

POPULAR Computing WEEKLY

35p

10-16 February 1983 Vol 2 No 6

This Week

ZX81 software

Tony Bridge assesses some of the latest software to come on the market for the ZX81. See page 12.

Spectrum type-founts

Ian Farquharson explains how to create different type-faces on the Spectrum by resetting Ramtop. See page 24.

Vic search

Colin Cattnach presents two programs for looking through the Vic's memory for a particular word or character. See page 22.

Dragon dictionary

David Lawrence completes his character generation program and explains how to hold up to 100 characters in memory at any one time. See page 25.

★ STAR
The Cavern on 16K
Spectrum by David
Leitch. See page 8.
★ GAME

News Desk



Display stands at the Toy and Hobby trade exhibition.

Toy trade moves into computers

THE 1983 British Toy and Hobby trade exhibition has now come and gone — leaving behind three new micro-computer systems.

Considering the recession that has settled over the UK toy industry in recent years, the trade show was a flamboyant affair. Almost 500 exhibitors took part, filling the whole of the Earl's Court Ex-

hibition Hall on two levels.

Apart from the traditional toy areas, this year's fair showed the first signs of the fundamental changes taking place in the industry as the computer and video games boom begins to take hold.

Well known games machine manufacturers were there — Atari and Mattel — and both

Continued on page 5 col 1

Mattel enters micro market

MATTEL, the American company behind the Intellivision video games system, has announced that it is to move into the home computer market.

The company is to launch a new computer system, the Aquarius, and is also to sell a range of add-ons which will give the Intellivision computing power.

The Aquarius is a Z80A-based machine with full-size integral keyboard and 4K Ram, expandable to 52K in 4K or 16K modules. It has 16 colours, three sound channels, and 256 graphics characters. Running Microsoft Basic, the display is both upper and lower case in a 40 × 24 character format — 320 × 192 pixels.

The machine will cost in the range £120 to £139, and be available in September.

A range of add-ons is also planned for the Aquarius. At the time of launch a dedicated thermal printer, cassette player, and mini expansion unit will be available. The

Continued on page 5 col 2

Classified

Computer Swap 01-930 3266

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

COMMODORE PET 16K, with cassette unit, work books, manuals, tapes, dust cover. Mint condition, £375. Tel: Office hours 073-672 477. Mr Measures.

16K SPECTRUM, with manual + leads + books + games tape, £130 ono. Tel: 0298 78098.

Classified

MICROLINE 80 PRINTER. Little used + accessories, £140. Tel: 01-458 5254.

ATARI 400, 16K. Still seven months guarantee left, £165. Basic cartridge, £25. Recorder, £35. Many games, cartridge + cassette. Tel: Leicester (0533) 554730 (Geoffrey).

EDUCATIONAL SOFTWARE DRAGON AND BBC COMPUTERS

High quality educational software for use in home and school. Physics, biology, maths. Send for full details (state main interest).

GARLAND COMPUTING,
35 Dean Hill, Plymouth,
Devon PL9 9AF

Classified

ZX81, Sinclair-built, leads, manual, work station, software, book and magazines, £50 ono. Tel: 01-402 9787. Commodore For Sale

VIC20 + cassette unit, + 3K Ram + high res. package, machine code, monitor and machine code book + various games, £210. Tel: Caterham 45776 after 6 pm.

DRAGON 32 or TANDY TRS-80 Colour? Lots of programs — lots of useful hints and information EVERY single month in "RAIN-BOW", an exciting new 200-page magazine from USA. Send £1.95 (plus large 56p s.a.e.) for sample issue to ELKAN ELECTRONICS (Dept. PCW), FREEPOST, 11 Bury New Road, Prestwich, Manchester M25 6LZ or telephone 061-798 7613 (24-hour service).

Classified

BBC MODEL B 32K. Under two months + guarantee, £390 ono. Tel: 01-993 3723 (Dave).

PET 32K, with toolkit and cassette, green screen. New Rom, including micro chess + games programs, £300 ono. Tel: Mr King, daytime 061-928 6400, evenings 0625 25230.

ZX81 + Mornotech 32K Rampack, printer, two power supplies, Psion flight simulation, cassette and leads, £110 ono. Tel: 01-368 7328.

ZX81 + 16K + lots of bought and pre-rewarded software and magazines, value £150, sell £85. Tel: Llanelli 78159.

Continued on page 28



BRITAIN'S HOME COMPUTER WEEKLY



SINCLAIR BUSINESS USERS (Software for ZX81 16K)

ACCOUNTS

For preparation of accounts from incomplete records. Produces nominal ledger, profit and loss account and balance sheet.

Sole trader £17.50. Limited company £17.50.
Sole trader and Limited company £25.00.

SALES

Produces sales day book, sales and VAT analyses, statements and list of debtors. Can handle up to 50 accounts and 200 monthly transactions.. £20.00.

PURCHASES

Produces purchase day book, purchases and VAT analyses, statements and list of creditors. Can handle up to 50 accounts and 200 monthly transactions. £20.00.

Combined price of Sales and Purchases – £25.00

MAILING LIST

This program can hold up to 90 names and addresses. Labels can be printed selectively using previously defined criteria. £3.00.

Further details from:

HESTACREST LIMITED

PO Box 19, Leighton Buzzard, Beds LU7 0DG

CAMPBELL SYSTEMS

The very best in machine code for
ZX81 and Spectrum

ZX81 16K GULP II Spectacular arcade game of the xxxMAN variety. "The best ZX81 game I have ever played" says John Fox of Osset W. Yorks — and so say many others. Entertains even just in demo mode. £4.75

ZX81 16K-64K THE FAST ONE business/domestic filing and reporting system, the best there is. Fully user-defined data and reports, sorting, totalling, printing, all menu-driven, a tool for the professional-minded. Absolutely crash-proof. With 11-page manual, £12.00

Spectrum SPDE Disassembler and Editor, fast self-relocating development tool. Shows all Z80 op codes and operands. £5.95. We used it to make...

Spectrum GULPMAN: this is GULP II plus colour and sound and is already a favourite for Spectrum. £5.95

Spectrum 48K MASTERFILE — the long asked-for equivalent to THE FAST ONE, with even more features which include separate files and full menu-driven report building. Almost total machine code. Yes, we will support the microdrive when they arrive. With full documentation and sample file, £15.00

All programs supplied double-recorded and sped 1st class return post. Prices include VAT and postage. SAE for full catalogue.

CAMPBELL SYSTEMS

(Dept WPC)

15 Rous Road, Buckhurst Hill,
Essex IG9 6BL, England.

ZX SPECTRUM KEYBOARDS PROGRAM SOUND GEN BUSINESS MEMORY	ZX81/80 SOFTWARE HARDWARE	ZX SPECTRUM KEYBOARDS PROGRAM AIDS SOUND GENERATORS BUSINESS PROGRAMS MEMORY EXTENSIONS	PRINTERS USER GROUPS BOOKS CONSOLES GAMES JOYSTICKS	ZX81/80 SOFTWARE HARDWARE MONITORS MAGAZINES COMPUTERS	ZX SPECTRUM KEYBOARDS PROGRAM AIDS SOUND GENERATORS BUSINESS PROGRAMS MEMORY EXTENSIONS
------------------------------------------------------------------------	---------------------------------	--------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------	-----------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------



See us at the ZX Microfair!

If you own a ZX81 or SPECTRUM — or if you're thinking of buying for the first time — the **ZX MICROFAIR** is not to be missed!

There's literally everything for the beginner, amateur, enthusiast and professional.

A fantastic range of products from both the established manufacturers and the newer ones!

There's a bring and buy sale and a complete show guide available on the day.

It's a good day out and the opportunity of learning everything there is to know about ZX Computers.

The facilities at the hall include Bar, Restaurant and lots of seating!

Make a note of it now, or write to Mike Johnston, 71 Park Lane, London N17 0HG for advance tickets (Cheques etc made payable to ZX MICROFAIR and please enclose S.A.E.)

At 80p for adults and 50p for kids (under 14) it must be a bargain!

6th.
ZX MICROFAIR

SAT FEBRUARY 26th • NEW HORTICULTURAL HALL LONDON SW1 • 10am - 6pm

The Team

Editor

Brendon Gore

News Editor

David Kelly [01-930 3271]

Sub-editor

Ninette Sharp

Editorial Assistant

Theresa Lacy

Advertisement Manager

David Lake [01-839 2846]

Advertisement Executive

Alastair Macintosh [01-930 3260]

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 1983

Subscriptions

You can have *Popular Computing Weekly* sent
to your home:

UK Addresses

26 issues £9.98

52 issues £19.95

Overseas Addresses

26 issues £18.70

52 issues £37.40

How to submit articles

Articles which are submitted for publication
should not be more than 3,000 words long. The
articles, and any accompanying programs,
should be original. It is breaking the law of
copyright to copy programs out of other maga-
zines 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 submit-
ted 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

Creativision, Grandstand home computer.

Letters

7

LMX Eprom Programmer.

The Cavern

8

A new game for 16K Spectrum by
David Leitch.

Street Life

11

David Kelly talks to the men behind the
Oric 1.

Reviews

12

Tony Bridge looks at some of the latest
software for the ZX81.



Open Forum

15

Six pages of your programs.

Programming

22

Colin Cattanch presents character
recognition and word search for the
Vic20.

Spectrum

24

Ian Farquharson explains how to create
different type-founts for the Spectrum.

Dragon

25

The Working Dragon — part 4 of our
program to mix text and hi-res graphics.

Competitions

31

Puzzle, Ziggurat, Top 10, Losers.

Editorial

In a letter to *The Times* (February 3),
Clive Sinclair argued for the establish-
ment of a free port in Dundee.

The basis of Sinclair's argument is
that he has to pay 17 percent duty on
semiconductors imported from outside
the EEC. This compares with a duty of
just 5 percent charged on completed
computers that are imported from non-
EEC countries. The net result is to
place Sinclair at a distinct disadvan-
tage *vis-à-vis* his foreign competitors.

In the absence of any sign from the
government that it is willing to remove
the duty on semiconductors, it makes
sense to establish a free port. This
would allow Sinclair to import semi-
conductors, provided they were all
subsequently exported, without
paying the 17 percent duty. British
built Sinclair micros would then be
able to compete with their foreign
competitors on at least equal terms.

Sinclair estimates that the establish-
ment of a free port in Dundee would
generate hundreds of extra jobs, just
to meet the needs of his company.

Unfortunately, the Customs and Ex-
cise Board is against the idea of free
ports. The Board cannot see that free
ports would serve any useful purpose.

Who do they think they are kidding?

Next Thursday

Dare you try to find your way through a
maze of sleeping dragons? Find out
next week in Ian Mercer's exciting new
game for the Dragon 32.

Other highlights in next week's issue
include a review of the IBM Personal
Computer by Boris Allan, a ticket
machine program for the ZX81 by Nick
Godwin and an investment decision-
making program for the BBC micro by
Dan Mitchell.

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.

Chameleon Computer Games



New Seewolf — All action Supergame

Up periscope, find the convoy in your vicinity, sink what you can, but the destroyer patrol knows you're there, so dive deep and use your instruments and sonar to escape.

- For Spectrum only - £ 9.50

Atari and Spectrum 16k

ADVENTURE GAMES : £ 9.50 each
TOWER OF BRASHT : Release your companion from the terrible Kharrs, a role playing game, 1-7 players.

GHOST OF RADUN : Having discovered the treasure can you escape from the forces of the supernatural ...

WIZZARD OF SHAM : The wizzard of the temple must be found, if you want to live on

WAR GAMES : £ 9.50 each
KING ARTHUR : 6th Century England, become Arthur and plan your strategy to overcome marauding Saxons.

BATTLE OF THE BULGE : Ardennes, 1944. The famous "Von Rundstedt" offensive

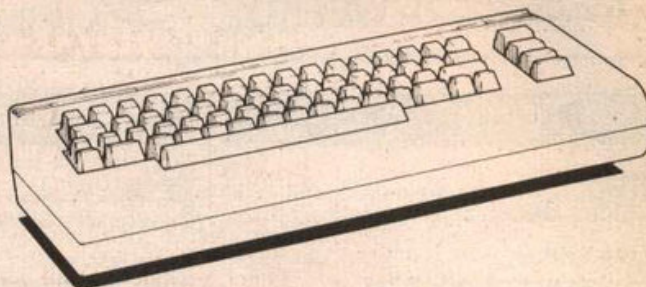
CHILDRENS GAMES : £ 4.50 each
PETER RABBIT SERIES :
 Peter Rabbit and the Magic carrot

Please add 50p P&P for each order

LYNTONIA HOUSE 7-9 PRAED ST. LONDON W2
 Telephone 01 402-7270, Telex 8953471



SPECIAL OFFER



Vic-20 Computer £129.99 (incl. VAT)

The Vic Centre has London's most comprehensive range of Vic-20 and Commodore 64 hardware and software. Telephone or call at The Vic Centre, 154 Victoria Road, North Acton, London W3 (opposite North Acton tube station) just off the A40.

Telephone: 01-992 9904

Monday-Saturday 10.00am-5.00pm

VISA, ACCESS, AMEX

C★TECH SOFTWARE

Is this the end of
SPACE INVADERS
 as we know it?

KONG

An Unbelievable Video Game from C Tech. If you want the latest in Software then this is for you.

The Program begins with a full colour KONG jumping across the screen causing the stairway to tilt out of place, then your man must run up the ladders avoiding KONG'S barrels to rescue his girl.

The final scene has lifts and fireballs all in full colour, sound and with M/C subroutines.

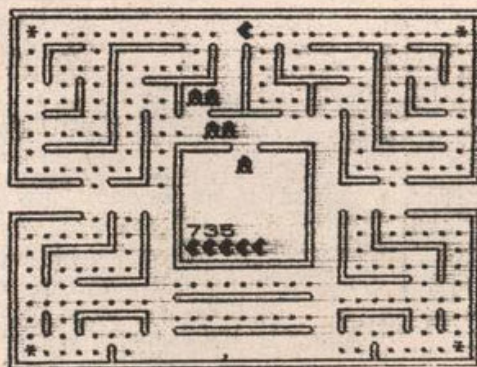
plus
 Panic Island



PANIC ISLAND

The Standard Panic Program has been modified to produce Panic Island, where you must bury Monsters and hunt for buried Treasure... before they hunt you.

SPECMAN AND FROGGER



2 FANTASTIC MACHINE CODE GAMES FOR 16K OR 48K SPECTRUM FOR ONLY £5.

Available now in good computer shops, and mail order.

FOR THE 16K OR 48K

SPECTRUM £5-00

184 Market Street, Hyde, Cheshire 061 366 8223



Toy trade moves

Continued from page 1 col 3

had new machines to show. Atari displayed the 5200 games machine — the successor to the Atari VCS. Mattel moved into the computer market with two ranges — computer add-ons for the Intellivision System and a new computer — the Aquarius.

Two other computers were seen for the first time in Britain — the Grandstand Computer from the Japanese company Tomy, and the Creativision System from Video Technology.

Computer manufacturers were also represented — Commodore and Dragon. Commodore showed the Vic20 and the 64, the latter with a hi-fi sound add-on.

Into the leisure zone

CREATIVISION is a new modular home computer system that builds up from a basic games machine into a sophisticated personal computer.

The starter unit is a 6502A-based machine, running 12K Rom Microsoft Basic with 16 colours, four sound channels (three music, one noise) and 16K Ram. The screen display format is 28 × 24 characters and 256 × 192 pixels.

A wide range of extension modules can be added, simply by clipping them together.

Among the options are: 16K memory expansion units (£39) — expandable up to 64K, cassette drive (£39.95), RS232 and Centronic interfaces (£39 each), modem and disc drive.

At the time of launch an extensive range of software will be available. Extended Microsoft Basic will be available in Rom. Games in Rom will be priced at £19.95 each. Cassette software will be launched in several areas — games, education, home and business applications.

V-Tech, a division of Leicester-Zone, was set up last year to develop electronic consumer products. The company

Mattel takes on the computer market

Continued from page 1 col 4

Aquarius has one expansion port — for either a Rom cartridge or expansion Ram — into which the mini expander fits giving two expansion ports — cost around £50.

Other peripherals will follow in 1984 — floppy disc drive, modem and a Master Expansion Module giving Extended Microsoft Basic and two hand controllers.

Software for the Aquarius is aimed at home management, education and entertainment. Initially, Logo will be available on Rom, home finance, file handling packages, and the best of the games titles presently on the Intellivision, will appear.

At the same time, in September, Mattel will launch its Entertainment Computer System — a range of add-ons for the Intellivision system giving the games machine a computing capability.

The central unit of the new system is the Intellivision Computer Adaptor. This module plugs into the Rom port on the games machine giving it 2K of additional Ram, Microsoft Basic in 12K Rom and a full-size full-travel keyboard. It will also provide additional sound channels, bringing the total to six. An RS232 interface on the unit allows a printer or modem to be connected.

The Computer Adaptor will sell for substantially less than £100.

Several other add-on units can be connected to the Adaptor: A Music Synthesizer 49-key full-size music keyboard add-on will cost around £80; two extra hand controllers can be connected allowing four

is headed by Kenneth Lasky, formerly Managing Director of the Laskys Hi-Fi chain, and Richard Abbott, formerly Merchandise Director of Dixons Retail Division.

The Creativision computer system will be launched in June and will cost £99.95.

player games; and the Program Expander unit gives an additional 16K Ram and 8K Rom with Microsoft Extended Basic — cost around £50.

Mattel's European Marketing Manager, Peter Fitters, explains: "The Intellivision system, originally launched in

1980, was always a modular system designed to expand far above the games market. With the new computer add-ons people can go step by step — when they want to begin computing they can build up a home computer."

Cartridge software — which plugs into the Rom port on the Computer Adaptor — will include a Basic teaching package and games based on the Flintstones and Scooby-Doo characters.



New machine from Japan

TOMY, the Japanese toy manufacturer, is to market its 16-bit microcomputer in the UK.

To be called the Grandstand Computer, it has 16K Rom, 16K Ram and a full-size keyboard. The machine is based around the TMS 99/98 chip and has a 256 × 192 pixel resolution which is dot-addressable in 16 colours.

It is unusual in that it has three modes of operation — a Basic programming mode, a Rom cartridge playing mode, and a graphics drawing mode.

The Basic mode has only 19 Basic commands but this can be up-graded to provide a more extensive programming capability. The up-grade also allows a printer and floppy disc drive to be connected.

The Rom cartridge mode converts the machine into a sophisticated games machine. Games cartridges will cost £9.95.

The Graphics mode offers a quick way of defining characters and producing simple

animation. In the lower, smaller part of the display an 8 × 8 character display can be programmed, one colour per square. This can then be converted into a single user-defined character on the main display located according to the position of a cursor. In this way the whole of the main screen can be defined. In addition, four 16 × 16 pixel sprites can be defined — two programmable from the keyboard, two moveable by games paddles.

The Grandstand Computer is being distributed by Adam Computer Systems. The basic machine will be available in the summer, priced around £160.



Commodore soundbox

MICROTRADING has designed what it calls a Hi-Res Soundbox for the Commodore 64 machine.

The unit gives the computer high quality sound reproduction and incorporates two loudspeaker drive units. It will

accurately reproduce notes between 50Hz and 10kHz at an output of 10 Watts RMS.

The soundbox is available from Microtrading, 641 Bromford Lane, Ward End, Birmingham, priced at £49.45 including VAT.



ROMIK SOFTWARE

24 Church Street, Slough SL1 1PT. Telephone: Slough (STD 0753) 71535

SHARK ATTACK For unexpanded Vic20

You are in shark-infested waters after being thrown overboard from a pirate ship. Your only protection being an atomic net which you trail behind you, trying to cover all the visible ocean and ensnare the sharks at the same time. Beware of stopping or covering your tracks for too long, if you do, then the sharks will escape and come after you. Watch out for the ever increasing deadly octopuses (sometimes the sharks will eat part or all of one!)

MOONS OF JUPITER

For expanded Vic20, 3K, 8K or 16K

You are the Commander of a fleet of destroyers looking on from the safety of a mother ship, you send in one destroyer at a time to blast a passage through the MOONS OF JUPITER. Your destroyers have to dodge, and blast the UFOs... Watch out for the Gologs they can smash your destroyers, but you cannot harm them.

A Machine Code Arcade Quality Game

SEA INVASION Unexpanded Vic20

Fight off the attacking sea creatures for as long as you can. Shoot the whale for a surprise score, watch out for the crabs, starfish and octopuses.

MARTIAN RAIDER For unexpanded Vic20

Skim as close as you dare to the surface of the planet, devastating the Martian cities, destroying ammunition dumps (gaining more time), shooting down the ground-to-air missiles.

SPECIAL OFFER C4 COMPUTER CASSETTES

£2.50 for 10; £20 for 100

Available post free from the above address only

ROMIK PROMISE A MINIMUM OF ONE NEW GAME EVERY MONTH



MULTISOUND SYNTHESIZER For the unexpanded Vic20

The Vic Multisound Synthesizer is very flexible and can be played in more ways than can ever be explained here, to create music and special effects. For example, create any tune, up to 255 notes (after following appropriate instructions), then press "F1" or "F3", then key "9" and enjoy the added effect. Now hit "+", listen to the difference. For a surprise — hit "—". Now add a melody over the top — hit key "8" then "7" — now play a melody, or experiment. Have fun!

MIND TWISTERS

For unexpanded Vic20

Four games to stretch your brain. Blackjack, Decipher, Four Thought and Teaser are our computerised versions of very popular home games and will test your mental agility and skill for many a long hour.

SPACE ATTACK

For the unexpanded Vic20

Space Attack is a game of skill. You as the pilot of an intergalactic battleship have to fight your way through wave after wave of various alien spaceships.

ALL PROGRAMS ARE £9.99

Machine Code Arcade Quality Game

STRATEGIC COMMAND

Our first game for the Dragon

A strategy game for two players. Will keep you active for many hours. Air, sea and land battles!

ALL PROGRAMS ARE £9.99

OUR GAMES ARE AVAILABLE FROM ALL
GOOD HOME COMPUTER STORES

SPECTRUM SOFTWARE

IQ TEST.....£5.75

How intelligent are you? 2 separate tests give an accurate assessment of your abilities

THE JOKER.....£5.75

Hundreds of rib tickling puns and jokes coupled with mind blowing graphics. Great for parties!!

Trade enquiries welcome: Orders despatched by return

PRICES INCLUDE POST & VAT. ALL PROGS 16 OR 48K.

Flowchart LTD

PHONE
(0933) 650073

DEPT 1
62 HIGH STREET
IRTHLINGBOROUGH
NORTHANTS NN9 5TN

Salamander Software

DRAGON AND BBC MODEL 'B' SOFTWARE

DRAGON AND BBC MICRO 'B' SOFTWARE

DRAGON 32 SOFTWARE

DRAGON-TREK

A real time version of the classic space game featuring full colour tactical, status and long-range scanner displays, hyperprobe, the Faerie Queen, Klingons and Klingon commanders, tractor beams, enemy movement, black holes and much more. Choose from ten levels of difficulty and three sizes of galaxy. Comes complete with 16-page flight manual. JOYSTICK (1) REQUIRED.

£9.95

Dragon Data Approved

WIZARD WAR

A game of magical combat between the Wizards of the Tri-Suns for supremacy of the planet Xarg. Both dexterity and deduction are needed in order to outwit your opponent as spell is traded against spell. Comes complete with 12-page illustrated spell book. JOYSTICKS (2) REQUIRED.

£7.95

Dragon Data Approved

GOLF

An accurate interpretation of the game of golf written by a keen club player. Allows match play between two players or one player may play using the Stableford points system widely used for competition golf. Features full club selection, hazards, out of bounds and player handicaps.

£7.95

Dragon Data Approved

GRAND PRIX

Do you have the potential to be a champion Formula One driver? Find out, when your race on these 8 famous grand prix circuits from around the world. For 1 or 2 players. JOYSTICKS (2) REQUIRED.

£7.95

Dragon Data Approved

GAMES COMPENDIUM D1

Six great games for the whole family — Donkey Derby, Blackjack, Kingdom, Hunt the Wumpus, Noughts and Crosses and Lunar Lander.

£7.95

Dragon Data Approved

VULCAN NOUGHTS AND CROSSES

A three-dimensional game of noughts and crosses for one or two players. Also includes a zero player option where the machine plays itself. Can you out-think your Dragon?

£7.95

Dragon Data Approved

THE EDG GRAPHICS PACKAGE £24.95

FOR THE BBC MODEL 'B' microcomputer

An advanced picture drawing system developed by a firm of consulting engineers to the oil and utility industries world-wide. Uses cassette tapes for software and picture storage and is controlled entirely by normal keyboard input — no extra hardware required. The main system features are:

- ★ Picture drawing in model 0, 1 or 2
 - ★ Actual and Logical colour changes at any time
 - ★ Drawing functions:
Lines, boxes, circles, arcs, text, shape repetition
 - ★ Drawing aids: Grid, elastic band, save and home cursor (5 positions)
 - ★ Colour fill
 - ★ Text window showing x,y cursor position, length, angle, colour menu and current colour
 - ★ Saving and Loading of picture using cassette tapes
 - ★ Multi-file pictures facilitating very complex drawings
 - ★ Flashing cross-hairs cursor
 - ★ User instructions/prompts
- This package comes complete with a spiral bound manual.

