

NOVEMBER 1981
75p

COMPUTER & VIDEO GAMES

THE
FIRST FUN
COMPUTER MAGAZINE

SPACE INVADERS! TAROT

Games and Programs for
Pet, Apple, Tandy, Sinclair,
Nascom, Vic, plus many more

SOLVE THIS AMAZING PUZZLE AND WIN A VIC COMPUTER

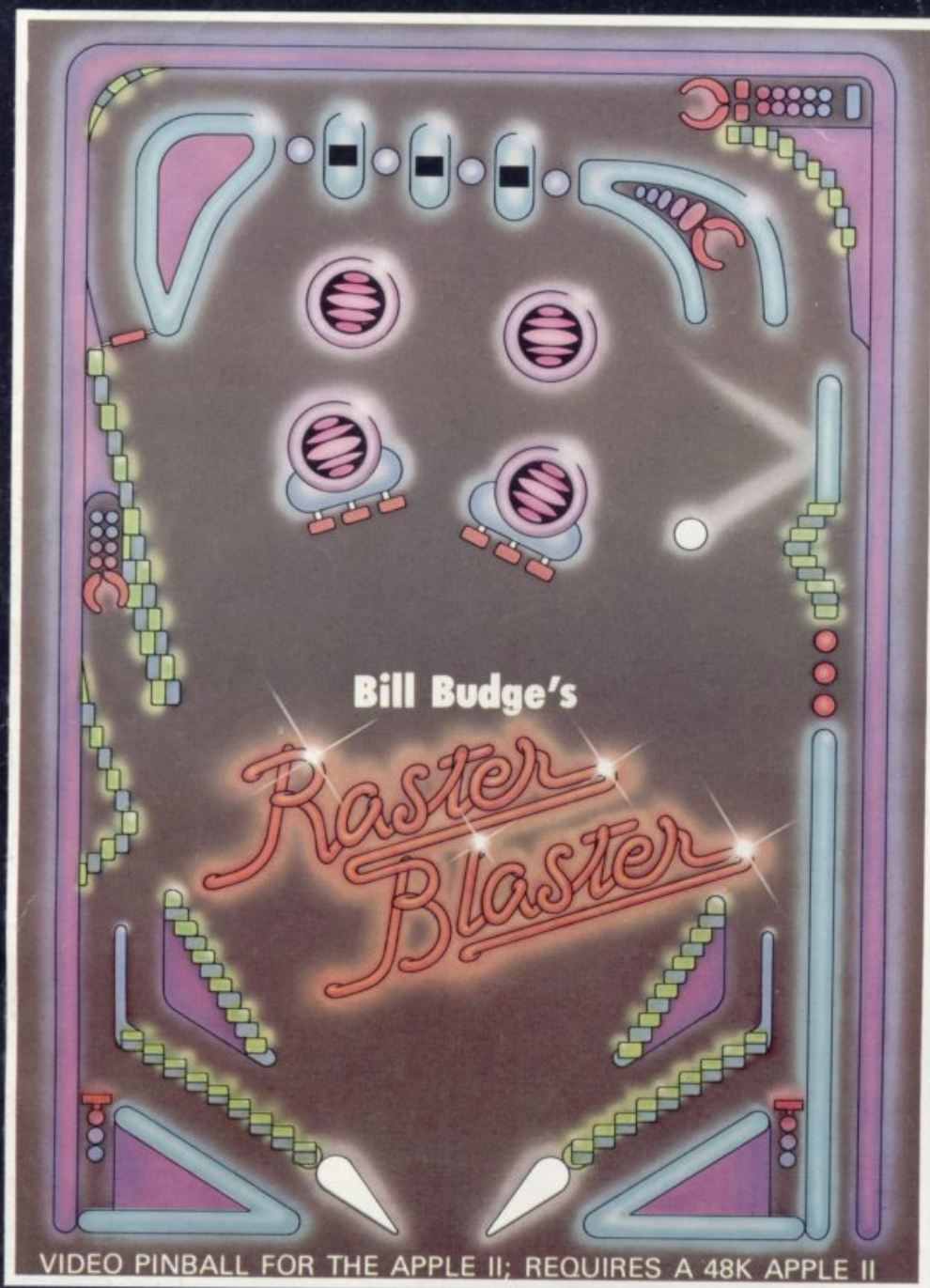
CHRISTMAS TOYS

Avoid the 5-day wonders

PLUS
CHESS & OTHELLO
ADD GRAPHICS AND SOUND
LEARN PROGRAMMING
and much, much more

WIN YOUR OWN ARCADE GAME





This may be the first Apple II game that is copied for the arcade machines. **RASTER BLASTER** for the Apple II and Apple II Plus is so technically sophisticated and fun to play that it is sure to attract the attention of the big arcade manufacturers. But you can get it right now for your Apple.

RASTER BLASTER

Video Pinball for the Apple II
See next month's issue for full details.

Apple II is a registered trademark of Apple Computer, Inc.

COMPUTER & VIDEO GAMES

CONTENTS

No 1 November 1981

Editor Terry Pratt

Assistant Editor Elspeth Joiner

Editorial Assistant Susan Cameron

Art Director Paul Flint

Design Linda Freeman, Chris Kapolka, Mike Butts

Illustrator Gary Scrase

Advertisement Manager Simon Teager

Advertisement Executives Rita Lewis, Neil Wood

Publisher Tom Moloney

In-house Contributors Bill Scolding, Chris Winch, Brian Cookman

Editorial and Advertisement offices: Durrant House, 8 Herbal Hill, London EC1R 5JB; Telephone 01-837 3699.

Subscription rates: UK £10 per annum (12 issues). Single copy 75p. Overseas £20 per annum (including airmail postage). Single copy £1.50.

Subscription enquiries to: Subscription department, EMAP National Publications, Bretton Court, Bretton, Peterborough, PE3 8DZ; Telephone 0733 264666.

Published and distributed by EMAP National Publications Ltd.

Printed by Eden Fisher (Southend) Limited, 555, Sutton Road, Southend-on-Sea, Essex.

© Computer & Video Games Limited
ISSN 0261 3697.

Cover: Illustration by Mike Tregenza

Try to think of something more exciting than a computer. What did you come up with: A trip up the Amazon, scoring a goal for England, landing on Mars or, maybe, beating the bank at Monte Carlo?

A computer will give you the chance to do any of these in your own living room.

And if you came up with some more illicit excitement, then perhaps you should be put in touch with a businessman I met who sends his programs out in plain brown wrappers!

Surprised? Then COMPUTER & VIDEO GAMES is the magazine to tell you just what you're missing out on. If you have already discovered computers you will know that their only limitation is the programmer's imagination — COMPUTER & VIDEO GAMES is out to push your imagination to its limits.

This magazine is putting the accent firmly on the "games" side. We are not commenting on computers as hardware, but as a means to an end — and that end is entertainment.

This is the age of the microchip and if you are not making the most of it, COMPUTER & VIDEO GAMES aims to show you how.

Whether you use chips in pub and arcade video games, buy them in toys for your children, play through them on a TV video games centre, or have them hidden away inside your computer, we will help you to make more of them.

In return we will be looking for some help from you in supplying views, ideas and — most importantly — games listings for us to print. Page 65 has more details on how to send in copy and the rewards we are offering.

We want you to get the most out of these listings that you possibly can. So don't just turn over pages which aren't featuring your particular machine's Basic. Instead, look to see how other people have got around problems which may have baffled you and if a game interests you then try to convert it to your machine.

Our Down to Basic page won't only teach beginners how to use this language but compare each machine's Basic functions and show which does each job on each machine.

If there are any terms you don't understand turn to our software glossary (pages 97 and 98) and you should find an explanation there.

Dotted around the magazine are the Bugs — you'll meet them officially on page 68. We've already fallen in love with these creations from the pen of Elphin Lloyd-Jones and we hope you will too. I'm sure they would like to join me now in offering you a big welcome to COMPUTER & VIDEO GAMES.

- 5 NEXT MONTH**
Bubbling under, our December issue. How will we keep this off the streets for a whole month
- 17 MAILBAG**
Your very own page. But do you have anything to say yet?
- 18 COMPETITIONS**
Can you tell an invader from a galaxian? Can you solve our free puzzle? Are you an arcade king? Then you could be a winner
- 24 GAMES NEWS**
All the latest software for your computer
- 27 CHESS**
From the first chess-playing machine to the most recent. Max Bramer checks out the computerised chess scene
- 28 ARCADE ACTION**
Showing soon on your local screens... the latest in pub and arcade games
- 31 OTHELLO**
Computers already have the edge in this popular game. Tom Napier offers the tips
- 32 THE INVADERS**
The aliens are as mean as ever on a Nascom 2
- 36 SUPER NIM**
Take on your Apple at this updated strategy game
- 42 RAINBOW PASSAGE**
A tactical board game is brought to colourful life on the Commodore VIC-20
- 46 THE NIBBLERS**
— are coming! And the fate of a town rests in your hands in this imaginative Pet program

- 50 TAROT**
The mysterious forerunner of our playing card pack. Become at one with fate on a Tandy
- 54 CITY BOMB**
Possibly the most wantonly destructive computer game yet devised for Sinclair owners
- 57 TRENCH**
Fly the Trench on your Atari and destroy the Death Star
- 60 DODGERS**
The Acorn computer's car is out to get you. How long can you avoid a collision?
- 62 MUSICAL HANGMAN**
Good use of the Sharp's music and graphics but can you save the innocent man from the gallows?
- 65 GAME OF THE YEAR**
We need your help — and we're not too proud to bribe you! Discover the benefits of becoming a C&VG contributor
- 66 SOUNDS**
Noises: musical, magical and mysterious. David Annal adds a fourth dimension to your micro
- 68 THE BUGS**
Meet our tribe of gremlins that you probably know only too well already
- 70 VIDEO SCREENS**
All the new cartridges for every TV video games centre. Read before you buy
- 73 MAINLINE**
What is it like playing a game with the power of a mainframe behind it? Alex Gates finds out

- 74 PRACTICAL PROGRAMMING**
It's in our interests to turn you all into better programmers. Ted Ball will tempt you further along the Basic trail
- 77 ADVENTURE**
Whether you want to write your own or just play other people's, Keith Campbell looks at the magic behind the most popular computer game
- 78 CHRISTMAS PARADE**
Most Christmas stockings will have a microprocessor in them this Yuletide. We look critically at the new toy generation
- 81 KIT KORNER**
A micro you have built yourself will give you that much more satisfaction. Keith Mott outlines the benefits and warns of the pitfalls
- 83 PUZZLES AND CROSSWORD**
Bottles of champagne are up for grabs in our Mind Routines problem and Nevera Crossword
- 85 GRAPHICS**
The marks on the screen — so often the mark of a good game
- 86 DOWN TO BASIC**
Computer beginners start here. But old hands should not pass by Moira Norrie's revealing look at the most widely used computer language
- 88 SOFTWARE REVIEWS**
An adventure with real treasure! An alien invasion of your spaceship! And many more
- 97 SOFTWARE GLOSSARY**
Don't be thwarted by computerised jargon. It's all here in plain English

NEXT ISSUE ON SALE NOVEMBER 18TH

COME DECEMBER

SOLVE THE CUBE THE MICRO WAY

If you are still 43 billion moves away from solving the all-conquering Rubik Cube, the next issue of *Computer & Video Games* is a must.

We are publishing a computerised solution to the puzzle which captured a nation's imagination. So no matter how much you've scrambled the six colours, just feed the cube's layout into the microcomputer and it will provide you with a simple step-by-step solution.

And if our free puzzle is causing you nightmares we'll be showing you the four mats put together in a way you may never have thought to see them... solved!

