (addition, multiplication, subtraction, division) and measures the time you take to decide if it is right or wrong. Useful and compulsive for all ages from 7 to 70. You really have to mind your P's and Q's. Also **TYPEEZ** to help you to find those letters on the keyboard which seem to disappear when needed; with typing speed per minute. Also a simple **SORT** program for any number of entries, without adjustment to the program. Also **BARGRAPH** and **DOTGRAPH.**

| | | |
|---|---|---|
| STAGE 1. | SPECTRUM | £4.00 |

BOND SYSTEMS, 15 BELMONT ROAD, HARROGATE, NORTH YORKS, HG2 0LR.

| | | |
|---|---|---|
| Name..... | German | £5.00 ☐ |
| Address..... | French | £5.00 ☐ |
| ..... | Stage 1. | £4.00 ☐ |
| ..... | Total ..... | £ |
| ..... | | |

# WHAT A CHRISTMAS PACKAGE FROM COMPUTERS FOR ALL







**ATARI 800**
*NEW LOW PRICE*
**£399.95**

This Christmas there's a good time for all at Computers for All!
A full range of the world's best micros for you to give up watching Television programmes and start writing computer programs!
There's still time to pick up a bargain by calling at our shop or phoning your credit card order. But do it straight away!
Everybody is after a new computer this Christmas . . . how about you?
**INSTANT CREDIT AVAILABLE FOR CALLERS WITH CHEQUE OR CREDIT CARD**

**Post today, phone, or call at our shop**
Post to Computers for All (P), 72 North Street, Romford, Essex. Telephone: (0708) 752862.

Please rush me the following equipment:

| | |
|---|---|
| . . . . ORIC 48K | @ £169.95 (inc VAT) |
| . . . . BBC MICRO (B) | @ £399.00 (inc VAT) |
| . . . . DRAGON 32 | @ £199.50 (inc VAT) |
| . . . . MPF II | @ £270.00 (inc VAT) |
| . . . . ATARI 400 | @ £199.95 (inc VAT) |
| . . . . ATARI 800 | @ £399.95 (inc VAT) |

Please add Post and Packing to all orders @ £3.00

NAME _____

ADDRESS _____

_____

Remittance enclosed £ _____

Please bill my Access/Barclaycard/Amex

Card No: _____

**COMPUTERS FOR ALL**

**"THE SHOP WHERE PEOPLE MATTER"**

# OPEN FORUM

## Bomber

### on Spectrum

This is a Spectrum version based on the popular arcade game. Your plane is circling over the city, each time losing altitude. Your only chance is to bomb away the city and clear a space to land. Beware, only one bomb may be dropped at a time so aim well!

The difficulty applies to the height of the skyscrapers and the descent rate determines how many passes you make at each level. I have never managed to win on "Fast descent rate".

Use "space" to drop a bomb. The game uses a *For-Next* loop (lines 70 and 90) for the position of the plane. I have used *Attr* for checking rather than *Screen$*, as the latter gives a null $ for user defined graphics.

```
  1 GO SUB 420: GO SUB 840
  2 LET sc=0
  5 LET b=0
  6 LET f=0: LET g=0
 10 CLS : BORDER 0: PAPER 0
 20 INK 6: CLS
 21 PRINT AT 21,0;"
 22 INK 7
 30 FOR f=2 TO 29 STEP 3
 40 FOR g=20 TO 20-(RND*(g+6))
) STEP -1: PRINT BRIGHT 1;AT g,f
;CHR$ 144;CHR$ 144: NEXT g: PAIN
T AT g,f; BRIGHT 1;"": NEXT f
 60 LET a=1
 70 FOR f=0 TO 29
 75 IF ATTR (a,f+3)>63 THEN GO
TO 200
 80 PRINT INK 7;AT a,f;" >-"
 85 IF INKEY$="" THEN IF b=0 T
HEN BEEP .05,0: GO TO 300
 86 IF b>0 THEN GO TO 320
 87 FOR v=1 TO 6: NEXT v
 90 NEXT f
 95 PRINT AT a,f;"   "
100 LET a=a+dr: IF a>=20 THEN G
O TO 600
110 GO TO 70
200 FOR i=1 TO 100
210 PRINT AT a,f;"**"
220 PRINT AT a,f;"++"
230 NEXT i
240 CLS
250 PRINT "You crashed!"
260 PAUSE 0
270 RUN
300 LET b=a
310 LET b1=f+2
320 PRINT AT b,b1;" "
330 LET b=b+1
335 IF b>20 THEN LET b=0: GO TO
90
340 IF ATTR (b,b1)>63 THEN LET
sc=sc+1: PRINT AT 0,0;"Score=";s
c: GO TO 400
350 PRINT AT b,b1; INK 1;CHR$ 1
45: BEEP .01,40-b: GO TO 90
400 PRINT AT b,b1; INK 7;CHR$ 1
46
405 IF ATTR (b,b1-1)>63 THEN PR
INT INK 7: PRINT AT b,b1-1;CHR$
146;AT b-1,b1-1;" ": BEEP .1,10:
 LET b=0: GO TO 90
410 PRINT INK 7;AT b,b1+1;CHR$
146: PRINT AT b-1,b1+1;" ": BEEP
 .1,10: LET b=0: GO TO 90
415 FOR f=0 TO 7: READ x: POKE
USR "c"+f,x: NEXT f
420 FOR f=0 TO 7: READ x,y: POK
E USR "a"+f,x: POKE USR "b"+f,y:
 NEXT f: FOR f=0 TO 7: READ x: P
OKE USR "c"+f,x: NEXT f: RETURN
430 DATA 255,126,129,60,255,24,
129,60,255,126,129,126,255,60,12
9,24
440 DATA 0,0,34+128,63+128,45+1
28,63+128,128+45,192+60
600 PRINT AT 20,0;">-";AT 10,0;
"You landed!"
610 FOR f=1 TO 700: NEXT f: RUN
840 INPUT "Difficulty 1=easy 10
=hard ";d
850 IF d<1 OR d>10 THEN GO TO 8
40
855 INPUT "Rate of descent(1=Fa
st,2=slow)?";df
856 IF df<1 OR df>2 THEN GO TO
855
857 IF df=2 THEN LET df=.5
860 RETURN
```

**Bomber**
*by Nick Wilson*

## Bugsplat

### on Vic 20

Bugsplat is an interesting program for the unexpanded Vic-20. It is based on the game of Beetle where you have to build a beetle up by throwing a dice. When the computer tells you to stop the dice press the top function key. Then the computer will give you the corresponding part providing you have not got it already.

However, there is a catch. When you build your bug you must start with a body and build the pieces you gain directly on to it. If this is not possible then you cannot use the piece and must miss your go.

Lines with graphics are as follows:

140 [HOM][RED[11CD][SHIFT O][3 COMMODORE SHIFT T][SHIFT P][CD][5CL][COMMODORE SHIFT G][3SPC][COMMODORE SHIFT M][CD][5CL]
145 [COMMODORE SHIFT G][3SPC][COMMODORE SHIFT M][CD][5CL][COMMODORE SHIFT G][3SPC][COMMODORE SHIFT M][CD][5CL][SHIFT L][3SPC][SHIFT @]

PROGRAM OF THE WEEK

```
0 REM BUGSPLAT BY M.MARTIN
5 DIMPT(1,5),DC$(5),PT$(5),MX(5)
10 POKE36879,110
20 PRINT"■      ■BUG SPLAT■"
30 PRINT"■ THE OBJECT OF BUG■SPLAT IS TO BUILD UP";
35 PRINT"■A BUG BY THROWING A■";
40 PRINT"DICE AND ADDING THE■CORRESPONDING PIECE."
42 PRINT"■■■■PRESS A KEY"
45 GOSUB1000
47 PRINT"■"
50 PRINT"■DICE PIECE NEEDED"
60 PRINT"————————————————"
```

```
70 PRINT"  1     BODY         1"
80 PRINT"  2     NECK         1"
90 PRINT"  3     HEAD         1"
100 PRINT"  4     FEELERS      2"
110 PRINT"  5     TAIL         1"
120 PRINT"  6     LEGS         6"
130 FORA=0TO5:READDC$(A):NEXT:FORA=0TO5
135 READPT$(A):NEXT:FORA=0TO5:READMX(A):NEXT
140 PRINT"                              ";
145 PRINT"|                     ___|"
150 FORA=0TO5:PRINT""
155 POKE36878,15:POKE36876,220+A*5
160 PRINT"|";DC$(A)
170 PT(0,A)=-1*(A<>3ANDA<>5)-2*(A=3)-6*(A=5)
180 GOSUB2000:FORB=1TO1000:NEXTB,A
190 POKE36876,0:POKE36878,0
200 PRINT"PRESS A KEY";:POKE198,0
210 GETA$:IFA$=""THEN210
220 POKE36879,93
225 PRINT""
230 GOSUB4000
240 FORA=0TO5:PT(0,A)=0:NEXT
250 PRINT"YOUR BUG":P1=0
260 PRINT"MY BUG":PL=1:GOSUB2000
261 B=0:FORA=0TO5:IFPT(1,A)=MX(A)THENB=B-1:NEXT:IFB=-6THEN6000
262 DC=INT(RND(1)*6):POKE198,0
265 GOSUB4000
270 IFDC=6THENDC=0
272 PRINT"|"DC$(DC);:DC=DC+1
275 PRINT"PRESS F1"
276 PRINT"TO STOP DICE"
277 POKE36878,15:POKE36876,RND(1)*128+128
280 GETA$:IFA$<>""THEN270
285 POKE36876,0
290 GOSUB4000:F1=2:DC=DC-1
300 GOSUB5000
370 PRINT"|";
372 IFF1=0THENPRINT"YOU NEED A":PRINT"|";PT$(DC)
375 IFF1=0THENPT(0,DC)=PT(0,DC)+1
380 IFF1=1THENPRINT"YOU DON'T   ":PRINT"NEED A ";PT$(DC)
390 IFF1=2THENPRINT"YOU CAN'T ":PRINT"HAVE A ";PT$(DC)
400 REM COMPUTER MOVES
405 FORA=1TO3000:NEXT:GOSUB4000:P1=1
410 PRINT"MY MOVE"
420 PRINT"YOUR BUG"
430 PL=0:GOSUB2000:DC=INT(RND(1)*6)
435 B=0:FORA=0TO5:IFPT(0,A)=MX(A)THENB=B+1:NEXT:IFB=6THEN6000
440 FORA=1TO50:PRINT"|"DC$(RND(1)*6):POKE36878,15
441 POKE36876,RND(1)*128+128:NEXT
442 POKE36878,0:POKE36876,0
445 GOSUB4000:PRINT"I'VE ROLLED":PRINT"| A";DC+1
450 PRINT"|"DC$(DC)
460 FORA=1TO1000:NEXT:GOSUB4000:F1=2
470 GOSUB5000
480 PRINT"|";
485 IFF1=0THENPRINT"I NEED A":PRINT"|";PT$(DC)
490 IFF1=0THENPT(1,DC)=PT(1,DC)+1
500 IFF1=1THENPRINT"I DON'T":PRINT"NEED A ";PT$(DC)
510 IFF1=2THENPRINT"I CAN'T HAVE":PRINT"A "PT$(DC)
998 FORA=1TO3000:NEXT
```