Send SAE for catalogue of our full range of Dragon and BBC model B software. Cheques or postal orders payable to Salamander Software.

•27 Ditchling Rise, Brighton, East Sussex BN1 4QL. Tel: 0273 771942.

Please add 50 pence P & P to all orders.

Dealer enquiries welcome. Programmers wanted: Good royalties paid.



LETTERS

The programmer is helped though

We wish to make a number of comments about your review of our LMX Eprom Programmer, *Popular Computing Weekly*, 16/23 December.

Firstly, in the opening paragraph, the reviewer points out that the LMX was designed for use with a 1K ZX81. Later he states that the LMX software produces a peculiar display when the 16K Ram-pack is attached. The size of the 1K ZX81 display file varies according to the number of characters currently required. By careful calculation it is possible to display an image in the centre of the screen without padding out blank lines with spaces. This technique is used in the LMX software because memory is at a premium with the minimum system. The reviewer must have been aware of this and yet, in spite of his opening remarks, felt bound to make this unhelpful comment.

Secondly, the LMX software was specifically written so that code could be entered in hexadecimal. Hexadecimal, we believe, is the natural base for machine code programmers to use. It is our belief that serious machine code programmers would not program in decimal. The reviewer's comments that code would have to be converted from decimal to hexadecimal before it could be entered shows that he has little experience of machine code programming.

Thirdly, unless an assembler is available, it is inevitable that code has to be entered a byte at a time. Even if other software is developed so that the LMX can be used, as a programmer, with the 16K Ram-pack, loading bytes into an array, as the reviewer suggested, and then transferring them into Eprom still means that each byte has to be individually entered at some stage.

J W Terrell
Lander Microsystems
32 Clockhouse Lane
Collier Row
Romford
Essex RM5 3QJ

Stephen Adams replies: The use of Print At routines would make it work on 16K and 1K ZX81s with no great increase in code.

Hexadecimal is useful for the programmer as it limits the number of digits printed and so can be easily formatted. Basic and Assemblers are increasingly being used to make machine code writing simpler than using Hex. As there were plenty of spare bytes it was a pity that this was not available as an option.

Code does have to be entered one byte at a time. But only proven programs go into Eproms and these can be loaded from tape. These can be quite long and a method for dumping code from program into Eprom would have been time saving.

Misleading advertising

I am writing to get your readers' reactions to Sinclair's latest advertisement for the Spectrum Microdrive. The advertisement has now been amended to include a section stating that in order to connect the Microdrive, you will also need a controller unit, at a further cost of about £30.

To announce this at such a late stage, when all previous advertisements implied that the Microdrive could be simply connected for around £50 is, I think, deliberately misleading to those people who bought the Spectrum on the promise of the Microdrive. OK so the RS232 interface and network unit will be incorporated into the controller, but that is no consolation if you did not want these in the first place.

Personally, I am very annoyed, but I thought even Sinclair, whose advertisements have been misleading in the past, would not play such a trick on the people who are keeping him in business.

A D Robinson
107 Doncaster Road
Wath-on-Deane
Nr Rotherham
S Yorks S63 7DN

High speed not recommended

I am writing with regard to the letter published in Issue No 35 from Dickon Smith, where he asks about speeding up the Dragon by Poking location 65495.

In my article, published in Issue No 32, I explained the use of three of the SAM regis-

ters used in setting graphics modes. Location FFD7H (65495) is used to 'set' the register R0 to one. There are two registers R0 and R1 which are used to set the timing of the cpu: R0 'set' and the cpu runs at 1.8 mhz — twice its normal speed.

To reset the speed, the register must be cleared. This is achieved by, *Poke &HFFD6, 0*.

Finally, by changing this register the Dragon's 6809E cpu is forced to run at double its normal speed. This is a feature of the "off-the-shelf" SAM chip, but the Dragon is not designed to run at this speed. Therefore, I do not recommend its use to speed up games etc.

Brian Cadge
311 Church Road
Yardley
Birmingham B25 8XR

Slowing down problems

I was interested in reading Dickon Smith's letter (*Popular Computing Weekly*, December 16, 1982) on the problem of returning to normal speed on the Dragon 32. It is true that *Poke 65495,X* (where X can be any integer between 0 and 255) increases the speed of the Dragon, by 73 percent, to be exact, and that *Poke 65494,X* returns it to normal speed.

In comparing the Tandy Colour computer with the Dragon I came up with the following information which I hope will be useful to other Dragon owners.

The Tandy stores its Basic commands, as does the Dragon, as tokens. However, Print is 159 on the Dragon and 182 on the Tandy so loading Tandy tapes is impossible, unless you get your friendly Tandy dealer to dump the program in Ascii format, *Csave""*, A command and load with the *Cload""*, A command.

The keyboard reading is also different. So programs which use Peek to scan the keyboard will not work or will return with the wrong key number.

Those who write graphics games but do not have joysticks can use the arrow keys to move an object. The continual need to press the keys is irri-

tating. So I came up with the following short subroutine.

```
1000 FOR K=0 TO 4:L=PEEK
(314+K): IF L<>223 THEN NEXT
K:NO KEY PRESSED GOTO ...
1010 ON K+1 GOTO 1012,1014,
1016,1018,1020
1012: UP ARROW PRESSED
1014: DOWN ARROW PRESSED
1016: LEFT ARROW PRESSED
1018: RIGHT ARROW PRESSED
1020: SPACE-BAR PRESSED
```

Stephen Head
2 Diptford Close
Roselands Park
Paignton
South Devon

Has the Dragon breathed fire?

I bought my Dragon at the end of November and sent off my guarantee. This was supposed to make me a member of the Dragon Data Club. Has anyone else had a reply?

Mrs P Hampson
10 Cherry Lane
Lawton Heath
Alsager
Staffs

We can't print what isn't sent

In November I bought an Atari 400 for my birthday. Since then I have not been able to find any games for it in *Popular Computing Weekly*.

Will you please print some games. If you do you will be one of the first magazines to do so.

Amir Anvarzadeh
4 Wymondham Court
St John's Wood Park
London NW8

As yet we are simply not being sent enough good Atari programs to publish them on a regular basis in the magazine. If there are as many Atari owners out there as the manufacturers claim, why don't any of you send in any programs?

Micros in the building trade

We are looking for a computer program for use in handling and calculating heating and cooling loads for building structures for use by us as a means of simplifying calculations.

Can anyone help?

Stuart Gladwell
Manners Mackay
10 Strangeways Terrace
Truro
Cornwall

The Cavern

A new game for 16K Spectrum by David Leitch

The supply ship 'Caligulos' hovered gently in the night sky. Camak gazed solemnly down at the bleak surface of the planet below as the low-power lighting switched itself on, turning his face a pallid green. Three hours ago the ship's main generator had exploded, rendering the hyper-drive useless. Without the drive, the chances of the ship's crew seeing their mother planet again were extremely remote.

But there was an answer.

Deep in the planet's bowels lay the sacred temple of the Druidians, a people shrouded in a deeply woven cloth of mysticism; it was even believed that they had found the secret of Eternal Life. The Temple contained the objects of their worship, the 'Crystals of Yoth', otherwise known as Dridimonds in Camak's galaxy, the main power source of the now disabled drive. Camak's task was to dig down into

the planet, enter the Temple, steal the Dridimonds and escape.

Easy?

The Caverns were patrolled by Guardians who were telepathically linked to each other so that if one was killed another could appear instantly from anywhere. There were booby traps. Camak's ship could only stay in orbit for a limited time. Camak also knew that if he resurfaced without the Dridimonds he would not be allowed on board.

Still easy?

A faint humming filled Camak's ears — the ship had landed.

It was time.

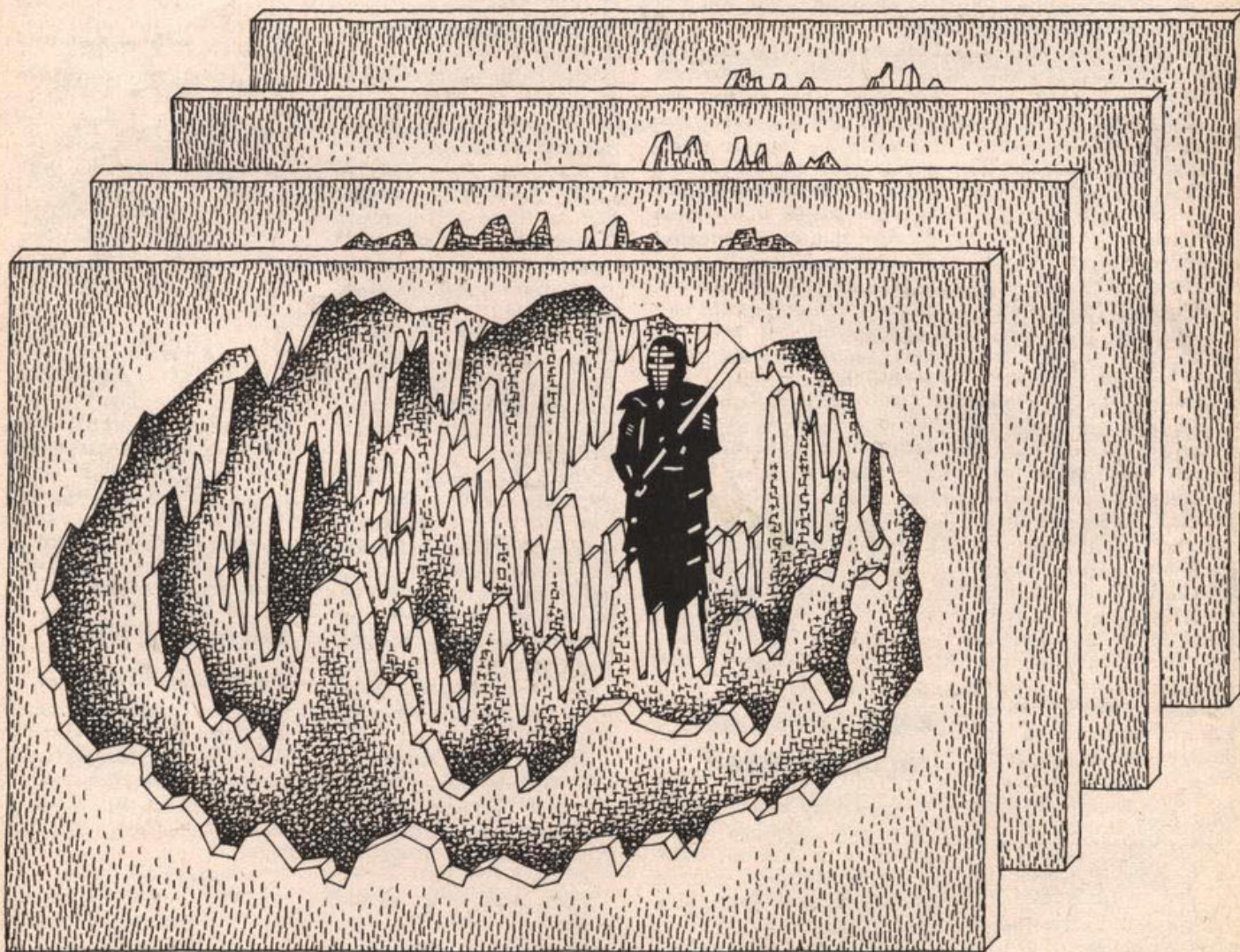
Pardon me for interrupting this gripping tale while I describe the program. You must guide your little white man down into the Cavern and collect the Jewels therein. You can move through the green and

black chequered walls and along the black passages, but not through the yellow walls.

You should, by now, have noticed that a little yellow Guardian is following you. He can only traverse the passages and anything, except a chalice will block his path. You can also throw pitch-forks at the Guardians (see Program for Instructions). To collect a Jewel just cross over it . . . I will leave you to discover what happens in the two inner Caverns.

Your score is displayed continuously and the time ticks away at the top of the screen: you must return to your ship with some Jewels before it runs out; failure will forfeit all your lives. Exterminating a Guardian on Level 2 and above may result in him dropping a chalice. This will gain an extra life for you.

Remember. A Guardian is replaced immediately. From Anywhere.




```

1 REM The Cavern!
2 REM By David Leitch
3 REM For The 16K SPECTRUM
4 REM OCTOBER '82
5
6 REM All Capitals represent
7 user definable graphics
8
9 RANDOMIZE
10 FOR X=144 TO 150
11   FOR Y=0 TO 7
12     READ Z
13     POKE USR CHR$ X+Y,Z
14   NEXT Y
15 NEXT X
16 DATA 50,92,127,251,190,255,
17 86,24,0,24,16,126,66,64,16,16,12
18 9,90,60,24,24,36,66,129
19 57 DATA 24,36,24,126,90,24,24,
20 24,170,86,170,86,170,86,0
21 0,24,24,24,24,126,126
22 59 DATA 0,0,0,16,56,124,56,16,
23 0,16,56,64,254,64,56,16,0,63,109
24 219,219,109,63,0
25 61 DATA 0,109,109,129,129,195,66,6
26 5,36,0,109,109,163,110,252,0
27 0,0,0,255,36,36,255
28 63 DATA 0,126,64,32,255,32,64,
29 126,0,1,2,4,255,4,2,1,0,0,66,66,
30 40,16,16,56,0
31 64 BORDER 0: PAPER 1: INK 5: C
32
33 65 PRINT TAB 10; FLASH 1; "The
34 Cavern!"
35 66 PRINT " z-left x-r
36 ight n-down m-up"
37 67 PRINT " z or x with CAPS SH
38 IFT to fire in the respective
39 direction."
40 68 PRINT " INK 2; " G=
41 50 " INK 2; " H=100 "
42 INK 6; " D=70 "
43
44 69 PRINT "EXTRA LIFE"
45 70 PRINT "Remember if you hav
46 e no jewels you will not be all
47 owed back on board." "Watch out
48 for booby traps!"
49 72 PRINT "If you complete a mi
50 ssion you will go on to the ne
51 xt level but will have less time.
52 "Press any key to play": PAUSE
53
54 79 LET hs=23495
55 92 LET sc=0
56 93 LET life=1
57 94 LET le=0
58 99 REM print board
59 99 BORDER 1: PAPER 0: INK 6: C
60
61 101 LET z=0
62 102 LET j=0
63 103 LET poi=0
64 104 LET in=0
65 106 LET ti=1000
66 107 LET ti=ti-le: IF ti=0 THEN
67 LET ti=1000
68 108 IF ti=0 THEN LET ti=1000
69 110 PRINT AT 3,0; " "
70
71 120 FOR i=4 TO 20: PRINT AT i,0
72 " "
73 NEXT i
74 121 INK 4: FOR i=4 TO 14: PRINT
75 AT i,6; "EEEEEEEEEEEEEEEEEEEEEE
76 EE"
77 NEXT i
78 122 FOR i=15 TO 20: PRINT AT i,
79 20; "EEEEEEEEEE"
80 NEXT i
81 123 FOR i=17 TO 20: PRINT AT i,
82 1; "EEEEEEEEEE"
83 NEXT i
84 125 PRINT AT 15,6; "EEEEEE"; AT 16
85 6; "EEEEEE"
86 127 PRINT AT 3,2; "E"; AT 16,11; "
87 E"; AT 16,19; "E"
88
89 128 FOR i=4 TO 7: PRINT AT i,1;
90 "EEEEEE"
91 NEXT i
92 129 INK 6: PRINT AT 4,5; " "
93 5,5; " "
94 7,4; " "
95 20,12; " "
96
97 130 FOR i=9 TO 15: PRINT AT i,1
98 " "
99 NEXT i
100 135 PRINT PAPER 6; AT 21,15; le/1
101 00+1
102 140 FOR i=16 TO 19: PRINT AT i,
103 12; " "
104 NEXT i
105 150 FOR i=3 TO 17: PRINT AT i,(
106 i(10)/28; " "
107 17; " "
108 17; " "
109 17; " "
110 17; " "
111 17; " "
112 17; " "
113 17; " "
114 17; " "
115 17; " "
116 17; " "
117 17; " "
118 17; " "
119 17; " "
120 17; " "
121 17; " "
122 17; " "
123 17; " "
124 17; " "
125 17; " "
126 17; " "
127 17; " "
128 17; " "
129 17; " "
130 17; " "
131 17; " "
132 17; " "
133 17; " "
134 17; " "
135 17; " "
136 17; " "
137 17; " "
138 17; " "
139 17; " "
140 17; " "
141 17; " "
142 17; " "
143 17; " "
144 17; " "
145 17; " "
146 17; " "
147 17; " "
148 17; " "
149 17; " "
150 17; " "
151 17; " "
152 17; " "
153 17; " "
154 17; " "
155 17; " "
156 17; " "
157 17; " "
158 17; " "
159 17; " "
160 17; " "
161 17; " "
162 17; " "
163 17; " "
164 17; " "
165 17; " "
166 17; " "
167 17; " "
168 17; " "
169 17; " "
170 17; " "
171 17; " "
172 17; " "
173 17; " "
174 17; " "
175 17; " "
176 17; " "
177 17; " "
178 17; " "
179 17; " "
180 17; " "
181 17; " "
182 17; " "
183 17; " "
184 17; " "
185 17; " "
186 17; " "
187 17; " "
188 17; " "
189 17; " "
190 17; " "
191 17; " "
192 17; " "
193 17; " "
194 17; " "
195 17; " "
196 17; " "
197 17; " "
198 17; " "
199 17; " "
200 17; " "
201 17; " "
202 17; " "
203 17; " "
204 17; " "
205 17; " "
206 17; " "
207 17; " "
208 17; " "
209 17; " "
210 17; " "
211 17; " "
212 17; " "
213 17; " "
214 17; " "
215 17; " "
216 17; " "
217 17; " "
218 17; " "
219 17; " "
220 17; " "
221 17; " "
222 17; " "
223 17; " "
224 17; " "
225 17; " "
226 17; " "
227 17; " "
228 17; " "
229 17; " "
230 17; " "
231 17; " "
232 17; " "
233 17; " "
234 17; " "
235 17; " "
236 17; " "
237 17; " "
238 17; " "
239 17; " "
240 17; " "
241 17; " "
242 17; " "
243 17; " "
244 17; " "
245 17; " "
246 17; " "
247 17; " "
248 17; " "
249 17; " "
250 17; " "
251 17; " "
252 17; " "
253 17; " "
254 17; " "
255 17; " "
256 17; " "
257 17; " "
258 17; " "
259 17; " "
260 17; " "
261 17; " "
262 17; " "
263 17; " "
264 17; " "
265 17; " "
266 17; " "
267 17; " "
268 17; " "
269 17; " "
270 17; " "
271 17; " "
272 17; " "
273 17; " "
274 17; " "
275 17; " "
276 17; " "
277 17; " "
278 17; " "
279 17; " "
280 17; " "
281 17; " "
282 17; " "
283 17; " "
284 17; " "
285 17; " "
286 17; " "
287 17; " "
288 17; " "
289 17; " "
290 17; " "
291 17; " "
292 17; " "
293 17; " "
294 17; " "
295 17; " "
296 17; " "
297 17; " "
298 17; " "
299 17; " "
300 17; " "
301 17; " "
302 17; " "
303 17; " "
304 17; " "
305 17; " "
306 17; " "
307 17; " "
308 17; " "
309 17; " "
310 17; " "
311 17; " "
312 17; " "
313 17; " "
314 17; " "
315 17; " "
316 17; " "
317 17; " "
318 17; " "
319 17; " "
320 17; " "
321 17; " "
322 17; " "
323 17; " "
324 17; " "
325 17; " "
326 17; " "
327 17; " "
328 17; " "
329 17; " "
330 17; " "
331 17; " "
332 17; " "
333 17; " "
334 17; " "
335 17; " "
336 17; " "
337 17; " "
338 17; " "
339 17; " "
340 17; " "
341 17; " "
342 17; " "
343 17; " "
344 17; " "
345 17; " "
346 17; " "
347 17; " "
348 17; " "
349 17; " "
350 17; " "
351 17; " "
352 17; " "
353 17; " "
354 17; " "
355 17; " "
356 17; " "
357 17; " "
358 17; " "
359 17; " "
360 17; " "
361 17; " "
362 17; " "
363 17; " "
364 17; " "
365 17; " "
366 17; " "
367 17; " "
368 17; " "
369 17; " "
370 17; " "
371 17; " "
372 17; " "
373 17; " "
374 17; " "
375 17; " "
376 17; " "
377 17; " "
378 17; " "
379 17; " "
380 17; " "
381 17; " "
382 17; " "
383 17; " "
384 17; " "
385 17; " "
386 17; " "
387 17; " "
388 17; " "
389 17; " "
390 17; " "
391 17; " "
392 17; " "
393 17; " "
394 17; " "
395 17; " "
396 17; " "
397 17; " "
398 17; " "
399 17; " "
400 17; " "
401 17; " "
402 17; " "
403 17; " "
404 17; " "
405 17; " "
406 17; " "
407 17; " "
408 17; " "
409 17; " "
410 17; " "
411 17; " "
412 17; " "
413 17; " "
414 17; " "
415 17; " "
416 17; " "
417 17; " "
418 17; " "
419 17; " "
420 17; " "
421 17; " "
422 17; " "
423 17; " "
424 17; " "
425 17; " "
426 17; " "
427 17; " "
428 17; " "
429 17; " "
430 17; " "
431 17; " "
432 17; " "
433 17; " "
434 17; " "
435 17; " "
436 17; " "
437 17; " "
438 17; " "
439 17; " "
440 17; " "
441 17; " "
442 17; " "
443 17; " "
444 17; " "
445 17; " "
446 17; " "
447 17; " "
448 17; " "
449 17; " "
450 17; " "
451 17; " "
452 17; " "
453 17; " "
454 17; " "
455 17; " "
456 17; " "
457 17; " "
458 17; " "
459 17; " "
460 17; " "
461 17; " "
462 17; " "
463 17; " "
464 17; " "
465 17; " "
466 17; " "
467 17; " "
468 17; " "
469 17; " "
470 17; " "
471 17; " "
472 17; " "
473 17; " "
474 17; " "
475 17; " "
476 17; " "
477 17; " "
478 17; " "
479 17; " "
480 17; " "
481 17; " "
482 17; " "
483 17; " "
484 17; " "
485 17; " "
486 17; " "
487 17; " "
488 17; " "
489 17; " "
490 17; " "
491 17; " "
492 17; " "
493 17; " "
494 17; " "
495 17; " "
496 17; " "
497 17; " "
498 17; " "
499 17; " "
500 17; " "
501 17; " "
502 17; " "
503 17; " "
504 17; " "
505 17; " "
506 17; " "
507 17; " "
508 17; " "
509 17; " "
510 17; " "
511 17; " "
512 17; " "
513 17; " "
514 17; " "
515 17; " "
516 17; " "
517 17; " "
518 17; " "
519 17; " "
520 17; " "
521 17; " "
522 17; " "
523 17; " "
524 17; " "
525 17; " "
526 17; " "
527 17; " "
528 17; " "
529 17; " "
530 17; " "
531 17; " "
532 17; " "
533 17; " "
534 17; " "
535 17; " "
536 17; " "
537 17; " "
538 17; " "
539 17; " "
540 17; " "
541 17; " "
542 17; " "
543 17; " "
544 17; " "
545 17; " "
546 17; " "
547 17; " "
548 17; " "
549 17; " "
550 17; " "
551 17; " "
552 17; " "
553 17; " "
554 17; " "
555 17; " "
556 17; " "
557 17; " "
558 17; " "
559 17; " "
560 17; " "
561 17; " "
562 17; " "
563 17; " "
564 17; " "
565 17; " "
566 17; " "
567 17; " "
568 17; " "
569 17; " "
570 17; " "
571 17; " "
572 17; " "
573 17; " "
574 17; " "
575 17; " "
576 17; " "
577 17; " "
578 17; " "
579 17; " "
580 17; " "
581 17; " "
582 17; " "
583 17; " "
584 17; " "
585 17; " "
586 17; " "
587 17; " "
588 17; " "
589 17; " "
590 17; " "
591 17; " "
592 17; " "
593 17; " "
594 17; " "
595 17; " "
596 17; " "
597 17; " "
598 17; " "
599 17; " "
600 17; " "
601 17; " "
602 17; " "
603 17; " "
604 17; " "
605 17; " "
606 17; " "
607 17; " "
608 17; " "
609 17; " "
610 17; " "
611 17; " "
612 17; " "
613 17; " "
614 17; " "
615 17; " "
616 17; " "
617 17; " "
618 17; " "
619 17; " "
620 17; " "
621 17; " "
622 17; " "
623 17; " "
624 17; " "
625 17; " "
626 17; " "
627 17; " "
628 17; " "
629 17; " "
630 17; " "
631 17; " "
632 17; " "
633 17; " "
634 17; " "
635 17; " "
636 17; " "
637 17; " "
638 17; " "
639 17; " "
640 17; " "
641 17; " "
642 17; " "
643 17; " "
644 17; " "
645 17; " "
646 17; " "
647 17; " "
648 17; " "
649 17; " "
650 17; " "
651 17; " "
652 17; " "
653 17; " "
654 17; " "
655 17; " "
656 17; " "
657 17; " "
658 17; " "
659 17; " "
660 17; " "
661 17; " "
662 17; " "
663 17; " "
664 17; " "
665 17; " "
666 17; " "
667 17; " "
668 17; " "
669 17; " "
670 17; " "
671 17; " "
672 17; " "
673 17; " "
674 17; " "
675 17; " "
676 17; " "
677 17; " "
678 17; " "
679 17; " "
680 17; " "
681 17; " "
682 17; " "
683 17; " "
684 17; " "
685 17; " "
686 17; " "
687 17; " "
688 17; " "
689 17; " "
690 17; " "
691 17; " "
692 17; " "
693 17; " "
694 17; " "
695 17; " "
696 17; " "
697 17; " "
698 17; " "
699 17; " "
700 17; " "
701 17; " "
702 17; " "
703 17; " "
704 17; " "
705 17; " "
706 17; " "
707 17; " "
708 17; " "
709 17; " "
710 17; " "
711 17; " "
712 17; " "
713 17; " "
714 17; " "
715 17; " "
716 17; " "
717 17; " "
718 17; " "
719 17; " "
720 17; " "
721 17; " "
722 17; " "
723 17; " "
724 17; " "
725 17; " "
726 17; " "
727 17; " "
728 17; " "
729 17; " "
730 17; " "
731 17; " "
732 17; " "
733 17; " "
734 17; " "
735 17; " "
736 17; " "
737 17; " "
738 17; " "
739 17; " "
740 17; " "
741 17; " "
742 17; " "
743 17; " "
744 17; " "
745 17; " "
746 17; " "
747 17; " "
748 17; " "
749 17; " "
750 17; " "
751 17; " "
752 17; " "
753 17; " "
754 17; " "
755 17; " "
756 17; " "
757 17; " "
758 17; " "
759 17; " "
760 17; " "
761 17; " "
762 17; " "
763 17; " "
764 17; " "
765 17; " "
766 17; " "
767 17; " "
768 17; " "
769 17; " "
770 17; " "
771 17; " "
772 17; " "
773 17; " "
774 17; " "
775 17; " "
776 17; " "
777 17; " "
778 17; " "
779 17; " "
780 17; " "
781 17; " "
782 17; " "
783 17; " "
784 17; " "
785 17; " "
786 17; " "
787 17; " "
788 17; " "
789 17; " "
790 17; " "
791 17; " "
792 17; " "
793 17; " "
794 17; " "
795 17; " "
796 17; " "
797 17; " "
798 17; " "
799 17; " "
800 17; " "
801 17; " "
802 17; " "
803 17; " "
804 17; " "
805 17; " "
806 17; " "
807 17; " "
808 17; " "
809 17; " "
810 17; " "
811 17; " "
812 17; " "
813 17; " "
814 17; " "
815 17; " "
816 17; " "
817 17; " "
818 17; " "
819 17; " "
820 17; " "
821 17; " "
822 17; " "
823 17; " "
824 17; " "
825 17; " "
826 17; " "
827 17; " "
828 17; " "
829 17; " "
830 17; " "
831 17; " "
832 17; " "
833 17; " "
834 17; " "
835 17; " "
836 17; " "
837 17; " "
838 17; " "
839 17; " "
840 17; " "
841 17; " "
842 17; " "
843 17; " "
844 17; " "
845 17; " "
846 17; " "
847 17; " "
848 17; " "
849 17; " "
850 17; " "
851 17; " "
852 17; " "
853 17; " "
854 17; " "
855 17; " "
856 17; " "
857 17; " "
858 17; " "
859 17; " "
860 17; " "
861 17; " "
862 17; " "
863 17; " "
864 17; " "
865 17; " "
866 17; " "
867 17; " "
868 17; " "
869 17; " "
870 17; " "
871 17; " "
872 17; " "
873 17; " "
874 17; " "
875 17; " "
876 17; " "
877 17; " "
878 17; " "
879 17; " "
880 17; " "
881 17; " "
882 17; " "
883 17; " "
884 17; " "
885 17; " "
886 17; " "
887 17; " "
888 17; " "
889 17; " "
890 17; " "
891 17; " "
892 17; " "
893 17; " "
894 17; " "
895 17; " "
896 17; " "
897 17; " "
898 17; " "
899 17; " "
900 17; " "
901 17; " "
902 17; " "
903 17; " "
904 17; " "
905 17; " "
906 17; " "
907 17; " "
908 17; " "
909 17; " "
910 17; " "
911 17; " "
912 17; " "
913 17; " "
914 17; " "
915 17; " "
916 17; " "
917 17; " "
918 17; " "
919 17; " "
920 17; " "
921 17; " "
922 17; " "
923 17; " "
924 17; " "
925 17; " "
926 17; " "
927 17; " "
928 17; " "
929 17; " "
930 17; " "
931 17; " "
932 17; " "
933 17; " "
934 17; " "
935 17; " "
936 17; " "
937 17; " "
938 17; " "
939 17; " "
940 17; " "
941 17; " "
942 17; " "
943 17; " "
944 17; " "
945 17; " "
946 17; " "
947 17; " "
948 17; " "
949 17; " "
950 17; " "
951 17; " "
952 17; " "
953 17; " "
954 17; " "
955 17; " "
956 17; " "
957 17; " "
958 17; " "
959 17; " "
960 17; " "
961 17; " "
962 17; " "
963 17; " "
964 17; " "
965 17; " "
966 17; " "
967 17; " "
968 17; " "
969 17; " "
970 17; " "
971 17; " "
972 17; " "
973 17; " "
974 17; " "
975 17; " "
976 17; " "
977 17; " "
978 17; " "
979 17; " "
980 17; " "
981 17; " "
982 17; " "
983 17; " "
984 17; " "
985 17; " "
986 17; " "
987 17; " "
988 17; " "
989 17; " "
990 17; " "
991 17; " "
992 17; " "
993 17; " "
994 17; " "
995 17; " "
996 17; " "
997 17; " "
998 17; " "
999 17; " "
1000 17; " "