But if you're busy trying to work out a computerised solution and win one of our VIC-20 computers, perhaps you should skip that page.

Among our games listings is a seafaring thriller 'Round the Horn, which recaptures the spirit of the hazardous races around Cape Horn by the American clippers of the 1850s.

Triggered by the discovery of gold at Sutter's Mill in California, the speedy clippers rushed passengers and freight from the eastern coast to the west — sailing around the entire southern continent on their way. You can relive those pioneer days when the fastest ships could name their price.

Plus: Mini Golf, Chomp, Goal and many more listings.

Also in our oh-so seasonal December issue we will continue our invaluable guide to the microprocessor controlled toys and games which you and your children could be playing with on Christmas morning.

Don't buy that toy until you've read our rundown of what to expect from it.

The new year also promises to be an exciting time in the arcade games world with a new generation of machines due out. Make

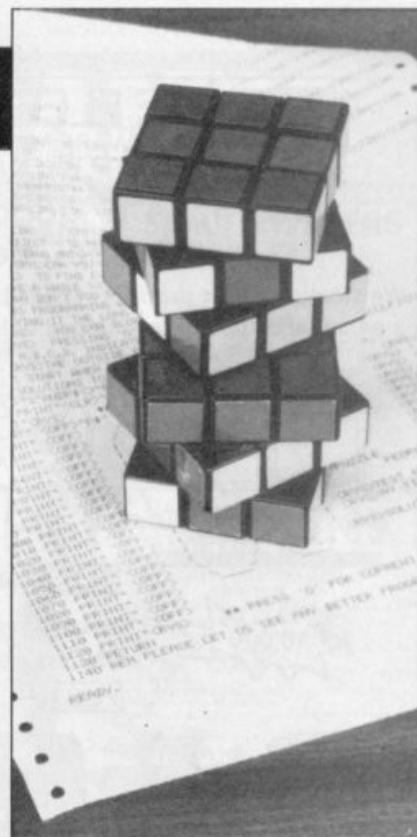
sure you keep up to date with your local screens.

The next three arcade graphics creatures for our Taito space invaders competition. And a second chance to enter our arcade player of the world finals.

Our first look at how to program that increasingly popular game of Go, another look at improving your programming skills with Down to Basic and Practical Programming.

All this plus our very different free giveaway template competition.

Make sure of your copy!!



SUBSCRIPTION ORDER FORM



Please start me a subscription to *Computer & Video Games* and continue to send it to me until I cancel.

I understand that I may stop my subscription at any time and you will refund me the difference. I enclose a cheque/P.O. for £10.00 (U.K.); Overseas £20.00. Twelve issues a year. Cheques should be made payable to Computer & Video Games Ltd.

Name _____

Address _____

Signed _____ Date _____

NOW PLEASE POST TO:
Computer & Video Games Ltd.,
Subscription Department, Bretton Court, Bretton,
Peterborough PE3 8D2

MICROAGE ELECTRONICS

135 HALE LANE EDGWARE MIDDLESEX HA8 9QP
TEL: 01-959 7119 TELEX: 8813241

**We make a good deal a
good deal better**

We stock the best products at the best prices then add
a personal or postal service and helpful advice.



only
£170
inc. VAT
ready built

THE
OUTSTANDING
ACORN ATOM



PLUS

10,000

2114 RAM sets - MUST GO
AT ONLY £2 each

PLUS



all the latest software - games, maths, VDU

PLUS

~~the Seikosha printer at £228 inc VAT, cassettes
monitors etc.~~

STOP PRESS!

Now only **£199** inc. VAT and postage
for the Seikosha uni-hammer printer.
96ASCII characters.

DAI personal computer 48K RAM
24K ROM

£684
inc. VAT



FOR THE
COMPUTER
MAN WHO
WANTS

nearly
everything

Atari games



The top range of games programs at rock bottom
prices.

MISSILE COMMAND £27.50
(Asteroids available soon)

For all these things and more, come to Microage
at Edgware and browse. We are open Monday to
Saturday, from nine in the morning until late.

If you cannot pay us a visit, just telephone or send
a self addressed envelope for our mail order prices.

MICROAGE ELECTRONICS

135 Hale Lane, Edgware, Middlesex, HA8 9QP TEL 01-959 7119

Main Line: Mill Hill Broadway

Tube Station: Edgware

On the 240 and 221 bus routes



Circle No. 102

SILICON CENTRE

EDINBURGH

MAIL ORDER

Price list, order form on request

ATARI 400 (16k)	£299
ATARI 800 (16k)	£560
ACORN ATOM (kit)	£120
ACORN ATOM (ready built)	£150
VIDEO GENIE (16k)	£299
GENIE II (16k)	£335
32k GENIE II/DISK	
Small Business System	£953

Mattel Intellivision, Electronic Games, Chess,
Software, Books, Accessories, etc.
(Please add 15% VAT)

SILICON CENTRE

21 Comely Bank Road, Edinburgh 4
Tel: 332 5277

ELECTRONICS FOR THE 80'S

Circle No. 103

ZX81 (16K) GAMES PACKS

These games are designed by Video Software Ltd and
are all completely original. All the games need the 16K
RAM pack. Program cassette and manual are sup-
plied. Programs are recorded twice on the cassette
with an accompanying commentary to teach you how
to use the program. Programs are written in standard
Sinclair BASIC with no machine code so you should
be able to add your own variations.

All games packs are priced at £3.95 to include VAT,
post and packing.

**indicates games which will run on ZX80 with 8K
ROM.

To: Video Software Ltd., Stone Lane, Kinver,
Stourbridge, West Midlands, DY7 6EQ.

FORCE-FIELD. Hostile UFOs attack a city. You control
the force field which destroys their bombs. Ani-
mated. ZX81 only

3.95

SPACE RACE Party game for up to eight players.
Animated. ZX81 only

3.95

FOOTBALL-LEAGUE For the student of football.
Simulate an entire season's play. **

3.95

TEST MATCH For the student of cricket. Select your
teams and see who wins. **

3.95

STOCK MARKET Buy and sell your way to a fortune.
Real time price changes. ZX81 only

3.95

Please send me the items ticked above.

I enclose cheque/postal order No: for £.....
Please allow 28 days for delivery.

Name:

Address:

Circle No. 104

ELECTRONIC GAMES

COLOUR CARTRIDGE T.V. GAME



SEMI-PROGRAMMABLE T.V. GAME
+ 4 Cartridges + Mains
Adaptor
Normal Price £73
NOW REDUCED TO: £39.50
inc. VAT

DATABASE T.V. GAME



FULLY PROGRAMMABLE
CARTRIDGE T.V. GAME
14 Cartridges available
Normal Price £87.86
NOW REDUCED TO: £59
inc. VAT

ATARI T.V. GAME



The most popular T.V. Game on
the market with a range of over
40 cartridges including SPACE
INVADERS with over 112
games on one cartridge.
£95.45
inc. VAT

SPACE INVADERS



Hand-held Invaders Games available **£19.95**
+ Invaders Cartridges available to fit
ATARI / RADOFIN / ACETRONIC / PHILIPS G7000
+ Cartridges also available for
MATEL / TELENG / ROWTRON /
DATABASE / INTERTON

CHESS COMPUTERS



MANY UNITS
ARE COVERED BY
THE EXCLUSIVE
SILICA SHOP 2 YEAR GUARANTEE

We carry a range of over 15
different Chess computers:
Electronic Chess **£29.95**
Chess Traveller **£39.95**
Chess Challenger 7 **£79.00**
Sensory 8 **£119.00**
Sensory Voice **£259.00**
SPECIAL OFFERS:
VOICE CHESS CHALLENGER
Normal Price £245 NOW **£135.00**
SARGON 2.5 / BORIS 2.5
Normal Price £273.70 NOW **£199.95**
All prices include V.A.T.

TELETEXT



ADD-ON ADAPTOR £199

inc. VAT
THE RADOFIN TELETEXT ADD-ON
ADAPTOR

Plug the adaptor into the aerial socket of your
colour T.V. and receive the CEEFAX and
ORACLE television information services.

THIS NEW MODEL INCORPORATES:

- * Double height character facility
- * True PAL Colour
- * Meets latest BBC & IBA broadcast specifications
- * Push button channel change
- * Unnecessary to remove the unit to watch normal TV programmes
- * Gold-plated circuit board for reliability
- * New SUPERIMPOSE News Flash facility

SPEAK & SPELL



Normal Price £49.95
NOW REDUCED TO:

£39.50 inc. VAT

Teach your child to
spell properly with
this unique learning
aid. Fully automatic
features and scoring.
Additional word
modules available to
extend the range of
words.

ADDING MACHINE OLYMPIA HHP 1010



Normal Price £57.21
NOW REDUCED TO:

£34 inc. VAT

Uses ordinary paper!
No need to buy expensive
thermal paper!
Fast adding using PRINTER-
CALCULATOR. 2 lines per
second. 10 digit capacity.
Uses normal adding
machine rolls. Battery or
mains operated.
Size 9 1/4" x 4 1/4" x 2 1/4"
(Mains adaptor extra)

24 TUNE ELECTRONIC DOOR BELL

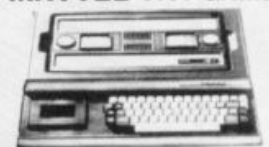


Normal Price £19.70
NOW REDUCED TO:

£12.70 inc. VAT

Plays 24 different tunes
with separate speed
control and volume
control. Select the most
appropriate tune for your
visitor, with appropriate
tunes for different times of
the year!

MATEL T.V. GAME



The most advanced T.V. game in the world. 20
cartridges available. Add
on KEYBOARD coming
soon to convert the unit
to a home computer with 16K RAM, fully
expandable and programmable in Microsoft Basic.
Other accessories will be available later in the year.

HAND HELD GAMES EARTH INVADERS



These invaders are a breed of creature hitherto
unknown to man. They cannot be killed by
traditional methods — they must be buried. The
battle is conducted in a maze where squads of
aliens chase home troops. The only way of
eliminating them is by
digging holes and
burying them.
£23.95 inc. VAT

THE OLYMPIA — POST OFFICE APPROVED TELEPHONE ANSWERING MACHINE WITH REMOTE CALL-IN BLEEPER

This telephone answering machine is manufactured by Olympia Business Machines, one of the
largest Office Equipment manufacturers in the U.K. It is fully POST OFFICE APPROVED and will
answer and record messages for 24 hours a day. With your remote call-in bleeper you can receive
these messages by telephone wherever you are in the world. The remote call-in bleeper activates the
Answer/Record Unit, which will at your command repeat messages, keep or erase them, and is
activated from anywhere in the world, or on your return to your home or office. The machine can also
be used for message referral, if you have an urgent appointment, but are expecting an important call,
simply record the 'phone number' and location where you can be reached. With optional extra
bleepers (£13 each) this facility can be
extended to colleagues and members of
the family. Using a C90 standard cassette
you can record as many as 45 messages.
The announcement can be up to 16
seconds long and the incoming message
up to 30 seconds long.
The machine is easy to install and comes
with full instructions. It is easily wired to
your junction box with the spade connec-
tors provided or alternatively a jack plug
can be provided to plug into a jack socket.
Most important, of course, is the fact that
it is fully POST OFFICE APPROVED.
The price of £135 (inc. VAT) includes the
machine, an extra-light remote call-in
Beeper, the microphone message tape,
A/C mains adaptor. The unit is
9 1/2" x 6 1/2" x 2 1/2" and is fully guaranteed for
12 months. The telephone can be placed
directly on the unit — no additional desk
space is required.



£135 inc. VAT

PRESTEL VIEWDATA



The ACE TELCOM VDX1000 Prestel View-
data adaptor simply plugs into the aerial
socket of your television and enables you to
receive the Prestel/Viewdata service in
colour or black & white.