Turn to page 20

from page 19

```
999 GOTO250
1000 GETA$:IFA$=""THEN1000
1010 RETURN
2000 IFPT(PL,0)=0THENRETURN
2010 PRINT"
2020 IFPT(PL,1)=0THEN2040
2030 PRINT"
2040 IFPT(PL,2)=0THEN2060
2050 PRINT"
2060 IFPT(PL,3)=0THEN2090
2070 IFPT(PL,3)=1THENPRINT"
2080 IFPT(PL,3)=2THENPRINT"
2090 IFPT(PL,4)=0THEN2110
2100 PRINT"
2110 IFPT(PL,5)=0THENRETURN
2120 PRINT"
2999 RETURN
3000 DATA"
3010 DATA"
3020 DATA"
3030 DATA"
3040 DATA"
3050 DATA"
3060 DATABODY,NECK,HEAD,FEELER,TAIL,LEG,1,1,1,2,1,6
4000 PRINT"
4010 PRINT"
4020 PRINT"
4030 PRINT"
4040 PRINT"
4999 RETURN
5000 IFPT(P1,0)=0ANDDC=0THENF1=0
5005 IFPT(P1,0)=1ANDDC=0THENF1=1:RETURN
5010 IFPT(P1,0)=1ANDDC=1THENF1=0
5020 IFPT(P1,1)=1ANDDC=2THENF1=0
5030 IFPT(P1,2)=1ANDDC=3THENF1=0
5040 IFPT(P1,0)=1ANDDC=4THENF1=0
5050 IFPT(P1,0)=1ANDDC=5THENF1=0
5060 IFF1=0ANDPT(P1,DC)=MX(DC)THENF1=1
5999 RETURN
6000 GOSUB4000:IFB>0THENPRINT"
6010 IFB<0THENPRINT"
6020 FORA=1TO3000:NEXT
6030 GOSUB4000:PRINT"
6040 GETA$
6050 IFA$="Y"THENRUN
6060 IFA$<>"N"THEN6040
6065 PRINT"
6070 END

READY
```

**Bugsplat**
*by Mike Martin*

## Memory
### on Vic20

This program, for a Vic with 8K or 16K expansion, will rearrange the Vic's memory to allow the use of a user-defined character generator. It moves the start of Basic to 8192 and the display file from 4096 to 7680, as on an unexpanded Vic. This leaves the area between 4096 and 7679 free for a new character generator or a machine code program.

The register 36869 is set to use the normal character set, but should be poked with 252 to use a defined character set. Having the character generator before the start of basic is an advantage because no memory has to be reserved and there is no chance of basic overwriting the characters.

No problems should occur if this program is run before loading the desired program.

**Program**

```
10  POKE 648,30:POKE 36866,150
20  POKE 641,0:POKE 642,32
30  POKE 36869,240
40  POKE 43,1:POKE 44,32
50  8192,0:PRINT "(clr)"
60  POKE CLR: NEW
```

**Program notes**

| Line(s) | |
|---|---|
| 10 | Move screen. |
| 20 | Memory start. |
| 30 | Normal Vic character set. |
| 40 to 50 | Move start of basic. |

**Memory**
*by Antony Collyer*

## Galaxy

### on ZX81

This is a program for the ZX81 with 16K Ram. The program sets up a screenful of stable stars (inverse *) with ten target or unstable stars (graphics shifted A). In your spaceship (equals sign) you move around the galaxy, using the cursor keys, in an attempt to wipe out the unstable stars. Each unstable star destroyed gives five points; each stable star inadvertently wiped out costs one point.

Each time an unstable star is destroyed, a number of black holes are created. Falling into a black hole brings the game to a sudden end. Otherwise, the game is ended by reaching the safety base, inverse S, which will give the final score, together with the best possible score of 50.

**Program notes:**

Lines

20 to 70 Gives instructions and explains the game.

80 to 95 Completes instructions, warning of the seven second blank-out of screen.

100 to 190 The screen will be blank for approximately seven seconds whilst the program:
1. Prints a black screen.
2. Prints 115 stars in random positions.
3. Places 10 targets in random places.
4. Places the safety zone (inverse S) in a random position along the bottom line of the black screen.

The program then returns to the "SLOW" mode.

200 to 280 Gives loop for moving spaceship; checks position of spaceship; limits values of X and Y to width and height of screen; if line 265 shows that the spaceship has made a hit then the program goes to 500.

400 to 430 Gives final score and ends game.

500 to 550 Sends program to appropriate subroutine for value of W. (W = the object hit or point reached by spaceship.)

1000 to 1070 Subroutine for destroying unstable star; adds five to value of S; creates black holes in random positions; returns.

2000 to 2010 Subroutine for destroying stable star; reduce S by 1; returns.

5000 to 5030 Blacks out screen, ends game.

```
   10 REM : GALAXY : EVE GORTON
   20 PRINT TAB 3;"ASSIGNMENT - S
 TARSWEEPER"
   30 PRINT AT 4,0;"YOU MUST TRAV
 EL TO GALAXY 500 TO DESTROY 10 U
 NSTABLE STARS WHICH HAVE APPEARE
 D THERE"
   40 PRINT AT 8,0;"KEY: -";AT 9,8
 ;"UNSTABLE STAR: ";A$;" STABLE STAR: ";
 ;AT  10,4;"YOUR SHIP: = ";AT 10,1
 8;"BLACK HOLE: ";B$
   50 PRINT AT 14,0;"SCORE:";"+5
 FOR EACH ";A$;" ";"-1 FOR EACH ";B$;"GO
 TO ";S$;" TO RETURN TO BASE"
   60 PRINT AT 20,0;"PRESS 0 TO P
 REPARE FOR TAKE-OFF"
   65 IF INKEY$<>"0" THEN GOTO 65
   70 CLS
   80 PRINT AT 10,0;"PRESS G FOR
 YOUR 7-SECOND JUMP  THROUGH HYPE
 RSPACE"
   85 PRINT AT 18,0;"CONTROL KEYS
  - 5,6,7 AND 8"
   90 PRINT AT 20,0;"WATCH OUT FO
 R BLACK HOLES"
   95 IF INKEY$<>"G" THEN GOTO 95
  100 FAST
  105 FOR N=0 TO 20
  110 PRINT AT N,0;"
                                "
  115 NEXT N
  120 LET S=5
  125 FOR L=1 TO 125
  130 LET Y=INT (RND*30)
  135 LET X=INT (RND*20)
  140 PRINT AT X,Y;A$
  150 IF L>=116 THEN PRINT AT X,Y
 ;B$
  160 NEXT L
  170 LET P=INT (RND*10)+10
  180 PRINT AT 20,P;"="
  190 SLOW
  200 LET X=1
  205 LET Y=1
  210 PRINT AT X,Y;"="
  215 PRINT AT X,Y;" "
  220 IF INKEY$="6" THEN LET X=X+
 1
  225 IF INKEY$="7" THEN LET X=X-
 1
  230 IF INKEY$="5" THEN LET Y=Y-
 1
  235 IF INKEY$="8" THEN LET Y=Y+
 1
  240 IF X<0 THEN LET X=0
  245 IF X>20 THEN LET X=20
  250 IF Y<0 THEN LET Y=0
  255 IF Y>30 THEN LET Y=30
  260 PRINT AT X,Y;
  265 LET U=PEEK (PEEK 16398+256*
 PEEK 16399)
  270 IF U=0 OR U=151 OR U=180 OR
 U=184 THEN GOSUB 500
  280 GOTO 210
  400 CLS
  410 PRINT AT 10,0;"YOUR FINAL S
 CORE:";S
  420 PRINT AT 12,0;"BEST POSSIBL
 E SCORE:50"
  430 STOP
  500 IF U=0 THEN GOSUB 1000
  510 IF U=151 THEN GOSUB 2000
  520 IF U=184 THEN GOTO 400
  530 IF U=180 THEN GOSUB 5000
  540 PRINT AT 21,0;"SCORE:";S;"
 "
  550 RETURN
 1000 PRINT AT X,Y;"="
 1010 LET S=S+5
 1020 FOR A=0 TO 5
 1030 LET B=INT (RND*20)
 1040 LET C=INT (RND*30)
 1050 PRINT AT B,C;"B"
 1060 NEXT A
 1070 RETURN
 2000 LET S=S-1
 2010 RETURN
 5000 FOR N=0 TO 20
 5010 PRINT AT N,0;"
                                "
 5020 NEXT N
 5030 PRINT AT 10,1;"THIS IS A BL
 ACK HOLE - GOODBYE"
```

GRAPHICS

```
line 40     UNSTABLE STAR =
               graphics shifted A
            STABLE STAR = inverse *
            BLACK HOLE = inverse O
line 110    32 inverse spaces
line 140    inverse *
line 150    graphics shifted A
line 180    inverse space
line 215    inverse space
line 5010   32 inverse spaces
```

**Galaxy**
*by Eve Gorton*

## Message

### on BBC Micro

Do you sometimes want to leave a message for someone to read if you are out? This program allows you to use your BBC Micro as an electronic message board. Your message can be up to 11 pages of about 200 characters per page long.

Just *Run* the program and give the recipients name. Follow this with the message, terminating with a blank page. Following this the screen displays "FOR FREDS EYES ONLY" making a two-tone sound. Pressing the space bar pages through the message and back to the title.

**Program notes**

Lines 60 to 110 input the message.