```

```

162 PLOT INK 5;223,152: DRAW IN
K 5;30,22,-PI/4
165 PRINT INK 4; AT 9,1; "LLLL";
INK 4; AT 9,5; "E"
167 PRINT INK 7; AT 15,1; "+++"
170 PRINT INK 3; AT 16,12; "FFFFF
FF"
173 REM Jewels
180 PRINT BRIGHT 1; INK 7; AT 20
13; "HH"; AT 20,16; "HH"
185 PRINT BRIGHT 1; INK 2; AT 17
6; "G"; AT 13,17; "G"; AT 15,26; "G"
210 LET l=2: LET c=2: GO SUB 70
00
220 PRINT INK 7; AT 0,14; "B="; li
fe
222 GO SUB 8500
225 GO SUB 3000: GO SUB 8000: R
EM Move?
226 LET ti=ti-5: PRINT INK 2; AT
0,20; ti: IF ti<0 THEN PRINT A
T 0,22; " "
227 IF ti=0 THEN GO TO 9000
228 PRINT PAPER 6; AT 3,12; "SCOR
E="; sc
232 IF l=6 AND c=2 THEN LET l=7
234 IF INKEY$="7" OR INKEY$="X"
THEN GO SUB 1000: REM Fire?
235 IF l=9 AND c=5 THEN GO SUB
2500
240 GO TO 225
249 REM THROU pitch-fork
1000 LET s+=(INKEY$="X")-(INKEY$
="7")
1003 PRINT INK 7; AT l,c; "B"
1004 LET s$="M"
1005 IF s=1 THEN LET s$="N"
1010 LET x=.0125: BEEP x,4: BEEP
x,6: BEEP x,8: BEEP x,10: BEEP
x,12: BEEP x,14: BEEP x,16: BEEP
x,4: BEEP x,6: BEEP x,8: REM
Sound effect
1012 FOR x=1 TO s*10 STEP s*1
1014 LET a=ATTR (l,c+x)
1015 IF a=70 THEN GO TO 1020
1016 IF a=70 THEN RETURN
1017 IF a=70 THEN PRINT BRIGHT 1
; INK 5; AT l,c+x,s$: PRINT AT l,
c+x; " "
1018 NEXT x: PRINT AT l,c+x; " "
RETURN
1020 BEEP .02,50: BEEP .04,-5: P
RINT AT l,c+x; " "
1021 IF AND(.85 AND le)=100 THEN
PRINT AT l,c+x; INK 6; FLASH 1;
"0"
1030 GO SUB 8500: LET sc=sc+70:
RETURN
2000 REM Oh! Dear you've picked
up a big jewel
2003 LET in=1
2005 LET r=0: GO TO 2020
2010 LET r=INT (RAND*7)+12
2020 FOR i=17 TO 20
2025 BEEP .1,-40
2030 LET ti=ti-5
2040 PRINT AT i-1,c; " "
INK 3; "F"
2041 IF i=1 AND r=c THEN PRINT A
T i,r; INK 2; "C": GO TO 5000
2044 GO SUB 3000
2045 IF c=11 OR c=19 THEN LET in
=0: RETURN
2050 NEXT i: GO TO 2010
2510 PRINT INK 4; OVER 1; AT l,c;
"B"
2512 LET r=INT (RAND*4)+1
2514 FOR i=14 TO 10 STEP -1
2515 PRINT AT i,r; INK 7; "+"
AT i+1,r; " "
2516 IF i=1 AND c=r THEN GO TO 6
000
2517 PRINT AT i+1,r; INK 6; " "
2518 LET ti=ti-5
2520 GO SUB 3002
2522 IF c=5 THEN LET c=5
2525 IF l=6 AND c=2 THEN LET z=0
RETURN
2530 GO TO 2510
3001 PRINT INK 7; AT l,c; "B"
3002 BEEP .0025,1
3003 IF z THEN PRINT INK 4; PAPE
R 3; AT l,c; "L"
3004 IF NOT z THEN PRINT AT l,c;
" "
3005 IF l=6 AND c=5 THEN PRINT A
T 6,4; INK 2; "A": BEEP .1,-30
3007 IF l=2 AND c=2 AND j THEN G
O TO 7000

```

```

3008 LET a=ATTR (l-1,c): LET b=A
TTR (l+1,c): LET d=ATTR (l,c-1):
LET e=ATTR (l,c+1)
3015 LET l=(INKEY$="m" AND l>2
AND (a=0 OR a>7 OR a=4))+(INKEY
$="n" AND (b=0 OR b>7 OR b=4))
3020 LET c=(INKEY$="7" AND (d=
0 OR d>7 OR d=4))+(INKEY$="X" AN
D (e=0 OR e>7 OR e=4))
3025 LET f=ATTR (l,c)
3030 IF f<5 THEN GO TO 3050
3038 REM Checks
3039 IF f=134 THEN BEEP .1,2: LE
T life=life-1: PRINT INK 7; AT 0,
16; life
3041 IF f=66 THEN BEEP .1,40: LE
T sc=sc+50: LET j=1
3044 IF f=71 THEN BEEP .1,50: LE
T sc=sc+100: LET j=1
3045 IF f=71 AND in=0 THEN GO SU
B 3000
3050 RETURN
4999 REM Hard Luck
5000 BEEP .2,60: FOR i=-30 TO 1
STEP 2: BEEP .1,i: BEEP .1,i+10:
NEXT i
5005 LET in=0
5010 LET life=life+1
5020 IF life=4 THEN GO TO 6070
5025 IF poi=1 THEN GO SUB 8500
5030 GO TO 100
5038 INK 2: PRINT AT l,c; "C"
5042 LET z=0
5010 FOR x=9 TO 15
5020 PRINT AT x-1,(x/9),c; " "
5030 PRINT AT x,c; "C"
5
```


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)

DRAGON 32 SOFTWARE

EDITOR/ASSEMBLER + MONITOR

Assembler functions include ORG, FCB, FDB, FCC, EQU, RMB and Hex or Decimal addition/subtraction. The ASSEMBLER is of the Two pass Global type. Monitor contains useful routines enabling the user to write and run machine code programs. Supplied on cassette + user manual £27.65

D.G.T.1

Contains five super games. OTHELLO, BREAKOUT, AWARI, MOONLANDER and RAFFLES

Fascinating entertainment for all the family. Only £5.75

D.G.T.4 M/code.

PTERODACTYL. Destroy all the Eggs before they hatch. Beat off the attacking PTERODACTYLS.

TORPEDO RUN. Similar to the ARCADE version. 3D perspective. Ships further away give higher points.

HORNETS. Very fast game. Kill the HORNETS as they emerge, but beware when angry they

ALL ORDERS INCLUSIVE. SAME DAY DESPATCH. SEND S.A.E. FOR LIST

J. MORRISON (MICROS), 2 GLENSDALE STREET, LEEDS LS9 9JJ

Callers welcome please phone (0532) 480987

swoop down firing 'stings'. All three games only £6.95

DISASSEMBLER

The ideal tool to have around. Disassemble the BASIC to see how it works. Make use of subroutines, etc.

Supplied on cassette £11.85

D.G.T.2

M/Code games. **SNAKES.** Kill them before they kill you. Up to 12 giant snakes at one time.

LANDER. Land your craft on the Lunar surface.

INVADERS. 35 Invaders, mother ship, 3 defenders, 9 skill levels. All three games in HI-RES + sound. £6.95

CHESS M/Code.

8 Selectable levels of play.

Hi-Resolution display of board and pieces. Cursor control 'move' selection.

Specific pieces may be set up to solve chess problems.

Supplied on cassette + instructions. £7.95

Business Education Ltd

We BUY and SELL

SECONDHAND AND NEW MACHINES
RENTAL OPTION available

Phone: 636 9612 Martin Foreman

103 Great Russell Street, London WC1

THE DRAGON DUNGEON

DRAGON STICKS!



Top quality joysticks, for the Dragon owner who demands arcade action. Ultra-sensitive, but tough and reliable, Dragon Sticks will keep on zapping when others fail! £19.95 per pair inclusive VAT and postage.

DRAGON'S TEETH

The Dragon Owners' Club monthly newsletter is packed with news, reviews and information for the dedicated Dragon-basher. The Dungeon Master has discarded his scrolls and is busily hammering your letters and tips into his new word-processor. He still needs lots of "gen" to complete his Memory Map and is anxious to hear of the latest bugs spotted to finish off the Manual Corrections Sheet.

The March issue of Dragon's Teeth, due out late February, will include both hardware and software offers and Club Members registering before 31st March will be eligible to purchase Dragon badges and sweatshirt at very special prices.

Annual membership, including Dragon's Teeth £6 (six-month trial subscription £3.25).



The Dungeon vaults are filled with peripherals, software, books and other goodies exclusively for the Dragon 32 owner — from cassette recorder leads, custom-made dust covers and Hi-Res Planning Pads to T-shirts, stickers and badges.

We don't claim to supply all the software available for your pet Dragon (apologies Commodore) just the best! Current best-seller: Salamander's superb Dragon: Trek.

Send for the current "Take Inventory" listing.

THE DRAGON DUNGEON

PO BOX 4, ASHBOURNE, DERBYSHIRE DE6 1AQ. TEL: ASHBOURNE 44626

Oric comes alive

David Kelly talks to Paul Johnson, hardware designer of the Oric 1.

Now that the Oric 1 microcomputer has been adopted by the W H Smith chain it seems likely that we shall be seeing quite a lot more of the machine.

At just under £100 for the 8-colour 16K version, the micro looks to have a lot going for it — providing early manufacturing and delivery problems can be sorted out.

The machine is a joint venture between Tangerine Computer Systems and a new company, Oric Products International, backed by British Car Auctions.

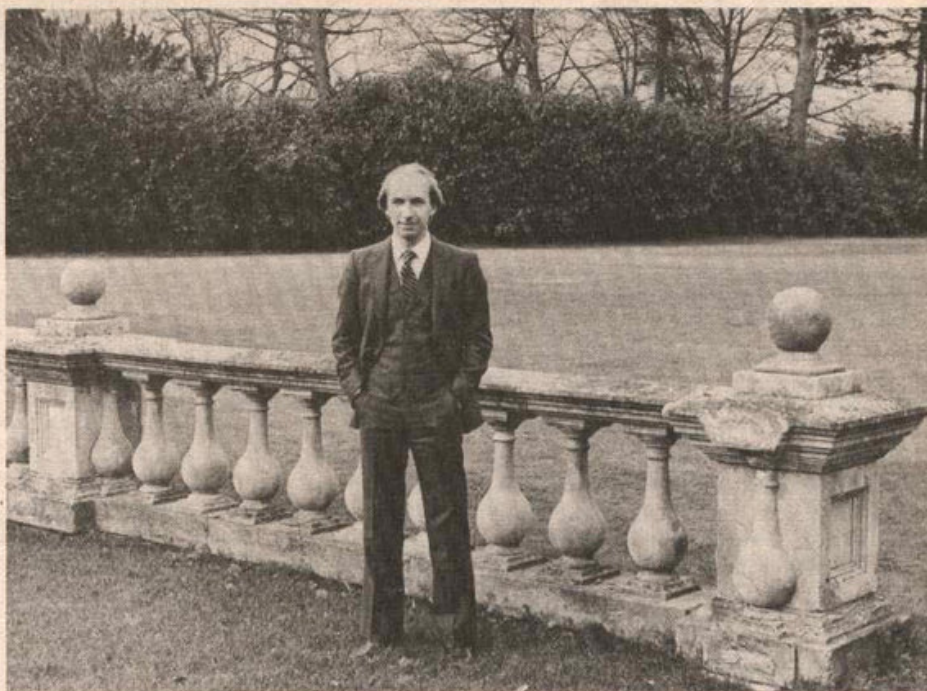
Home for Oric is Coworth Park, an imposing stately home, set in 500 acres of parkland, just outside Ascot. Paul Johnson — technical director of Oric — explained how the project began: "The Oric was first conceived by John Tullis — back in the spring of last year. He had been employed as a financial consultant at Tangerine. While he was with us he came up with the idea for a home micro.

"As far as the specifications were concerned, we realised we would have to develop a machine at the very low-cost end of the market. There were far too many computers at the business end and, at that time, the only manufacturer of home micros was Sinclair. "Then, just as we started to look at the idea in more detail, the Spectrum came out."

From that point on, Tangerine knew what they were competing with. The new computer was to have Basic, colour, sound and a full-size keyboard.

"We gave it a Centronics interface as standard, so that people don't have to wait until we come out with a printer — they can connect up any other printer instead. We also put in an RGB monitor output. Both the Centronics and RGB outputs cost next to nothing to include — so why don't other companies do it?

"We stuck with the 6502 processor — which we used on the MicroTan — because it's probably the world's best selling chip. Besides, we have lots of experience



Paul Johnson — Oric Technical Director.

with it and software for it has already been built up. For example, we can quite easily modify the MicroTan disc operating system to run on the Oric.

"To make sure the sound on the Oric was good we gave it the GI8912 sound chip — that's the one most arcade machines use — anything you hear in the arcades you should get on your Oric.

Unlike most Z80-based machines, the Oric has a colour resolution of 1 x 6 pixels. The Spectrum — for example — can take only two colours in any 8 x 8 pixel square.

"The most exciting thing for me about the Oric" says Paul "is its serial attributes capability. It will be invaluable in fast games to save memory. If you want a laser Zap on the screen — like in *Galaxians* — you *Poke* the two attributes at the start and finish of the laser Zap and the computer will join up the line.

One of the reasons the Oric is priced so low is the number of chips it contains. By using 64K DRAM chips the 48K Oric only needs eight memory chips.

Another key feature of the design is the gate array, designed by Paul. This large chip is the "hardware master". Simply, what it does is to control what goes into the processor, and when. The clock timer from the CPU is fed into the gate array and it

uses this to organise all the video output, to carry out all the address multiplexing for the memory and in so doing to control the CPU.

"As a starting point, I knew that we wanted a viewdata compatible display. "We did the TTL version back in the summer. I designed it in my study at home — I just had to get away from the phone!"

"Once you have the TTL version working, you know the logic is OK. Then I went to the US to California Devices Inc, who were going to do the CMOS arrays. CMOS technology is different from TTL, so we first laid the thing out as a plan to see where the problems would be. Then we did a simulation of a new logic diagram and worked out the timing paths."

Tangerine had the first Oric working as long ago as August last year, using TTL emulators in place of the finished gate arrays. "When the first finished gate array chips came through from California Devices in early December we took out the emulator, plugged in the chip and it worked first time. It was quite a relief!"

One innovative part of the Oric is its digital PAL colour video encoder. This is the part of the micro which puts the correct colours on the screen in the correct places.

"My PhD is in high-speed analogue to digital converters for use in digital television" explained Paul. "So I just went back to my notes and gened back up. "The beauty of the digital system is that it is all done with integrated circuits.

"As well as being a great games machine, a lot of businessmen will buy the Oric to learn about computing. Some of them will go on to invest maybe £20,000 in a larger system but, for the corner sweet-shop the Oric is all that is needed.

"Orics will not, however, be used to run a multi-million pound business or a nuclear power station" grinned Paul.

In the latter case one can only hope that he is right!



Tangerine team: (Left to right) Peter Halford (Software), Andy Brown, Chris Shaw, Barry Muncaster (Director of Tangerine and Oric) and Paul Kaufman (Software).

Little Brother throws down the gauntlet

Tony Bridge looks at some of the latest software to come on the market for the ZX81.

For a while, after the Spectrum was announced, the flood of software for the ZX81 slowed to a mere trickle. Now with the delays in delivery, and the stiff competition making people think twice before investing, software houses have taken heart, and once again come on stream with products for Little Brother.

This latest batch of software is rather a varied one. There is the usual majority of games, but there is also the odd, interesting program of a more serious nature.

First up is *The Gauntlet*, from Colourmatic Computing. A very colourful cassette box contains a version of *Scrambler*. Once loaded, good attention-getting graphics wait for the "1- or 2-player?" input. The keys used for movement (Q, W, A and S) are fairly well grouped, although the wider spacing of W, A, D and X would probably have been even better on the '81's small keyboard.

The program runs in a rather jerky fashion but the game is good, with a number of features, including five or six airlocks (I'm rather hazy on this point, never having reached such dizzy heights!). There is a high-score table, which may be saved on tape for future games, although inexplicably the table has no accommodation for names. Full use is made of the 81's character set in the very healthy explosions. Good documentation and packaging, together with excellent game mechanics, make this highly addictive game very good value for money.

From Computer Rentals, of London, come three games. *North Sea Trawler* is a novel graphic Management game. As the name suggests, you are the captain of a trawler doomed to fish the seas off the north-east coast of Scotland. Whilst dodging various natural hazards in the waters, and undergoing strikes, engine breakdown, crew incompetence and so on, you must net a good catch and get as much money as you can for your catch. A map of the area is available to you, and summaries of your inventory, with prevailing prices at the ports.

The Keys of Gondrun is, as you may surmise from the name, an adventure game. A novel feature of this program is the multiple choices available in answer to most situations, thus making it rather easier for clods such as me, who can never seem to find the appropriate word to give the computer.

Galactic Patrol, the final game submitted for review by this company, unfortunately refused to load under any circumstances.

Now here is a chance to win some

money with your ZX81 — as much as £300,000, claims the author of the next program, Mr. Puzzleman. *Lojix* is the name of it, and the author will put £1 for each one sold into a bank account. The first person who solves the puzzle will collect whatever is currently in the account.

Mr. Puzzleman reckons that, as 300,000 ZX81's have been sold in the UK, that is the potential number of pound notes going into the account.

So, how hard is the puzzle? A chessboard has to be covered by a number of irregularly-shaped "pieces", in much the same way as the Pyramid Puzzle, which enjoyed a certain vogue earlier in 1982, or Dr. Bono's well-known L-puzzle. Not only is Lojix extremely hard — frustrating even! — but, I'm glad to say, is also one of the most stylish I've seen for the '81, admirably suiting the computer's graphics.

Fortunately, it is also highly addictive, with machine-code responses. I'm now torn between seeing the solution when it is published, to put me out of my misery, and being kept blissfully unaware of the solution, so as to prolong the life of the puzzle.

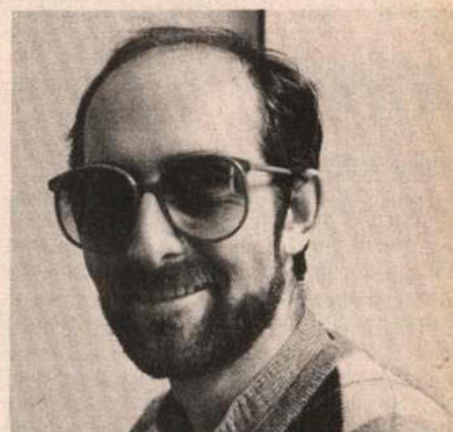
If £300,000 is not enough for you, how about a jackpot on the pools? Hartland Software promise you at least a good crack at winning the pools using their *Football Forecasting Program*. The results of the '81-'82 season are stored in the program, and the data is used to forecast the results of matches (you may also use your own data, should you wish).