- Features —
- Simplified controls for quick, easy operation
 - Special graphics feature for high resolution
 - State-of-the-art microprocessor controller
 - Standard remote telephone keypad with Prestel
keys 1-8
 - Auto dialler incorporated for easy Prestel
acquisition
 - True PAL colour encoder using reliable IC —
chroma filter and delay line incorporated for
minimum picture interference/maximum
fidelity
 - Includes convenient TV — Prestel switchbox
 - Easily connected to standard home or office
telephone lines
 - Fully Post Office approved

SPECIAL PRICE £228.85 inc. VAT

HAND HELD GAMES GALAXY 1000



The 2nd generation Galaxy Invader. The invaders
have re-grouped and have a seemingly endless
supply of spacecraft whilst the player's arsenal is
limited to just 250 missiles to be launched from 3
missile stations. You have to prevent the invaders
landing or from
destroying your home
defences.
£19.95 inc. VAT

FOR FREE BROCHURES — TEL: 01-301 1111



For free illustrated brochure and reviews on our range of electronic games, please telephone 01-
301 1111. Free delivery service available. To order by telephone please quote your name, address and
ACCESSBARCLAYCARD number, and leave the rest to us. Post and packing free of charge.
Express 48hr delivery service available.
* CALLERS WELCOME — Demonstrations daily at our Sidcup shop, open from 9am-6pm.
Monday-Saturday (Late Closing Thursday 1pm — Late Opening Friday 6pm).
* 2 YEAR GUARANTEE — All goods are covered by a full year's guarantee and many are further
covered by our exclusive Silica Shop 2 year Guarantee.
* MONEY BACK UNDERTAKING — If you are unsatisfied with your purchase and return it within
7 days we will give you a full refund.
* AFTER SALES SERVICE — Available on all machines out of guarantee.
* COMPETITIVE PRICES — We are never knowingly underpriced.
* HELPFUL ADVICE — Available on the suitability of each machine.
* CREDIT FACILITIES — Full credit facilities available over 12, 24 or 36 months at competitive
rates of interest.
* PART EXCHANGE SCHEME — available on second hand machines.
* CREDIT CARDS WELCOME — Access, Barclaycard, Oritex Club, American Express.
SILICA SHOP LIMITED DEPT. NO. CYG 1181
1-4 The Mews, Hatherley Road, Sidcup, Kent DA14 4DX
Telephone: 01-301 1111 or 01-309 1111

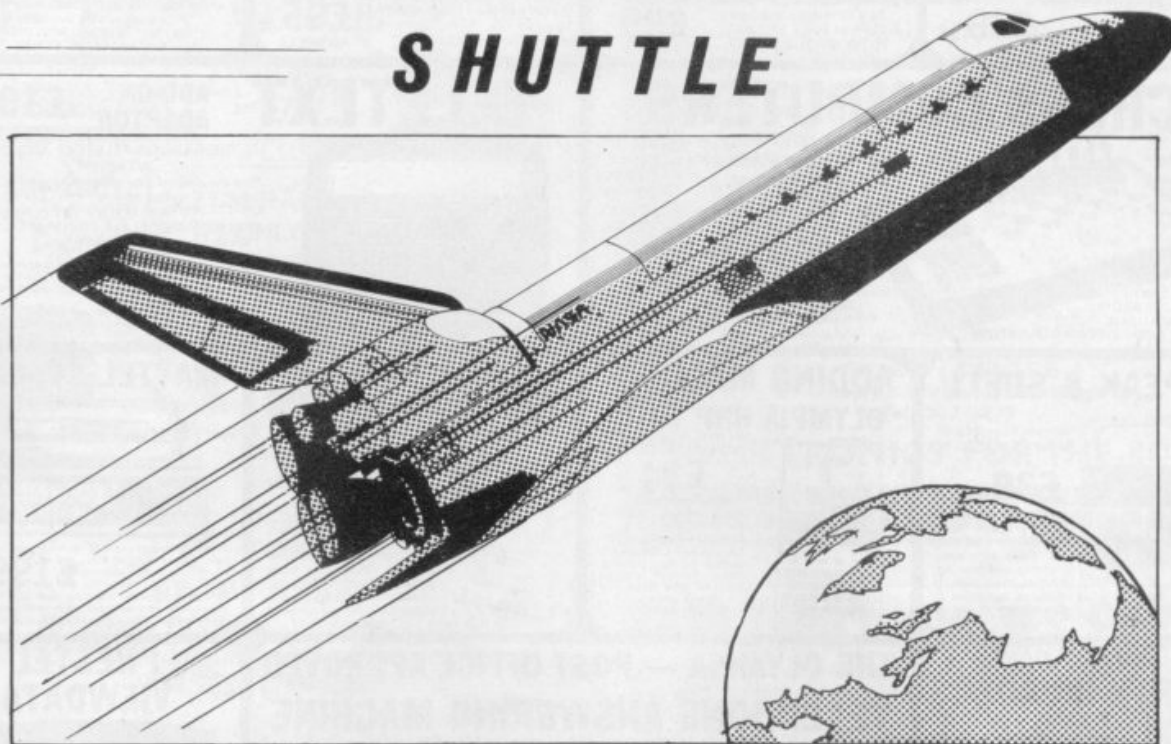


INNOVATIVE

TRS-80 SOFTWARE

FROM THE PROFESSIONALS

SHUTTLE



This program is a highly accurate computer simulation of the flight of the Space Shuttle Columbia from the initial countdown through the launch period, the launch itself and into a stable orbit. The craft may be manoeuvred within the orbit and then dropped out to finally fly through the atmosphere to a safe touchdown.

The attraction of this simulation is its authenticity. So far as is possible, it follows the actual parameters of the first Columbia flight with only one or two minor exceptions. The shuttle, of course, starts its flight pointed vertically into the sky and carries a huge fuel tank to provide the fuel for its three main engines in addition to the solid fuel rockets which provide the major thrust to lift it off the ground. Two minutes into the flight the rockets are jettisoned, having burned all their fuel. The count-down for take off starts at T-20 seconds. At T-10 seconds the shuttle motors start firing, but the shuttle remains tethered until T=0. When the shuttle blasts off, the pilot must guide the craft into its orbit by controlling its attitude and track. A number of guidance controls are supplied, together, of course, with control of the shuttle motors' thrust.

The simulation may be started at one of three points in time: either at take off, at a point where the Columbia is in a stable orbit round the earth, or finally, prior to landing. Measurements of speed, fuel and so on may be selected for either Metric or Imperial measurements. All of the physical forces which acted upon the actual flight are taken into account. One departure from fact has been included in that the two solid fuel rockets have had their thrusts increased from 26 to 36 million Newtons so as to give the pilot an increased latitude for error. In other words to make the take off easier.

A fascinating program, the more so because it follows fact so closely. Available for the Model I and Model III TRS 80, Model I and Model II Genie and on tape or disk. The tape version will run in 16K, the disk in 32K.

Tape version.....£14.95 Disk version.....£17.95

Both inclusive of V.A.T. but plus 50p P & P (if ordered alone).

TRS-80 & VIDEO GENIE SOFTWARE CATALOGUE £1.00 [refundable] plus 50p postage.



MOLIMERX LTD.

A. J. HARDING (MOLIMERX)

1 BUCKHURST ROAD, TOWN HALL SQUARE,
BEXHILL-ON-SEA, EAST SUSSEX.

TEL: [0424] 220391/223636

TELEX 86736 SOTEX G



INNOVATIVE

TRS-80 SOFTWARE

FROM THE PROFESSIONALS



We are pleased to be able to announce the commencement of a new series of Adventure games. The series named "Mysterious Adventures" is written in machine language by B. Howarth, an English author. The first episode is entitled "The Golden Baton". The scenario is that you have been sent by the ruler of your own land to a strange province with the mission of discovering the whereabouts of the legendary Golden Baton of Ferrenuil, King of the Ancient Elf Kingdom. The baton mysteriously disappeared several years ago and whilst others have ventured to the land in an attempt to discover it, none have returned to tell their tale!

The program follows what has become the normal structure for Adventure programs. Like the original main frame Adventure, directions can be designated by just the first letter of the compass point and commands may be optionally entered with just the first three letters of the appropriate word. As usual provision is made for saving the game at any stage and such standard commands as Help, Inventory, Score and Quit are all available. Experienced adventurers will inevitably draw comparisons between this series and that of Scott Adams, so we will leave it to them to make their judgements! The only comment that we will make at this time is that we find it quite invigorating to play an Adventure game by a different author as obviously they construct their stories slightly differently. Mysterious Adventure 1, "The Golden Baton" is available on cassette for TRS-80 or Video Genie machines of 16K or more and on disk for 32K up machines. It occupies a full 16K. The tape versions save their game to tape and the disk to disk.

Tape version£8.75

Disk version£11.00

Both prices plus VAT and 75p P. & P.

TRS-80 & VIDEO GENIE SOFTWARE CATALOGUE £1.00 [refundable] plus 50p postage.



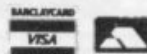
MOLIMERX LTD.

A. J. HARDING (MOLIMERX)

1 BUCKHURST ROAD, TOWN HALL SQUARE,
BEXHILL-ON-SEA, EAST SUSSEX.

TEL: [0424] 220391/223636

TELEX 86736 SOTEX G



Acorn Atom

OLD FAVOURITES

INVADERS 12K, m/c, Gr.4, sound — The original and best version **£8.00**
PINBALL 6K, m/c, Gr.2, sound — packed with features, 1 or 2 players **£4.50**
STAR TREK 12K, BASIC & m/c, sound, FP — Fantastic real-time version **£5.00**
BREAKOUT 4K, m/c, Gr.1, sound — This will keep you frustrated for hours! **£4.00**
FRUIT MACHINE 8K, BASIC & m/c, Gr.2, sound — Spinning reels, hold, nudge etc. **£4.00**
DISASSEMBLER 4K, BASIC — Invaluable machine code aid **£4.00**
UFO BOMB 7K, BASIC, sound — entertaining space game with great sound effects **£4.00**
LUNAR LANDER 12K, BASIC & m/c, Gr.4 — Gets harder as you get better — fantastic graphics **£5.50**
GOLF 6K, BASIC, FP — The only thing missing is the 19th hole! **£5.00**

★ NEW RELEASES ★

LABYRINTH 12K, BASIC, Gr.2A, sound, FP — High resolution 3D colour graphics! **£6.95**
BACKGAMMON 7K, BASIC — Challenge your Atom to a game — can you beat it? **£7.00**
★PLEASE NOTE — 50% of the takings from **BACKGAMMON** will be donated to **LEUKAEMIA** research and treatment, so please help.
LAST RUN 7K, BASIC, sound — A compulsive game requiring fast reactions and good nerves! **£3.00**
RHINO & WIGGLE 10K, BASIC, sound, FP — Two highly entertaining games for the price of one **£5.00**

All figures refer to TOTAL memory required.