Lines 120 to 130 make the sound. (For a loud sound set last two *Envelope* parameters larger (up to 127)).

*Procspace* waits for the user to press a key to page on.

Line 170 stops the sound.

Lines 180 to 220 page the message. The *Vdu* 19 command is used to give background variety.

```
   10  REM *****
   20  REM    MESSAGE PROGRAM
   30  REM       BY TONY LORD
   40  REM     (C) 22 AUG 82
   50  REM *****
   60  C%=0:MODE 5:DIM A$(20)
   70  INPUT "WHO IS THIS FOR ?" ''F$: IF LEN(F$)>19 THEN
       F$=LEFT$(F$,19)
   80  C%=C%+1
   90  CLS:PRINT TAB(0,12) STRING$(20,"-");
  100  INPUT TAB(6,1)"TYPE HERE:"'A$(C%)
  110  IF A$(C%)<>"" THEN GOTO 80
  120  ENVELOPE 1,1,0,-20,0,75,1,75,127,0,0,-1,30,30
  130  SOUND 1,1,101,255
  140  CLS
  150  PRINT TAB(9,4)"FOR"''STRING$((20-LEN(F$))/2," ")
       ;F$;"S"'' TAB(6)"EYES ONLY"
  160  PROCSPACE
  170  SOUND 17,1,101,0:CLS
  180  FOR Z%=1 TO C%
  190  CLS:VDU 19,0,Z% MOD 3,0,0,0
  200  PRINT TAB(0,3)A$(Z%):IF A$(Z%)=""THEN PRINT TAB(4,3)
       "MESSAGE ENDS"
  210  PROCSPACE
  220  NEXT
  230  GOTO 130
  240  END
  250  DEF PROCSPACE:REM***
  260  PRINT TAB(3,29)"PRESS SPACE TO"TAB (6,31)"CONTINUE";
  270  REPEAT UNTIL INKEY$(10) <> ""
  280  ENDPROC
```

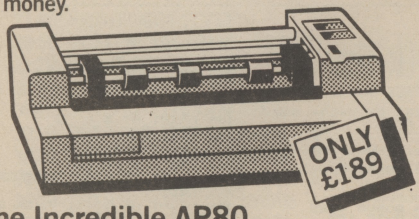
**Message**
*by Tony Lord*

# Follow us to MICROAGE ELECTRONICS for printer value



Win a £100 or a £50 token! Free entry into raffle with every order. For details write or phone Microage.

**At Microage you can now get the very best value in microcomputer printers. We've selected only the best printers available so you can choose confidently, knowing you're getting the best value for money.**




## The Incredible AP80

The AP80 is probably the world's LOWEST COST, compact 80-column graphic dot-matrix printer available.

It can produce single and double width characters and has the ability to produce any pattern through its dot-matrix capability.

The AP80's robust construction and its unique "unihammer" make it an extremely cost effective and efficient printer.

**Its features include**

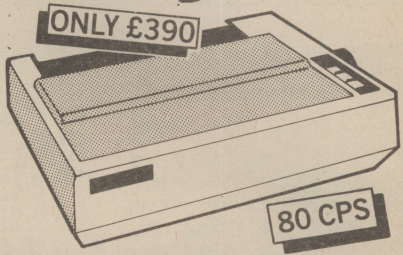
80 Cols 30 cps ● Dot Matrix Unihammer action ● 96 ASCII standard characters ● Up to 8" paper width ● Upper and lower case ● Double width printing ● Standard interface: Centronics

## The Amazing AP100

Big brother to the AP80 the AP100 is a wider more sophisticated version of the AP80 with a full graphics capability and the ability to take standard width computer stationery, the AP100 is an ideal choice for anyone with a microcomputer.

**Its features include:**

80 cols 30 cps ● Dot Matrix Unihammer action ● 116 ASCII standard characters ● Full graphics capability ● Up to 10" paper width ● Upper and lower case ● Double width printing ● Centronics interface: ● Friction feed. Only £215.



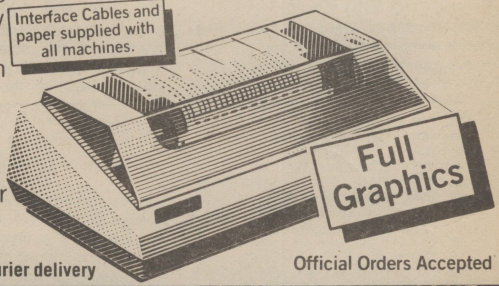

## The Outstanding MX80 FT Type 3

The MX80 is a flexible, high quality and extremely reliable graphic, dot matrix printer.

Its superb performance is due to a number of outstanding features. High resolution graphics, a wide range of type sizes, a quality 9 x 9 dot matrix head and up to 132 chars per line are just some of the exceptional features on this ideal printer for microcomputers. Only £390.

**Specifications**

132 cols 80 ● Logic-seeking, Bi-directional printing ● 9 x 9 Dot matrix printhead ● 96 ASCII standard chars with descenders ● Full graphics capability ● Several type sizes ● Automatic underlining ● Standard interface Centronics ●




**Free courier delivery**

Official Orders Accepted

**MICROAGE ELECTRONICS**

135 HALE LANE EDGWARE MIDDLESEX HA8 9QP TEL: 01 959 7119 TELEX 881 3241

**DEALER ENQUIRIES WELCOME**
**CALL 01-959 7119**
**FOR TRADE PRICES**

# Fashioning by whimsy

*In part three of our extract from The Working Spectrum we continue adding modules/subroutines to the Unifile program, designed to enable a single program to cover a variety of filing tasks without the need for constant re-writing every time a new use comes along.*

**MODULE 1.1.3**

This is the module which permits Unifile to assume different shapes according to the whim of the user. In the course of the module the major arrays and variables are set in preparation for the data to come. Note that one result of this is that any previously stored data is lost. We shall not discuss the use of the various arrays in detail here, preferring to leave that task until we actually begin to use them.

**Commentary**

Lines 1230-1340. A typical entry to the file might consist of name, address, age and telephone number. In the course of these lines the program records how many such items there will be in each entry in the variable X. The names of the items are requested and stored in the array A$, an indicator having been attached by the subroutine at line 2780. Note that we print Q$ stripped of its first character, since the indicator is not a meaningful character.

Line 1350 is the main array in which the entries will be stored.

Line 1360 sets up two dummy entries which will mark the beginning and end of the file.

Lines 1370-1380. Two examples of user-defined functions which could just as well be replaced by single line subroutines. The first function extracts the value of a pointer and will be explained in the course of Module 5. The second function extracts a single item from the main file based on the value of the indicator found at position C in the file.

Line 1390. P is the variable used to record the first empty space in B$. B$ will always be 28,000 characters long but we will use only part of it. Clearly we need to know how much is already in use.

Line 1400. Y$ stores the pointers in the form of character codes, a method that is discussed in relation to Module 5.

Line 1410. N is the variable which records the number of entries in the file.

**Testing Module 1.1.3**

We can now test Modules 2 and 3. Run the program and select function 1 from the menu. You should be able to specify a number of items and then give them names. Having done this, stop and program and, in direct mode, print out the various arrays and variables as follows:

B$: ??? COPY
Y$: ????
N: 2
P: 5

X should equal the number of items you specified and the array A$ should have X lines, each containing an item name with an indicator tacked on to the front.

**MODULE 1.1.4**

The purpose of this module is to accept the input of an entry composed of the correct number of items and to present that entry to the section of the program which will insert it into its correct place in the file.

**Commentary**

Line 1600. R$ is the entry and is composed of a number of successive Q$s added together.

**Testing Module 1.1.4**

If you have already entered some sensible item names then start the program with *Goto* 1 and call up function 2 from the menu. You should be asked for an input for each item name. After the correct number of item names the program will stop with the report 0 OK,1630:1. The file size should be 4/28000 and, if you print out R$ it should consist of your items, each preceded by an indicator character. ■

**More of the Unifile program will be presented next week.**

**This is an extract from *The Working Spectrum*, by David Lawrence (price £5.95) published by Sunshine Books, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.**

**UNIFILE:** *Module 3*

```
1200 REM ************************
1210 REM ENTRY STRUCTURE
1220 REM ************************
1230 PRINT PAPER 2;"              FILE
 STRUCTURE                "
1240 PRINT '"HOW MANY ITEMS IN E
ACH ENTRY?"
1250 INPUT X
1260 CLS
1270 DIM A$(X,20)
1280 PRINT PAPER 2;"              NAMES
 OF ITEMS                 "
1290 FOR I=1 TO X
1300 PRINT "ITEM ";I;":";
1310 GO SUB 2780
1320 PRINT Q$(2 TO )
1330 LET A$(I)=Q$
1340 NEXT I
1350 DIM B$(28000)
1360 LET B$(1 TO 4)=CHR$ 2+CHR$
0+CHR$ 2+CHR$ 255
1370 DEF FN A()=256*CODE Y$(2*5-
1)+CODE Y$(2*5)
1380 DEF FN A$()=B$(C TO C+CODE
B$(C)-1)
1390 LET P=5
1400 LET Y$=CHR$ 0+CHR$ 1+CHR$ 0
+CHR$ 3
1410 LET N=2
1420 RETURN
```

**UNIFILE:** *Module 4*

```
1430 REM ************************
1440 REM NORMAL INPUT
1450 REM ************************
1460 LET R$=""
1470 PRINT PAPER 2;"              EN
TRIES                    "
1480 PRINT '"COMMANDS AVAILABLE:
"
1490 PRINT '">ENTER ITEM SPECIFI
ED"'">""ZZZ"" TO QUIT"
1500 PRINT "********************
**********"
1510 PRINT "FILE SIZE:";P-1;"/";
LEN B$
1520 FOR I=1 TO X
1530 GO SUB 2810
1540 GO SUB 2780
1580 PRINT Q$(2 TO )
1590 IF Q$(2 TO )="ZZZ" THEN RET
URN
1600 LET R$=R$+Q$
1610 NEXT I
1620 CLS
1630 GO SUB 1660
1640 GO TO 1440
```

# Whorled graphics

***Simon Cross** presents a spiral printing routine for the ZX81.*

This program is a 114 byte machine code routine which prints a character, chosen by the user, in a "spiral" form from the edge of the screen to the centre. It runs on the Sinclair ZX81 with more than 3¼K (with slight modification it will run on the unexpanded ZX81). The program produces a 32 x 24 display on the ZX81 with more than 3¼K — in the unexpanded ZX81 the display is 32 x 22.