Your own data, should you want it.

A lot of hard work has gone into the production of this program, so I hesitate to say that, in the two weeks over which I tried it, no score draws at all were forecast correctly. Two weeks is of course, too short a time for a meaningful test. I would expect that over the season the Law of Averages would give you a good chance of breaking even.

Staying with the more serious side of ZX software, we come to the products of Saxon Computing. These are *Database Manager* and *Forecasting/Graphs (Time Series Analyser)*. The tapes come with comprehensive documentation, although the section dealing with suggested applications for the *Database* program was not forthcoming as promised, at least in the review copy. Data manipulation in the *TSA* program was impressive, with statistics, averages, percentages and so on being calculated from your data.

All the usual features are present in the *Database* program, including Amend, Search, Delete and so on. The authors



Tony Bridge – optimistic about the future of the ZX81.

rightly warn against the program being used in time-wasting exercises such as compiling Personal Telephone Directories, which are more easily done with the good old pencil and paper.

Hestacrest is "committed to low cost business software", and to this end has just released two more low-cost tapes to complement their *Accounts* package. The new programs are *Sales Ledger* and *Purchase Ledger*. We received the former for review, and found it to be as excellent as the *Accounts* tape. Full documentation is supplied — typed to keep costs down — and the program itself would be very helpful to a small one-man business in keeping tabs on its finances.

Bridge Software is an established name in the ZX world, and has released two new tapes. *Lynchmob*, which we shall return to in a moment, and, staying in the non-game sector, *Ephemeris*. This is billed as "an observer's guide to the Galaxy". The program asks you, with the aid of nicely laid-out screens, for the present date, time and latitude/longitude.

From these data, the computer then works out, for each planetary body and the Sun, the altitude, azimuth, distance from earth, rise and set times and so on. This is



a good program for home astronomers, taking all the drudgery out of these calculations. An acknowledgement is given to Paul Duffet-Smith's "Practical Astronomy with your Calculator".

Lynchmob brings us back to the games, and is, of course, a version of Hangman, set in the Wild West. There is a good instruction page, and the game itself runs well, with fine graphics depicting an evil-looking cowboy complete with spurs and Abe Lincoln beard.

The *Break* key is not disabled, which is a pity in a program likely to be used by smaller children. However, if *Break* is inadvertently pressed, REM statements are displayed which describe how to get the program going again. As far as I know, this is unique and a practice that other authors should follow.

Saltcoats was immortalised in song by Billy Connolly, when he was half of a group called The Humblebums. Now Saltcoats, in Ayrshire, is immortalised in the annals of ZX software by Messrs Morrison and Anderson. They have produced two tapes of 1K programs, one of which, Tape A, they have sent us for review, together with listings of another 10 which comprise Tape B, naturally enough.

The games are the usual collection of *Asteroids*, *Galaxians*, *Defender*, *Squash*, *Sketch* etc., but containing machine code, as they do, all the games run very fast. Tape B has a more intellectual flavour with *Simon*, *Towers of Hanoi* and *Mastermind* all making an appearance.

There is also, would you believe, a 1K adventure, *Haunted House*. The authors have packed an awful lot into the tiny memory, and the graphics are among the best I've seen yet on a 1K machine — the *Galaxians* game even has a High Score!

Another collection — this time for 16K — comes from Enigma. They've called their tape, *Enigma One*, and it contains six puzzles. Included here are old favourites like *Towers of Hanoi* (again), *Solitaire* and *Flanders Wheel*, along with some new ones as *Dilemma* and *Crossover 6*. The puzzles are all very difficult and feature excellent graphics. Like the Saltcoats collection, this one is extremely good value if you are a devotee of this kind of game, and is probably the definitive collection of cerebral puzzles for the ZX81.

From the sublime to the faintly ridiculous! *Love* is an adventure game from Remsoft. This is a text Adventure "for women" and places you, poor defenceless

creature, in a bedroom in Poke Hall (honest!). You are wearing pyjamas, and have with you a suitcase. All the usual word-inputs are recognised, plus a few non-standard ones, like "Love", "Cry", "Kiss", etc., which will give you a pretty good idea of the general mood of the Adventure.

You are beset on all sides by, no, not monsters of the animal kind, but rather of the human kind. The Rude Sinclair, Mr Ram Pac, and others are trying to seduce you, and another word that you might find useful in these situations — and one which I'm ashamed to say came readily to my mind — is "Undress"! On the practical side, things get a bit tedious, as the words all have to be typed in full. The program is in Basic, but the computer goes into FAST mode after accepting a command, so reaction times are fairly rapid.

So, the program works as an Adventure should: but do women need an adventure such as this? Sexism doesn't often rear its ugly head in the world of computer software — Ms Pacman and that lady frog in Frogger excepted — and I'm not sure that the authors (D. Bollen and H. McEwen) are women anyway!

Se habla español? Now we come to a batch of programs from JSR, a Spanish-based company. Their catalogue of new releases is evenly-spread with games and utility programs.

Super-Graphics Toolkit is the title of the first one and explains itself fairly well. The tape contains the main program together with a demonstration program, and also the main program on it's own. The demonstration can quickly be erased, however, when finished with. While most of the other programs came with excellent English instructions, only Spanish instructions were included in this program. My few weeks in Majorca were not enough to cope with translating Sinclair-ese! I could not, therefore, do justice to the program.

The demonstration was very impressive and by the time you read this, JSR will no doubt have produced full instructions for their Graphics toolkit. (es todo?) Just some of the facilities (that I could understand!) are, *Scroll* in any direction, *invert* any character, *Flash* any character, and so on.

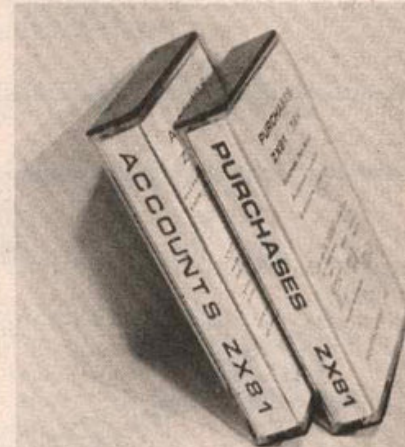
Orchestra is an ambitious music/sounds editor that works extremely well. With this program it is possible to produce melodies of up to 3,000 notes from your ZX81 — almost enough for a symphony! The menu will give you six options. After entering your melody, which admittedly is rather

laborious, each individual note and its duration having to be entered, you may then edit to your heart's delight. It is also possible to test between two notes, or repeat just a section of the melody — which you may then ask to be repeated a number of times if required.

You may also change the speed of the whole piece, or duration of individual notes. *Concert* will play back your symphonic efforts, or, alternatively the melody already stored in the program, which turns out to be Rondo à la Turk. All you need is to turn up your TV's volume. This a truly impressive program.

3D Space Battle is the promising name of the first games program. Upon loading — and, in common with all the other tapes, this program is preceded by a short loading program to get the loading level right — you are presented with a view of the near galaxy from your spacecraft window. The documentation promises that you will then be assailed by bloodthirsty aliens which you have to annihilate with your lasers. Maybe something went wrong in loading the machine code, but I could not get any enemy ships at all!

I fared better with *Alunijaze* (*Lunar*



Lander) which is a pretty good version of the old favourite. You can choose to land your lunar module on one of three pads on the moon's surface. The easiest route increases your score by a factor of two, whilst taking the most difficult route is rewarded with five times your score. As you get close to the pad, the view is magnified, so that you can really see, in detail, all those little jagged lunar rocks ready to smash your craft to pieces. Your fuel is running out all the time, and your mission is to gain as high a score as possible in the time given.

Unfortunately, there is no high score system so each game is entirely separate. It is, however, a highly addictive game, and I rate it as good value for money. This is a very good first release from this new Spanish company.

Summary

All in all, a pretty optimistic-looking future lies ahead for the ZX81. There is obviously plenty of life left in Little Brother. ■

Saxon Computing: 3 St Catherine's Drive, Leconfield, North Humberside HU17 7NT.
Mr Puzzleman: 13 Cherry Tree Walk, Newpark, Pontyclun, Mid-Glamorgan CP7 8RG.
Remsoft: 18 George Street, Brighton BN2 1RH.
JSR Software: Chalet "Capvespre", Avda de Rhode No. 253, Apartado de Correos No. 168, Rosas (Gerona), Espana.
Hestacrest: PO BOX 19, Leighton Buzzard.
Hartland Software: 8 Penzance Place, London W11.
Bridge Software: 36 Fernwood, Marple Bridge, Stockport, Cheshire.
Enigma: 24 Main Road, Littlehale, Sleaford, Lincolnshire.
Computer Rentals: 140 Whitechapel Road, London E1.
Colourmatic Computing: 40 Longfellow Road, Coventry, W Midlands.

DRAGON 32 **NEW FROM** **TROJAN** **"SPACE TREK"**

Space Trek is an absorbing space wars game in real time which can be played in any of four levels. Special features include: Onboard battle computer, long-range galaxy scanning, a galaxy containing 100 quadrants, impulse and warp drive speeds, shield control and status reports.

THIS GAME IS A MUST FOR DRAGON USERS. APPROVED BY DRAGON DATA LIMITED.

THE TROJAN LIGHT PEN

PLUGS INTO JOYSTICK PORT
 SUPPLIED WITH CASSETTE OF INSTRUCTIONS
 A SIMPLE-TO-USE DEVICE FOR MICRO FANS

Send to:

TROJAN PRODUCTS
 Dept. PCK
 166 DERLWYN, DUNVANT
 SWANSEA, WEST GLAM SA2 7PF

Please send:

SPACE TREK ☐ I enclose cheque/PO for £7.50

LIGHT PEN ☐ I enclose cheque/PO for £10.00

Both prices include post and packing.

MR/MRS.....

ADDRESS.....

SOFTWARE LIBRARY

FOR

SPECTRUM, SHARP MZ-80K
MZ-80A

Low-cost weekly hire of Games, Languages, Utilities and Educational Programs.

We have a large selection of software with full software reviews in our FREE comprehensive catalogue.

- Membership only £6 for 12 months.
- Program hiring from only 50p (plus 25p p&p).
- New titles constantly being added.
- Return of post service.

Join today by clipping the coupon below or send for your free catalogue and see for yourself our fantastic range of software.

☐ YES, please send me my free catalogue and selection sheet. I enclose my £6 cheque/Postal Order.

☐ I enclose a 22p stamp, please rush me your free catalogue. My Computer is ☐ Spectrum, ☐ Sharp MZ-80K, ☐ MZ-80A.

NAME.....

ADDRESS.....

TEL

Send to:

KERNOW SOFTWARE LIBRARY

(Dept PCWK)

55 ELIOT DRIVE, ST GERMAN'S
 SALTASH, CORNWALL PL12 5NL

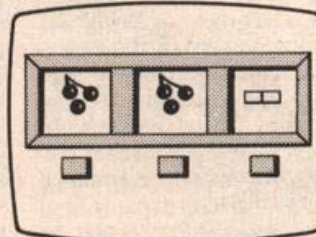
DRAGON 32 Cassettes

Flight simulator

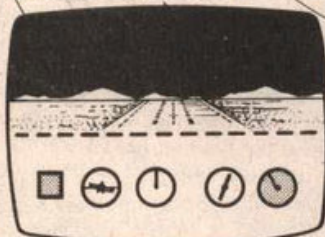
Fruit

Compulsive, addictive, fruit machine. Using your skill with the holds, turn your £5 stake into £10 and beat the system. Hi-res graphics and sound.

£4.95 inc. p & p



Tango Foxtrot 01



£6.50 inc. p & p

Using your skill, locate the airstrip with the radar scanner, fly your aircraft through hazardous crosswinds and air pockets to land safely. Watch your fuel; watch your artificial horizon; be sure you are level on final approach. Full colour, hi-res graphics, 3D and sound.

DRAGON and ORIC "JUNIPER" word processor,
 comprehensive edit facilities, menu and cursor driven
£25.00 inc. p & p

QUARK DATA P.O. BOX 61, Swindon, Wilts. Tel. (0793) 40661.

Please supply.....

Cheque for total amount enclosed

Name

Address

OPEN FORUM

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the *Program of the Week* double our new fee of £6 for each program published.

Pontoon

on Vic-20

This program is written for a Vic20 with at least 3K extra memory. If you have more memory remember to change the screen and colour addresses in the program. In this version of *Pontoon* you play against the computer and the first to go bust is the loser. Your money, Vic's money, the stake, and all the cards dealt so far in one game are shown on the screen.

You always place the bet unless you win a game in which case Vic will

either double the last bet (if he has enough money) or he will put half his money at stake in an attempt to win back money lost. If you get a five-card trick or a straight win (ie, ace, king) then the screen flashes and sound effects are made.

In the program there are two separate packs. The first A\$(i) contains a nice and neat pack of cards. The second pack B\$(i) takes out randomly cards from A\$ (checking that none is taken twice) to produce the 'playing' pack. The pack is re-shuffled when the number of cards undealt drops below 12. This can be changed if you want (line 100). The actual cards are shown with

the suit in the middle and the value above it. X is 10, J is Jack, etc.

Program notes

Lines	
15	Display title, set up variables, and wait for you to hit a key.
30 to 90	Set up shuffled deck (B\$).
110 to 135	Draw card subroutine.
200 to 300	Get the values of four cards. Gosub routine to get bets.
345	Subroutine to display value and suit of card.
600 to 700	Subroutine to place bets.
700 to 720	Vic's bankrupt!!!
800 to 900	Turn B\$(f) into values/codes for display.
1000 to 1090	Player's turn.
1200 to 1290	Vic's turn.
1300 to 1320	Vic wins (five-card trick).
3000	Vic wins.
4000	You win.
4500	Straight win (ie ace, king).
5000	You win (five-card trick).
6000	You lose!!!
POKES	
7680 to 8186	Screen (memory mapped).
38400 to 38884	Colour (memory mapped).
36874 to 36877	Sound generators.
36878	Volume.

```

5 Poke36878,15:Poke36879,90:Print"  ":dima$(51):
  dimb$(51):c$=","
6 d4=100000:P4=100000:f=0
7 bd=0
8 fora=0to21:Poke7680+a,160:Poke38400+a,(aand7):
  Poke8164+a,160:Poke38884+a,(aand7):next
9 foral=0to484steP22:Poke7680+a1,160:Poke38400+a1,
  (aland7):next
10 fora2=0to484steP22:Poke7701+a2,160:Poke38421+a2,
  (a2and7):next
11 Print"          ":Print"
  Pontoon ":Print"
12 Print"    for  ":Print"
  ":Print"    vic-20  "
13 Print"    by kelvin hepburn":Print"    hit
  a key to start"
14 geta$:ifa$=""then14
30 i=0:c$=",":forc=1to4:form=1to13:Print
  "    shuffling"
40 a$(i)=str$(n)+c$+str$(c):Poke36875,170+i:
  i=i+1:ifi>51then55
45 next:next
55 Poke36875,0:fori=0to51
60 r=int(rnd(1)*52)
70 ifa$(r)="d"andi<=51then9oto60
80 b$(i)=a$(r):a$(r)="d"
85 ifi=51then100
90 Poke36875,170+51-i:next
100 Poke36875,0:Poke36877,0:Print"  ":
  iff>=40thenf=0:9oto30
105 g=102:i=3:9osub110:i=i+1+1:9osub110:i=311:
  9osub110:i=i+1+1:9osub110:9oto200
110 forl=0to2:form=0to6
120 Poke7700+i+m*22+l,g
130 next:next:Poke36875,150:foru=1to20:next:
  Poke36875,0
135 return
200 fort=1to100:next:f=f+1:g=208
229 deffnw(x)=val(right$(b$(f),1))
230 def fnv(x)=val(left$(b$(f),3))
240 d1=fnv(1):e=fnw(1):f=f+1:d2=fnv(1):m1=fnw(1)
255 f=f+1:P1=fnv(1):k=fnw(1):f=f+1:P2=fnv(1):
  y=fnw(1):9osub600:9oto1000
345 Poke7680+43+i,w2:Poke7680+87+i,w1:Poke38400+
  43+i,a:Poke38400+87+i,a:return
500 ifw2=10thenw2=128+10
510 ifw2=11thenw2=128+17
520 ifw2=12thenw2=128+11
530 ifw2=13thenw2=128+1

```

```

540 9oto850
600 Print"    my money=f"d4
603 ifd4<=0then9oto720
607 ifP4<=0then9oto6000
610 Print"    your money=f"P4
620 ifd4<=5thenbt=bt*2:9oto625
623 9oto630
625 ifd4<=0thenbt=int(d4/2):ifd4=1thenbt=d4
626 Print"    my bet is f"bt:foru=1to900:next:
  9oto640
630 input"    your bet":bt
635 ifP4<=0thenPrint"    you ain't got that
  much! bet again cheat! ":9oto637
636 9oto640
637 foru=1to100:Poke36875,130:Poke36877,130:next:
  9oto100
640 d5=d4:Print"    stake=f"bt:return
720 Poke36877,220:forl=15to8steP-1:Poke36878,1:
  form=1to20:Poke36879,int(rnd(1)*255)
721 Print"    bankrupt!!!":nextm,1:Poke36877,0:
  Poke36878,0:9oto6040
800 Poke36875,150:foru=1to20:next:Poke36875,0:
805 w1=val(right$(b$(f),1))
810 w2=val(left$(b$(f),3))
840 ifw2>9then9oto500:9oto850
841 ifw2=9thenw2=24:9oto850
845 w2=w2+49
850 ifw1=1thenw1=65:a=0
855 ifw1=2thenw1=83:a=2
860 ifw1=3thenw1=88:a=0
865 ifw1=4thenw1=90:a=2
870 return
1000 Print"
1001 Print"
1002 t=0:s(1)=0:s(2)=0:s(3)=0:s(4)=0:s(0)=0
1003 w1=k:w2=P1:i=311:9osub840:9osub110:9osub345:
  w1=y:w2=P2:i=i+1+1:9osub840:9osub110
1004 9osub345
1005 P1=P1+1:P2=P2+1
1006 ifP1>10andP1<14thenP1=10
1007 ifP2>10andP2<14thenP2=10
1008 ifP1=14thenP1=11:s(t)=10:t=t+1
1009 ifP2=14thenP2=11:s(t)=10:t=t+1
1010 tP=P1+P2:iftP=21then9oto4500
1015 ca=1
1020 Print"
  itick or  itwist"
1030 getq$:ifq$=""then1030

```

Turn to page 17



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 hanggliders, 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 Sinclair 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)

48K SPECTRUM* £10
16K ZX81 £5
DRAGON 32* £10

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

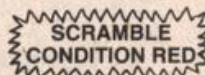
QUALITY SPECTRUM SOFTWARE LET AUTO-SONICS PUT EXCITING, COLOURFUL SOUND EFFECTS INTO YOUR PROGRAMS!

AUTO-SONICS GIVER YOU

- 26 superb sound effects, including ten arcade-style space effects, Telephone, Police Siren, Monster Growl, Helicopter, Outboard, Geiger, Frog, Duck, Pig, etc, etc.
- An on-screen "synthesiser", control panel that lets you create thousands of your own unique sounds.
- Every sound you hear can be instantly added to your own program, completely independent of Auto-Sonics. Cassette/instructions £4.99.

GULPMAN

Superb arcade-quality version of shh... you-know-what! Fast machine code... Full colour and sound... 15 mazes... 9 speeds... 9 grades... Hi-score, etc. ("An extraordinarily good programme — well worth the price," PCW Magazine.) Cassette with full-colour insert £5.95



7 Speeds... Laser Shield... Mother-ship Re-fuelling... Smart bombs... Hi-score... Sound... Hi-res colour graphics ("One of the best Sinclair games yet," YC). Only £4.50

Full machine code, Hi-res colour graphics... Sound... 8-direction controls... Missiles... Bombs... Fuel dumps... Meteors... Hi-score, etc. Super Arcade Action for only £4.95

AMPLIFY YOUR SPECTRUM (OR ANY COMPUTER) FOR ONLY

£4.99
+ 50p p&p



UNISONIC AMPLIFIER/AM RADIO

- * Use cassette lead to connect to your computer for loud, clear amplification of all sound output
- * Unplug lead and it's a neat pocket radio with smart wrist-strap. Uses one PP3 (not supplied)

TRS80 and Video Genie owners! Ask for our list of Guaranteed Quality Software, including new for '83 Frogger-Plus, only £4.99

BUTTERCRAFT SOFTWARE

14 WESTERN AVE., RIDDLESDEN(W), KEIGHLEY, YORKS, ENGLAND
Please Deduct 50p Discount second and subsequent orders

THE SOFTWARE BANK

LEND A TAPE
AND BORROW ONE OF YOUR CHOICE

NOW IS YOUR CHANCE
TO TRY OUT PROGRAMS BEFORE YOU BUY
FAST RELIABLE SERVICE
ALL TAPES CHECKED BEFORE DESPATCH

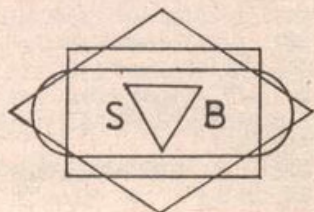
COMPUTERS REPRESENTED:

ZX81 SPECTRUM BBC VIC20
DRAGON 32

(ENQUIRIES WELCOME FOR OTHER COMPUTERS)

Only 50p per tape borrowed plus p&p. Send £5 Annual Membership Fee on full money-back approval and we will supply you with our information sheet and order form.

Office:
The Software Bank
35 Alexandra Road
Stoneygate
Leicester
LE2 2BB



Watford Technical Books



Now in stock, **Compute!'s First Book of Vic**, (£11.95 including p&p) contains many articles from Compute! magazine and some previously unpublished. There's a range of material ready to type in — programs and helpful hints, applications and utilities, from games and graphics techniques to a complete listing of TINY-MON — ready to load and occupying just 760 bytes.

Also just in is **Compute!'s Second Book of Atari** (£11.95 including p&p), which includes a Player-Missile Drawing Editor, ready to type in — and many other gems.

If you can't visit Watford and save a little p&p, send SAE for lists or phone. We're open daily till 6.00 (Weds till 1.00, Sat till 5.00). Access and Visa will do very nicely, thank you, including by phone.

105 St Albans Road, Watford WD1 1RD

(2 minutes from Watford Junction Station)

Tel: Watford (0923) 23324




```

1035 ifq$="s"then goto1200
1050 f=f+1:gosub800:i=i+1+1:gosub110:gosub345
1060 p3=fnv(1):p3=p3+1
1062 ifp3>10andp3<14thenp3=10
1065 ifp3=14thenp3=11:s(t)=10
1067 tp=tp+p3
1070 iftp>21ands(1)=0ands(2)=0then goto1072
1071 goto1075
1072 ifs(3)=0ands(4)=0ands(0)=0then goto3000
1075 foro=0tot:iftp>21ands(o)=10thentp=tp-10:
s(o)=0:goto1070
1076 next
1077 t=t+1
1078 iftp=21then goto4000
1080 ca=ca+1:ifca<=3then goto1020
1090 goto5000
1200 iftp=21then goto4000
1201 t=0
1202 q(1)=0:q(0)=0:q(2)=0:q(3)=0:q(4)=0
1220 i=3:w1=e:w2=d1:gosub110:gosub840:gosub345
1230 i=i+1:w1=m1:w2=d2:gosub110:gosub840:gosub
345:foru=1to450:next
1231 d1=d1+1:d2=d2+1
1232 ifd1>10andd1<14thend1=10
1233 ifd2>10andd2<14thend2=10
1235 ifd1=14thend1=11:q(t)=10:t=t+1
1236 ifd2=14thend2=11:q(t)=10:t=t+1
1238 td=d1+d2:iftd>tPortd=21then3000
1239 ca=1
1240 f=f+1
1250 i=i+1+1:gosub110:gosub800:gosub345:foru=
1to450:next
1260 d3=fnv(1)
1261 d3=d3+1
1262 ifd3>10andd3<14thend3=10
1263 ifd3=14thend3=11:q(t)=10
1267 td=td+d3
1270 iftd>21andq(0)=0andq(1)=0then1272
1271 goto1277
1272 ifq(2)=0andq(3)=0andq(4)=0thenPrint"bust":
goto4000
1277 forr=0tot:iftd>21andq(r)=10thentd=td-10:
q(r)=0:goto1270
1278 next
1280 iftd>tpthen goto3000
1285 t=t+1
1300 ca=ca+1:ifca<=3then goto1240
1305 forl=1to9:form=10to10step10
1310 Poke36875,130+m:Poke36879,m:next:next
1320 forl=1to15:form=15to15step3:Poke36875,215+m:
Poke36879,m+1:next:next:Poke36875,0
1325 Poke36879,90
1330 Print"5 card trick!":d4=d4+bt:p4=p4+bt:for
t=1to3500:next:Print" ":goto100

```

```

3000 Poke36875,140:foru=1to250:next:Poke36875,
130:foru=1to400:next:Poke36875,0
3005 iftp>21then goto3200
3010 Print"i win sucker! "
3020 d4=d4+bt:p4=p4+bt:ifp4=0then6000
3040 foru=1to3500:next
3041 Print" ":goto100
3200 Print"Ha!you bust " :fort=1to1000:next:
Print"1 win! " :goto3020
4000 foru=1to3:fort=10to50step2:Poke36878,15
4010 Print"you win " :Poke36875,170+t:
nextt,u
4015 Poke36875,0
4020 Print"lucky win! " :d4=d4+bt:p4=p4+
bt:foru=1to3500:next:Print" ":got
o100
4500 Print"i didn't get a chance"
4505 forl=1to9:form=10to10step10
4510 Poke36875,150+m:Poke36879,m:next:next
4514 forl=1to15:form=15to15step3:Poke36875,230+m:
Poke36879,110+m:next:next:Poke36875,0
4518 Poke36879,90:d4=d4+bt:p4=p4+bt:foru=1to3500:
next:Print" ":goto100
5000 forl=1to9:form=10to10step10
5005 Poke36875,150+m:Poke36879,m:next:next
5010 forl=1to15:form=15to15step3:Poke36875,230+m:
Poke36879,85+m:next:next:Poke36875,0
5015 Poke36879,90
5020 Print"5 card trick!":d4=d4+bt:p4=p4+bt:
fort=1to3500:next:Print" ":goto100
6000 Print" "
6010 Print"y y ooo u u"
6011 Print" y o o u u"
6012 Print" y o o u u"
6013 Print" y ooo uuu"
6014 Print" "
6015 Print" "
6016 Print"l ooo sss eee"
6017 Print"l o o s e "
6018 Print"l o o sss eee"
6019 Print"l o o s e "
6020 Print"lll ooo sss eee"
6021 Print" ":Print" "
6030 Poke36877,200:forl=15to0step-1:Poke36878,l:
Poke36879,int(rnd(1)*255)
6035 form=1to300:next:next:Poke36877,0:Poke
36878,0:Poke36879,90
6040 Print"another go(y/n)?"
6045 geta$:ifa$=""then6045
6050 ifa$="n"then6060
6055 run
6060 Print"Bye, chicken!!!"