Sinclair ZX81

PROGRAM PACK 1
 (for 1K ZX81 & 8K ROM ZX80)
 8 compact and entertaining programs for the unexpanded ZX81, including DIGICLOCK, CATCH, GOBBLER, REACTION TEST, SKETCHPAD. Fantastic value at **£3.50**

PROGRAM PACK 2
 (for 16K ZX81)
 Four programs for the expanded ZX81 — OXO (against the ZX81), PONTOON (against the ZX81), FRUIT MACHINE (with hold & nudge), and BIO-RHYTHMS. ONLY **£3.50**

PROGRAM PACK 3
 (for 1K ZX81 & 8K ROM ZX80)
 Three amazingly compact machine code programs with fast moving graphics: ASTROPILOT, AUTOMATIC GRAPHIC GENERATOR and ROADRACE. PRICE ONLY **£4.50**

PROGRAM PACK 4
 (for 16K ZX81)
 Two highly entertaining and addictive games for the expanded ZX81, written in machine code (so they're fast) — ASTEROID BELT and SURROUND. ONLY **£4.50**

ZXAS MACHINE CODE ASSEMBLER

For 16K ZX81 & 8K ROM ZX80

Complete assembler. Assembles standard Z80 mnemonics written into REM statements. Overwrite protection. Occupies 5K. Supplied on cassette, with written documentation. Amazing value at only **£3.95!!**

ZXDB — The complete debugging program

Perfectly complements the ZXAS assembler. Includes disassembler, single-step, string search, block transfer and many more useful routines all in one amazingly compact machine code program. SAE for details.

MULTIFILE (16K ZX81 only)

Versatile multipurpose filing system, with complete documentation and 3 data cassettes. Many possible applications. PRICE **£17.50**, or **£1.00** for documentation (refundable against purchase).

ALL OUR PRICES ARE INCLUSIVE!

BUG-BYTE

SOFTWARE

98-100 THE ALBANY
 OLD HALL STREET
 LIVERPOOL L3 9EP

Circle No. 108

Questions and Answers on

PERSONAL COMPUTERS

by
 Peter Lafferty

"An excellent starting point
 for the newcomer"

David Tebbutt
 (editor Personal
 Computer World)



£7.95
 96 pages

This book will help anyone who wishes to learn about personal computers and the uses to which they can be put. It describes the development of the personal computer. Explains its operation and outlines the principles of programming. It deals in large part with systems that are available, particularly in the middle price range, and what can be expected from them, while a chapter on applications surveys the many uses of these remarkable machines.

Illustrated Paperback 165 x 111mm
 0 408 00555 6

Questions and Answers on Video

by Steve A Money

Whether your interest in video is in recording 'home movies' or TV programmes, playing games or receiving information by teletext or videodata systems, this book provides a lucid introduction to an involved subject.

Illustrated Paperback 165 x 111mm 128 pages 0 408 00553 X £1.95

Learning BASIC with Your Sinclair ZX80

by Robin Norman

This book will be of great value to all ZX80 owners. It contains all the information necessary to use the Sinclair ZX80 to the full, plus 14 specially written programmes unavailable elsewhere.

Illustrated Paperback 216 x 135mm 160 pages 0 408 01101 7 £3.95

ORDER NOW — from your local bookseller

or in case of difficulty cut out this coupon and return to
 Patricia Davies, Marketing Manager at the address below.

Please send me _____ copy/copies as marked above,
 I enclose a cheque/postal order for £_____ in total payment

Name _____

Address _____

(CVG 10/81)

Newnes Technical Books
 Borough Green, Sevenoaks, Kent TN15 8PH

Circle No. 109

**PROGRAM
POWER**

NASCOM 1 & 2

MATHSPACK (B/32K)

Studying maths at 'O' level or above? These routines will be of interest! Plotting — user defined function, with 'zoom in & out', alter scales etc. Simultaneous Equations — up to order 32. Calculus — function evaluation, 1st, 2nd & 3rd derivatives, integration. Non-linear equations — solves quadratic equations. Factorials (up to 33) — permutations, combinations. Vector Routines — manipulates 3 dimensional vectors. £7.95

AY-3-8910 SOUND CHIP

INVASION EARTH with INCREDIBLE SOUND EFFECTS(MC/G) £10.95

SOUND CHIP — Program up to 3 independent channels, with music & sound effects! Data sheet incl. £6.45

SOUND CHIP INTERFACE BOARD — Designed to interface between the PIO & the chip. Ready built — plugs straight onto PIO. Nascom 1 connectors available. Sound generation illustrated in MC. & Basic. (chip not incl.) £13.50

DEMO PROGRAM (MC) 1st mode — direct entry to chip register making experimentation simple. 2nd mode — turns keyboard into 7 octave 'piano', giving state of registers & notes played. £5.95
DATA MANUAL (60 pages) No VAT £2.25

GALAXIAN ATTACK (MC/G)

Fast M/C space game, featuring diving Galaxian spacecraft. 10 speeds from good to impossible. No barriers for protection. Hi-score display. £8.95

VORTEX(MC/State 16/32/48K)

Speed up your display of pixel graphics. 29 routines called from BASIC. Manipulate 2 screen images & then update your VDU. Changes appear instantaneous. Extensive examples and instructions supplied. £8.95

"MICRO-POWER" - Magazine

ISSUES 1 & 2 NOW AVAILABLE
ISSUES 3 & 4 AVAILABLE NOV/DEC
ORDER NOW to secure your copies — ONLY 95p each (£3.80 for all FOUR)
SERIES ARTICLES — 'Hands-on' (from the beginning) — NAS-SYS monitors revealed. Also included — Featured articles, news from clubs, schools, letters to the Editor, questions & answers!

THE KEYS OF KRAAL (24K/B/G)

Superb adventure game PLUS exciting graphics. Fight the monsters & demons in real time. Swords flash, arrows fly & spells home-in. Endless hours of enjoyment. Save on tape. £8.95

SERPENT (MK/G)

8K of incredible M/C. An interactive game 'par excellence'. Torpedo the moving snake-like sea serpents & the marauding killer whales. 5 levels & special missions with almost infinite skill settings. £5.95

WIRRAL PILOT V4.0 (MC)

WIDELY USED VERSION of this computer aided learning language. Being adept at matching long strings, it has considerable advantages over BASIC in interactive learning projects. £12.50

BASIC FILE HANDLER (MC) for cassette-based systems.

PAYROLL, SALES & PURCHASE LEDGERS, PRICE LISTS etc. — NOW you can write them! Save complex data files on cassette — any combination of strings, string variables, string arrays, constants, expressions, variables or arrays. Definable block size. At 2400 BAUD using 1K blocks, 1000 numbers can be stored/accessed in less than 1 min. Comprehensive manual & circuit for optional automatic cassette drive control supplied. £17.50

*** NASCOM 1 — Cottis Blandford cassette interface for N2 format, reliability & fast load £14.90

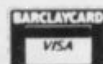
— 8K RAM required unless otherwise stated.

— Please state if Nascom TAPE Basic required.

ALL PROGRAMS SUPPLIED ON CASSETTE IN CUTS/KANSAS CITY FORMAT.

Please add 55p/order P & P + VAT @ 15%.
Large (15½p) Sae for FULL CATALOGUE.

PROGRAM POWER
5, Wensley Road,
Leeds LS7 2LX.



ASTROBIRDS (5K* + 6K graphics)
Incredible GALAXIAN style program with fantastic sound effects! Screaming missiles, swooping bird-men. Undoubtedly the best game on the market. £8.95

LUNAR LANDER (5K* + 6K graphics)
Superb high res. version. Long range scan, short range scan. Limited fuel supplies. Land the module with minimum impact. £8.95

INVADER FORCE (5K* + 6K graphics)
4 Invader types + mother ship. Great sound effects. High score. 6 skill levels & increasing difficulty. £8.95

3D ASTEROIDS (5K* + 2K graphics)
Steer through the rolling, hurtling asteroids coming out of the black void. Exciting new graphical representation. £6.95

MODE 4 VDU (3K* + 6K graphics)
Replaces ATOM VDU giving 224 characters incl. upper and lower case, inverted chars. and special graphics. MIX text with MODE 4 GRAPHICS! DESIGN your OWN characters! £8.95

ACORN ATOM

TERRITORY + AZTEC (3K* + 2K graphics) 2 super arcade games £5.95
DAMBUSTERS (3K* + 2K gr) Realistic bombing raids, bouncing bombs, ack ack etc £4.95
SPACE STORM (4K*) Survive amid the raging comets & space debris £4.95
ALIEN MAZE (5K* + 2K graphics) Escape the 3D labyrinth before the beast eats you. £5.95

STAR TREK (5K* + Fl.Pt.)
An "all-out" war with the Klingons! 8x8 galaxy, long & short range scans, photon torpedoes, shield control, starbases etc. £6.95

Super RACETRACK/TRANG (5K* + 6K gr)
Outstanding race simulation! Design your own racetrack and then race against the clock. Steering and acceleration controls. Also TRANG 'monster' chase. £6.95

DEMON DUNGEON (5K*)
Adventure game. Find the treasure in the depths of the dungeons. Beware the lurking demons whilst making your escape. £6.95

LABYRINTH/SLOT RACER (5K* + 6K gr)
Excellent 3D graphics showing walls, turnings etc. Compass and/or 2D map if in difficulty. ALSO arcade style 'dodgems' game. £6.95

EXTRA MEMORY — Low power chips as recommended by Acorn 2 x 2114L — £3.75

WRITTEN ANY PROGRAMS? — WE PAY 20% ROYALTIES!

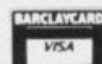
SPECIAL OFFER — Deduct £1 per cassette when ordering 2 or more.

Please add 55p/order P & P + VAT @ 15%

Send Sae for FULL CATALOGUE.

PROGRAM POWER

5, Wensley Road,
Leeds LS7 2LX.
Tel. (0532) 683186.