Initially, I wrote this routine to be used as a "fancy" *Cls* routine to brighten up some of my Basic programs, but I think that it has enough intrinsic interest to be the core of a "pattern-making" program.

The routine is quite simple, consisting of a main loop which itself contains four smaller loops which print the four edges of the pattern. I needed to put a delay loop between each printing of a character, since without these the pattern appeared to be printed instantaneously. The character to be printed on to the screen is stored in location 16514. The rest of the routine could be relocated in the memory since it contains no absolute jumps.

To enter the machine code, first *Poke* the code into a Rem statement in line 1 which contains 114 characters. Most readers have probably developed their own methods of entering machine code by now, but I have included my own loading program. After this program has been entered it should be Run and the machine code entered one byte at a time. The address and entered code will be scrolled up the screen.

The short demonstration program prints various randomly selected characters on to the screen and can be enjoyed as a "pattern-making" program. Just enter the Basic program once the machine code has

| ADDRESS | HEX CODE | MNEMONIC | NOTES |
|---|---|---|---|
| 16514 | 00 | | location storing character to be printed |
| | 21 0C 40 | LD HL (16396) | load HL with DFILE pointer |
| | 5E | LD E (HL) | |
| | 23 | INC HL | |
| 16520 | 56 | LD D (HL) | |
| | 21 00 00 | LD HL (0) | |
| | 19 | ADD HL DE | HL now contains address of 1st byte display |
| | 01 02 40 | LD BC (16514) | load address which contains character to be printed |
| | 0A | LD A (BC) | |
| 16529 | 16 21 | LD D (33) | load D with row length variable |
| | 1E 16 | LD E (24) | load E with column length variable |
| | 06 0B | LD B (11) | load B with counter for main loop |
| | C5 | PUSH BC | start of main loop |
| | 15 | DEC D | |
| | 42 | LD B D | load row length into loop counter |
| | 23 | INC HL | start of upper row print loop |
| | 77 | LD (HL) A | print a character onto the screen |
| 16540 | C5 | PUSH BC | |
| | 06 FF | LD B (255) | |
| | 10 FE | DJNZ (-2) | delay loop |
| | C1 | POP BC | |
| | 10 F6 | DJNZ (-10) | end of upper row print loop |
| | 1D | DEC E | |
| | 43 | LD B E | load column length into loop counter |
| 16550 | C5 | PUSH BC | Start of R/H column print loop |
| | 06 21 | LD B (33) | |
| | 23 | INC HL | |
| | 10 FD | DJNZ (-3) | |
| | C1 | POP BC | |
| | 77 | LD (HL) A | print a character onto the screen |
| | C5 | PUSH BC | |
| 16559 | 06 FF | LD B (255) | |
| | 10 FE | DJNZ (-2) | delay loop |
| | C1 | POP BC | |
| | 10 F0 | DJNZ (-16) | end of R/H column print loop |
| | 15 | DEC D | |
| | 42 | LD B D | load row length into loop counter |
| | 2B | DEC HL | start of lower row print loop |
| | 77 | LD (HL) A | print a character onto the screen |
| 16570 | C5 | PUSH BC | |

been *Poked* into the Rem statement and then Run the whole program. To use the routine in any other program, *Poke* the decimal code of the character to be printed into location 16514. The routine is called by *Rand Usr* 16515.

### 1K ZX81 modifications

The collapsed display file needs to be filled out before *Poking* characters into it. Add the following lines to the pattern-making program:

```
5 FOR N = 0 TO 21
6 PRINT " —32 spaces— "
7 NEXT N
```

Since I do not know a simple way of filling out the bottom two lines of the display file, I reduce the display to 32 x 22 by altering the machine code with the following direct commands:

```
POKE 16532, 22
POKE 16534, 10
```

Initial program to load machine code:

```
 1 REM XXXXXXXXXXX—total of 114 X's—
   XXXXXXXXXXXX
10 FOR N = 16514 TO 16627
20 INPUT A$
30 LET A = 16 * CODE (A$) + CODE (A$(2)) — 476
40 POKE N, A
50 SCROLL
60 PRINT N; " "; A$
70 NEXT N
80 SCROLL
90 PRINT "END"
```

Program to demonstrate machine code routine

```
 1 REM machine code routine
10 LET X = 1 + RND * 10
20 LET Y = 129 + RND * 15
30 POKE 16514, X
40 RAND USR 16515
50 POKE 16514, 128
60 RAND USR 16515
70 POKE 16514, Y
80 RAND USR 16515
90 POKE 16514, 0
100 RAND USR 16515
110 RAND
120 GOTO 10
```

| ADDRESS | HEX CODE | MNEMONIC | NOTES |
|---|---|---|---|
| | 06 FF | LD B (255) | |
| | 10 FE | DJNZ (-2) | delay loop |
| | C1 | POP BC | |
| | 10 F6 | DJNZ (-10) | end of lower row print loop |
| | 1D | DEC E | |
| | 43 | LD B E | load column length into loop counter |
| 16580 | C5 | PUSH BC | start of L/H column print loop |
| | 06 21 | LD B (33) | |
| | 2B | DEC HL | |
| | 10 FD | DJNZ (-3) | |
| | C1 | POP BC | |
| | 77 | LD (HL) A | print a character onto the screen |
| | C5 | PUSH BC | |
| 16589 | 06 FF | LD B (255) | |
| | 10 FE | DJNZ (-2) | delay loop |
| | C1 | POP BC | |
| | 10 F0 | DJNZ (-16) | end of L/H column print loop |
| | C1 | POP BC | |
| 16597 | 10 C0 | DJNZ (-64) | end of main loop |
| | 15 | DEC D | start of fill centre routine |
| 16600 | 42 | LD B D | load loop counter with row length |
| | 23 | INC HL | |
| | 77 | LD (HL) A | print a character onto the screen |
| | C5 | PUSH BC | |
| | 06 FF | LD B (255) | |
| | 10 FE | DJNZ (-2) | delay loop |
| | C1 | POP BC | |
| 16609 | 10 F6 | DJNZ (-10) | |
| | 06 21 | LD B (33) | |
| | 23 | INC HL | |
| | 10 FD | DJNZ (-3) | |
| | 42 | LD B D | |
| | 77 | LD (HL) A | print a character onto the screen |
| | 2B | DEC HL | |
| | C5 | PUSH BC | |
| 16620 | 06 FF | LD B (255) | |
| | 10 FE | DJNZ (-2) | delay loop |
| | C1 | POP BC | |
| | 10 F6 | DJNZ (-10) | end of fill centre routine |
| 16627 | C9 | RET | return to Basic |

# Hex dumper

***Paul Murton** creates a hex dump which enables you to inspect memory blocks.*

This short program creates a hex dump on the Dragon 32.

On running, you are asked to enter the start and end addresses of the memory you wish to inspect. The hex is then displayed in blocks of 120.

When you have inspected each block, press the space bar and the next block of 120 will appear.

Those lucky enough to own a printer, need only replace lines 200 and 210 and insert a subroutine to copy the contents of the screen to the printer.

```
READY.

 10 CLS:PRINT"          HEX DUMP"
 20 PRINT"ENTER START ADDRESS (DEC)":INPUT A
 30 PRINT"ENTRER END ADDRESS (DEC)":INPUT B
 40 CLS:FOR N=A TO B STEP 8:Y=Y+1
 50 PRINTHEX$(N);"  ";
 60 FOR J =0TO 7
 70 PRINTHEX$(PEEK(N+J));" ";
 80 NEXTJ
 90 PRINT
 100 IFY/15=INT(Y/15)THEN GOSUB 200
 120 NEXTN
 130 GOTO130
 200 A$INKEY$:IF A$<>" "THEN 200
 210 CLS:RETURN
READY.
```



# Beaufort scale

***Robert Coates** presents a spacecraft landing program complete with wind.*

The aim of the game is to land your spacecraft on the landing pad on earth, just to the right of the flag.

The spacecraft starts at a random position at the top of the screen and automatically descends. There is also a strong wind blowing from the right which pushes your craft to the left.

To counteract the wind, press the spacebar. This moves your craft to the right and enables you to land.

If the landing is successful, then the game starts again with your craft in a different position. If unsuccessful, then the game ends.

To increase the difficulty, change line 180 to read:

180 x = x – 0.6 (or any other increment). ■

```
 10 L = 0
 20 DIM R(14,14)
 30 PMODE 3,1:SCREEN 1,0 : PCLS : COLOR 2,3
 40 X = RND (150) + 25 : Y = RND (10)
 50 R$ = "BM 105,27; H2E2R543H2L1G2D3R5F2G2"
 60 T$ = "BM0,164;F4E3F7R2E4F5R6E6R15F6
    R16E7F4E6F3E2F5R3E3F4R4E6F4R4E10F4
    E3F8R10E19F10E7F10R15E20U15E7"
 70 PAINT (0,0),4
 80 DRAW R$ : DRAW T$
 90 DRAW "BM39, 165; U6L4D3R4"
100 GET (101,13) – (115,27),R,G
110 X = X + 1
120 IF INKEY$ = "      " THEN 160
130 Y = Y + 0.5
140 IF Y = 153 THEN 210
150 GOTO 180
160 PUT (X,Y) – (X+14,Y+14),R,PSET
170 GOTO 110
180 X=X – 0.4
190 PUT (X,Y) – (X+14,Y+14), R,PSET
200 GOTO 120
210 IF X>40 AND X<48 THEN 220:ELSE 290
220 PMODE 1,1 : SCREEN 0,0 : PCLS
230 L= L+1
240 CLS (6)
250 PRINT @ 192, "CONGRATULATIONS"
260 PRINT @ 224, "SUCCESSFUL LANDINGS" ;L
270 FOR N=1 to 800 : NEXT N
280 GOTO 30
290 PMODE 1,1: SCREEN 0,0: PCLS
300 CLS (6)
310 PLAY "T20" + "ABCDCBAGFAEDDAFBC"
320 PRINT @ 192, "GAME OVER"
330 FOR N = 1 to 1000 : NEXT N
```

**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.**

## BIAS ACCUSATION UNWARRANTED

*R McConaghie of Middlesbrough, Cleveland, has sent a long letter accusing me (and most of the rest of the British computer press) of bias against the Atari computers. He refers mainly to my comments in* Popular Computing Weekly, *October 7. The main points of his letter are as follows:*

**Q The Atari does not have a *Verify* command as such, but the same effect can be achieved by first *Listing* the program to tape and then *Entering* it back into the computer's memory. Not as convenient as a straightforward *Verify*, but it does serve the purpose. The Atari does not have a flashing ability, but it does have luminences which are a more than adequate replacement.**

**A user defined graphics function? I don't know what it does on a Spectrum, but player missile graphics must count as the same thing. The Atari can in fact also display 192 colours.**

**I feel that patriotic fervour (what about the Vic?), seems to be leading to a very blinkered attitude on the part of the British press. I spent over 12 months researching the computer market before I bought an Atari. There are a few things that it cannot do that others can — how I would like a *Get* command for example. But this definitely works the other way round as well.**

A Before I address myself to the important question of bias, I would like to clear up one point. The correct number of luminence levels is 16, not eight or 15.