```

Pontoon
by Kelvin Hepburn

Attack

on Dragon

This program is a game for the Dragon which puts to good use its extensive graphics capabilities. When the game is run a 'defender' type shape appears on the left-hand side of the screen which can fire and be moved up and down by use of the right joystick.

The object of the game is to hit the two objects moving towards you as many times as possible in the time allowed (75 secs). These objects move in both 'sin' and 'cos' curves and score 100 points for

every direct hit.

Your score will be displayed at the end of the game but to give you an indication of how well you are doing during the game, a vertical line will appear in the top left-hand corner of the screen for every hit.

Program notes

Lines	
30	Switches processor into fast mode.
60 to 90	See if instructions are required.
100	Sets mode and clears screen.
110 to 200	Set up screen.
210	Plays start tune.
220	Plays start tune.
230	Reads joystick.
240	Checks to see if time is up.
250 to 300	Calculate positions of enemy objects.
310	PE=shape of objects. (E=\$)

320 to 340	Draw enemy objects.
350	Checks fire button.
360 to 370	Blank out enemy ready for new positions.
380	Plays tune if fire button is pressed.
400 to 440	If y-value of your ship equals that of the enemy and the fire button is pressed, draw a line between ship and enemy to indicate laser. Also play tune.
450 to 470	If the enemy is not in line with your ship and the fire button is pressed, draw laser going off the screen.
480 to 510	Make sure ship does not go off the screen and see if movement of joystick is large enough to warrant a movement.
530 to 540	If hit then draw explosion.
550 to 560	Draw line at top of screen for every hit.
610	Draw your ship.
630 to 640	Draw and erase your ship.
700	When finished switch processor back to slow mode.

Program follows on page 18


```

10 ***DRAGON ATTACK***
20 **BY PAUL FERGUSON**
30 POKE65495,0
40 M=RND(10):HH=0:C=RND(
20):X=250:Z1=50:T=5
50 FOR D=1 TO 300:NEXT D
60 CLS:SOUND200,1:PRINT
@160,"DO YOU WANT INSTR
UCTIONS ? (Y/N)"
70 E$=INKEY$:IF E$="Y" T
HEN 720
80 IF E$="N" THEN 100
90 IF E$<>"Y" OR E$<>"N"
THEN 50
100 PCLS:PMODE3,1:SCREEN
1,0
110 LINE(1,0)-(44,20),PS
ET,BF
120 LINE(1,191)-(44,165)
,PSET,BF
130 L$="F4E3F7R2E4F5R6E6
R8F5R3E3F4R4E6F4R4E10F4
E3F8R10E19F10E7F10R15E1
0F10E8R3E4"
140 B$="BM45,164;":T$="B
M45,18;"
150 G$="E10BG10F10BH10G1
0BE10H10BF10"
160 LINE(45,0)-(45,191),
PSET
170 DRAWB$:DRAWL$:DRAWT$
:DRAWL$
180 PAINT(150,180),3,4
190 PAINT(150,6),3,4
200 A$="D2L2D4R2D2R35E1H
2L15H5L14"
210 TIMER=0
220 PLAY"T10CDEFGABCCBAG
FEDC"
230 Q=JOYSTK(0):Z=JOYSTK
(1):Z=Z*4
240 IF TIMER>=4000 THEN
660
250 X=X-5:IF X<=50 THEN
X=250
260 Y=(INT(SIN(M)*50)+85
):M=M+0.2
270 F=(INT(COS(C)*30)+85
):C=C+0.4:F$=STR$(F)
280 X$=STR$(X):Y$=STR$(Y
)
290 L$="BM"+X$+"", "+Y$+";
"
300 K$="BM"+X$+"", "+F$+";
"
310 P$="R10D10L10U9R8D8L
7U8R6D7L4U7"
320 COLOR3,2:DRAWL$:DRAW
P$
330 DRAWK$:DRAWP$:COLOR2
,3
340 COLOR1,2
350 P=PEEK(65280):IF P=1
26 OR P=254 THEN I=1
360 COLOR2,3:DRAWL$:DRAW
P$

```

```

370 DRAWK$:DRAWP$:COLOR1
,2
380 IF I=1 THEN PLAY"T15
V1505CL80BL80AL80GL80FL
80EL80DL80CL80":K=Z1:GO
TO400
390 GOTO480
400 U$=STR$(K+7):B$=STR$
(X-50):I=0:V=Z1+7
410 N$=STR$(Y+3):J$=STR$
(F+3)
420 IF (V-(Y+10))<=0 AND
(V-(Y+10))>=-9 THEN D
RAW"BM50,"+U$+";C3R"+B$
+";":DRAW"BM"+X$+"", "+N$
+";":C3:XG$;":EX=1
430 IF (V-(F+10))<=0 AND
(V-(F+10))>=-9 THEN DRA
W"BM50,"+U$+";C3R"+B$+
";":DRAW"BM"+X$+"", "+J$+
";XG$;":CX=1
440 IF (V-(Y+10))<=0 AND
(V-(Y+10))>=-9 OR (V-(F
+10))<=0 AND (V-(F+10))
>=-9 THEN PLAY"T1V3101C
L180BL180AL180GL180FL18
0EL180DL180CL180"
450 IF EX=0 AND CX=0 THE
N DRAW "BM50,"+U$+";C3R
260 IF X>50 AND X<250 A
ND EX=1 OR CX=1 THEN HH
=HH+1
470 COLOR2,3:DRAW"BM50,"
+U$+";R200":COLOR3,2
480 IF Z-Z1>10 THEN Z=Z1
+10
490 IF Z-Z1<-10 THEN Z=Z
1-10
500 IF Z>=141 THEN Z=140
510 IF Z<=30 THEN Z=30
520 COLOR2,3
530 IF EX=1 THEN DRAW"BM
"+X$+"", "+N$+";XG$;":
540 IF CX=1 THEN DRAW "B
M"+X$+"", "+J$+";XG$;":
550 IF EX=1 OR CX=1 THEN
T=T+4:XX=1:T$=STR$(T)
560 IF XX=1 THEN DRAW"BM
"+T$+"",5,D10"
570 XX=0
580 COLOR3,2
590 EX=0:CX=0
600 Z$=STR$(Z):P$=STR$(Z
1)
610 B$="BM4,"+Z$+";":C$=
"BM4,"+P$+";":
620 IF Z=Z1 THEN 230
630 COLOR2,1:DRAWC$:DRAW
A$
640 COLOR1,2:DRAWB$:DRAW
A$
650 Z1=Z:GOTO230
660 CLS:PLAY"03T100V31C
DEFGABCDGABCDGABCDGABCD
FGABCDGAB":PRINT"YOUR

```



```

TIME IS UP"
670 PRINT "YOU SCORED ";H
H*100"POINTS"
680 PRINT@160,"ANOTHER ?
(Y/N)"
690 R$=INKEY$:IF R$="Y"
THEN 40
700 IF R$="N" THEN POKE
65494,0:END
710 IF R$<>"Y" OR R$<>"N
" THEN 680
720 CLS: SOUND234,2:PRIN
T@32,"*****DRAGON
ATTACK*****"
730 PRINT@96,"THE OBJECT
OF THE GAME IS TO HIT
THE OBJECTS MOVING FROM
THE RIGHT OF THE SC

```

```

REEN AS MANY TIMES
AS POSSIBLE IN THE TIME
ALLOWED(75 SECS)."
740 PRINT "YOU WILL GA
IN 100 POINTS FOR EVERY
OBJECT HIT.NOTE:YOUR S
HIP CANNOT BE DESTROYED
NEITHER CAN THE ENEMY!
"
750 PRINT@416,"PRESS 'S'
TO START"
760 O$=INKEY$
770 IF O$=" " THEN 760
780 IF O$="S" THEN 100
790 GOTO 750

```

Attack
by Paul Ferguson

Tables

on Spectrum

This program is designed to allow children to practice their tables by either multiplication or division. Two attempts are permitted at each question before the correct answer is displayed, but the first answer must be correct to score.

It is necessary to enter the same number of digits as the correct answer before the computer will respond. The range of the table may be altered by modification of lines 45 and 280.

Program notes

Lines	
30 to 90	Determines type of question.
100 to 110	Sets counter to zero.
130	Notifies if answer correct.
160 to 170	Give final score and allows choice for next test.
160	Inverse video reads WELL DONE YOU GOT FULL MARKS.
190 to 270	Determine choice of next test.
250	Inverse video reads "SCORE :"; out of "9".
260 to 340 & 410 to 900	Set questions and totals questions asked.
350 to 400	Deal with incorrect answers.
370 to 410	Graphics "D".
1000 to 1240	Read keyboard and determine whether answer is correct or not.
2000 to 2050	Create division sign.
2020	Graphics "D".

```

1 REM Tables
2 REM © Derry Wilman 1982
10 GO SUB 2000
20 CLS
30 PRINT "Which table do you w
ant?" (ENTER 1 to 12)
40 INPUT B
45 IF B>12 THEN GO TO 20
50 PRINT "B:"
60 PRINT "Multiplication or di
vision?" (ENTER m or d)
70 INPUT X$
80 INPUT Y$
90 PRINT "X$:"
100 LET F=0
110 LET C=0
120 PRASE SW: GO TO 150
130 PRINT "CORRECT": IF count=0
THEN LET F=F+1
140 PRASE 100
150 CLS
160 IF G=10 AND F=10 THEN PRINT
AT 10,2,"WELL DONE YOU GOT FULL
MARKS:" PRINT AT 15,2,"Press 'n'
to repeat or 't' to change
the table": GO TO 190
170 IF G=10 AND F>10 THEN PRIN
T AT 10,2,"YOU GOT 11:" SUI OF
10": PRINT AT 15,2,"Press 'n'

```

```

to repeat or "t" to change tab
le " : GO TO 190
190 GO TO 240
190 IF INKEY$="" THEN GO TO 190
200 LET Q$=INKEY$
210 IF Q$="t" THEN GO TO 20
220 IF Q$="c" THEN GO TO 100
230 IF Q$<>"t" AND Q$<>"c" THEN
GO TO 190
240 CLS
250 PRINT AT 20,10:"SCORE :";F
260 LET J=0
270 LET count=0
280 LET A=1+INT (RND*12)
290 LET B=A+B
300 IF X$="m" THEN GO TO 320
310 IF X$="d" THEN GO TO 410
320 PRINT AT 0,0;A,"X",B,"="?
330 LET C=B
340 GO TO 900
350 LET count=count+1
360 IF X$="m" AND count=2 THEN
PRINT "Wrong, try again": P
AUSE 200: GO TO 140
370 IF X$="d" AND count=2 THEN
PRINT "Wrong, try again": P
AUSE 200: GO TO 140
380 LET J=2
390 PRINT "Wrong, try again": P
AUSE 100
400 GO TO 1000
410 PRINT AT 0,0;A,"D",B,"="?
420 LET C=B
430 LET G=G+1
1000 IF INKEY$="" THEN GO TO 10
1010 IF INKEY$="" THEN GO TO 101
0
1020 LET K=VAL INKEY$
1030 PRINT AT 1+0,0;K
1040 IF K=C THEN PRASE 100: GO T
O 130
1050 IF K>C THEN GO TO 350
1060 IF C=10 AND K<10 AND K>1 T
HEN GO TO 350
1070 IF K<C AND C=10:0 THEN GO T
O 350
1080 IF INKEY$="" THEN GO TO 10
90
1100 IF INKEY$="" THEN GO TO 110
0
1110 LET L=VAL INKEY$
1120 LET K=K+10+L
1130 PRINT AT 1+0,0;K
1140 IF K=C THEN PRASE 100: GO T
O 130
1150 IF K>C THEN GO TO 350
1160 IF C=100 AND K<100 AND K>10
THEN GO TO 350
1170 IF K<C AND C=100:0 THEN GO
TO 350
1180 IF INKEY$="" THEN GO TO 11
80
1190 IF INKEY$="" THEN GO TO 119
0
1200 LET O=VAL INKEY$
1210 LET K=K+10+O
1220 PRINT AT 1+0,0;K
1230 IF K=C THEN PRASE 100: GO T
O 130
1240 IF K>C THEN GO TO 350
2000 FOR N=0 TO 7
2010 READ X
2020 POKE USR "D"+N,X
2030 NEXT N
2040 DATA 0,0.24,0.125,0.24,0
2050 RETURN

```

Tables
by Derry Wilman

Morse Code

on Vic-20

This program is used to convert a sentence or word into morse code. It asks you to type in a message and then it will send it out as morse code using sound, it also displays the letter it is on and its equivalent code with . and _

Lines 40 to 200 are the main ones that convert the message into code and make the bleeps. The rest is pretty straightforward.

```

1 REM *****
2 REM * ALAN BLACKHAM'S *
3 REM * MORSE CODE *
4 REM * (10/10/82) *
5 REM *****
10 POKE36879,8
15 PRINT "MORSE CODE"
17 PRINT " "
18 PRINT "MORSE CODE IN MESSAGE!"
20 INPUT "MESSAGE";M$
30 L=LEN(M$)
40 FOR I=1 TO L
50 X$=MID$(M$,I,1)
52 PRINT X$;" "
55 IF X$=" " THEN FORE=1 TO 400: NEXT:
PRINT:GOTO200
60 RESTORE
70 READA$,B$
72 IF A$="-1" THEN PRINT "NOT
PERMISSABLE!": RUN
80 IF A$<>X$ THEN 70
85 PRINT B$
90 FOR R=1 TO LEN(B$)
100 POKE36878,15
110 N$=MID$(B$,R,1)
120 IF N$="." THEN G=70
130 IF N$="_" THEN G=160
140 POKE36876,220
150 FOR E=1 TO G: NEXT
160 POKE36876,0
162 FOR Y=1 TO 70: NEXT
165 NEXT R
200 FOR Y=1 TO 50: NEXT Y, I
300 PRINT "MANY MORE (Y/N)?"
310 GETA$: IF A$=" " THEN 310
320 IF A$="N" THEN PRINT "NO": END
330 IF A$="Y" THEN RUN
340 GOTO 310

```

Continued on page 20

OPEN FORUM

Continued from page 19

```
500 REM**DATA FOR CODE **
502 DATA A,-,B,-,...,C,-,...,D,-,...,E,-,...,F,-,...,G,-,...,H,-,...,I,-,...
510 DATA J,-,...,K,-,...,L,-,...,M,-,...,N,-,...,O,-,...,P,-,...,Q,-,...,R,-,...
520 DATA S,-,...,T,-,...,U,-,...,V,-,...,W,-,...,X,-,...,Y,-,...,Z,-,...
530 DATA 1,-,...,2,-,...,3,-,...,4,-,...,5,-,...,6,-,...,7,-,...,8,-,...,9,-,...,
,-1,-1

READY.
```

Morse Code
by Alan Blackham

Sound

on BBC Micro

This program allows full use of the BBC sound commands. A chord can be played at the same time as a noise. Various envelopes have been defined including

piano and mouth organ.

The function keys F1 to F9 have the envelopes. F1 is Piano and F2 is Mouth Organ. Noise can be made by pressing Shift and Z, X, (for pink) and V, B, N for white noise. Try a piano envelope with Shifted V.

The variable K is the number of keys pressed. The array of N stores which notes are pressed. Lines 620-640 stop the program coming to a halt by keeping the sound channels clear. By pressing FO the notes you have played will be repeated. *Delete* resets the envelopes. The program has a range of two octaves.

```
10 EN=1
20 REM 7/11/82
30 MODE7
32 VDU 23,0,11,0,0,0,0,0,0
33 MODE7
40 DIMMOT%(1024,3):TI%=0
50 K=1
60 DIM N(3)
70 PROCDISPLAY
80 REM ENVELOPE SELECT
90 REM *****
100 *FX 15,1
110 IF INKEY(-90)=TRUE EN=0:FOR A=1 TO 3:ENVELOPE 1,0,0,0,0,0,0,0,126,-4,0,-1,126,10:PRINTTAB(20,17);"ENVELOPE ";1:NEXTA
120 :IF INKEY(-116)=TRUE THEN ENVELOPE EN,1,2,-2,2,6,1,2,6,1,1,-1,-1,63,126:PRINTTAB(20,17);"ENVELOPE ";3:EN=EN+1
130 IF INKEY(-114)=TRUE THEN ENVELOPE EN,0,0,0,0,0,0,0,126,-4,0,-1,126,10:PRINTTAB(20,17);"ENVELOPE ";1:EN=EN+1
140 IF INKEY(-115)=TRUE THEN ENVELOPE EN,10,0,0,0,0,0,0,60,10,0,-60,60,120:PRINTTAB(20,17);"ENVELOPE ";2:EN=EN+1:IF EN>3 GOTO 220
150 IF INKEY(-21)=TRUE THEN ENVELOPE EN,0,2,-2,2,6,12,6,126,-4,0,-1,126,100:PRINTTAB(20,17);"ENVELOPE ";4:EN=EN+1:IF EN>3 GOTO 220
160 IF INKEY(-117)=TRUE THEN ENVELOPE EN,1,0,0,0,0,0,0,5,126,0,-5,40,126:PRINTTAB(20,17);"ENVELOPE ";5:EN=EN+1:IF EN>3 GOTO 220
170 IF INKEY(-118)=TRUE THEN ENVELOPE EN,1,50,50,50,2,2,2,12,0,126,1,126,9:PRINTTAB(20,17);"ENVELOPE ";6:EN=EN+1:IF EN>3 GOTO 220
180 IF INKEY(-23)=TRUE THEN ENVELOPE 1,0,2,0,2,6,12,6,126,0,126,1,126,9:PRINTTAB(20,17);"ENVELOPE ";7
190 IF INKEY(-119)=TRUE THEN ENVELOPE EN,1,100,100,100,100,100,100,25,-50,-50,-50,126,90:PRINTTAB(20,17);"ENVELOPE ";8:EN=EN+1:IF EN>3 GOTO 220
200 REM NOISE SELECT
210 REM *****
220 IF INKEY(-1)<>TRUE GOTO290
230 IF INKEY(-98)=TRUE SOUND 0,1,1,10
240 IF INKEY(-67)=TRUE SOUND 0,1,2,10
250 IF INKEY(-83)=TRUE SOUND 0,1,3,10
260 IF INKEY(-100)=TRUE SOUND 0,1,4,10
270 IF INKEY(-101)=TRUE SOUND 0,1,5,10
280 IF INKEY(-86)=TRUE SOUND 0,1,6,10
290 IF INKEY(-33)=TRUE PROCREPLAY
300 REM NOTE SELECT
310 REM *****
320 IF INKEY(-66)=TRUE N(K)=53:K=K+1
330 IF INKEY(-82)=TRUE N(K)=61:K=K+1
340 IF INKEY(-51)=TRUE N(K)=69:K=K+1
350 IF K>3 GOTO560 ELSE IF INKEY(-35)=TRUE N(K)=57:K=K+1
360 IF K>3 GOTO560 ELSE IF INKEY(-52)=TRUE N(K)=65:K=K+1
370 IF K>3 GOTO560 ELSE IF INKEY(-68)=TRUE N(K)=73:K=K+1
380 IF K>3 GOTO560 ELSE IF INKEY(-36)=TRUE N(K)=77:K=K+1
```

PROGRAM OF THE WEEK


```

390 IF K>3 GOTO560 ELSE IF INKEY(-84)=TRUE N(K)=81:K=K+1
400 IF K>3 GOTO560 ELSE IF INKEY(-69)=TRUE N(K)=85:K=K+1
410 IF K>3 GOTO560 ELSE IF INKEY(-85)=TRUE N(K)=89:K=K+1
420 IF K>3 GOTO560 ELSE IF INKEY(-54)=TRUE N(K)=93:K=K+1
430 IF K>3 GOTO560 ELSE IF INKEY(-70)=TRUE N(K)=97:K=K+1
440 IF K>3 GOTO560 ELSE IF INKEY(-71)=TRUE N(K)=101:K=K+1
450 IF K>3 GOTO560 ELSE IF INKEY(-2)=TRUE N(K)=49:K=K+1
460 IF K>3 GOTO560 ELSE IF INKEY(-65)=TRUE N(K)=41:K=K+1
470 IF K>3 GOTO560 ELSE IF INKEY(-55)=TRUE N(K)=105:K=K+1
480 IF K>3 GOTO560 ELSE IF INKEY(-87)=TRUE N(K)=109:K=K+1
490 IF K>3 GOTO560 ELSE IF INKEY(-88)=TRUE N(K)=117:K=K+1
500 IF K>3 GOTO560 ELSE IF INKEY(-56)=TRUE N(K)=113:K=K+1
510 IF K>3 GOTO560 ELSE IF INKEY(-73)=TRUE N(K)=121:K=K+1
520 IF K>3 GOTO560 ELSE IF INKEY(-72)=TRUE N(K)=125:K=K+1
530 IF K>3 GOTO560 ELSE IF INKEY(-89)=TRUE N(K)=129:K=K+1
540 IF K>3 GOTO560 ELSE IF INKEY(-57)=TRUE N(K)=133
550 IF K>3 GOTO560 ELSE IF INKEY(-74)=TRUE N(K)=137
560 PRINTTAB(5,10);CHR$141;"KEYS PRESSED ";K-1
570 PRINTTAB(5,11);CHR$141;"KEYS PRESSED ";K-1
580 PROCPLAY
590 GOTO 100
600 *****
610 DEFPROCPLAY
620 IF ADVAL(-6) > 3 THEN *FX 15,0
630 IF ADVAL(-7) > 3 THEN *FX 15,0
640 IF ADVAL(-8) > 3 THEN *FX 15,0
650 IF N(1)=0 SOUND &0201,0,N(1),5:GOTO670
660 SOUND &0201,1,N(1),5
670 IF N(2)=0 SOUND &0202,0,N(1),5:GOTO700
680 IF EN>1 ES=2 ELSE ES=1
690 SOUND &0202,ES,N(2),5
700 IF N(3)=0 SOUND &0203,0,N(1),5:GOTO730
710 IF EN>2 ES=3 ELSE ES=1
720 SOUND &0203,1,N(3),5
730 IF TI%>1024 GOTO750
740 MOT%(TI%,1)=N(1):MOT%(TI%,2)=N(2):MOT%(TI%,3)=N(3)
750 K=1:N(1)=0:N(2)=0:N(3)=0
760 TI%=TI%+1
770 ENDPROC
780 *****
790 DEFPROCDISPLAY
800 FOR A=2 TO 6 :PRINTTAB(0,A);CHR$129;CHR$157;CHR$135:
810 NEXT
820 FOR A=20 TO 25:PRINTTAB(0,A);CHR$129;CHR$157;CHR$135:NEXT
830 PRINTTAB(10,0);CHR$141;"SYNTHESIZER"
840 PRINTTAB(10,1);CHR$141;"SYNTHESIZER"
850 PRINTTAB(4,3);" f0=REPLAY :f1-f8=ENVELOPES:"
860 PRINTTAB(4,4);" delete=ENVELOPE RESET"
870 PRINTTAB(10,19);"NOISE:_"
880 PRINTTAB(4,20);"Use SHIFT and Z,X,C,V,B"
890 PRINTTAB(4,21);"Z,X,C=PINK NOISE"
900 PRINTTAB(4,22);"V,B,N=PINK NOISE"
910 PRINTTAB(4,23);"Z,B HIGH:X,B MEDIUM:C,N LOW"
920 ENDPROC
930 *****
940 DEFPROCREPLAY
950 FOR A%=0 TO TI%
960 PROCPLAY
970 PRINTTAB(0,18);"REPLAY"
980 N(1)=MOT%(A%,1):N(2)=MOT%(A%,2):N(3)=MOT%(A%,2)
990 PROCPLAY
1000 NEXT
1010 PRINTTAB(0,18);" "
1020 ENDPROC

```

Sound
by Robert Lober

Showing up the nature of the character held in the corner

Colin Cattanach presents two programs for searching around in the Vic20 memory.