MICROCOMPUTER COMPONENTS

LOWEST PRICES — FASTEST DELIVERY

DEVICE	PRICE	DEVICE	PRICE	DEVICE	PRICE
CPU's		CRYSTALS		74LS257	0.44
6502	4.95	1 MHz	3.00	74LS258	0.38
6800	3.70	1.8432 MHz	2.50	74LS259	1.15
6802	5.11	2.4576 MHz	2.50	74LS261	1.90
6803	11.80	4 MHz	1.85	74LS266	0.23
6809	11.95			74LS273	0.90
8085A	5.50	DIL SOCKETS		74LS279	0.34
Z80 CPU	4.00	8 pin	0.07	74LS283	0.44
Z80A CPU	4.82	14 pin	0.09	74LS290	0.56
		16 pin	0.09	74LS293	0.45
SUPPORT CHIPS		18 pin	0.15	74LS365	0.34
6520	3.15	20 pin	0.17	74LS366	0.34
6522	4.95	22 pin	0.21	74LS367	0.34
6523	7.95	24 pin	0.23	74LS368	0.34
6821	1.74	28 pin	0.25	74LS373	0.74
6840	4.20	40 pin	0.29	74LS374	0.74
68488P	9.11			74LS375	0.47
6850	1.70	74LS SERIES		74LS377	0.89
662	6.91	74LS00	0.11	74LS378	0.69
6871A/T	18.70	74LS01	0.11	74LS386	0.28
6875L	4.18	74LS02	0.12	74LS390	0.59
6880	1.07	74LS03	0.12	74LS393	0.59
6887	0.80	74LS04	0.13		
8212	1.70	74LS05	0.13		
8216	1.70	74LS08	0.13		
8224	2.45	74LS09	0.13		
8228	3.95	74LS10	0.13		
8251	3.95	74LS11	0.14		
8253	7.95	74LS12	0.15		
8255	3.95	74LS13	0.22		
AY-3-1015	3.90	74LS14	0.44		
AY-5-1013	3.45	74LS15	0.13		
AY-5-2376	6.95	74LS20	0.12		
MC1488	0.54	74LS21	0.14		
MC1489	0.64	74LS22	0.14		
MC1441	6.94	74LS26	0.18		
MC14412	7.99	74LS27	0.14		
RO-3-2513L	7.70	74LS28	0.14		
RO-3-2513U	7.70	74LS30	0.12		
Z80 CTC	4.00	74LS32	0.14		
Z80A CTC	4.00	74LS33	0.16		
Z80 DMA	11.52	74LS37	0.16		
Z80A DMA	9.99	74LS38	0.16		
Z80 DART	7.18	74LS40	0.13		
Z80A DART	7.18	74LS42	0.34		
Z80 PIO	3.78	74LS47	0.39		
Z80A PIO	3.78	74LS48	0.60		
Z80 SIO-0	13.95	74LS49	0.59		
Z80 SIO-1	13.95	74LS51	0.14		
Z80 SIO-2	13.95	74LS54	0.15		
Z80A SIO-0	13.95	74LS55	0.15		
Z80A SIO-1	13.95	74LS73	0.20		
Z80A SIO-2	13.95	74LS74	0.17		
		74LS75	0.28		
CRT CONTROLLERS		74LS76	0.20		
9364AP	5.94	74LS78	0.24		
9365	62.90	74LS83	0.50		
9366	62.90	74LS85	0.70		
6845	9.50	74LS86	0.18		
		74LS90	0.30		
DATA CONVERTERS		74LS91	0.80		
ZN425E	3.50	74LS92	0.35		
ZN426E	3.90	74LS93	0.34		
ZN427E	6.28	74LS95	0.44		
ZN428E	4.78	74LS109	0.25		
ZN429E	2.10	74LS112	0.25		
ZN432	28.98	74LS113	0.25		
ZN433	22.59	74LS114	0.25		
ZN440	56.63	74LS122	0.39		
ZN450E	7.61	74LS123	0.55		
Data Converter H'book	1.00	74LS124	1.00		
Data Converter Kit	29.95	74LS125	0.28		
		74LS126	0.28		
BUFFERS		74LS132	0.45		
81LS95	0.90	74LS136	0.28		
81LS96	0.90	74LS138	0.34		
81LS97	0.90	74LS139	0.37		
81LS98	0.90	74LS145	0.75		
8726A	1.50	74LS148	0.90		
8728A	1.50	74LS151	0.34		
8735N	1.50	74LS153	0.35		
8797N	1.50	74LS155	0.39		
8798	1.50	74LS156	0.38		
		74LS157	0.34		
		74LS158	0.36		
		74LS160	0.39		
		74LS161	0.39		
		74LS162	0.39		
		74LS163	0.39		
		74LS164	0.47		
		74LS165	0.99		
		74LS166	0.94		
		74LS173	0.70		
		74LS174	0.54		
		74LS175	0.54		
		74LS181	1.30		
		74LS190	0.55		
		74LS191	0.55		
		74LS192	0.69		
		74LS193	0.59		
		74LS194	0.39		
		74LS195	0.39		
		74LS196	0.58		
		74LS197	0.65		
		74LS221	0.60		
		74LS240	0.89		
		74LS241	0.89		
		74LS242	0.79		
		74LS243	0.79		
		74LS244	0.79		
		74LS245	0.89		
		74LS247	1.34		
		74LS248	1.00		
		74LS249	0.68		
		74LS251	0.39		
		74LS253	0.39		
				E. & O.E.	

OFFICIAL ORDERS WELCOME — QUANTITY DISCOUNTS AVAILABLE*

MIDWICH COMPUTER COMPANY LIMITED.

Dept. CVG/1, Hewitt House,
Northgate Street, Bury St. Edmunds,
Suffolk IP33 1HQ.
Tel: (0284) 701321

All prices exclude Post and Packing
(50p on orders under £10) and VAT. All
orders despatched on day of receipt
with full refund for out of stock items
if requested.

CREDIT CARD ORDERS WELCOME (ACCESS AND VISA)
24 HOUR TELEPHONE SERVICE

VOLTMACE Ltd.

DATABASE

GAMES
COMPUTER
B.E.A.B. MODEL
AVAILABLE



MORE THAN

300 GAME

VARIATIONS INCLUDING:

SPACE * WARFARE * SPORTS

EDUCATIONAL * BRAIN TEASERS

MADE IN ENGLAND BY

VOLTMACE LTD

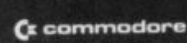
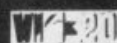
PARK DRIVE, BALDOCK, HERTS.

Circle No. 112

TWICKENHAM

COMPUTER CENTRE LTD

With the best microcomputers available



GAMES FOR APPLE

Missile Defence

High Res Soccer

Alien Typhoon Etc.

NEW! ADULTS ONLY.
SOFT PORN ADVENTURE

NEW Prestel with **Tanetel** £170.00 + VAT.

01 - 892 7896
01 - 891 1612

TWICKENHAM
COMPUTER
CENTRE LIMITED



72, Heath Road Twickenham Middlesex TW1 4BW

Circle No. 111

Circle No. 113

MAPLIN for ATARI

AUTHORISED DEALER



The World-beating ATARI PERSONAL COMPUTERS

3 consoles available

Atari 400 with 16K RAM (AF36P) £345

Atari 400 with 32K RAM (AF37S) £395

Atari 800 with 16K RAM (AF02C) £645
(expandable to 48K)

All consoles when connected to a standard UK colour (or black and white) TV set can generate the most amazing graphics you've ever seen.

Look at what you get:

- * Background colour, plotting colour, text colour and border colour settable to any one of 16 colours with 8 levels of illuminance!
- * Video display has upper and lower case characters with true descenders, double and quad size text and inverse video.
- * 57-Key keyboard (touch type on Atari 400) and four function keys.
- * Full screen editing and four-way cursor control.
- * 29 keystroke graphics and plottable points up to 320 x 192 (160 x 96 only with 8K RAM).
- * 40 character by 24 line display.
- * Extended graphics control and high speed action using a DMA chip with its own character set.
- * Player missile graphics.
- * Four programmable sound generators can be played individually or together and each has 1785 possible sounds playable at any one of eight volume settings, for game sounds or music.
- * Full software control of pitch, timbre and duration of notes in 4-octave range.
- * Four joystick or paddle ports, sounds output to TV.
- * BASIC cartridge and 10K ROM operating system and full documentation.

MORE HARDWARE

Atari 410 Cassette Recorder (AF28F)	£50
Atari 810 Disk Drive (AF06G)	£345
Atari 822 40-column Thermal Printer (AF04E)	£265
Atari 850 Interface (AF29G)	£135
Joystick Controllers (AC37S)	£13.95
Paddle Controllers (AC29G)	£13.95
16K RAM Memory Module (AF08J)	£65

MUCH MORE FOR ATARI COMING SOON

SOFTWARE

Lots and lots of amazing software for Atari available NOW

- ★ Word Processor ★ VISI-CALC
- ★ ADVENTURE GAMES ★ Arcade Games
- ★ Trek Games ★ ASSEMBLER & DISASSEMBLER ★ FORTH ★ Teaching
- ★ 3D GRAPHICS ★ Character Set Generator

SEND S.A.E. NOW FOR OUR LEAFLET (XH52G)

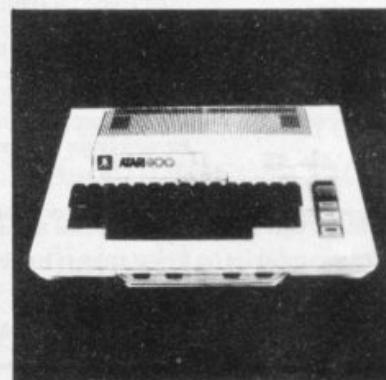
LE STICK

For Atari Computer or Video Game
Replaces standard joystick, but much easier to use. Internal motion detectors sense hand movements. Large pushbutton on top of Stick. Squeeze Stick to freeze motion. A MUST for SPACE INVADERS, STAR RAIDERS & ASTEROIDS.
ONLY £24.95 (AC45Y)

Note: Order codes shown in brackets. Prices firm until 14th November, 1981 and include VAT and Postage and Packing. (Errors excluded).



Atari 400 Console



Atari 800 Console

SPECIAL PACKAGE OFFER

Disk-based system for £725 with Le-Stick
The Atari 400 Console
Special 32K RAM Module
Atari 810 Disk Drive
Disk Operating System
Documentation
Interconnecting Leads
Everything in "Look at what you get" list.
Can any other computer on the market offer all this at anything like this price?

VERSAWRITER

12½ x 8in. drawing board. Drawing on board is reproduced on TV via Atari with 32K RAM and Disk Drive. Closed areas may be filled in with one of 3 colours. Text may be added in any one of 4 fonts. Paint brush mode: select size of brush and paint away. Air brush mode: shade in your drawing - colour and density is up to you. Plus many more features. S.a.e. for price and further details.

MAPLIN

Maplin Electronic Supplies Ltd
P.O. Box 3, Rayleigh, Essex.
Tel: Southend (0702) 552911/554155

Demonstrations at our shops NOW
See Atari at 284 London Road, Westcliff-on-Sea, Essex.
Tel: (0702) 554000 and at 159-161 King St., Hammersmith W6.
Tel: 01-748 0926

NOW AVAILABLE TO NON-MEMBERS TANGERINE USERS GROUP SOFTWARE LIBRARY

ASTEROIDS:	M/C K/P G. S. C. A superb version of that popular arcade game. FULL graphics, 7K, action packed. HYPER-SPACE CONTROL. FULL LEFT & RIGHT ROTATION. VARIABLE MANOEUVRING SPEEDS. TWO LEVELS OF PLAY. HIGH SCORE INDICATOR. £12.50
SHUTTLE LANDER:	M/C K/B G. C. Imagine yourself in the cockpit of NASA's Space Shuttle and this 7K FULL graphic game will keep you going for hours. This is one of the best 'landing simulators' we've seen. £12.50
DIVE BOMBER:	M/C K/P G. C. Another CLASSIC example of what FULL graphics can offer (7K). Be a jump-jet pilot and blast those laser sites if you can. Refuel in flight. Radar guided anti-laser missiles. High level of difficulty. £12.50
SPACE INVASION:	M/C K/P G. S. C. You don't need to be told about this one. FULL graphics and sound (sound & control kit available from Tangerine Computers Ltd.) This 2K program is a must in any library. £5.00
SPACE FIGHTER:	M/C & B. G. C. This game is in FULL graphics and requires a simple JOYSTICK or PUSHBUTTON CONTROL. Just get your sights on the marauding alien and blast him. (Connection diagram supplied) 6K. £6.00
SCRABBLE:	B. K/B. C. You're going to need a dictionary with this one. Some of the oldest games are well proven for family entertainment. Two opposing teams battle it out while Eric keeps watch. TUG-ON-OFF-ON. £9.00
DEMOLITION:	M/C K/P G. Our version of Breakout. For single boards or expanded systems. Ideal family game. Listing £4.00 Cassette £6.00
NIM:	M/C K/P K/B G. Our version of the famous matchstick game. Cassette £4.00
TANTYPE:	B. K/B. C. A comprehensive tutor using the computer as teacher. Eight routines including data storage of exercises. £10.00
HOME FINANCE:	M/C K/B C. This is a comprehensive home accounts package incorporating user defined facilities for files. An Auto-Budgeting facility. Automatic processing of standing orders. Cheque numbering control. Built-in protection against errors. Security protected data. This program calculates and files the monthly balances for ELEVEN accounts, ten of which are user defined. This package comes complete with a comprehensive manual and sample program. Built in modular form for later additions. £17.00
Pack 1:	M/C K/P. This pack is an ideal little pack for the single board fans. Non-graphic. Two games. Moto-cross and Re-Action Hangman (with user defined library of words). Listing £5.00. Cassette £5.50
Pack 2:	M/C K/P. MAZE & DRAW. For single board users. Watch the stupid Tanbug find his way out of a user defined maze. Listing £4.00. Cassette £6.00
Pack 3:	M/C K/B. C. Two utility programs for the expanded systems. TANScribe is a simple text editor. BASIC TRACE monitors the operation of Basic progs., slowing them down and printing the line numbers. £5.00
Pack 4:	M/C K/B. C. Non-graphic these two. Chase the Aliens round the screen. A very simple and good fun program. Add to that Two's Complement, which is a real brain teaser logic puzzle. 1K. £6.00

B = BASIC. M/C = MACHINE CODE. K/P = KEYPAD. K/B = KEYBOARD. G = GRAPHICS. S = SOUND. C = CASSETTE. L = LISTING.
For more details of these programs, give us a 'TUG-RING' sometime. We pay top Brass, for top Class, programs.