I do not think that the fundamental quality of the Atari machines is really in doubt — their sound and graphics capabilities are excellent. Where I feel that disenchantment does creep in is the way the Atari user is tied to a small group of dealers. This is especially noticeable when the Atari market is compared to the wide-open Sinclair market. It is easy to say that the customer has a lot of support and that the Atari is a modular system, but the customer will pay a great deal more for those modules than he would with another computer.

Perhaps it is partly jealousy that so many goodies seem to be locked up in the Atari in such a way that many users find them hard to get without paying a lot of money. Yet many similar goodies are available for other micros at much lower cost.

The Atari 400 does cost £200, but I have come across more than one person who has saved his money to buy an Atari computer, only to find that it is useless because he has no money left to buy any games and cannot program it because he has not got another £35 or £40 to buy the Rom.

## SIGNIFICANT IMPROVEMENTS

*Linda Crowther of Jubilee Drive, Thornbury, Avon, writes:*

**Q I am hoping to buy a Spectrum early next year (when the bugs have been sorted out) but in the meantime I am hoping to get a cassette player for Christmas. Do you know of one that will work well with the Spectrum, and that will also play music tapes? I know you covered this in September, but I would like some more details.**

A This is also for James March of Sheffield and P Douglas of Falkirk. It seems as though some of Uncle Clive's chickens are coming home ro roost. For all those worried about *Load/Save* on the Spectrum, don't.

Whatever the faults on the Spectrum, this is one area where very significant improvements have been made. Any domestic cassette player with jack sockets for the ear and mic should work.

If you want a particular model, then Data-assette sell a Ferguson model which we use here in the office for both the ZX81 and the Spectrum. It can also play conventional cassettes, and has so far worked well in both the *Load/Save* and conventional audio roles. Data-assette is at 44 Shroton Street, London NW1 6UG.

## ACE AND THE FORTH CHALLENGE

*Paul Purvis of Preston, Lancashire, writes:*

**Q I have seen the advertisements for the Jupiter Ace and, like a lot of other ZX81 owners, I am very interested in the challenge that Forth would offer. However, I am worried that the small faults which dogged the ZX81 will also plague the Ace. Namely, loose jack sockets and I/O connectors, poor *Loading* and *Saveing*, and just the general delicacy of the ZX81. I accept that a computer is not a robust toy, but it must be able to withstand a certain amount of wear and tear. Also I know the keyboard is meant to be a proper one, but does this mean 'proper' in the sense of the Spectrum keyboard?**

A To a certain extent only time can fully answer your questions. However, the Ace is more robust than the ZX81. The jack sockets if anything are too tight. It is quite possible to lift the Ace up and shake it in the air, without any chance of the plugs becoming disconnected even for a moment. As yet there are no add ons for the I/O port, so I cannot say how good the connections will be.

Again, until it is thoroughly tested the *Load/Save* facilities cannot be judged. But it does seem as though the signal has been inverted, because the instructions that come with the computer tell you to turn the tone right down. Remember, the designers of the Ace were also responsible for the Spectrum, and the *Load/Save* in this is excellent.

The keyboard on the Ace is the same type as the Spectrum's, but the rubber is stiffer, and the keys have a small peg underneath to make contact easier. For people used to the ZX81, and even the Spectrum, the positive response of the keys on the Ace will be very welcome.

It is a less delicate machine than the ZX81. However, such terms are relative and, like all computers, it is not designed to be battered or thrown around.

## NON-APPEARING CURSOR

*A Campbell of Arabella Drive, Roehampton, writes:*

**Q For the last few weeks, every time I try and turn on my ZX81 I get a plain screen, with no Cursor. I have tried the computer with and without the 16K Ram Pack, but I get the same response. I have an IVM attached but the computer started to go wrong before this was done. Please could you advise me on what to do?**

A By IVM I presume you mean an inverse video module. You do not make it clear whether or not the problem has been worse since this has been fitted. I have met this problem from time to time, and have rectified it by simply pulling out the jack plug for a little while.

However, it is possible that you have had two faults run into each other. I do not know which inverse graphics modules you have, but if it is Haven's, try making a small adjustment to the potentiometer, which does have a screw slot. I would suggest that you do this with a small piece of wood, to be on the safe side.

There is also a chance that the power supply is not stable enough. A 0.1 microfarad polystyrene resistor across the power supply should sort out this problem.

If none of this works, then you may have shorted out the video lead. The type of screen response you are getting means the computer is working, but the video signal is not getting through. You will have to try removing the IVM to see if you can get the cursor back without it. If you get no response then you will have to consider a new computer, because the fitting of the module will almost certainly have voided your guarantee.

# CLASSIFIED

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

**WHAT IS AXON USERS GROUP?**

Axon Group has been formed to give school, private clubs and private house users of Microcomputers a complete range of consumables at a discounted price. We are a group of companies already supplying to large trade and business users and because of our buying power we can pass on the bulk costs to yourselves. Our aim is to reduce your cost of consumables by at least 10 per cent. **Axon User Group, 31 Corsica Street, London N5 1JT. For further details please telephone 01-226 8809.**

**Got your copy yet?**
**INVADERS FOR THE ZX81**
**4K INVADERS** ..... **£4.00**
(formerly advertised as GALAXY INVADERS)
Machine code for speed. Head-up display of HIGHEST SCORE, LAST SCORE, CURRENT SCORE, NUMBER OF BASES. Ten levels of difficulty.
**"Deservedly popular . . . excellent"** (*Popular Computing Weekly*, **22nd May 1982**). Highest total score of 14 games reviewed in *Your Computer*, May 1982
**"The best on the market" S. C. Beds.**
**SUPER INVADERS for the ZX81 (16K) £4.95**
An updated version of 4K INVADERS with animated on-screen instructions, league table of hi-scores etc., etc.
**"Great game!" S. F. Glos.**
**"Very pleased at the speed with which you sent it" S. A. R. Preston**
All-inclusive prices. Return of post service.
**Dept. POP, BRIDGE SOFTWARE, 36 Fernwood, Marple Bridge, STOCKPORT, Cheshire SK6 5BE**

**DRAGON 32 SOFTWARE**
**FAMILY PROGRAMS:** Eight full-length original games, utility and educational programs.
**FUN AND GAMES:** Ten exciting games for young and old. Ideal for Christmas parties etc. £5 for each cassette, £9 for the pair.
**Send cheque/PO to Shards Software, 10 Park Vale Court, Vine Way, Brentwood, Essex CM14 4UR.**

**DRAGON 32.** Print on the graphics screen as easily as on the text screen with this subroutine. Cassette £3.25, will merge with existing programs without any typing. F. Webber, 15 Shapland Place, Tiverton, Devon.

**QUALITY GAMES/APPLICATIONS** programmers for micros required. Good royalties. Apply in writing to Fernleaf Micro Systems, 132 Springfield Road, Brighton.

**JUPITER ACE,** Duck Invaders 50p and s.a.e. for listing, F. M. Collins, Sylvestris Ham Lane, Elstead, Surrey GU8 6HG.

**SEIKOSHA GP100-A** printer with BBC lead, spare ribbon, £160. Tel: Leighton Buzzard 375547.

**SPECTRUM RENUMBER,** instantly renumbers all or part of program. All Gotos, Gosubs, etc, included. The first and probably the best in M/C for only £3.95. David Webb, Southolme, 9 Park Road, Woking, Surrey.

**ZX81 VIDEO INVERTER.** Saves your eyes, increases safe level, displays sharp white characters on solid black background screen. Kit £4, built £5 (includes VAT and P&P, instructions). Reviewed in *Popular Computing Weekly*, August 26. Send cheque/postal order to D. Fritsch, 6 Station Road, Thelwell, Warrington, Cheshire WA4 2HS.

**3.5K VIC20 SOFTWARE**

**PLANETFALL:** Lunar lander with a difference. Escort your fleet to a safe planet landing, under alien attack. Use joystick or keyboard Only £4.95

**SPACEBLITZ:** 2000 AD and aliens are laying waste the city of London. Defend your capital and destroy their mothership for a big bonus. Totally addictive. Use joystick or keyboard Only £4.95

**GAMES PACK 1:** Unbelievable value for money. Consists of Turtle Race, Volleyball; Pelmanism, Catch 22, Onslaught Only £4.95

**CHRISTMAS PACK:** All three cassettes for £12 Any 2 for £9

**All Prices include VAT postage etc.**

**SHADOW SOFTWARE, 8 HALLGATE, THURNSCOE, NR ROTHERHAM, S. YORKSHIRE S63 0TU**

£££££££££££££££££££££££££££

You could win a fortune if you are the first person to solve an intriguing new puzzle called Lojix. Lojix has been designed for the 16K ZX81. For each puzzle that is sold, £1 will be placed in an independent bank account. The first person to send the correct solution to us will win the contents of the independent account. The puzzle is recorded on a high quality cassette and costs only £4. Cheques and PO payable to: **The Puzzleman, 13 Cherry Tree Walk, Newpark, Mid-Glamorgan CF7 8RG.**

£££££££££££££££££££££££££££

**SPECTRUM AND ZX81**

**Accounts;** budget your household expenditure. Cassette, **16K ZX81, £3.95;** Spectrum **£4.95.** Both versions save and load separate Datafiles.
**ZX81 Dataprint;** provides equivalent of Data and Print Using statements. Cassette **£3.95.**
S.A.E. for further details. Cheque/P.O. to **A. N. Wilson, The Vicarage, Whitworth Square, Rochdale, Lancs, OL12 8PY.**

**BBC (32K) VIC20 (6.5K)**
Guaranteed programs for home and school.
**"SEQUENCES"** — seven demos., e.g. triangular numbers, Fibonacci, square numbers, etc. £5.95. Sae for details and complete list. **CHALKSOFT, Lowmoor Cottage, Tonedale, Wellington, Somerset TA21 0AL.**

**SPECTRUM 16K** Firefighter, Golf, Indexer and Buzzman, all on one cassette, £3.50. R. G. Martin, 56 Qualitas, Bracknell, Berks.