Character recognition

When poking around in the Vic's memory, one is often uncertain which location a particular character is held in. This program, which incorporates two options, clearly shows the nature of the character held at a particular location, by printing an enlarged version of it at the bottom right-hand corner of the screen, within an area of 160 x 160 pixels.

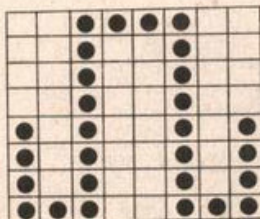
The 8 byte values, which make up each character, are printed for reference, alongside the relevant horizontal rows of dots. In a second option, one may choose to view every character in an area of memory in turn, together with all the relevant byte data.

The program, as set out (Lines 230-350) will run on an unexpanded Vic. When the program is used with an expanded Vic (of 16K+) for which it was first developed, one must first enter the following one line program.

POKE 44, 32: POKE 648, 30: POKE 8192, 0: NEW:
RUN.

Then press the *Run Stop* and *Restore* keys to regain the cursor. This fools the Vic into behaving as the unexpanded version. The program is now fed in, and operates as with the unexpanded Vic.

Byte = 60
Byte = 36
Byte = 36
Byte = 36
Byte = 165
Byte = 165
Byte = 165
Byte = 231



A word of warning. Having placed the program in the computer, be sure to save it on tape before a run. Experimenting with *Poke* commands can crash a program and it is very time-consuming entering all again from the keyboard.

The following additional lines to insert in the program, for use with the expanded Vic, (16K+), illustrate the kind of situation the program may be used to investigate.

```
2 PRINT: PRINT "INSTRUCTIONS FOLLOW IN 11
SECS": FOR I=0 TO 1024: POKE 5120+I, PEEK
(32768+I): NEXT: PRINT
3 PRINT: FOR I=0 TO 1024: READ Q: IF Q= -1
THEN 5
4 POKE 6144+I, Q: NEXT
5 POKE 36869, 253: POKE 36866, PEEK (36866)
OR 128
6 DATA 60, 36, 36, 36, 165, 165, 165, 231, - 1
10 FOR N=6137 TO 6144: FOR Y = 6144 TO 6151:
POKE N, PEEK(Y): NEXT: NEXT
```

Line 2 duplicates 128 characters held in Rom in the user's Basic program Ram

from 5120 TO 6144. This area can now be used for programmable characters. Use the program to check the characters now held at say 32768 and 5120. Line 5 commands the Vic to seek characters at location 5120 onwards, rather than in Rom at 32768. Lines 3,4 and 6 have been used to insert a new character at 6144. Again check this by running the program. Line 10 transfers one character from location Y TO N.

The essential part of the program is in

lines 300-350, which converts the decimal value inserted upon demand, to a binary number system, which is printed out to illustrate each line's byte value. The latter is then used to compile the enlarged character with a series of *Poke* values.

Word or Data Search

This program will print out all the data recorded in your listings or search for and print out all the listings in which a particular word appears.

On a straight run, the program asks for the limits of the chosen area in memory to be viewed. This is then printed out at a rate suitable for scanning. It is often necessary to search for a piece of desired information recorded in memory, whose exact location is forgotten. With a large memory, it would not be convenient to have to scan through all the memory every time. This is

Character recognition

```
1 REM "CHARACTER RECOGNITION(VIC)BY C.J.CATTANACH"
230 PRINT "CLH"
233 F=8000:G=81H=38720:J=6
234 PRINT "VARIOUS OPTIONS ARE AVAILABLE": PRINT
235 PRINT "TO SEE CHARACTERS AT MEMORY POSITION 'K', &
BYTE DATA, PRESS F1 & ENTER K"
236 PRINT:PRINT:PRINT"FOR PRINT-OUT OF ALL CHARACTERS,
PRESS F3"
238 GET A$: IF A$="" THEN 238
240 IF A$="F1" THEN 249
241 IF A$="F3" THEN 259
249 PRINT "CLH":PRINT:PRINT
250 PRINT "K=":INPUT K: GOSUB 350
251 Z=PEEK(K)
252 GOSUB 300: IF F>8154 THEN 254
253 K=K+1: GOTO 251
254 PRINT:PRINT"PRESS ANY KEY TO CONTINUE"
255 GET B$:IF B$="" THEN 255
256 RUN 230
259 PRINT:PRINT:PRINT "ENTER POSITION K OF FIRST
CHARACTER": X=1: INPUT K
260 PRINT "CHARACTER":X;"IN MEMORY": X=X+1: GOSUB 350
261 Z=PEEK(K)
262 GOSUB 300: IF F>8154 THEN 264
263 K=K+1: GOTO 261
264 FOR T=1 TO 2000: NEXT
265 PRINT "CLR"
266 F=8000: G=81: H=38720: J=6
268 GOTO 260
300 L=Z/2: IF (L-INT(L))*2=1 THEN 325
302 M=INT(L)/2: IF (M-INT(M))*2=1 THEN 327
304 N=INT(M)/2: IF (N-INT(N))*2=1 THEN 329
306 P=INT(N)/2: IF (P-INT(P))*2=1 THEN 331
308 Q=INT(P)/2: IF (Q-INT(Q))*2=1 THEN 333
310 R=INT(Q)/2: IF (R-INT(R))*2=1 THEN 335
312 S=INT(R)/2: IF (S-INT(S))*2=1 THEN 337
314 T=INT(S)/2: IF (T-INT(T))*2=1 THEN 339
316 F=F+22: H=H+22:RETURN
325 POKE F+7,G:POKE H+7,J: GOTO 302
327 POKE F+6,G:POKE H+6,J:GOTO 304
329 POKE F+5,G: POKE H+5,J: GOTO 306
331 POKE F+4,G: POKE H+4,J: GOTO 308
333 POKE F+3,G: POKE H+3,J: GOTO 310
335 POKE F+2,G: POKE H+2,J: GOTO 312
337 POKE F+1,G: POKE H+1,J: GOTO 314
339 POKE F,G: POKE H,J: GOTO 316
350 FOR T=1 TO 12: PRINT: NEXT: FOR L=K TO K+7: PRINT
TAB(2); "BYTE=":PEEK(L): NEXT: RETURN
```


where the word Search comes in useful.

On entering *Run 4000*, one is asked to supply the word to be searched for. A systematic search is then carried out of all recorded information, and all sentences containing the word in question are printed out on the screen, with the word highlighted in red.

The program is obviously of more use with an expanded Vic, which has a greater memory capacity for recording information. But by placing less information on file, one can experiment with it using the basic machine. The program as listed takes up about a third of the memory available with the 16K expansion, leaving plenty of room to record more information to search through, using the Word Search procedure.

Lines 52 and 55 ask for the limits of information to be printed out in the straight *Run* mode, pertaining to the area of memory covered by Listings 100-184. The

latter can easily be expanded, of course, providing the routines in lines 10-14 and lines 70-74 are also expanded.

Lines 10-14 direct the operation in hand to the lines of information to be printed on the screen. These are further defined by lines 70-74, which direct exactly which lines are to be printed out between limits of lines 100 and 184. This covers 84 listings or $84 \times 4 = 336$ lines of screen print. With 16K one can easily incorporate 1000 lines of screen print. It is important to ensure that the maximum value of L inserted on demand, line 55, falls within the limits of recorded data, i.e. the D\$ values of lines 100-184. Failure to observe this can lead to annoying hold ups.

Before running the Word Search program, lines 4000-4210, one should ensure that the value 84 in line 4005 represents the maximum number of recorded pieces of information in the listings 100-184 (i.e.

the maximum number of values for D\$). In the initial Word Search, lines 4005-4025 cause every sentence of information to be scanned for the presence of the Desired Word C\$. If this is found, line 4200 prints out the actual listing of the sentence in which the word occurs.

Lines 4201-4203 decide which part of the sentence shall be printed in blue and which shall be in red (the high-lighted word appears in red). Line 4208 prints one letter at a time in blue, and line 4210 prints in red. Line 4204, and also line 60, contains the time delay values T between each sentence printed, and may easily be altered.

After the Word Search and the resulting print on the screen, one is given the option, lines 4100-4114 of a repeat viewing of the same data, (pressing F1), or one is asked for the next word to be searched for (pressing F7).

Record or individual word search

```

1 REM "RECORD SEARCH OR INDIVIDUAL WORD SEARCH BY
C.J.CATANACH"
5 GOTO 49
10 IF Z<18 THEN 70
11 IF Z=>18 AND Z< 34 THEN 71
12 IF Z=>35 AND Z< 51 THEN 72
13 IF Z=>52 AND Z< 68 THEN 73
14 IF Z=>69 AND Z< 85 THEN 74
49 PRINT "(CLR) MAXIMUM STATEMENTS LISTED IS 84": PRINT:
PRINT " FOR WORD SEARCH RUN 4000": PRINT
50 PRINT"GIVE VALUES OF 'K' TO 'L' REVIEWED":PRINT
52 PRINT"K=":INPUT K
55 PRINT "L=":INPUT L
58 FOR Z=K TO L:GOSUB 10:PRINT"(Z=";Z; "LIST NO.=";
Z+99)":PRINT
60 PRINT D$:PRINT:PRINT:FOR T=1 TO 2000:NEXT:T
62 PRINT:PRINT:"END OF DATA":STOP
70 ON Z GOSUB 100, 101, 102, 104, 105, 106, 107, 108, 109,
110, 111, 112, 113, 114, 115, 116: RETURN
71 ON Z-17 GOSUB 117,.....133:RETURN
72 ON Z-34 GOSUB 133,.....150:RETURN
73 ON Z-51 GOSUB 151,.....167:RETURN
74 ON Z-68 GOSUB 168,.....184:RETURN
990 REM LINES 100 TO 184 CONTAIN FILED INFORMATION (MAX
OF 4 LINES TO EACH LIST NUMBER)
100 D$=" THIS IS THE FIRST PIECE OF INFORMATION FILED,
AND MAY TAKE UP A MAXIMUM OF FOUR SCREEN LINES":RETURN
184 D$=" THIS IS THE LAST PEICE OF INFORMATION FILED,
OUT OF 84 LISTINGS":RETURN
4000 PRINT"(CLR) GIVE WORD SOUGHT":PRINT:PRINT"WORD C$=":
INPUT C$
4005 FOR Z=1 TO 84: GOSUB 10
4009 N=LEN(C$)
4015 FOR R=1 TO (LEN(D$)-N)
4020 IF MID$(D$,R,N)=C$ THEN 4200
4025 NEXT:NEXT
4100 PRINT:PRINT"PRESS F1 FOR NEXT SEARCH"
4101 PRINT"PRESS F7 FOR REPEAT VIEWING"
4110 GET F$:IF F$="" THEN 4110
4112 IF F$="(F1)" THEN 4000
4114 IF F$="(F7)" THEN 4005
4200 PRINT:PRINT"Z=";Z;" (LIST NO=";Z+99;")": PRINT
4201 FOR R=1 TO LEN(D$)
4202 IF MID$(D$,R,N)<>C$ THEN 4208
4203 IF MID$(D$,R,N) =C$ THEN 4209
4204 FOR T=1 TO 3000:NEXT:T:PRINT:PRINT:GOTO 4025
4208 PRINT MID$(D$,R,1):NEXT
4209 FOR X=R TO R+N-1
4210 PRINT"(RED)"MID$(D$,X,1):NEXT: PRINT "(BLUE)" ;:
R=R+N:NEXT

```


Type founts galore

Ian Farquharson explains how to create and store your own character sets.

The Spectrum character set, or at least the upper case letters and numbers, was copied across from the ZX81 without any changes. To make any changes to the ZX81 character set, an expensive hardware add-on was required, such as the excellent DK'tronics unit.

Most Spectrum owners know how to re-define the UDG characters. The only problem with these is their numbers — at most only 21 different shapes may be programmed. This means that you can not create foreign alphabets or new English type faces with more than 21 letters.

There is a way to get around this. If you look at page 173 of the ZX Spectrum Basic manual, at the bottom of the page is a note about the system variable called *Chars*. This is a pointer which holds the address of a byte which is always 256 bytes above where the Spectrum thinks the character set is located. This character set extends from 32 to 127 inclusive and can be sited anywhere in memory.

Having explained the principle I will now show you how to set up your own character table on a free part of the memory.

Firstly, you will need to set up some space for the character table near to the top of your free Ram. This will require 768 bytes of memory. In a 48K machine it is best to begin at 64000 decimal. To protect this area you should execute the command *Clear 63999* which resets the Ram-top so that the area above is kept free from the program and data.

Secondly, you will need to copy the existing character set from its location in Rom into the new character table. (This will not be needed if you are going to redefine the entire set as we will over-write the old set). To relocate the character set the following short Basic program is used.

```
10 FOR Z=15616 TO 16384
20 POKE Z+48384,PEEK Z
30 NEXT Z
```

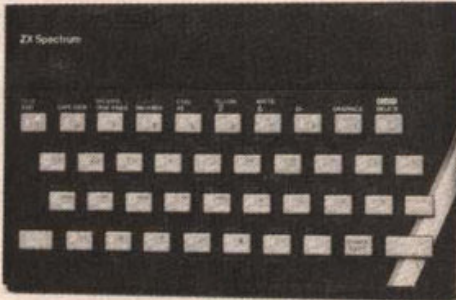
Thirdly, you can replace certain characters (or all) with your own type-faces by *Poking* in the appropriate eight bit numbers (1-255) to form the rows of your new characters. Remember to enter eight numbers for each character even if they are intended to be blank, as the previous contents will remain in the table and interfere with the new characters. The method of introducing the new characters into the table depends upon how many bytes need to be altered, but for most applications the following Basic program will probably suffice.

```
10 INPUT "Enter start address>";START
20 CLS
30 FOR Z=START TO 64767
```

```
40 INPUT (Z);"":AS
50 LET AS="BIN "+AS
60 POKE Z, VAL AS
70 PRINT Z,AS
80 POKE 23692,-1
90 NEXT Z
```

This short program requires the user to input the binary string representing the pattern of *Ink* and *Paper* pixels with a 1 for *Ink* and 0 for *Paper*. Ideally you should have worked out the characters on graph paper beforehand to simplify the process of entering the new characters.

Once you have changed the relevant characters you will want to test out your creations. To do this you must alter *Chars* to point to 63744, which is 256 less than the first character. Because of the location, which is on a 1/4K boundary, you need only alter the most significant byte of this variable. The actual value which needs to be poked is 249 (249x256=63744). To do this type *Poke 23607,249* followed by *Enter*. With luck you should find your new type-face being used in the automatic listing.



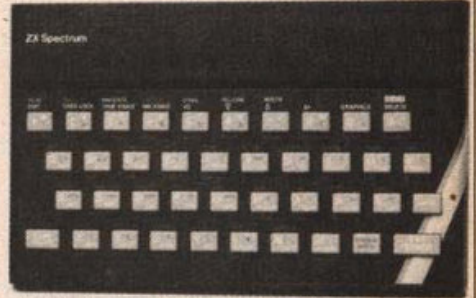
If you have made a mistake and set the machine to use a character set which contains just spare bytes or garbage such as the program area, Rom, or a machine routine, you will find that the listing has either disappeared or turned into a mass of grey squares, do not panic. All you need do is type *Poke 23607,60* to restore the pointer to its original position in the Sinclair Rom. You will not be able to see this command as you type it but if you are careful this should not prove difficult.

Once the character set is working correctly you can delete any Basic program as usual with *New*. When this is done the original Sinclair set will be used. You can always restore the programmed table by entering *Poke 23607,249*. The old set may be called up at any time by the command *Poke 23607,60*.

The following data, when entered at the specified locations using the program in the third stage, with line 50 removed, will replace the upper case letters and the numerical set with a futuristic type face which can only be described as similar to those used in the arcade game "Defender".

Numbers 1 to 9 and 0

```
64128: 0, 126, 102, 106, 106, 114, 126, 0.
64136: 0, 24, 120, 24, 24, 24, 126, 0.
64144: 0, 126, 2, 2, 126, 96, 126, 0.
64152: 0, 126, 6, 62, 6, 6, 126, 0.
64160: 0, 96, 96, 100, 126, 4, 4, 0.
64168: 0, 126, 96, 96, 126, 2, 126, 0.
64176: 0, 126, 96, 96, 126, 96, 126, 0.
64184: 0, 126, 6, 6, 6, 6, 6, 0.
```



```
64192: 0, 126, 98, 126, 98, 98, 126, 0.
64200: 0, 126, 98, 98, 126, 2, 2, 0.
```

Upper case letters A to Z

```
64264: 0, 126, 98, 98, 126, 98, 98, 0.
64272: 0, 126, 98, 124, 98, 98, 126, 0.
64280: 0, 126, 96, 96, 96, 96, 126, 0.
64288: 0, 124, 98, 98, 98, 98, 124, 0.
64296: 0, 126, 96, 124, 96, 96, 126, 0.
64304: 0, 126, 96, 124, 96, 96, 96, 0.
64312: 0, 126, 96, 96, 102, 98, 126, 0.
64320: 0, 98, 98, 126, 98, 98, 98, 0.
64328: 0, 126, 24, 24, 24, 24, 126, 0.
64336: 0, 126, 24, 24, 24, 24, 120, 0.
64344: 0, 100, 104, 112, 104, 100, 98, 0.
64352: 0, 96, 96, 96, 96, 96, 126, 0.
64360: 0, 126, 106, 106, 106, 106, 106, 0.
64368: 0, 126, 98, 98, 98, 98, 98, 0.
64376: 0, 126, 98, 98, 98, 98, 126, 0.
64384: 0, 126, 98, 98, 126, 96, 96, 0.
64392: 0, 126, 98, 98, 106, 102, 126, 0.
64400: 0, 126, 98, 98, 126, 104, 102, 0.
64408: 0, 126, 96, 126, 2, 2, 126, 0.
64416: 0, 126, 24, 24, 24, 24, 24, 0.
64424: 0, 98, 98, 98, 98, 98, 126, 0.
64432: 0, 98, 98, 98, 98, 52, 24, 0.
64440: 0, 106, 106, 106, 106, 106, 126, 0.
64448: 0, 102, 102, 24, 102, 102, 102, 0.
64456: 0, 98, 98, 98, 126, 8, 8, 0.
64464: 0, 126, 12, 24, 48, 96, 126, 0.
```

Once you have your character set safely stored away and working, you will want to save it on tape. To use them in a future session all that is required to be done is clear some memory, load the character table, and set the pointer to it. To do this type *Save "Charset" Code 64000,768* then *Enter*. The whole process should only take a few seconds. Because there is a lot of typing involved in entering the data it would be advisable to verify the data. This is done with *Verify "Charset" Code 64000,768*, which checks the saved data against the data in memory to make sure the saving operation has been properly done.

It should be remembered that this is basically a project for those willing to experiment with the principle. The only fault with this system is that all the keywords will also change. It is advisable to turn on the new set at the beginning of the program and to restore it just before you list the program. Doing this will allow you to extend the character set by defining the five characters after Z for both upper and lower case use, but will not corrupt these symbols in the listing.

This program has been written for use on the 48K version of the ZX Spectrum. It could be used on a 16K version with changes to all the addresses which are above 16384. But as you would be left with less than 8K of memory for your own Basic programs, it would limit the use of many commercial programs which have been written tightly into the free memory space of the 16K machine.

Dictionary compiler

3270 The design is now *Drawn* next to the grid, using the new E\$ which has been created. *Drawing* it at scale 8 ensures that its proportions, though not its size, are the same as the design created on the grid.

3280-3300 The design is displayed until a key is pressed, then control is returned to Module 4. Note that the scale for *Drawing* must be returned to the normal 4 before a *Return* is made, otherwise subsequent use of the *Draw* command will produce over-size results.

Testing

Having defined a design on the grid, you should now be able to call up this module by pressing key 'E' and, after a lengthy pause, see it displayed at half scale. Stopping the program will allow you to examine the E\$ which the module has created. Note that no check is made that your design is not too complex to be drawn by a string of up to 255 characters, so that too full a grid might result in an error, though this is unlikely to happen.

Module 7: Lines 6000-6090

The function of this module is to allow the design which the user has created to be saved on tape in the form of a string. You will note that the module is more simple than many of the data file modules of earlier programs, this is because its sole purpose is to save a single string.

Testing

You should now be able to save E\$ on tape. This can be verified by calling up this module, then stopping the program and clearing the variables. Insert at 8888 a single line instruction to open an input file by the name of CHAR and input E\$, not forgetting to close the file. You may then print out E\$ in direct mode, or DRAW it to check that it has been satisfactorily recorded and reclaimed. If this is successful then the program is complete and you are ready to proceed to the second half of the high resolution text section.

CHARACTERS: *Summary of single-key functions:*

With cursor flashing:

0 — erases square on grid where cursor is situated.

I — inks in square on grid where cursor is situated.

R — rotates design within grid by 90 degrees anti-clockwise.

M — calls subroutine which moves design within grid.

I — transforms design within grid into its mirror image.

E — creates string which will duplicate design if DRAWn.

S — saves design on tape.

The Working Dragon 32, by David Lawrence, costs £5.95 and is available from **Sunshine Books Ltd.**, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.

With large "M" drawn to the right of the grid: 1, 2, 3 or 4 — specifying corner towards which design is to be moved.

Summary

This program is an odd one in that, as it stands, it is almost completely useless. That is to say, all it accomplishes is to store strings defining small-scale designs or characters onto tape — hardly a stunning feat. In combination with other programs, however, which will pick up the characters created and compile them into usable character sets, and modules which will allow you to use such character sets easily in high resolution *Pmodes*, the program becomes an indispensable tool which enables the Dragon to exceed its normal capabilities.

Going further

(1) A character creator is hardly much use unless you are prepared to sit down and define some characters. Though this may seem an incredibly difficult and boring task at first glance, a moment's reflection will suffice to realise that a complete set of characters, already defined in pixels, is laid out before you in the listings given in this book. Alternative styles of lettering can be found in the program listings in any computer magazine. With such examples to work from, you really should have no difficulty in building up a collection of worthwhile characters.

(2) The program given does not necessarily always make the best use of the 255 characters of string space available for E\$. This is because a blank move always uses the BM notation, which requires at least seven characters (BM+2,-2) and possibly 9. An interesting challenge would be to insert a routine to test whether such a blank move could be covered by one of the single-letter *Draw* instructions — for in-

stance the blank move given above could just as easily have been defined by "BE2", which would result in a considerable saving.

Dictionary

Having created characters it now only remains for them to be combined in such a way as to be useful for subsequent programs. The program which follows is designed to accomplish this by holding in memory up to 100 characters at one time, with the possibility of more being picked up from tape in batches of one hundred. The characters so stored can then be combined into collections such as "ABCDEFGH I..." etc to provide material for high resolution programs which require text. In later programs we shall examine practical modules for using such character sets without constantly having to specify DRAW commands in the program.

MODULE 1: Lines 1000-1150

A standard menu module.

MODULE 2: Lines 1500-1560

This module sets aside sufficient memory for the necessary PMODE and reserves the rest of the available memory for strings as well as setting up the necessary variables.

Commentary

1540 The main dictionary of characters will be held in the string array DI\$. The number of elements which this array will be capable of holding will depend on the complexity of the characters and, therefore, the length of the strings required to *Draw* them. The character set currently being compiled will be held in the string array *Chars*.