Eprom Programmer: Designed for the Microtan System, this kit contains powerful software for Automatic Programming. Kit £21.00. Send S.A.E. for details.

Now available: TUG's own contribution to the Microtan System — High Definition Graphics Board (256 x 256). Programmable Graphic Module £26.00 + VAT. Reverse Asci Character Set in Eprom for P.G.M. £18.000 incl.

Prices quoted are for Non-Members; Members must deduct 25%. Send S.A.E. for Membership details. Or give us a 'TUG-HARD-RING'.

TANGERINE USERS GROUP LTD.


16, Iddesleigh Road, Charminster, Bournemouth, Dorset. BH3 7JR. (0202) 294393

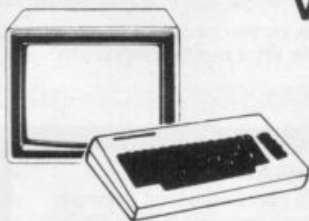


Circle No. 115

THE COMPUTER SHACK

COME TO THE COTSWOLD'S OWN COMPUTER CENTRE FOR VIC 20 AND ACORN ATOM

 **COMMODORE
VIC**

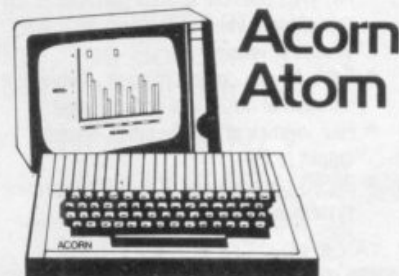


Both these popular and highly successful computers now in stock at our superb new shop in the heart of the Cotswolds.

**COME AND TRY—
BEFORE YOU BUY**

Our staff will be pleased to demonstrate these and many other computers for you.

- * 100 BOOK TITLES IN STOCK
- * AGENTS FOR: COMMODORE, ACORN, SHARP AND VIDEO GENIE
- * STOCKIST: EPSON, CUMANA, SEIKOSHA, TANDY*
- * 6 MONTHS INTEREST FREE CREDIT ON PURCHASES OVER £100.



THE COMPUTER SHACK

14 Pittville Street, Cheltenham, Glos. (0242) 584343.

"MicroComputer Printout is the most imaginative journal in the industry" –

Chuck Peddle, Inventor of the PET

MicroComputer Printout has always been No. 1 with PET users. Now there is special coverage of Apple, Sinclair, and other popular systems, all written in straightforward English. It is quite unlike any computer magazine you've read before. Which is why we are regularly quoted in the national press. Three recent examples: our report on how a micro-computer could have aided the Ripper investigation; then there was the time we used the VisiCalc program to predict the whereabouts of Lord

Lucan (Mozambique as it emerged); and most recently, our investigation into how much the Government com-

puters know about you, the citizen (rather too much as it turned out).

During the past year, *Micro-Computer Printout* has published major state-of-the-art reports on such key topics as communications printers, multi-user systems, CP/M and computer books,

plus dozens of programming articles, news analysis and the best gossip column in the business. Can you afford not to subscribe?



To: MicroComputer Printout, Magsub Ltd., Stuart House, Perrymount Road, Haywards Heath RHG16 3DH

Please enter my subscription for 12 issues starting with..... issue

[] UK £11.40 [] Eire £15.60 [] Europe £17.40 [] USA Airspeed \$29 [] Rest of World £16.50

I enclose cheque []

Please send me a sample issue for £1 []

Barclaycard/Visa/Access/Eurocard orders accepted by telephone on 0635-201131

Name:

Address:

Postcode:

CVG1181

THE Video Genie EG3000 Series

WITH *16K user RAM plus extended 12K Microsoft BASIC in ROM *Fully TRS-80 Level II software compatible *Huge range of software already available *Self contained, PSU, UHF modulator, and cassette *Simply plugs into video monitor or UHF TV *Full expansion to disks, and printer *Absolutely complete - just fit into mains plug.



16K **£199** + VAT

GP80 The most compact 80 column impact graphic-dot printer available - at a very compact price

by seikosha

Graphics, Normal and Double-Width Characters can be printed on the same line. Pine Feed Tractor is equipped as standard.

Two Line-Feed Commands (1/6 and 1/9 inch)

Print on Plain Paper with two copies

Continuous Self-Inking Ribbon for easy handling

Centronics type Parallel Interface standard

Wide Range of Optional Interface Boards

Self-Test Programme standard



£225 + VAT

SUPERBRAIN

SuperBrain's CP/M operating system boasts an overwhelming amount of available software in BASIC, FORTRAN, COBOL, and APL. Whatever your application... General Ledger, Accounts Receivable, Payroll, Inventory or Word Processing, SuperBrain is tops in its class.

320K £1850 700K £2400
1.5Mb £2750

COMMODORE COMPUTERS

PET 8K	£415
PET 16K	£525
PET 32K	£650
PET 8032	£895

DISK DRIVES

4040	£695
------	------

PRINTERS

EPSON TX80B (inc. I/F & cable)	£299
EPSON MX80T	£395
ANADEx DP8000	£495
ANADEx DP9500	£895
ANADEx DP9501	£995

VIDEO MONITORS

10" BLACK & WHITE	£85
10" GREEN SCREEN	£95

Aculab

Floppy Tape

The tape that behaves like a disk.

Connects directly to TRS-80 level 2 keyboard. Operating and file handling software in ROM 8 commands add 12 powerful functions to level 2 BASIC. No buttons, switches or volume controls. Full control of all functions from keyboard or program. Maintains directory with up to 32 files on each tape.

for all TRS 80 & Video Genie owners

TRS80 version:	£165
Video Genie:	£170

Please add £10 Securicor delivery charge to all computers etc.
Plus 15% VAT on all prices.



Acorn Atom

Unique in concept — the home computer that grows as you do!

Special features include

- *FULL SIZED KEYBOARD
- *ASSEMBLER AND BASIC
- *TOP QUALITY MOULDED CASE
- *HIGH RESOLUTION COLOUR GRAPHICS

Simple to build, simple to operate. A powerful, full facility computer with all the features you would expect.

Just connect the assembled computer to any domestic TV and power source and you are ready to begin.

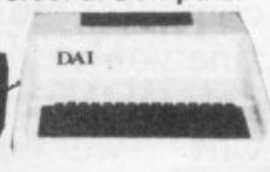
Full-sized QWERTY keyboard
6502 Microprocessor Rugged injection-moulded case 2K RAM
8K HYPER-ROM 23 integrated circuits and sockets Audio

cassette interface UHF TV output Full assembly instructions

£120 + VAT



The Second Generation Personal Computer



Highest performance - lowest price

- *48K (8080A)
- *16 Colours or shades of Grey
- *Multiple High Resolution Graphics Modes (64 x 71, 129 x 159, 255 x 335)
- *Character mode (60 x 24)
- *Split Screen Modes

- *Full ASCII Upper & Lower Character Set
- *Unique graphical — Sound Commands for Smooth Music, random frequencies & enveloped sound!
- *RS232 I/F

DAI Personal Computer

at only **£595** + VAT

Paper Tiger 460

The Paper Tiger 460 sets new standards by incorporating many features previously only available on units costing much more.

Features like a specially developed nine wire 'staggered column' head which overlaps the dots of each matrix character with just one pass of the printhead giving a dense, high quality print image without reducing the units 160 c.p.s. print speed.

It also offers a bi-directional logic seeking device to enhance its print optimisation characteristics and wide range of 'print versatility' features such as mono or proportional spacing, automatic justification, programmable horizontal and vertical tabbing, and 'fine' positioning for word processing applications.

Paper Tiger 560

£695 + VAT

The Paper Tiger 560 is the first printer which bridges the gap between conventional matrix and 'daisy wheel' types offering quality printing at a relatively low price.

Full 'width' 132 column printing at 160 c.p.s., a unique nine wire 'staggered' print head, bi-directional printing, an inbuilt tractor feed and a host of selectable features set it apart from ordinary matrix printers.

Plus for even greater versatility a full dot plot graphics facility if supplied which includes a 2K buffer.

£895 + VAT

Books & bits

Books — Manuals —

Diskettes — ribbons — Paper

— chips (2114 x 2 1K) £4 pair.

RS232 to Centronics interfaces £40 etc. etc.

A variety of second-hand computer equipment usually available, spares, repairs and service.

MicroStyle

29 Belvedere, Lansdown Road, Bath, BA1 1SP
Telephone: (0225) 334659. After Hours: (0761) 33283

New Showroom
NOW OPEN
29 BELVEDERE, BATH.
2 minutes from town centre

MAILBAG

TAPING THAT SINCLAIR PROBLEM

Dear Sir,

Sinclair claims that the ZX81 will accept a tape input from any cassette recorder with either a 4 ohm or 8 ohm output. This may be true but for some reason I have found it impossible to reload my own programs once they have been recorded. Why is this?

Puzzled,
London N7.

Our resident expert replies:

Most portable tape machines these days have two sets of inputs and outputs. One set will be a 5-pin DIN standard socket. This may be used to record from the ZX81 but cannot be used to reload. The other set will be a pair of 3.5 millimetre jack sockets. One will be for the microphone and marked "MIC" and the other will, hopefully, be the 4 ohm or 8 ohm output. This should be used to load programs.

To begin with I had trouble loading programs into the computer once I had recorded them. For some reason I was using the same side of the jack-to-jack plug lead supplied for reloading. Only when I swapped them over to the other lead did I realise that one side was an open circuit, so check both before throwing your

THIS is a page of opportunity. Well sited in the magazine with plenty of room for expansion and soon to have lots of exciting places for screen-tired eyes to visit.

With a little building up the views should be good as well.

If you have a homeless letter bubbling up inside you or even a whole family of correspondence looking for a nice area to settle. Why not send them along to us at Mailbag and we'll do our best to find a good home for them.

Problems, comments, ideas and even criticism can find a place here. If you are interested please drop a line to: the editor, Computer & Video Games, EMAP, Durrant House, 8 Herbal Hill, London EC1R 5JD.

Well you didn't have much chance to write to us before this first issue so we put together some letters of our own, by asking the North London Computer Club for two of the problems they have been faced with and then providing answers to them. It was all a bit too easy so we hope you'll test us some more in the future.

cassette machine out of the window!

Sinclair suggest that if you cannot get the program to enter you should vary the volume level until the ZX81 accepts the signal. Once you have pressed LOAD and RETURN the computer will wait forever or until it gets a

signal it recognises so you do not have to hurry if you have a long enough program on the tape.

If you are able to load a program but find it corrupted try turning the volume level down as this may be distorting the signal. Also check the state of the batteries, if you are using them, or, preferably, use a mains adaptor if you can.

INFURIATING KIT CLANGER

Dear Sir,

One of the most infuriating mistakes I have seen with kit building is incorrect component insertion.

Not only are components in the wrong places but they are also put in the wrong way round. While excuses can be made for components with unrecognisable markings e.g. capacitors, diodes or transistors, they cannot be made for chips especially when boards are marked with the layout.

Angry,
North London.