**BBC B "COLOUR LOGIC"** — Mastermind type game. Tested on O.S. 0.1 and 1.2 with disk. Comes with FREE O.S. 0.1 patch and User-Key routines — all on tape, only £2.75 from I. Burley, 30 Spareleaze Hill, Loughton, Essex.

**DRAGON SOFTWARE TAPE,** Tennis game with colour, sound and all refinements, £3 complete with full program notes. J. Bevan, 9 Vicarage Close, Guilden Sutton, Chester.

**SPECTRUM SOFTWARE:** Puck Man, a superb two-player game with Black Jack on reverse side. Bargain at £3. Cheques to M. Imperato, 59 Princes Park Avenue, Golders Green, London NW11 0JR.

**DRAGON 32** software on tape, from £1.95. Send sae for list. ATL(D), 115 Crescent Drive South, Brighton, BN2 6SB.

**TI99/4A SOFTWARE ON TAPE,** from £1.95. Send sae for list. ATL, 115 Crescent Drive South, Brighton, BN2 6SB.

**COLOUR MONITOR,** suitable BBC Micro, £225. Tel: 0532 evenings or weekends, Mr Novick.

**SPECTRUM 32K RAM — £24-50**
*(Converts 16K to 48K)*
For Issue Two only—look in the back for a large chip in a socket in line with the 9 key. We supply a set of chips and full instructions. You need only a screwdriver—there is no soldering to do.
**£24-50 incl. VAT & P.P.**
* * * * * * * * * *

**HAPPY WITH YOUR DISPLAY?**
*Or do you have problems?*
- Are your whites yellowish?
- Is every other line a different colour—like Venetian blinds?
- Do your characters wobble? (Some wobble is bound to exist, but it can be reduced.)

We have prepared instructions to allow any Spectrum to give the best possible results, by adjusting internal controls.
**Send £1 plus S.A.E.** *(Sent free if you order the RAM.)*
**Fountain Computers Ltd., Darvill Road, Ropley, ALRESFORD,SO24 0BW**

**Dragon Software!**
**BARNSOFT**
**32K STARTREK**
Save the Universe from the Invading Klingons, **£6.50.**
***Barnsoft, 48 Waverley Road, Portsmouth***

**Got a DRAGON 32** or **TANDY** colour computer? Then you need your own monthly magazine "RAINBOW" for colour computer users. Send £1.50 and large sae for sample issue to: **ELKAN ELECTRONICS (Dept. POP), FREEPOST, 28 Bury New Road, Prestwich, Manchester M25 6LZ. Telephone 061-798 7613 (24-hour service).**

**EPROM PROGRAMMING SERVICE.** 2K/4K EPROMs supplied programmed to your requirements. Send sae for details to: Trent Micro Systems, 2 Parkdale Court, Kenilworth Road, The Park, Nottingham, NG7 1DD.

**BEEBTAPE 1;** Alien Brkblast, Earth Blockade, Twenty-one, Breakout (model b), only£4.20 inc. M. A. Paris, 38 Wooburn Manor Park, Wooburn Green, Bucks.

**SPECTRUM** software, why buy rubbish? Send for details first! (sae appreciated) Softtrax, 24 Sydenham Buildings, Bath, Avon.

**ZX PRINTER** almost new, £50 ono Tel: (0691) 6038 evenings.

**VIC20,** swap ORB 16K adventure for Llama Defenda or another adventure. Tel: Stevenage (0438) 811634 after 6 pm.

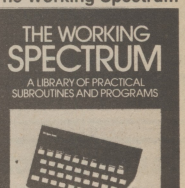
**SWAP VIC20** Pirate Cove adventure for any other Rom adventure. Tel: 0273 697021 after 6.30 pm.

**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**

**SINCLAIR SPECTRUM 48K,** with software and magazines, £200 ono. Tel: Llantrisant 223307 after 6 pm.

New book for Spectrum
**The Working Spectrum**




Published in association with *Popular Computing Weekly.*
**Send cheques/postal orders, for £5.95, to The Working Spectrum, *Sunshine Books,* Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.**
We can normally deliver in four to five days.

**BBC MICRO SOFTWARE**
**ARCADE STYLE GAMES (32K)**
**Gobbler:** Classic maze chase, uses keyboard or joy sticks. **£5.45.**
**City Defend.** Protect your cities, requires joysticks. **£4.95.**
Both including full instructions
Cheque/PO to:
**M.G.B. SOFTWARE SUPPORT LTD 52 BARLEY CROFT HARLOW, ESSEX**

**DRAGON GAMES**
Five super games for your DRAGON, supplied on ONE top quality cassette. AWARI, BURGLERS, BREAKOUT, MOONLANDER, OTHELLO. Fascinating entertainment at unbelievable low cost. £5.75 per cassette (incl P&P etc.) **J. Morrison (Micros), 2 Glensdale Street, Leeds LS9 9JJ**

**ZX SPECTRUM,** 48K, boxed, in original condition, £170 ono. Tel: 01-658 0645 (7 pm + weekends).

**ZX SPECTRUM,** 48K + printer + 5 rolls of paper, £210. Tel: 01-739 7780 (evenings).

**16K SPECTRUM** unused, £125. Tel: 061-432 4631.

**48K SPECTRUM** + printer + 3 books + software. Worth £269, will sell for £190 ono. Tel: 699-6215.

**SPECTRUM 48K,** £40 of software plus book and magazines, £180. Tel: 01-653 6825 after 5 pm.

**ZX SPECTRUM 48K** plus sound amplifier, printer with five rolls of paper, books and cassettes, £230. Tel: Levent Pancuk 01-567 4351 evenings and weekends.

**ZX81s for sale**

**16K ZX81,** Power Pack, leads etc. Plenty of mags and tapes, £70. Tel: Kidderminster 751417.

**ZX81,** 16K Ram, games tapes, £50 ono. Vaughan, Evesham (0386) 840492.

**ZX81, 16K** including Scramble, Invaders, Centepeed, Gunfight and more. Still under guarantee, very good condition, £65. Tel: 01-857 2905 (after 6 pm).

**16K ZX81,** proper keyboard, mother board, sound board, character board, printer, £250 of software. £130. Tel: 01-445 2519.

**ZX81 16K,** manual and leads supplied, some software, £50. Tel: 01-228 5069.

**ZX81 16K,** including £100 worth of software, £50. Tel: (0962) 60148 (evenings).

**ZX81 16K** with seven tapes, £60. Also ZX80 1K, £25. Both boxed as new. Tel: 01-591 1911.

**ZX81** with 16K Ram Pack, excellent condition, still under guarantee. Manual plus many games, £60. Tel: 0795 72176 after 5 pm.

**ZX81.** Fuller keyboard plus printer, 54K Memo Tec Ram plus Sinclair 16K Ram, 13 16K games, £150. Tel: Harlow 417618. Mr Adams.

**ZX81** plus 16K, as new, complete in box with book of 30 programs and 5 cassettes including Galaxy Invaders, Gunfight, Galaxian and Monster Maze, £60. Tel: Middleton-on-Sea 2128.

**ZX81 32K,** audio computer memory, extended keyboard by Redditch Electronics, software, books and magazines. Sinclair built, £90. Tel: M. Lyons, Bridlington 75107.

**ZX81 16K,** two books including manual, 12 software cassettes, cassette leads, £100 ono. Tel: Potters Bar 50498.

**ZX81 16K** plus DK'Tronics keyboard, 2X printer and two rolls of paper, tapes and £20-worth of books, £170 ono. Tel: Totton 866793 after 5 pm.

**ZX81 16K,** still under guarantee, two tapes, two books and leads, £55. Tel: Ongar (Essex) 362270.

**ZX81** with 16K Ram, magazines, ZX81 Pocket Book, software, £50. Tel: Dawlish (Devon) 865392.

**ZX81 1K** plus ICI cassettes, £35. Tel: Disley 4787 after 4.30 pm.

**SINCLAIR ZX81,** 16K Ram learning lab worth £20, eight software tapes worth £30. £90 wanted. Tel: 061-980 4592 evenings only.

**ZX81 16K,** Sinclair-built D.K. Tronics fitted, 4K graphics Rom, software, books plus manual, power supply and leads, £60 ono. Tel: 0538 754629 after 6 pm.

## Commodores for sale

**VIC20** colour computer, plus 8K Ram with 3 extra expansion slots, plus super expander cartridge plus £30 worth of software plus joystick and manuals worth £370. Sell for only £250. Contact Mr Cuenca, Camberley. Tel: (0276) 61435.

**VIC20,** cassette, 3 games, cartridges, lots of magazines and Vic Revealed, £160 ono. Tel: Derby 810 498.

**PET 4032, 4040** Disk drive, Epson MX80 FT printer, Papermate word processor, basic 4.0. Lots of games suitable for hobby or business, £1,200. Phone Steve Erith (38) 37437 evenings.

**VIC20 CASSETTE UNIT,** 3K super expander cartridge with hi-res, £50 of software including Asteroids, Scramble, Galaxians and Attack. Three books, only 3 months old and still under guarantee, £265. Tel: 01-866 5135 evenings.

**VIC20 19K** cassette. Avenger, Super Lander, Joystick, Intro to Basic, value £370. Starting price £245 reducing £1 per day till sold. Tel: 0271 830278.

**VIC20** with cassette unit. Unwanted gift. Sell for £140 ono. Tel: David on 061-228 0463 working hours.

**VIC20 8K ram,** hi-res graphics, C2N cassette unit, super expander cartridge, joystick, books, software (Galaxians, Scramble, Myroid, Attack, Dune Buggy, Ski Run and much more), only three months' old (nine months' guarantee remaining. Cost £350, want £260. Tel: 01-866 5135 evenings.