1550 CI and DI record the number of characters stored in the character set and the dictionary.

Module 7

```
6000 REM*****
6010 REM SAVE CHARACTER TO TAPE
6020 REM*****
6030 MOTOR ON: AUDIO ON: CLS: INPUT
"POSITION TAPE THEN PRESS enter
(MOTOR IS ON):" :Q$
6040 MOTOR OFF: INPUT "START
RECORDING THEN enter:" :Q$
6050 MOTOR ON: FOR I=1 TO 10000:
NEXT
6060 OPEN "O",E-1,"CHAR"
6070 PRINT E-1,E#
6080 CLOSE E-1
6090 RETURN
```

Module 2. Dictionary

```
1500 REM*****
1510 REM INITIALISE
1520 REM*****
1530 PCLEAR 4: CLEAR 15000
1540 DIM DI$(128): DIM CHARS(40)
1550 LET CI=0: LET DI=0
1560 GOTO 1000
```

Module 1. Dictionary

```
1000 REM*****
1010 REM MENU
1020 REM*****
1030 CLS: PRINT @ 42,"dictionary"
1040 PRINT: PRINT "FUNCTIONS AVAILABLE:"
1050 PRINT " 1>DISPLAY DICTIONARY"
1060 PRINT " 2>DISPLAY CHARACTER SET"
1070 PRINT " 3>LOAD/SAVE DATA"
1080 PRINT " 4>INITIALISE"
1090 PRINT " 5>STOP"
1100 PRINT: INPUT "WHICH DO YOU REQUIRE:" :Z: CLS
1110 IF Z<4 THEN ON Z GOSUB 2000,2500,6000: GOTO 1000
1120 ON Z-3 GOTO 1500,1140
1130 GOTO 1000
1140 CLS: PRINT @ 7*32+10,"dictionary": PRINT: PRINT "
PROGRAM TERMINATED"
1150 STOP
```


?

Don't bother guessing which programs our members are saving money on this month.

If you use a BBC, Dragon, Spectrum, VIC or ZX81 computer and you are not yet a member of THE MICROCOMPUTER SOFTWARE CLUB, then only those with the VIC can be forgiven. We have only just added the VIC to our coverage.

Membership of The Microcomputer Software Club would save you money and trouble. Each month we thoroughly test and evaluate the many programs issued by the growing number of producers - including Pixel, IJK, Bug-Byte, A & F, Campbell, C-Tech, and the smaller companies that you may find it difficult to keep track of. If a program is good, and it has got to be very good, it is recommended to our members in the next issue of the Newsletter.

All the programs that we recommend are made available to our members at very low prices. For example, a Bug-Byte program usually costing £10.00 would be offered to members at £9.00 or less. A saving of at least 10%. Every month we select what, in our opinion, is the overall best program for each computer and this MAIN CHOICE program is offered to members, for one month only, at an average 20% less than the normal price. A MAIN CHOICE program usually costing £6.00 would, therefore, be available to members at about £4.80.

Every month members receive, free of charge, our Newsletter full of information on the programs we have found suitable for recommendation. The range is large, including adventure, arcade, standard games, household, financial, educational, wordprocessing, and utilities. Ordering from the Newsletter is simple and quick and, of course, quality is guaranteed.

JOIN THE CLUB AND WE WILL TELL YOU, FOR FREE

Membership is completely free of charge, and receipt of the Newsletter is automatic. Members are under no obligation to purchase a fixed number of programs from the Club. They buy what they want when they want in the full knowledge that they are buying the best programs at the best prices. So, if you own or use a BBC A or B, Dragon, Spectrum (both versions), VIC (expanded or unexpanded), or ZX81 (16k), join the Club. It will cost you nothing, and save you a lot.

JOIN TODAY

THE MICROCOMPUTER SOFTWARE CLUB
P.O.Box 166, Oxford, OX2 9BJ, England.

THE MicroComputer SOFTWARE CLUB

Free membership application

Please accept my application and enrol me as a member of The Microcomputer Software Club. I understand that membership is free of charge.

As a member I will receive the Club Newsletter free of charge and will be entitled to benefit from any savings offered to members on selected programs for microcomputers. I may cancel my membership at any time.

When completed, return form to:-

THE MICROCOMPUTER SOFTWARE CLUB
P.O.Box 166, Oxford, OX2 9BJ, England.

NAME	<input type="text"/>																				
ADDRESS	<input type="text"/>																				
CITY	<input type="text"/>																				
POSTCODE	<input type="text"/>										AGE (If under 18)	<input type="text"/>									
COMPUTER MODEL	<input type="text"/>										COMPUTER RAM	<input type="text"/>									
SIGNATURE	<input type="text"/>																				



COMPUSENSE LTD
Computer Systems Consultants
286D Green Lanes, PO Box 169
Palmer's Green, London N13 5TN
Tel: 01-882 0681 01-882 6939

DEMON Machine Code Monitor for DRAGON Computer

What is a Machine Code Monitor?

A monitor is a program which allows access to the low level functions of a computer. Normally a good monitor will allow access to the memory contents and the microprocessor registers as well as the ability to run programs written in machine code. There should be an accessible library of documented subroutines which can be used for developing programs around the monitor.

What can DEMON do?

DEMON has twelve commands:

1. A — Adjust the Microprocessor registers
2. B — Set breakpoints (up to 12 breakpoints are allowed)
3. E — Examine memory in either Hexadecimal or Ascii mode
4. F — Fill memory between two addresses with a constant value
5. G — Restart a program from the program counter value
6. J — Restart a program at the supplied address
7. M — Modify memory contents
8. O — Memory test
9. R — Register dump
10. V — Relocate Video text page
11. X — Clear breakpoints
12. Z — Return to BASIC

DEMON does not affect the normal running of BASIC and can be accessed at any time from BASIC. There are fully documented subroutines which allow keyboard input and output to a text page, relocation of video text pages and other useful routines. DEMON subroutines are totally self-contained.

A 6809 instruction summary is supplied with every copy of DEMON giving full details of all the instruction opcodes and their meaning as well as a programming model of the 6809 microprocessor.

The powerful interrupt handling in DEMON allows programs to be easily developed and checked in machine code.

All subroutine entry points are grouped in such a way that DEMON will be fully compatible with other software due to be released by COMPUSENSE.

DEMON — available from COMPUSENSE or any good dealer price £18.40 including postage.

Order by cheque or ACCESS/VISA by telephone or post.

DRAGON BYTE
51a QUEEN STREET
MORLEY
Tel: 522690

Home Computers,
Software, Board Games
Mon—Sat 11 am—5 pm



STOCKISTS OF ZX81, SPECTRUM
VIC AND ATARI COMPUTERS — AND
OTHERS AS WE CAN GET THEM

★
SOFTWARE: GAMES, EDUCATION
ADVENTURES FOR VIC, ATARI
ZX81, SPECTRUM ETC, ETC
(OUR RANGE GROWS DAILY)

★
BOARD GAMES GALORE INCLUDING
'DUNGEONS AND DRAGONS'

For more information and details
of mail order, ring
KEITH NATHAN 788377
or DAVID TOWN 524543
after 7 pm

in MORLEY to Serve
W. YORKS

WANTED URGENTLY

Arcade-type games programs for Spectrum, ZX81,
Vic20, Oric, Dragon, BBC Micro and Lynx.
We pay top royalties or buy your copyright for cash.
National mail order and dealer sales ensure you get
the best reward for your genius.

Write or call into

NORTHWISH LTD
THE GROUND FLOOR, RALLI BUILDINGS
STANLEY STREET, MANCHESTER
M3 5FD
or Phone 061-832 9143

SPECIAL OFFER

ON ZX81 & SPECTRUM ADVENTURES

MINES OF SATURN: "While piloting a routine orbit of SATURN, you are caught up in a radiation storm which forces you into the giant planet's rings. Your energy drained, you make a forced landing on the planet surface. Luckily you crash near an abandoned mining base and you set off in search of some Di-Lithium crystals to refuel your stranded space-ship. Can you succeed?"
BE WARNED — THIS IS NOT EASY.

RETURN TO EARTH: "Having escaped from your previous dilemma, you reach Earth Station 1, but fail to make radio contact. You effect a safe if harrowing manual docking with the orbital station. On entry you find it deserted, and the control room destroyed. You must explore the station and find some way to alert Earth of your predicament. BEWARE, many of the rooms are identical, there is extensive damage, and signs of Alien intruders. (The sequel to MINES OF SATURN.)"

Special offer to readers of *Popular Computing Weekly* £5.95.

FOR BOTH GAMES POST AND PACKING FREE.
(Programs run on 16K & 48K machines.)

Send now for this fabulous offer, double saved on computer quality cassettes, and despatched by return of post (1st class letter), you won't be disappointed.

PLEASE SPECIFY ZX81 or SPECTRUM VERSION.

Please make cheques etc payable to:

SATURN DEVELOPMENTS LTD
Dept PK, 37 Heol Dulais, Birchgrove
Swansea SA7 9LT

COMING SOON, our exciting 1983 catalogue of Sinclair Software. For Sinclair machines, Vic20, TI 99/4A and the Oric.

DEATH'S HEAD HOLE

You'll almost believe it's true!

Courage, skill, and split-second decisions will see you through, as your newly-formed rescue team battles to save three frightened potholers, trapped in the blackness of Death's Head Hole.

There are hours of nail-biting excitement in this new brand of adventure for the Dragon 32, written with the help of cave rescue experts. After this, other adventures will just be games.

Only £5.45 by return of post from:
WORDS AND PICTURES
7 Hawthorn Crescent, Burton-on-Trent

DRAGON WIZARD SOFTWARE

SMASH

A super "break out" type game in high resolution graphics. Features include a demonstration mode, 9 bat angles and walls of increasing difficulty from a single wall up to a full three walls. Continuous display of score, best score and balls remaining.

£7.00

EVICTOR TM

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

£7.00

Still available:

WIZARD £6.50	FRUITA £6.50
SIRIUS IV £6.50	TRIPLT £5.50
GALLEONS £5.50	BREAKER £3.50

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

WIZARD SOFTWARE, P.O. BOX 23, DUNFERMLINE, Fife KY11 5RW

Also available from software retailers.

Send SAE for full program catalogue.

Royalties paid for superior quality DRAGON software.

CLASSIFIED

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

Melbourne House
software for the
48K SPECTRUM



***Amazingly Fast Arcade Action!**
Includes 'Training Mode' and
***Unique Customizing Feature**
The fastest and most exciting
game for your 48K Spectrum

PENETRATOR for the 48K
Spectrum is only **£6.95**.
Orders to Melbourne House,
131 Trafalgar Road,
London SE10.

Or call our 24-hour
ansaphone for Access
orders (01) 858 7397

ZX PRINTER PROBLEMS SOLVED

Fit a precision aluminium wheel
and use paper to last inch without
jamming.

£4 inclusive, p&p included

SADLERS DEVELOPMENTS,
SADLERS, VICARAGE LANE END, NR.
WOKING, SURREY.

EASIREADER

**The Greatest Programming Aid
Since Fingers**
Cut down program entry time
Minimise Bugs by Minimising Entry Errors

The EASIREADER is an attractive, high-
quality acrylic plastic stand designed to aid
the manual entry of programs from magazine
listings, printouts and most books.

99 percent of bugs in programs copied from
printout listings are the result of entry errors.
The EASIREADER holds the copy at a com-
fortable angle, avoiding strain, and a special-
ly-designed cursor runs down the program to
prevent skipping between complex and similar-
looking lines.

It effectively keeps a 'finger' on your current
line, especially useful for two-handed
keyboard entries and for use with Sinclair
computers.

Available now only from BUGBEAR (Patent
Pending No. 8232718) at an introductory
price of **£12.99** (plus £1.25 p&p).

Send cheque/PO or SAE for further details
to: BUGBEAR, Dept. W, Nicholson Build-
ings, Templetown, South Shields, Tyne and
Wear, NE33 5RZ.

ORIC 1 CASSETTE LEADS

WITH MOTOR CONTROL
DIN to DIN or
DIN to JACKS

£2.50

Orders to:

Clares, 222 Townfields Road,
Winsford, Cheshire CW7 4AX
Tel: Winsford 51374

DISCOUNT BOOKS

Large range of computer books for everyone
from hobbyist to businessman at discount
prices. Send large SAE for list. Spectrum
Graphics by N. Hampshire, £6.45. Farmers,
"Rowcliffe", Brook End, Keyson, Beds
MK44 2HR

New book for Spectrum

THE WORKING SPECTRUM

A LIBRARY OF PRACTICAL
SUBROUTINES AND PROGRAMS



DAVID LAWRENCE

Published in association with
Popular Computing Weekly.

228 pages Over 150 subroutines
and programs.

Send cheques/postal orders, for
£5.95, to *The Working Spectrum*,
Sunshine Books Ltd., Hobhouse
Court, 19 Whitcomb Street, Lon-
don WC2 7HF

We can normally deliver in four to
five days.

ZX81 : 16K SOFTWARE

NIGHTMARE PARK: Will you be the first to
escape alive? Uses machine code for stun-
ning graphics.

ZX-OCTATHLON: Test your sporting ability
with eight exciting sports. For one to four
players — uses machine code.

HOUSE OF DEATH: Enter Awlton Hall, the
House of Death, if you dare. Collect all five
jewels to escape.

All games use a full 16K.

£4.95 per game, or see for details:
Andrew Rushton, 194 Shay Lane, Walton,
Wakefield, West Yorks WF2 8NW.

Also from Zedextra and other dealers.

DRAGON 32 Five Exciting Games for ONLY £2.40

Hi-res colour and graphics

Fun for all the family

BULBS AND OUT

MAZE RUNNER

HAMURABI

RATTRAP

EARTH DEFENCE

ARGENT SOFTWARE LTD
Midcourt House
Lynwood Chase, Bracknell,
Berkshire RG12 2JT

DRAGON — 'G' SOFT

Meet Merlin, use the Magic Shield, rescue
damsels, try to win a kingdom in "KNIGHTS
CASTLE", 9 levels of play + "SKI" for 1 to 8
players. BOTH for £4.95 post free from 2
Beaulieu Avenue, Fareham, Hants. PO16
9TS.

BBC MODEL B

WHOLE NUMBER ARITHMETIC (£7.95).

Seven exercises + five levels of difficulty +
comments on answers. **FRACTIONS ILLUS-
TRATED — I** (£5.95). Animated displays with

pie-charts. Six options permit illustration of
change of denominator, simplification, com-
mon denominator, addition and mixed num-
bers. **FRACTIONS ILLUSTRATED — II**

(£5.95). Animated displays with bar-charts
for illustration of comparison and multiplica-
tion. Three programs including one game on
fraction size estimation. Dept PCW, 143

Montague Road, London E11 3E. Cheques or
POs to W. E. Hunt.

COMMODORE 64 £264 (excl. VAT)

Tel: Chris Gurney, Dave Walsh

or Floyd Paterson:

Tel: 01-969 4553 or send SAE

Image Science Micro Computers Ltd

189 Freston Road, London W10 6TH

or cheques PO (add 15% VAT)

and £5 for p+p

BEST OF

POPULAR Computing WEEKLY



Four top games on one cassette for **£4.45**.
Laserchase and Kong's Revenge for the
16K ZX Spectrum.

Robot Control (16K) and Alien Attack (1K)
for the ZX81.

Order now from *Popular Computing
Weekly*, Hobhouse Court, 19 Whitcomb
Street, London WC2 7HF.

We can normally deliver in four to five days.

NORTHERN SOFTWARE LIBRARY ZX81 USERS

If you have a ZX81 and want to use it to its full
potential — then you should seriously think
about joining our Library, where you can
HIRE a single cassette for only **£1** per
fortnight. Join today — send just **£6** for
annual membership and we will send your
library list and order forms by return post, on
full money-back approval of course. (Or just
send SAE for details.)

NORTHERN SOFTWARE LIBRARY,
33 Parkhills Road, Bury,
Greater Manchester BL9 9AS

TEXAS TI 99/4A CASSETTE LEADS

£6.95

INCLUDING POST
AND PACKING

Single Recorder only

Orders to:

Clares, 222 Townfields Road,
Winsford, Cheshire CW7 4AX

Tel: Winsford 51374

CE

The popular arcade game. Written in machine
code, the game features spiders, scorpions,
poisoned mushrooms, fleas and of course the
centipede.

THE FROG

Help a Frog today! Guide it across a motor-
way and river, but beware of the Snakes and
Alligators.

Both games run on a BBC Model B. Avail-
able for **£6.50** each from: James Hager, 7
Basset Street, Camborne, Cornwall TR14
8SW.

SPECTRUM ASSEMBLER

Enter the world of the Z-80! Full 2-pass
assembler with labels — all opcodes — 11
powerful directives — easy program editing
— 16/48K — manual. Written and tested by
professionals. **£5.95**. Cheque/PO to C. New-
port, 57 Camlet Way, Hadley Wood, Herts

ZX81 AND SPECTRUM CONSOLE

Heavy duty, black or white rigid plastic. Size
30" x 17". Spaces for computer, printer,
cassette recorder, Ram pack, power pack,
cassettes, plus extra space for future add-ons.
ALL CABLES HIDDEN. Send **£11** which
includes P&P (state black or white). Delivery
by return. Trade enquiries welcome. **KMAT**, 2
Raeburn Ridge, Livingston, West Lothian,
Scotland EH56 3J3.

DRAGON 32 AND SHARP SOFTWARE

Games Pack 1 — Bowling, UFO, Muncher,
Micropoly, Mastermind **£6.50**

Games Pack 2 — Race-Chase, Depth Charge,
Moto Cross, Glorious 12th, Canyon Bom-
ber **£6.50**

Games Pack 3 — Tank Battle, Reaction Time,
Blind Maze, One Man and His Dog, Life
..... **£6.50**

Games Pack 4 — Poker, Pontoon, Roulette,
Stock Broker, Othello (Sharp only) **£6.50**

Devils Triangle — Adventure — Sail to
Bermuda but avoid the Devils Triangle
where anything can happen **£5.00**

Earth Rescue — Adventure — Search for a
rare mineral needed for Earth's survival —
space action **£5.00**

Maths Tutor — A set of programmes de-
signed to teach maths to children from
3-10 years old **£5.00**

Many other programmes available. SAE for
details.

Dragon and Oric programmes wanted.

Generous royalties paid.

Send cheque/PO or SAE for details to: **Abacus
Software**, 20 Rhosaleigh Avenue, Sharples
Park, Bolton BL1 6PP

48K SPECTRUM

The Personal Finance System is a
professionally written menu-driven
package for the maintenance of your
current account.

Features include auto posting of
standing payments, all entries fully
updatable, reconciliation to bank state-
ment, full search facilities, future bal-
ance, system status, etc, etc.

Cassette and Full Documentation for
only **£4.95** from:

FOREST SOFTWARE

45 Southwold, Bracknell, Berks

★ 48K SPECTRUM STARBREK II ★

Speed around the galaxy destroying the
attacking alien fleets in this fantastic game:
it's absorbingly realistic — not only must you
save mankind, but control your spaceship
effectively!

LOOK: machine routines: great sounds, daz-
zling effects, 3D combat, real-time docking
(skillful), on-board computer, hi-res damage
reports, energy allocation, etc. 10 levels
(easy to near impossible): Free Battle Manual.
Speedy delivery for just **£8.00** from

SONIC SOFTWARE

9 Benscliffe Drive, Loughborough, Leics.

ZX81 16K THE KEYS OF GONDON

What is the secret of Dancing Daisies. What is
the skeleton trying to tell you? Can you avoid
dying in combat with Orcs. Trolls or the
Dreaded Jubaroo? Will you pick up the right
objects from the cavern floors? How will the
magic of the tunnels affect you? Will you be
able to find the Keys of Gondron? Who can
tell? Only **£4.95**. Including VAT and p&p.
COMPUTER RENTALS, 140 Whitechapel
Road, London E1. Dealer Enquiries Wel-
come. Telephone 247 9004.

ZX81 High Res Graphics Unit £32 (excl. VAT)

Tel: William Haynes 01-969 0819

Tools for Living

Notting Dale Technology Centre

191 Freston Road, London W10 6TH

cheque/PO (add 15% VAT)

plus 75p p+p

JUPITER ACE USERS CLUB

Newsletter, software (both
games and utilities), adapter
for ZX81 add-ons.

SAE for details.

Remsoft, 18 George Street,
Brighton BN2 1RH

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

TELEPHONE PHILIP COPLEY ON
0924 272545
PLEASE RING FOR DETAILS OF OUR MAIL ORDER SERVICE

DRAGON GAME CARTRIDGE, PCB (plated through hole, double-sided). Accept two 2516, 2532, 2564, 2716, 2732, or 2764. Eprom copying service provided for only £1 each. Also available DC-DC converter (5v input to 25v output, current output 50mA maximum, ripple level pk-pk 80mV). Measuring only 35 x 40 x 19 mm. Game PCB £5.50 (full instruction provided, please specify 25 or 27 series). DC-DC converter £10 (with full spec). Price inclusive VAT, p&p 60p. K. H. P'ng, 30 Queensbury Road, Alport, Middlesex HA0 1LU. Tel: Egham (0784) 34300 ext 208 or 01-997 9708 eves.

VIC20 OWNERS. At last! All-action arcade games for the unexpanded Vic at low prices. Written entirely in m/c for exciting colour graphics, animation and sound. Super games cassette — three games on one cassette, Super Break-out, Galaxians and Scrambler. Full feature games with defined graphics, hi-score, free ships and bonus points. Only £4.95. Fast delivery, J. P. Shay, 51 Meadowcroft, Radcliffe, Manchester.

PERSONAL COMPUTERS bought for cash. Morgan Camera Co, 160 Tottenham Court Road, London, W1. 01-388 2562.

SWAP YOUR UNWANTED SOFTWARE via Software Exchange Club. Sae for details. UKSEC, 15 Tunwell Greave, Sheffield S5 9GB.

VIC20 SOFTWARE: Cribbage, Cubed Tac Toe, Morse Tutor, Jupiter Defender, Character Designer, Juggernaut, Flytrap, Football Pools Forecaster, and more. Listing service. Send sae. C. P. White (Services), 76 Uxbridge Road, Hanwell, London W7 3SU.

JUPITER ACE/VIC/ATOM games, programs. Sae for details. 32 Bayview Road, Bangor, NI.

VIC20 SUPER-EXPANDER SOFTWARE: Vaults of Dugor a real-time adventure, 15 levels, traps, objects, treasure, monsters, full combat, plus three hi-res programs. The Mystic Wood, a woodland adventure, 88 locations, gold, objects, monsters, plus Sculcher, the hunter-killer packman game, Kaleidoscope and Moray. Send £3.95 for one cassette, £6.95 for two to: M. Conway, 10 Alder Grove, Chester. Delivery in seven days.

ATARI 16K CASSETTES. (a) Morse Encoder. (b) Three Dimensional Drawing. Hi-res graphics, colour and sound, are all used for some amazing effects. £5 each or £8 for both. P. T. Hawkins, 6 Longwater Road, Bracknell, Berkshire. **VIC CASSETTES**: Defenda £5, Frogger £5, Myriad £5, Skramble £5, 8K ram £20. Tel: 021-440 2124.

BRAINSTORM CASSETTE. VIC20 unexpanded, contains Gobbler, Bomber, Sprogger, Xenon and Hangman. Will you be able to outwit the fiendish Zenon robots or avoid the hungry ghosts in Gobbler? Can you help the poor frog across the fast moving traffic and river in Sprogger? Addictive using defined characters. Keyboard or joystick. All for £4.95. Peter Robinson, 24 Butterfield Road, Bolton BL5 1DU.

CESIL for the BBC Model B. Run your CESIL programs on your Beeb. Tape and instructions £8. V. Webb, 3 Poplars Grove, Maidenhead, Berks SL6 8HD.

MONSTER SOFTWARE CLUB

Software library for the **DRAGON 32**
Top quality cassettes
FOR HIRE
All tapes used with the manufacturers' permission
SAE for details
Monster Software Club,
32 Lennox Drive, Lupset Park,
Wakefield, West Yorks

ZX81 16K EDUCATIONAL GAMES on cassette. Countdown — up to 800 questions, 9 choices of answers with time limit. Score depends on speed of response. Categories, meanings of words, countries/cities, music terms, etc, or set your own. £3.50. Anagrams — input book titles, TV programmes, etc. Different anagram of each word chosen for every attempt. £2.50, £5 for both. Sae for more details. Dr G. K. Pickup, 47 Ellesmere, Burnmoor, Houghton-le-Spring, Tyne and Wear DH4 6EA.

16K/48K SPECTRUM POOLS PROGRAM. Calculates and prints out expected results. Includes free blank tape for records, £4.95. C5 and C12 cassettes X10, £3.50 + P&P £1.40. 20 labels 80p. M. W. Holman, 60 Camperdown Street, Bexhill, Sussex TN31 5BE.

ZX SPECTRUM 16K plus cassette recorder and assorted arcade games, £100. Tel: (0273) 673558.

PET 8K, full keyboard, external cassette, new ROM, programs, books, dust-cover, £250 ono. Phone Derby 550602.

OSBORNE 1's, single density, £795 + VAT, available now. Ex-stock demonstration, with warranty from main Osborne dealer. Telephone 0295 50796.

DRAGON ACCOUNTING SYSTEM. Includes trial balance, P & L Account, A/C Code Enquiry (max 300 accounts), etc, only £4 from Nigel Bradder, 72 Berry Hill Lane, Mansfield, Notts.

LET YOUR COMPUTER help you to control your weight and advise you on the best diet. Weight and Diet Control program for the Vic20 or Commodore 64 (Cassette £12, Disk £17). Full-feature Database for Commodore 64, Cassette £12, Disk £17. (State drive 1540 or 1541). More details and orders: E. D. Frangoulis, 54 Holland Road, London W14 8BB.