Our kit correspondent replies:

I too have found a problem with chip identification recently which has made me look again at the subject. Most good kits or self-assembly boards are supplied with a good diagram indicating the correct position of each chip. Some, however, do not and just specify the end or corner with the "dot" that corresponds to pin 1. This, in some cases, is not enough.

Most chips are configured as shown below. This shows a cutout, A, a recessed hole, B, and the "dot", C. Pin 1 is clearly indicated by the "dot", C. In figure 2, however, C is omitted and the recessed hole, B, could be mistaken for the "dot".

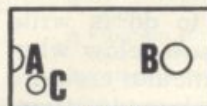


FIG. 1

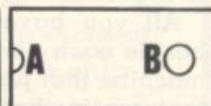


FIG. 2

The safest method I have found is to combine A and C to indicate the top of the chip and depend on either if the other is missing. Pin 1 is then always to the left if the chip is pin down on the table and the cutout, A, and/or the "dot", C, are away from you.



COMPETITION

WIN A TAITO SPACE INVADERS OF YOUR OWN

Imagine having a Taito space invaders machine of your very own. It could be the centrepiece of your living room or plugged into your bedroom.

That is the marvellous prize which Taito has kindly put up for the winners of the Know your Creatures Competition.

The arcade game industry recognises space invaders as a one-off success and it is convinced there will never be another game like it. The way it caught people's imaginations make it a classic of its kind. A success that no amount of new machines will ever repeat. If you win this prize you will have more than just an



LOOKING FOR A GOOD HOME!

enthraling game in your living room but a slice of the world's leisure history.

Do you remember that first game of space invaders? It was probably back in 1979 when Britain first went space invaders crazy. I can recall struggling with the tactics of this bizarre game in a South London pub.

Without any idea of whether it

was worth shooting the flying saucers that soared across the top of the screen or whether I should go for the space invaders on the edge, or that bottom row. I was wiped out long before the first wall even looked like being cleared.

Feeling certain I could improve on my meagre score I was already reaching for that next 10p before I noticed that a good number of coins had already accumulated on top of the machine and that half the pub was lined up behind me waiting to have a go.

It is a measure of just how addictive space invaders is that I scoured the pubs for another machine for weeks.

My dream then was to have a space invaders machine of my very own, so that I didn't have to wait for a free machine in pubs or keep travelling up to the bar for my change.

Now for one lucky reader, Taito — the name behind the original space invaders craze — will make that dream come true.

With such an opportunity, you could soon be rivalling the top scores of the video game world champions.

For details of the Know Your Creature Competition, see below.

HAVE YOU KILLED ONE OF THESE?

Do you know a space invader from a galaxian? Or can you tell an Asteroid spacecraft from a Phoenix one?

If so then you could find yourself owning a Taito space invaders machine. Anyone who knows his pub and arcade game machine characters will be in with a chance of showing off a space invaders table to visiting friends.

If you can put a name to the three creatures shown below then you will be well on your way to having that prize in your living room.

All you have to do is write beside each picture below what machine that particular creature features in. For example if you

think the first creature comes from a Puckman or Mazeman machine, then write either word beside him — we will know what you mean.

Then answer the question below in not more than 25 words and cut out this section of the magazine but do not post it yet.

Hang on to it! For in our December and January issues there will be another three graphics characters and then another three. When you think you have all nine then send the three sections back to us.

This gives you time to hunt around your local arcade if there is a creature you are not sure of and make certain of the right answer. The first correct answer picked out of the hat will have that space invaders table.

KNOW YOUR CREATURES/1



A



B



C

Name _____

Address _____

Telephone: _____

I THINK SPACE INVADERS PROVED SO POPULAR BECAUSE:

For details of Computer & Video Games competition rules see page 20.

THE LATEST, AND INDEED THE GREATEST OF THE KANSAS ARCADE SERIES ARCADE SCRAMBLE

FOR
TANDY
TRS 80,
VIDEO
GENIE

Don't waste your time playing the simple starts to the Big Five games — get straight into the heavy action with this brand-new multi-action, home grown 'Arcade' game.

Yes, it's the famous one of the Arcades, and the first time it's ever been achieved on a computer.

Not that easy though, for without warning suddenly there's a squadron of enemy fighters heading straight at you hell bent on your destruction. Then comes the ack-ack flung at you from the ground batteries to add to your difficulties, and there's the cluster of blimps to make things even more difficult.

But the real nasties are the rockets, which the enemy blast at you, without warning, from the ground installations.

Even if you manage to out-shoot, out-fight, out-maneuvre that little lot, you still have the mountains to negotiate which is a problem with the fighters streaming through the only available space.

But with this really unbelievable game, you have no less than six different controls at your fingertips, being able to move your bomber forward, backward, up and down, whilst at the same time both firing your guns at the enemy and bombing the installations.

And not only do you have infinite control over the bomber, but the ground and enemy installations continuously unfold below, with valleys and mountains actually moving across the screen, giving an hitherto undreamed of realism.

The installations include rocket launch pads, ack-ack batteries, forts, munition dumps and fuel dumps. You do your damndest to destroy these as they unfold below, so building up your score.

The famed Mike Chalk who created Arcade Invaders and U-Boat Strike, has teamed up with Chris Smyth to create this fantastic machine language Arcade game.

There is so much happening it really is unbelievable with sound adding to the realism of this ultra-fast moving game.

£9.50

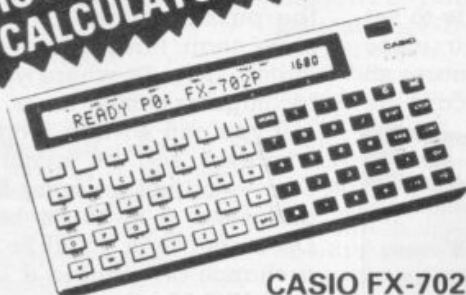
Programs are for the Tandy TRS 80 and Video Genie. All prices are VAT paid and postage free. Same day return first class post service. All software fully guaranteed and in stock as we are the actual publishers, not the retailers. Free catalogue upon request.

Kansas

0246 850357. KANSAS CITY SYSTEMS, UNIT 3, SUTTON SPRING WOOD, CHESTERFIELD S44 5XF.

Circle No. 118

**PROGRAMMABLE
CALCULATORS**



CASIO FX-702P

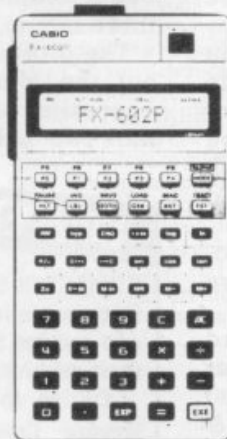
(R.R.P. £134.95)

ONLY £119.95

Available September

LCD scrolling display of alpha/numeric (dot matrix) characters. Input can be varied from 1680 program steps with 26 independent memories to 80 program steps with 226 memories. (All retained when switched off). Up to 10 programs can be stored (P0 to P9). Subroutine: Nested up to 10 levels. FOR-NEXT looping: Nested up to 8 levels. Straightforward program debugging by tracing. Editing by moving cursor. 55 built-in scientific and statistical functions, can be incorporated in programs. Program/data storage on cassette tape via optional FA-2 (available soon). Optional FP-10 mini printer and plug-in ROM modules available soon. Two lithium batteries give approx. 200 hours continuous operation, with battery saving Auto Power Off after approx. 6 minutes non-use. Dimensions: 17 x 165 x 82mm (5/8 x 6 1/2 x 3 1/4"). Weight: 180g (6.3oz).

Powerful high-speed FX702P computer using BASIC language



CASIO FX602P

(R.R.P. £84.95)

ONLY £74.95

- ★ 2 lithium batteries. Approx. 660 hours continuous use.
- ★ Battery saving Auto Power Off.
- ★ Only 9.6 x 71 x 141.2mm. 100g.

- ★ LCD alpha/numeric (dot matrix) scrolling display (86 types)
- ★ Variable input capacity from 32 functional program steps with 88 independent memories, to 512 steps with 22 memories.
- ★ Memory and program retention when switched off.
- ★ Up to 10 pairs unconditional jumps (G010). Manual jump.
- ★ Conditional jumps and count jumps. Indirect addressing.
- ★ Up to 9 subroutines. Nesting possible up to 9 levels.
- ★ 50 built-in scientific functions, all usable in programs.
- ★ PAM (perfect Algebraic Method) with 33 brackets at 11 levels
- ★ Ultra high-speed calculations.
- ★ Program storage on cassette tape using optional FA-1.
- ★ Compatible with FX-501/2P.

Prices include V.A.T. and P. & P. Send your company order, cheque, p.o. or phone your ACCESS or BARCLAYCARD number.

DELIVERY NORMALLY BY RETURN POST

LEADING CASIO DISTRIBUTORS

DEPT. CVG

164/167 EAST ROAD, CAMBRIDGE, CB1 1DB

TEL: 0223-312866

TEMPUS

Circle No. 119

COMPETITION

TAKE ON THE ARCADE WORLD

If you are blasting more galaxians per 10p than anyone else down your local... isn't it about time you displayed this talent to the world?

Whatever your favourite machine, send us in your best score and you could find yourself hailed as the Best Arcade Game Player in the World.

In conjunction with Taito Electronics we are trying to find the best galaxian-blaster, puckman muncher, asteroid annihilator or invader halter going — and give him the acclaim he is due.

The competition is very easy to enter, simply turn to the reader reply card between pages 82 and 83 and fill it in. You will find a section of questions on arcade games which will give us a better idea of what you want from arcade games and we, in turn, can help manufacturers we come in contact with, to provide those sort of games.

Next fill in the machine you wish to enter on and take the card down to your local pub or arcade. Put the best score you can on the machine, ask the pub or arcade owner to sign it and send it off to us.

Should you find yourself producing a disappointing score simply try again.

If, after you have sent the card off, you turn in an even better score, don't kick yourself but just buy the next issue of *Computer & Video Games* and there will be another entry form in there.

The highest scores on the 10 most popular machines will appear in our Arcade Action section to give the rest of the arcade world something to aim at.

And the three top scorers on the three most popular machines we hear from by 1 January will be invited to take part in our Grand Arcade Game Final. So don't hide that expensively-obtained talent under a bushel — tell the world about it.



Can you solve the tantalizing puzzle attached to our front cover?

There is a solution (you may begin to doubt this after the first three hours), but only one.

The aim of the puzzle is to set out the four cards in a close approximation of a square so that two sides of each card lie

against one side of two others. See the photograph above.

And the four places where these cards meet must all match up. That sounds easy enough until you actually start work on the puzzle and find that never more than three sides seem to match. This is where your microcomputer comes in.

If you can write a program on whatever sort of machine you own — or just ordinary Basic — and send it in to us before 13 December then you'll be in with a chance of winning a Commodore VIC-20 colour computer.

We have three to give away to the best programs that come in before that date.

We have a program to solve the puzzle which will be printed in our January issue. But for the very frustrated we will be showing a solved puzzle next month.

A panel of three judges will sift through the programs you send in and if yours is one of the best then a VIC-20 computer will be on its way to you.

Warning: Trying to do this puzzle without a computer using the old fashioned trial and error method could result in hours of frustration.

COMPETITION RULES

COMPUTER & VIDEO GAMES' many free competitions are open to anyone except EMAP employees and their relatives.

Entries to our Mind Routines, Nevera Crossword, Know Your Creature, Free Puzzle Program, Game of the Year and Arcade Player of the World competitions, should be sent to: **COMPUTER & VIDEO GAMES**, Durrant House, 8 Herbal Hill, London EC1R 5JB. Judges' decisions are final and no correspondence can be entered into.

Send entries to Mind Routines on a postcard and in all cases please include a name, address and, where possible, a phone number — so we can let you know should you have won.