**VIC20,** £100; 3K Ram, £20; Programmers Reference Guide, £10; Vic Revealed, £7; other books, £10; machine code cartridge, £25. All as new. Tel: 01-882 0083 after 5 pm.

**VIC 20,** cassette unit, 16K Ram, Arfon expansion board, tool kit (including set, draw, fill etc) and software. Worth £650. Best offer accepted. Tel: Bedworth 316421 after 6 pm.

**VIC20 C2N** super expander, Super Lander cartridge and software, £190 ono. Tel: Baz 01-993 2778 or 01-995 6316.

## Acorns for sale

**ACORN ATOM,** 12K + 12K, floating point Rom, PSU, some games, books + mags, hardly used. £170 ono. Brammer, Tel: 01-228 2654 (after 6 pm).

**EXPANDED ACORN ATOM,** 12K Ram + 12K Rom + Floating Point Rom and PSU, all leads + manuals, 6 books, 30-40 games. Condition as new £200. Tel: Accrington, Lancs (0254) 397074.

**ATOM,** case, keyboard and power supply unit, £25. Tel: Mr Parker 01-586 1059 weekday evenings; Locks Heath 04895 3818 weekends.

**BBC MODEL B.** Lots of books plus software, £370. Tel: Reading 477715.

## Ataris for sale

**ATARI CONSOLE,** 18 cartridges and storage rack, spare joysticks, keyboard controllers, dust cover, excellent condition, £190. Tel: Potters Bar 57900.

**ATARI VCS GAME SYSTEM** with six cartridges: Defender, Missile Command, Asteroids, Championship Soccer, Outlaw Combat. New £230 offered for £150. Tel: 01-997 2017.

**ATARI VCS,** excellent condition with two cartridges, cost £153 accept £85. Tel: 01-467 7155.

## Tandys for sale

**TRS80 LEVEL II 32K,** twin disc drives, expansion interface with RS232C, £700. Tel: 01-594 5500 ext 49 (office hours).

**VIDEO GENIE I 16K** and Transtec 1200 Green Screen Monitor, nine months old, £250. Tel: 01-697 1094 (near Bromley, Kent, evenings).

**VIDEO GENIE I 16K,** excellent condition, hardly used, £190 ono. Tel: Mr Grivvell on Crawley 33099 after 6 pm.

## For sale

**DRAGON 32** with tape cables and recorder adventure tape, 6 weeks old, cost £235, only 199. Tel: 01-986 0272.

**ACETRONIC,** Black Jack Cartridge, £6 ono. Tel: Stoke-on-Trent 516235.

**ZX PRINTER** and 5 rolls of paper, complete with additional PSU, £60 ono. Tel: 01-521 1058.

**VIC20** machine language monitor cartridge, brand new, £25. Tel: 01-882 0083 after 5 pm or weekends.

**TANGERINE 48K,** cased, separate keyboard. Basic, user definable graphics. EPROM storage board and programmer, hi-res graphics (512 × 256) with mode PSU, software and manuals, £700 ono. Tel: 0792 798156.

**SHARP MZ80K 48K,** hi-res board, nine Basics including Xtel, Pascal, Fortran, machine code, Forth, Zem assembler, dis-assembler, over £700. software of all types on all languages. Realistic offers. N. Ingram (05438) 5265.


# SOFTWARE DRAGON PROGRAMS

**22 PRESTWICK DRIVE, BISHOP'S STORTFORD, HERTS CM23 5ES. Telephone: 0279 52401**

**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.
..... **£7.95** .....

**GOLF** by Pete Allen
Over 20K of Basic, giving you full 18-hole golf course with handicaps, choice of clubs, golfing weakness must be specified, full colour graphics and sound including score card.
..... **£7.95** .....

**GAMES PACK 1**
Space Wars by John Line.
Torpedo by Erik Pattison.
Sheepdog by Erik Pattison.
Snake by Christopher Hunt.
..... **£7.95** .....

**GAMES PACK 2**
Landing by Peter Chase.
Hangman by Christopher Hunt.
Speedboat by Peter Chase.
Battleships by C. A. Castle.
..... **£7.95** .....

**CHARACTER GENERATOR**
by John Line
Create and use your own symbols and character sets on the Dragon's high resolution graphics screens. Written in Basic for ease of use, comes with complete ASCII character file and demonstration program.
..... **£7.95** .....

**MONSTER MINE** by W. E. MacGowan
Also available for the ZX81 and Spectrum.
..... **£4.95** .....

ALL THE ABOVE CASSETTES AVAILABLE, MAIL ORDER THROUGH **GEM SOFTWARE** OR CALL IN AND SEE OUR RANGE OF SOFTWARE AND HOME COMPUTERS
AT

WE ARE CURRENTLY LOOKING FOR TOP QUALITY SOFTWARE FOR DRAGON AND LYNX

TRADE ENQUIRIES WELCOME. CONTACT GEM SOFTWARE

# µicroWorld

**2 CRAWFORD ROAD, HATFIELD, HERTS 07072 64137**

"OPENING SOON" BISHOP'S STORTFORD BRANCH OF MICROWORLD "OPENING SOON"

# FINANCIAL MODELLING
# CASH FLOW FORECAST
# BUDGETING

13 columns
number of rows dependent on memory used

Row and column arithmetic
incl. % calculation
Each row on screen if needed
Printout for columns wanted

Extensive manual

For SPECTRUM 48K only

**£40.00 incl.**

## C.P.S.
**14 Britton Street**
**London EC1M 5NQ**

---

*FOR THE FIRST TIME*
*ANYWHERE IN THE WORLD!*

# ASTROLOGY
## ON YOUR SINCLAIR ZX81 COMPUTER (16K)

USER PROMPTING PROGRAMS: merely key in birth information as requested by the computer — READ OUT (and/or PRINT OUT) what is normally the result of many hours of painstakingly tedious and complex mathematical calculations using tables, ephemera, etc. .

Cassette I ZODIAC I ONLY **£10.00**

makes truly AVAILABLE AT YOUR FINGERTIPS
THE SIDEREAL TIME OF BIRTH.
THE ASCENDANT AND MIDHEAVEN in Sign, Degrees, Minutes, and Seconds for EQUAL HOUSE SYSTEM.
THE SIGNS AND POSITIONS OF THE HOUSE CUSPS in Sign, Degrees, and Minutes for the PLACIDEAN SYSTEM.
THE SUN AND MOON POSITIONS in Sign, Degrees, Minutes and Seconds.
ALL THE PLANETS POSITIONS in Sign, Degrees and Minutes.
THE LUNAR NODE — THE PART OF FORTUNE — THE VERTEX, AND A HOST OF OTHER BIRTHCHART INFORMATION AT THE TOUCH OF A KEY.

Cassette II ZODIAC II ONLY **£8.00**

GIVES YOU THE ASPECTS

Other programs in course of preparation include: PROGRESSING THE HOROSCOPE; RECTIFICATION OF THE BIRTH TIME, etc.

## STELLAR SERVICES
**8 FIR TREE VALE, LEEDS LS17 7EY**
**Tel: (0532) 692770**

---




7 LEVELS, RAPID FIRING, LASER SHIELD, MOTHER SHIP, RE-FUELLING, SMART BOMBS, 3 WAVES, HIGH SCORE SPECTRUM VERSION HAS SOUND AND GRAPHICS. ONLY **£4.50.** FOR SPECTRUM OR 16K ZX81. P.C.W. "ONE OF THE BEST SINCLAIR GAMES YET". Y.C. "THE ACTION IS FAST."

**AND NOW SPECTRUM SCRAMBLE**

**"CONDITION RED",** M/CODE ACTION, 8 DIRECTIONAL KEYS, MISSILES, FUEL DUMPS, METEORS, USER GRAPHICS, SOUND. MOVE, FIRE AND BOMB AT THE SAME TIME. HIGH SCORE, FAST ACTION AND DELIVERY. **£4.95**

**"ZX81 CONDITION RED",** ZX81 VERSION. MOVE UP/DOWN, FIRE LASERS. FAST M/CODE. HIGH SCORE TABLE. BY ARCADE GAMES FOR ZX81 USERS. **£3.95.**

**DRAGON, ZX81, SPECTRUM PROGRAMS WANTED**

**WORK FORCE. 140, WILSDEN AVENUE, LUTON, BEDS.**

---

## CHRISTMAS
# it MICROFEST '82

**Micro Fair and Seminar for all users**
**HARDWARE. SOFTWARE. PERIPHERALS.**

ADMISSION
ADULT ..... £2.00
CHILD (under 16) ..... £1.00
(half price with coupon)

Exhibition and other diversions for ZX, B.B.C. Micro, VIC, TRS, Sharp, Sorcerer, Video Genie, Tangerine, Nascom, Atari, Pet and Acorn user.

10 Free draw for MICRO computer
20 Club Stands
30 Bring and Buy stall
40 Free parking
50 Review of Sinclair Spectrum
60 Lectures on small micro applications
70 Free Films
80 Bar and refreshments
90 Close to centre and Piccadilly station
100 Free Coffee
110 Facilities for the Disabled



UNIVERSITY OF MANCHESTER INSTITUTE OF SCIENCE AND TECHNOLOGY, SACKVILLE ST., MANCHESTER.

SATURDAY 11, 10.30 – 21.00
SUNDAY 12, 10.30 – 18.00
DECEMBER 1982

## Ziggurat



# A fallacy of the division of labour

If it takes three days for 12 politicians to dig four holes in the ground, how long does it take for 15 politicians to dig half a hole?

The answer: it is not possible to dig half a hole, for a hole is a hole be it ever so shallow. We might have asked how many holes the coalition could dig in a day, and the answer would not have been 5/3 holes.

Sometimes the article with which we are working is not amenable to simple quantitative notions. "Hole" is not an easily quantified object, though holes of specified dimensions can easily be specified. ". . . There are 20,000 holes in Blackburn, Lancashire: How many holes would it take to fill the Albert Hall? . . ."

Frederick P. Brooks, Jr, writes (in *The Mythical Man-month*, 1972) that to add more people to the production of a piece of software does not usually shorten the time taken to complete it. In fact, adding people *extends* the time needed to complete it. Software production is a human exercise in complex relationships, for every person needs to know something of what the others are doing. Even if the project has been partitioned into small segments to save time, adding more people means that communication time has to increase, and "adding more men then lengthens not shortens, the schedule."