SPECTRUM 16/48K. Electricity, gas bill program. Will store 15 years data (7½ on 16K), give estimates, draw graphs with printer output, etc. Both programs with instructions £3.95. W. Roberts, 23 Tan-y-Bryn, Penprisk, Pencoe, Mid Glamorgan.

GRANDSTAND CARTRIDGE television game, worth £100 sell for £30. (94) 612438.

SPECTRUM 48K/DRAGON. Freelance programmers required for contract conversion work. Access to BBC 'B' and Vic20 useful. Details from: Contract Programmers, Lowmoor Cottage, Tonedale, Wellington, Somerset TA21 0AL.

ZX81 SOFTWARE, for use with/without QS character board, includes: Panic, Scramble, Dodgems etc. Send SAE for catalogue to: Mark Andrews, 44 Eaglesham Road, Newton Mearns, Glasgow.

TRANSAM TUSCAN S100 with 8K basic, 2K machine code monitor and all manuals £200 ono. Elector terminal and keyboard, offers. 0788 76630 after 6 pm.

BIORHYTHMS, ZX81 16K. Plots any 32-day period, past/future £1.95. Merlin Marketing, 141 Friar Park Road, Wednesbury, West Midlands.

CASSETTE LABELS. White self-adhesive, 100 £3. DCS, 38 South Parade, Bramhall, Stockport.

DRAGON 32 LISTING SERVICE. Top quality printed listings available on A4 paper to improve documentation and as a last resort back-up copy. Only one penny per program line. Minimum £1. Send your BASIC programs on cassette to: J-SOFT, 2nd Floor, 21 Gold Street, Northampton NN1 1RA.

DRAGON 32. Software Library. You've seen the rest, now join the best. ★ Quality Software stocked. ★ Software and Hardware on sale to members at discount prices. Sae for details to: Cotswold Computers, Park Hill, Hook Norton, Oxon.

ZX SPECTRUM 16/48K OTHELLO in machine code. Large six-colour graphics display, eight play levels. Sae for details. £4.50 from P. Tapster, 47 Kingshill Close, Malvern, Worcs WR14 2BP.

21K VIC20 + CZN CASSETTE RECORDER, with 13 game and utility cartridges, including Super Expander and program aids. Lots of programs on tape with game paddles and joystick. All worth £644, will accept £375. Phone Pete on Erith 32102.

ZX COMPLETE FOUR. Popular game for the ZX81 16K. Complete four in any direction to win. Challenge the computer for an exacting game or play with a friend. A winner for young and old alike. £2.25 cheque/PO for cassette to: Paul Gillett, 38 Cromwell Way, Kidlington, Oxford OX5 2LL.

DRAGON Independent Owners Association. Sae for details to DIOA, School House, Neven Road, Rayleigh, Essex.

SPECTRUM FORTH on cassette. Faster than Jupiter Ace. All structures, colour, hires. Order as SP16A (16K) or SP48A (48K) £5.95, to Mike Hampson, 7 Hereford Drive, Clitheroe, BB7 1JP.

WHY PAY MORE? Cliffhangman plus Tabletester for Texas TI99/4A. £3.25 for cassette or sae for details from: J. Shemilt, 1 Aldon Grove, Longton, Preston PR4 5PJ.

ACE INVADERS a program in Forth for the Jupiter Ace. Fast action, full graphics and sound. Listing £1 or cassette £1.50 inc p&p. Forth Dimension, 32 Bathurst, Orton Goldmay, Peterborough.

DRAGON 32 POOLS SELECTOR. Uses sound, graphics, great fun, user friendly. Cassette, £2.50. To: S. Neal, 15 Highview Crescent, Hutton, Essex CM13 1BJ.

DUST COVERS available for any computer, printer, etc, BBC, TI, Epson £3.95. Dragon, Atari, VIC20, £2.95. Sharp MZ-80A-K £4.95. For others please phone or write to Sherborne Designs, Victory House, 8A The Rank, North Bradley, Trowbridge, Wilts. Tel: 02214 4425. Also made to measure service. Dealer enquiries welcome. Access and Barclaycard.

ALL MICRO OWNERS — filter your power supply, and avoid "glitches", filter fitted in two minutes, complete with instructions, £4.50. M. Lamb, 6 Park Street, Scarborough.

WANTED ORIC-1, 16K Ram, swap for all my fantasy games. Tel: 051-733 0090.

Computer Swap 01-930 3266

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

Spectrums for sale

SPECTRUM 48K + software, £175. Tel: 021-351 4058 evenings.

SPECTRUM 48K. Abacas controller + £40 to £50 of software, separate if necessary, £220 ono. Offers to Edward. Tel: 0984 32355 (after 6 pm).

ZX SPECTRUM. 16K. Brand new. Still in box, £115. Tel: 01-773 0495.

16K SPECTRUM, as new etc, £100. Telephone Aldridge 55613.

ZX SPECTRUM, 48K, boxed, with one year's guarantee. Leads, power pack, manuals, books, games. Cost over £200, sell for £175. Tel: 01 674 7631 (Danny), (Can deliver).

48K SPECTRUM. Part exchange for BBC Model B. Tel: Erith 33474.

SPECTRUM 16K, £105 ono + software + one extra book, good condition. Tel: Salford (0454) 26073.

SPECTRUM 16K, unused, complete in box, £105. Tel: 01-789 7553.

For sale

CHESSE CHAMPION Mark 5, as new, £175. Intelligent chess and tapes, £170. As new. Tel: 01-556 6142, Mr. Nichols.

DRAGON 32. As new, in box, with leads and manual, £160. Tel: Birmingham 458-1553.

VIC20, Arrow of Death, Part 1. Swap for other Vic adventure. Tel: 0909 473102.

ATARI VCS. Nine Cartridges including Space Invaders, Basket Ball, Night Driver, etc, £125. Tel: 0222 707400 (will split).

ATARI 400 32K COMPUTER. Atari recorder and basic cartridge, four joysticks and many games including Star Raiders. Full technical books, cost over £500, only £395. Burgess Hill 47017.

48K MASTER CHESS PROGRAM for ZX Spectrum, 10 levels of play, chess clock plus other features. Tel: Aberdeen 35268.

SWAP DRAGON 32, Berserk cartridge or program cassette, one for any Dragon cartridge or tape. Tel: 809-3032 evenings.

SWAP TRIO COMMUNICATIONS RADIO RECEIVER for a computer outfit, or I will sell for £150. W. Allen, 24 Redbourn Street, Liverpool L6 0AP.

VIC 1540 DISC DRIVE. Data Cassette, Arfon 7 slot expander + mountains of software, under guarantee, £300. Will separate. Tel: Bradford 638274.

ATARI 800, 32K, program recorder + joystick, £400 ono. Herriot, Tunbridge Wells (0892) 31901.

ELECTRONIC CASH REGISTER, 8 months old, value £390, exchange for 48K Spectrum with printer + other equipment. Tel: 0758 2062. Business hours

BBC MODEL B, hardy used, in original case + £130 of software including six adventures, Chess, Snapper, Defender, Space Warp, etc, offers over £390. Tel York (0904) 33329.

ZX81 with 4K extra graphics Rom + 2K UDG PSU, leads + manual, complete with £15-worth of books, £45 ono. Tel: 0895 53925 after 6 pm.

ZX81 + 16K Ram, £65 ono. Tel: 051 426 6897.

SHARP, dual disc drive with or without interface, offers. Telephone 051-449 2044, Michael.

Wanted

WANTED for children's charity (NAGC). Defunct, tatty and temperamental ZX81s for repair and rebuild. Rampacks, odd chips, anything. Regret few funds but post etc. repaid of course. Tel: Fred 01-579 2015 (Ealing).

TRS 80 MARK 1. Disc drives + printer. Second-hand. Tel: 01-948 1704.

WANTED TO BUY. Second-hand Apple II. Interest in word processor. Applications. Tel: (Wheatley) Oxfordshire 3186.

T.R.S. 80 PARALLEL INTERFACE. Tel: 01-467 3835 (Davie, daytime).

DRAGON 32 + cassette or would consider 16K Vic20. Tel: 038 781545.

WANTED. VIC20 revision packs (Maths., geography, physics, English language), Ashish. Tel: 01-574 4122.

SOFTWARE AT DISCOUNT PRICES FOR BBC, DRAGON, VIC20, SPECTRUM AND ZX81

Most popular cassettes and cartridges available
Please send SAE for list stating name of your machine

COTSWOLD COMPUTERS

Park Hill, Hook Norton, Oxon.

Tel: Hook Norton 757472

Quality Software from BRIDGE SOFTWARE LYNCHMOB

for ZX81 with 16K RAM £4.95
for ZX Spectrum (16K) £6.50

Hangman was never like this! A competitive game of skill and strategy for 2 to 6 players. To make things fair, the computer picks turns. If you're the lucky one, you type in a word or phrase. Then the other players guess letters. And look out if they guess wrong, because then the lynching begins! Great fun! Educational too!

EPHEMERIS

for ZX81 with 16K RAM £6.90
for ZX Spectrum (16K/48K) £7.90

For everyone interested in astronomy. An observer's guide to the universe (1975-2000). Tell EPHEMERIS your position, the date and time EPHEMERIS will tell you the position of the sun, moon and planets in the sky above you plus a whole lot more astronomical information e.g. LST, phase, rise and set times etc. (rise and set times only in ZX81 and 48K Spectrum versions). Results may be printed out on ZX Printer. A triumph of programming skill!

All inclusive prices. Sent promptly by 1st class mail.
Full money-back guarantee. Send s.a.e. for further details.

Dept. Pop, BRIDGE SOFTWARE, 36 Fernwood,
Marple Bridge, STOCKPORT, Ches. SK6 5BE

Bridge
Software

SPECTRUM SOFTWARE AT TRADE PRICES

FLIGHT SIMULATOR. PILOT YOUR OWN PLANE — VERY REALISTIC COCKPIT	16K-48K	£2
HORSE RACING PREDICTOR. FEED IN YOUR DATA FROM DAILY NEWS-PAPER. BY USING THE PREDICTOR AND YOUR INTUITION YOU COULD BE ON A WINNER!	16K-48K	£2
CREEPY-LAND. ADVENTURER BEWARE!	16K-48K	£2
GAMES BONANZA. MAZES, INVADERS ETC.	16K-48K	£2
ASSEMBLER. FOR YOUR MACHINE CODE BUFFS	16K-48K	£2
MONITOR AND DISASSEMBLER		£2
GRAPHICS AID. GRAPHICS ALL MADE EASY	16K-48K	£2
ANY 3 £5 — BARGAIN, THE LOT £9.50		
CHEQUE/PO + 50p, P&P TO		

T. JEVON, 29 CROP COMMON, HATFIELD
HERTS AL10 0DG

VICTAGRAPH

VICTAGRAPH PLOT WINDOW is produced with silk screened details onto clear PVC sheet with easy to read calibrations and numbers on each side, leaving a large area clear for your designs. A thicker sheet in white is provided as a base.

NOW AVAILABLE FOR

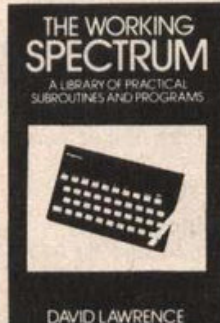
ZX SPECTRUM

A SPECIAL window has been developed to find Spectrum's DRAW offset co-ordinates. Place your drawing in the Victagraph and you are ready to PLOT using the window mask and DRAW using the offset co-ordinate window, with it's EASY FINDER designed to make Spectrum's negative and zero numbers quicker to program. PLOT, DRAW, CIRCLE is easy with VICTAGRAPH PLOT WINDOW.

1983
Atari.

Spectrum total price £7.50 inc p&p in tube.
Atari 4/800 .. £7.00 ..
Cheque payable to Victa Ceramics.

VICTA CERAMICS (ZAP), 62 BOW STREET, RUGELEY, STAFFS. WS15 2BT.
UK ONLY Tel: 08894 (2426) UK ONLY



The Working Spectrum

(228 page book)
The first well-documented collection of serious programs for the ZX Spectrum. Programs include a Basic Renumber which can handle Gotos and Gosubs, a character dictionary, a file-handler, several utility programs and a few games. Each program is built up out of re-usable subroutines.

£5.95*



The Working Dragon 32

This is a companion volume to The Working Spectrum and includes several new features such as a Text Editor and a Music Composer and Editor. Other programs help you use the Dragon 32 as an accountant, for more advanced high resolution graphics, as a home tutor for education and for playing games. Each of the programs and subroutines is explained line by line to help develop your own programming skills.

£5.95



Best of Popular Computing Weekly

Cassette
Four of the top Spectrum and ZX81 games from Popular Computing Weekly are recorded on this one cassette. The games are Laserchase for the 16K & 48K Spectrum, Kong's Revenge for the 16K & 48K Spectrum, Robot Control for the 16K ZX81 and Alien Attack, a Space Invaders type game for the 1K ZX81.

£4.45



Cruising (on Broadway)

cassette
Behind the wheel of your machine. Cruising on Broadway — tearing up the strip. You look mean. People stop to stare. Suddenly a black-and-white pulls on to the Broadway behind — its light flashing and siren wailing. The chase is on! Cruising on Broadway is a tyre-burningly fast machine-code game for the 16K & 48K Spectrum. The further you can get the more difficult it becomes — cash prizes in Popular Computing Weekly for the highest scores.

£4.95*

Please send me
Qty:

- ☐ The Working Spectrum at £5.95 each
- ☐ The Working Dragon 32 at £5.95 each
- ☐ Best of Popular Computing Weekly at £4.45 each
- ☐ Cruising (on Broadway) at £4.95 each

I enclose a cheque/
postal order for

£
payable to

Sunshine Books Ltd.
19 Whitcomb Street,
London WC2 7HF

Name

Address

Signed

We can normally
deliver in four to five
days.

*Available from W. H. Smith and computer dealers.

A New Range From Sunshine Books Ltd

Ziggurat



Marvellous Mediocrity

I recently bought a calculator with a square-root facility and integral quartz watch.

Have I bought a calculator with a time-keeping facility, or have I bought a time-keeper with a calculating facility, or did I really buy what I wanted: something to tell the time and something to perform simple calculations?

An alternative would have been to have bought a wristwatch with an integral calculator function — one of those with tiny little buttons you push with a point — but being clumsy I needed big keys. That my purchase was much larger than such a watch (though wafer thin, so I was informed) was an advantage, not a disadvantage. To reduce the size of the watch plus calculator to that of a half-penny (new version) is to reduce its appeal — small is a pain!

The trouble with small things is that "In the ant's house the dew is flood" (or so goes an Iranian proverb), and this is very true of electrical devices.

So far, in the short history of computing the trend has been towards miniaturisation. To what extent can this be continued? Or, rather, to what extent *should* this reduction be continued, and in what directions? Ask yourself where many of the problems, and some of the benefits, of small computers lie: in the smallness of the computer.

The popularity of 'proper' keyboards for the Sinclair computers, and the many plays people

use to cool such small microcomputers (remember the old carton of milk caper for the ZX80?) reveal some of the drawbacks. As anybody who has played with crystal sets and simple transistor radios will know, when you place electronic components close to each other interactions begin to take place between the components. If one is not so very careful in the layout of the printed-circuit board, funny things happen — purely by electrical induction you can get a change from what is supposed to happen.

Brian Josephson, a British physicist, developed a new technology in 1962. Called by the generic term "Josephson devices" or "Josephson junctions", these are integrated circuits which act as superconductors at low temperatures (near absolute zero, -273°C). These devices were to be used to develop a (so far) theoretical supercomputer by IBM, which was to be little greater in volume than a Sinclair Spectrum, but immensely more powerful.

My hands are not over-large, but my fingers still prefer a full-size keyboard if I am to use a computer as a computer rather than as a specialised tool. I can see that for particular applications such a specialised tool would have a use, but the beauty of the computer as an artifact is that it is so adaptable. When I see some of the present generation (sorry — present set) of miniscule computers, I wish more thought had gone into the package. It is no use having a superb language or operating system without a proper keyboard, with space around the chips to let them breathe, with (of course) more on the price.

Simply, the argument is that miniaturisation can only go so far in the physical package — humans are not shrinking in sympathy.

It is undoubtedly a good thing that we have moved away from the vast computers — which were every bit as ingenious as our present crop of miniscule machines — but there has now become evident an over-reaction. Small has stopped being good. Small is painful.

I like a machine the size of an Atom, a Dragon, or a Vic. Mediocre is marvellous!

Boris Allan

Puzzle

Memory question

Puzzle No 42

Jamie had been given some homework to do but, typically, had left it at school.

All he could remember of the question was that it consisted of two two-digit numbers multiplied together and a further one-digit number which was either to be added or subtracted. The result produced a four-digit number with all the digits the same. He also recalled that all the numbers to the left of the equals sign were either all even or all odd.

Jamie drew out the following equation:

$$_ \times _ = _ _ _ _$$

Can you solve the puzzle for Jamie?

Solution to Puzzle No 37

The answer is: $A = 92$ and $B = 58$.

From the clues given we know that both A and B are greater than 32 as they have four-digit squares. Also A is greater than B by at least ten (Clue 1 across). In the program the values A and B are entered into two *For/Next* loops and interlocking values are checked to see if corresponding digits match.

```
10 FOR A = 42 TO 99
20 FOR B = 32 TO A - 10
30 LET AS = STR$ A
40 LET BS = STR$ B
50 LET CS = STR$ (A * B)
60 LET DS = STR$ (B * B)
70 IF CS(1) <> BS(2) OR DS(3) <> CS(3) THEN
    GOTO 120
80 LET ES = STR$ (A - B)
90 LET FS = STR$ (A + B)
100 IF ES(1) <> DS(1) OR ES(1) <> FS(2) OR
    ES(2) <> CS(2) OR FS(1) <> BS(1) OR FS(2)
    <> ES(1) OR FS(3) <> DS(2) THEN GOTO 120
110 PRINT A,B
120 NEXT B
130 NEXT A
```

Winner of Puzzle No 37

The winner is: Geoff Bogg, Holling Hill Lane, Wickersley, Rotherham, S. Yorks, who receives £10.

Top 10

Atari
1(4) Galaxians (Atari)*
2(3) Air Strike (English Software)
3(5) Canyon Climber (Data Soft)
4(1) Astro Chase (First Star)*
5(10) Scott Adams Adventures (Adventure International)*

6(-) Soccer (Thorn EMI)*
7(-) Rear Guard (Adventure International)
8(-) Chop Lifter (Broderbund)*
9(-) Darts (Thorn EMI)
10(-) Missile Command (Atari)*

*Cartridge. †24K cassette. ‡32K cassette. §48K disc.

(Figures compiled by Callisto Computers, Birmingham 021-632 6458)

Spectrum
1(1) The Hobbit (Melbourne House)*
2(-) Time Gate (Quicksilver)*
3(2) Penetrator (Melbourne House)*
4(5) Flight Simulation (Psion)
5(3) 3D Tunnel (New Generation)
6(-) Football Manager (Addictive Games)*
7(4) Arcadia (Imagine)
8(-) 3D Tanx (DK Tronics)
9(8) Hungry Horace (Psion)
10(9) Escape (New Generation)

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

Books
1(1) Creative Graphics on the BBC Microcomputer, Cownie (Acornsoft)
2(-) Spectrum Machine Language for the Absolute Beginner, Tang (Melbourne House)
3(2) Assembly Language Programming for the BBC Micro, Birnbaum (Macmillan)
4(4) Programming the 6502, Zaks (Sybex)
5(7) Basic Programming for the BBC Micro, Cryer (Prestice Hall)
6(6) Over the Spectrum, various authors (Melbourne House)
7(-) The Z80 Instruction Handbook, Wadsworth (Hayden)
8(8) Graphs and Charts on the BBC Micro, Harding (Acornsoft)
9(-) Power of SuperCalc, Williams (MIS)
10(-) Forth Programming, Scanlon (Sams)

(Figures compiled by Watford Technical Books, Watford 0923 23324)
(Last week's positions in brackets)

ZX81
1(2) 3D Defender (JK Greye)
2(4) Flight Simulation (Psion)
3(-) King Kong (Tony Barber)
4(5) Gulp II (Campbell Systems)
5(7) Sea War (Panda)
6(8) Adventure 1 (Abbersoft)
7(3) Gauntlet (Colourmatic)
8(-) Football Manager (Addictive Games)
9(-) Centipede (Llamasoft)
10(10) ZXAS (Bug-Byte)

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

Vic20
1(6) Andes Attack (Llamasoft)*
2(2) Abductor (Llamasoft)
3(-) Frog (Interceptor Software)
4(-) Alien Attack (Interceptor Software)
5(5) Gorf (Commodore)*
6(-) Scramble (Rabbit)
7(1) Grid Runner (Llamasoft)
8(-) Martian Raider (Romik)
9(9) Myriad (Rabbit)
10(-) Moons of Jupiter (Romik)

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

LOSERS



SEE US
AT THE . . .



AMAZING NEW PRODUCT TELESOUND 84 BBC/SPECTRUM SOUND BOOSTER

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

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

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

Cheques/PO to
COMPUSOUND
32 Langley Close
Redditch, Worcs. B98 0ET
Please state your computer when ordering

AT LAST! BY POPULAR DEMAND

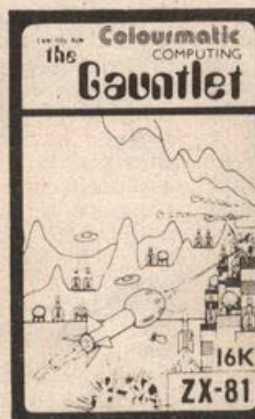
ONLY
£5.50
inc p.&p.

It's been in the PCW top ten for weeks. Now everyone has the opportunity of owning this fantastic new piece of video action software for the 16K ZX81. Make no mistake, you won't have to use your imagination on this one! It's the most faithful simulation of the arcade game **SCRAMBLE** available. It contains **all** the phases and adversaries of the real thing. And rockets do **not** look like alphabetic characters!

Beware Imitations!

Available from Buffer Micro, Streatham; Microware, Leicester; Micro Marketing, selected Spectrum dealers and by post from:

Colourmatic Computing
40 Longfellow Road,
Coventry, CV2 5HB



Stop Press! Colourmatic is ready for the ZX Microdrive! Coming soon, Microdrive based **Dungeon Adventure**. Real time hi-res graphics, talk to your adversaries, run away a lot from unspeakably nasty monsters. A surprise guaranteed in every room you enter. (Pleasant surprises **not** guaranteed!) 100K of sheer terror.

Also coming soon, Spectrum Forth and lots more arcade action!

Programmers!

We offer only the very best in royalties for the very best in real time software. Send us a sample of your work. ZX81, Spectrum, Oric, Lynx, BBC, Atom, etc.

FED UP WITH
SPACE INVADERS?

M.C. LOTHLORIEN



offers you hours of stimulating entertainment with their challenging range of **wargames** for the **SPECTRUM, ZX81, DRAGON 32**

- **SAMURAI WARRIOR** — could you have been **SHOGUN** in the 13th Century Japan?
Price: Spectrum £5.50 16K ZX81 £4.50
DRAGON 32 £6.95
- **TYRANT OF ATHENS** — can you guide Athens to survival against many other hostile states?
Price: Spectrum £5.50 16K ZX81 £4.50
DRAGON 32 £6.95
- **ROMAN EMPIRE** — How good a general are you?
Price: Spectrum £5.50 16K ZX81 £4.50
- **PELOPONNESIAN WAR** — can you defeat those nasty SPARTANS?
Price: 16K ZX81 only £4.50
- **WARLORD** — how well can you protect your village?
Price: 16K ZX81 only £4.50. Dragon 32 £6.95

Cheques or PO's please — made payable to:
M.C. LOTHLORIEN, DEPT. P.3
4 GRANBY ROAD, CHEADLE HULME
CHESHIRE SK8 6LS



SOFTWARE

DRAGON 32 PROGRAMS

MONSTER MINE by W. E. MacGowan	£7.95
GOLF by Pete Allen	£7.95
SPACE MISSION by W. E. MacGowan	£7.95
ALIEN BLITZ by Peter Chase	£7.95
CHARACTER GENERATOR by John Line	£9.95
GAMES PACK I	£7.95
Space Wars. Sheepdog. Torpedo. Snake.	
GAMES PACK II	£7.95
Landing. Hangman. Speedboat. Battleships.	
GAMES PACK III	£7.95
Reversi. Pontoon.	
GEMPACK IV by W. E. MacGowan	£7.95
Sea Harrier. Sub Chase.	
EDUQUIZ I by Peter Chase	£9.95
Geography. Inventors. Monarchs.	

LYNX PROGRAMS

Please phone or write for details
All available through mail order

GEM SOFTWARE
22 PRESTWICK DRIVE, BISHOP'S STORTFORD
HERTS, CM23 5ES
Telephone: (0279) 52401

Trade Enquiries welcome — ring for dealer pack.