The "mythical man-month" of Brooks' title is the assumption that, if it takes 12 man-months to produce an item of software, it is possible to employ *either* 12 people for 1 month *or* 1 person for 12 months; whereas it might take 12 people 6 months in reality.

Brooks makes the point that though the division of labour works in conventional manufacturing — making metal pins for example — this is not true of products of the mind. He says: "Men and months are interchangeable commodities only when a task can be partitioned among many workers *with no communication among them.*"

When making pins or electronic gadgets, there is very little need for communication — but this cannot be said of software production or the design of new gadgets. The Apple II computer was designed by two men (one hardware, one software); the Sinclair series has been designed by small teams; the Osbourne 1 is the result of one man's vision; and the story is being repeated all the time in the UK and USA.

Japan is the world leader in manufacturing gadgets, a fact with which governments are only too well acquainted. The Japanese strength is in producing and improving goods, which others have designed and invented, more cheaply than they themselves are able. The Japanese reputation for innovation is mostly a reputation for improvement. Their position as leader in the production of cheaper gadgets is now under attack from many other countries (including Hong Kong, Singapore and Taiwan) who can produce pins more cheaply.

The nature of Japanese society is bureaucratic, paternalistic, and deferential, and the individual tends to be lost. As there has been so little good software produced by the Japanese, perhaps we might postulate that this is the reason? To create pins (or gadgets) requires efficiency, and the man-month argument fits. To create intellectual products requires a more complex approach to people. Programmers are not assembly-line workers. The Japanese government has realised that others will under-cut them in production, so they have set up the Fifth Generation Project. To speed up the production of *software* they are employing thousands of people . . . ■

**Boris Allen**

## Puzzle

# Expressing squares in twos

**Puzzle No 33**

Fifty is the smallest number that can be expressed as the sum of two squares in two different ways: seven squared plus one squared or twenty-five squared plus twenty-five squared.

What are the next three higher numbers that can be formed, in the same way, as the sum of two squares in two ways?

**Solution to Puzzle No 28**

We must find a number, *N*, which, when divided into each of the four numbers given (1702, 3064, 5334 and 6696), produces the same remainder. In the program below the value *N* is repeatedly subtracted from the first of the numbers until the remainder, *R*, is found. This value is then subtracted from each of the other three numbers and each is tested to see if it is a multiple of *N*. Since the highest value is required, *N* is started at 1702 and is decremented by one each time the loop is run.

```
10 FOR N = 1702 TO 1 STEP - 1
20 LET R = 1702 - N
30 IF R < 0 THEN LET R = R + N
40 LET A = 3064 - R
50 LET B = 5334 - R
60 LET C = 6696 - R
70 IF A/N - INT (A/N)<>0 THEN GOTO 120
80 IF B/N - INT (B/N)<>0 THEN GOTO 120
90 IF C/N - INT (C/N)<>0 THEN GOTO 120
100 PRINT N
110 STOP
120 NEXT N
```

This gives us the answer of 454 leaving, in each case, a remainder of 340.

**Winner of Puzzle No 28**

The winner is J P Mensink, Acomb Crescent, Newcastle-upon-Tyne, who receives £10.

## Top Sellers

**Atari**

| | | |
|---|---|---|
| 1 | Jumbo Jet Pilot | (Thorn EMI)* |
| 2 | Submarine Commander | (Thorn EMI)* |
| 3 | Soccer | (Thorn EMI)* |
| 4 | Preppie | (Adventure International) |
| 5 | Claim Jumper | (Synapse) |
| 6 | Air Strike | (English Software) |
| 7 | Diskey | (Adventure International)† |
| 8 | Alien Swarm | (Inhome Software) |
| 9 | Snooker/Billiards | (Thorn EMI) |
| 10 | Frogger | (Sierra On-line) |

*Cartridge. †Disc only.
(Figures compiled by Calisto Computers, Birmingham 021-632 6458)

**ZX81***

| | | |
|---|---|---|
| 1 | Gauntlet | (Colourmatic) |
| 2 | Frogger | (DJL Software) |
| 3 | 3D Defender | (JK Greye) |
| 4 | Sea War | (Panda) |
| 5 | Gulp II | (Campbell Systems) |
| 6 | Monster Maze | (JK Greye) |
| 7 | Subspace Striker | (Pixel) |
| 8 | Maze Man | (Abbersoft) |
| 9 | Chess I | (Artic) |
| 10 | Database | (Campbell Systems) |

*All require 16K Ram.
(Figures compiled by Buffer Micro Shop, London, 01-769 2887)

**ZX Spectrum**

| | | |
|---|---|---|
| 1 | Invaders | (Bug-Byte) |
| 2 | Escape | (New Generation) |
| 3 | Orbiter | (Silversoft) |
| 4 | Star Trek | (Chromasoft)* |
| 5 | Meteor Storm | (Quicksilva) |
| 6 | Masterfile | (Campbell Systems)* |
| 7 | Maze Man | (Abbersoft) |
| 8 | Gulpman | (Campbell Systems) |
| 9 | Spectrum Chess | (Artic)* |
| 10 | Personal Banking | (J P Gibbons)* |

*Requires 48K.
(Figures compiled by Buffer Micro Shop, London, 01-769 2887)

**Vic**

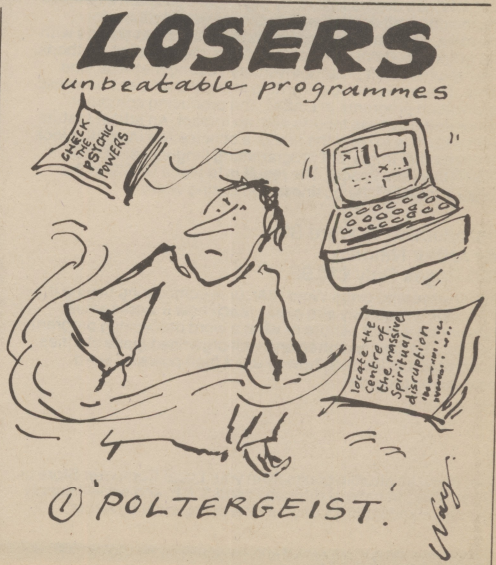
| | | |
|---|---|---|
| 1 | Sargon II Chess | (Commodore)* |
| 2 | Defenda | (Llamasoft)† |
| 3 | Super Expander | (Commodore)* |
| 4 | Blitz | (Commodore) |
| 5 | Spiders of Mars | (Audiogenic)* |
| 6 | Jellymonsters | (Commodore)* |
| 7 | Star Battle | (Commodore)* |
| 8 | Grid Runner | (Llamasoft) |
| 9 | Traxx | (Llamasoft)† |
| 10 | Scramble | (Rabbit) |

*Cartridge. †Requires 8K or 16K.
(Figures compiled by the Vic Centre, London, 01-992 9904)

**Books**

| | | |
|---|---|---|
| 1 | Starting Forth, *Brodie* | (Prentice Hall) |
| 2 | ZX Spectrum Explored, *Hartnell* | (Sinclair/Browne) |
| 3 | BBC Micro Revealed, *Ruston* | (Interface) |
| 4 | ZX81 Users Handbook, *Terrell and Simpson* | (Newnes) |
| 5 | Easy Programming for the ZX Spectrum, *Stewart and Jones* | (Shiva) |
| 6 | Z80 Assembly Language Programming, *Leventhal* | (Osborne) |
| 7 | Over the Spectrum, *various authors* | (Melbourne House) |
| 8 | Programming the 6502, *Zaks* | (Sybex) |
| 9 | Machine Code and Better Basic, *Stewart and Jones* | (Shiva) |
| 10 | Atari Sound and Graphics, *Moore* | (Wiley) |

(Figures compiled by Watford Technical Books, Watford, 0923 23324)



# TOOLS FOR THE BUSINESS MAN!




THE COMPUTER BOOKSHOP IS THE SOLE U.K. DISTRIBUTOR FOR ALL SYBEX BOOKS

**BASIC for Business**
**By Douglas Hergert**
**224 Pages Only £10.95**

This book offers a clearly mapped out, step-by-step introduction to BASIC, oriented toward the business user. All the elements of BASIC are covered, including input/output commands, IF/THEN decisions, FOR loops, arrays, subroutines, strings, and advanced features. Different versions of BASIC are discussed. Many significant program examples are included, all dealing with business applications; for example, comparative income statements, sales reports with bar graphs, present value calculations, depreciation methods, cost-volume-profit graphs, inventory costing methods, and more. The emphasis is on writing clear and efficient business application programs in BASIC, and producing computer-generated business reports with an impact. An added feature of this book is to offer the reader a concise, yet insightful look at three other important programming languages: COBOL, FORTRAN, and Pascal. The result is to place BASIC in the larger context of the business computing world.

**Introduction to Word Star**
**By Arthur Naiman**
**200 Pages Only £10.95**

For anyone who owns Word Star, or is considering buying it, this book will quickly and easily teach how it works while presenting a clear picture of what a word processing program can do. The clearly written and well organised guide clarifies the process of learning how to use a high-powered word processing program.

**Executive Planning with BASIC**
**By X T Bui**
**197 Pages Only £10.50**

This invaluable book has 3 goals.

1. To explain the quantitive methods of management decision making in clear and practical terms.
2. To dispel the idea that programming is only for specialists and that it is practical for management to have direct access to computers for analysis, planning and control.
3. To provide an efficient and time-saving set of computer implementations for quantitive analysis.

**Introduction to Word Processing**
**By Hal Glatzer**
**300 Pages Only £10.95**

Why "process" words? Why not just type? The electronic revolution that gave us calculators has now given us word processing machines that remember, display, edit, correct and print entire pages faster than any person can. Yet these sophisticated machines are as easy to operate as a typewriter and no more expensive than an office copier. If you write letters, organize reference materials, produce articles, reports, contracts or any other materials, a word processor will help you save time, and improve accuracy and efficiency. This book explains in plain language what a word processor can do, how to use one, how it improves productivity – especially in businesses that handle lots of words – and how to buy one wisely.
LEVEL: No technical knowledge required. For all first-time users and those considering the purchase of a word processor.

Get these invaluable books from your Local Computer Store or Book Shop. In case of difficulty send S.A.E. and we will supply the name and address of your nearest stockist by return.

Dept. PC **The Computer Bookshop**

**30 Lincoln Road, Olton, Birmingham B27 6PA**