Make the most of your Sinclair ZX Computer...

Sinclair ZX software on cassette.

£3.⁹⁵ per cassette.

The unprecedented popularity of the ZX Series of Sinclair Personal Computers has generated a large volume of programs written by users.

Sinclair has undertaken to publish the most elegant of these on pre-recorded cassettes. Each program is carefully vetted for interest and quality, and then grouped with other programs to form a single-subject cassette.

Each cassette costs £3.95 (including VAT and p&p) and comes complete with full instructions.

Although primarily designed for the Sinclair ZX81, many of the cassettes are suitable for running on a Sinclair ZX80—if fitted with a replacement 8K BASIC ROM.

Some of the more elaborate programs can be run only on a Sinclair ZX Personal Computer augmented by a 16K-byte add-on RAM pack.

This RAM pack and the replacement ROM are described below. And the description of each cassette makes it clear what hardware is required.

8K BASIC ROM

The 8K BASIC ROM used in the ZX81 is available to ZX80 owners as a drop-in replacement chip. With the exception of animated graphics, all the advanced features of the ZX81 are now available on a ZX80—including the ability to run much of the Sinclair ZX Software.

The ROM chip comes with a new keyboard template, which can be overlaid on the existing keyboard in minutes, and a new operating manual.

16K-BYTE RAM pack

The 16K-byte RAM pack provides 16-times more memory in one complete module. Compatible with the ZX81 and the ZX80, it can be used for program storage or as a database.

The RAM pack simply plugs into the existing expansion port on the rear of a Sinclair ZX Personal Computer.



Cassette 1—Games

For ZX81 (and ZX80 with 8K BASIC ROM)

ORBIT—your space craft's mission is to pick up a very valuable cargo that's in orbit around a star.

SNIPER—you're surrounded by 40 of the enemy. How quickly can you spot and shoot them when they appear?

METEORS—your starship is cruising through space when you meet a meteor storm. How long can you dodge the deadly danger?

LIFE—J. H. Conway's 'Game of Life' has achieved tremendous popularity in the computing world. Study the life, death and evolution patterns of cells.

WOLFPACK—your naval destroyer is on a submarine hunt. The depth charges are armed, but must be fired with precision.

GOLF—what's your handicap? It's a tricky course but you control the strength of your shots.

Cassette 2—Junior

Education: 7-11-year-olds

For ZX81 with 16K RAM pack

CRASH—simple addition—with the added attraction of a car crash if you get it wrong.

MULTIPLY—long multiplication with five levels of difficulty. If the answer's wrong—the solution is explained.

TRAIN—multiplication tests against the computer. The winner's train reaches the station first.

FRACTIONS—fractions explained at three levels of difficulty. A ten-question test completes the program.

ADDSUB—addition and subtraction with three levels of difficulty. Again, wrong answers are followed by an explanation.

DIVISION—with five levels of difficulty. Mistakes are explained graphically, and a running score is displayed.

SPELLING—up to 500 words over five levels of difficulty. You can even change the words yourself.

Cassette 3—Business and Household

For ZX81 (and ZX80 with 8K BASIC ROM) with 16K RAM pack

TELEPHONE—set up your own computerised telephone directory and address book. Changes, additions and deletions of up to 50 entries are easy.

NOTE PAD—a powerful, easy-to-run system for storing and

retrieving everyday information. Use it as a diary, a catalogue, a reminder system, or a directory.

BANK ACCOUNT—a sophisticated financial recording system with comprehensive documentation. Use it at home to keep track of 'where the money goes,' and at work for expenses, departmental budgets, etc.

Cassette 4—Games

For ZX81 (and ZX80 with 8K BASIC ROM) and 16K RAM pack

LUNAR LANDING—bring the lunar module down from orbit to a soft landing. You control attitude and orbital direction—but watch the fuel gauge! The screen displays your flight status—digitally and graphically.

TWENTYONE—a dice version of Blackjack.

COMBAT—you're on a suicide space mission. You have only 12 missiles but the aliens have unlimited strength. Can you take 12 of them with you?

SUBSTRIKE—on patrol, your frigate detects a pack of 10 enemy subs. Can you depth-charge them before they torpedoed you?

CODEBREAKER—the computer thinks of a 4-digit number which you have to guess in up to 10 tries. The logical approach is best!

MAYDAY—in answer to a distress call, you've narrowed down the search area to 343 cubic kilometers of deep space. Can you find the astronaut before his life-support system fails in 10 hours time?

Cassette 5—Junior

Education: 9-11-year-olds

For ZX81 (and ZX80 with 8K BASIC ROM)

MATHS—tests arithmetic with three levels of difficulty, and gives your score out of 10.

BALANCE—tests understanding of levers/fulcrum theory with a series of graphic examples.

VOLUMES—'yes' or 'no' answers from the computer to a series of cube volume calculations.

AVERAGES—what's the average height of your class? The average shoe size of your family? The average pocket money of your friends? The computer plots a bar chart, and distinguishes MEAN from MEDIAN.

BASES—convert from decimal (base 10) to other bases of your choice in the range 2 to 9.

TEMP—Volumes, temperatures—and their combinations.

How to order

Simply use the order form below, and either enclose a cheque or give us the number of your Access, Barclaycard or Trustcard account. Please allow 28 days for delivery. 14-day money-back option.

sinclair **ZX SOFTWARE**

Sinclair Research Ltd,
6 Kings Parade, Cambridge,
Cambs., CB2 1SN. Tel: 0276 66104.

To: Sinclair Research, FREEPOST 7, Cambridge, CB2 1YY

Please print

Please send me the items I have indicated below.

Qty	Code	Item	Item price	Total
	21	Cassette 1—Games	£3.95	
	22	Cassette 2—Junior Education	£3.95	
	23	Cassette 3—Business and Household	£3.95	
	24	Cassette 4—Games	£3.95	
	25	Cassette 5—Junior Education	£3.95	
	17	*8K BASIC ROM for ZX80	£19.95	
	18	*16K RAM pack for ZX81 and ZX80	£49.95	
		*Post and packing (if applicable)	£2.95	
		Total £		

*Please add £2.95 to total order value **only** if ordering ROM and/or RAM.

I enclose a cheque/PO to Sinclair Research Ltd for £

Please charge my Access*/Barclaycard/Trustcard no.

*Please delete as applicable.

Name: Mr/Mrs/Miss

Address:

Sinclair ZX81 Personal Computer the heart of a system that grows with you.

1980 saw a genuine breakthrough – the Sinclair ZX80, world's first complete personal computer for under £100. Not surprisingly, over 50,000 were sold.

In March 1981, the Sinclair lead increased dramatically. For just £69.95 the Sinclair ZX81 offers even more advanced facilities at an even lower price. Initially, even we were surprised by the demand – over 50,000 in the first 3 months!

Today, the Sinclair ZX81 is the heart of a computer system. You can add 16-times more memory with the ZX RAM pack. The ZX Printer offers an unbeatable combination of performance and price. And the ZX Software library is growing every day.

Lower price: higher capability

With the ZX81, it's still very simple to teach yourself computing, but the ZX81 packs even greater working capability than the ZX80.

It uses the same micro-processor, but incorporates a new, more powerful 8K BASIC ROM – the 'trained intelligence' of the computer. This chip works in decimals, handles logs and trig, allows you to plot graphs, and builds up animated displays.

And the ZX81 incorporates other operation refinements – the facility to load and save named programs on cassette, for example, and to drive the new ZX Printer.



New BASIC manual

Every ZX81 comes with a comprehensive, specially-written manual – a complete course in BASIC programming, from first principles to complex programs.

Kit: £49.⁹⁵

Higher specification, lower price – how's it done?

Quite simply, by design. The ZX80 reduced the chips in a working computer from 40 or so, to 21. The ZX81 reduces the 21 to 4!

The secret lies in a totally new master chip. Designed by Sinclair and custom-built in Britain, this unique chip replaces 18 chips from the ZX80!

New, improved specification

- Z80A micro-processor – new faster version of the famous Z80 chip, widely recognised as the best ever made.
- Unique 'one-touch' key word entry: the ZX81 eliminates a great deal of tiresome typing. Key words (RUN, LIST, PRINT, etc.) have their own single-key entry.
- Unique syntax-check and report codes identify programming errors immediately.
- Full range of mathematical and scientific functions accurate to eight decimal places.
- Graph-drawing and animated-display facilities.
- Multi-dimensional string and numerical arrays.
- Up to 26 FOR/NEXT loops.
- Randomise function – useful for games as well as serious applications.
- Cassette LOAD and SAVE with named programs.
- 1K-byte RAM expandable to 16K bytes with Sinclair RAM pack.
- Able to drive the new Sinclair printer.
- Advanced 4-chip design: micro-processor, ROM, RAM, plus master chip – unique, custom-built chip replacing 18 ZX80 chips.



Built: £69.⁹⁵

Kit or built – it's up to you!

You'll be surprised how easy the ZX81 kit is to build: just four chips to assemble (plus, of course the other discrete components) – a few hours' work with a fine-tipped soldering iron. And you may already have a suitable mains adaptor – 600 mA at 9 V DC nominal unregulated (supplied with built version).

Kit and built versions come complete with all leads to connect to your TV (colour or black and white) and cassette recorder.



puter-



16K-byte RAM pack for massive add-on memory.

Designed as a complete module to fit your Sinclair ZX80 or ZX81, the RAM pack simply plugs into the existing expansion port at the rear of the computer to multiply your data/program storage by 16!

Use it for long and complex programs or as a personal database. Yet it costs as little as half the price of competitive additional memory.

With the RAM pack, you can also run some of the more sophisticated ZX Software – the Business & Household management systems for example.

Available now- the ZX Printer for only £49.⁹⁵

Designed exclusively for use with the ZX81 (and ZX80 with 8K BASIC ROM), the printer offers full alpha-numerics and highly sophisticated graphics.

A special feature is COPY, which prints out exactly what is on the whole TV screen without the need for further instructions.

At last you can have a hard copy of your program listings – particularly useful when writing or editing programs.

And of course you can print out your results for permanent records or sending to a friend.

Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch.

The ZX Printer connects to the rear of your computer – using a stackable connector so you can plug in a RAM pack as well. A roll of paper (65 ft long x 4 in wide) is supplied, along with full instructions.

How to order your ZX81

BY PHONE – Access, Barclaycard or Trustcard holders can call 01-200 0200 for personal attention 24 hours a day, every day.

BY FREEPOST – use the no-stamp-needed coupon below. You can pay

by cheque, postal order, Access, Barclaycard or Trustcard.

EITHER WAY – please allow up to 28 days for delivery. And there's a 14-day money-back option. We want you to be satisfied beyond doubt – and we have no doubt that you will be.

To: Sinclair Research Ltd, FREEPOST 7, Cambridge, CB2 1YY.

Qty	Item	Code	Item price £	Total £
	Sinclair ZX81 Personal Computer kit(s). Price includes ZX81 BASIC manual, excludes mains adaptor.	12	49.95	
	Ready-assembled Sinclair ZX81 Personal Computer(s). Price includes ZX81 BASIC manual and mains adaptor.	11	69.95	
	Mains Adaptor(s) (600 mA at 9 V DC nominal unregulated).	10	8.95	
	16K-BYTE RAM pack.	18	49.95	
	Sinclair ZX Printer.	27	49.95	
	8K BASIC ROM to fit ZX80.	17	19.95	
	Post and Packing.			2.95

☐ Please tick if you require a VAT receipt

TOTAL £

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

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

*Please delete/complete as applicable.

Please print.

Name: Mr/Mrs/Miss

Address:

FREEPOST – no stamp needed.

CVGII

sinclair ZX81

6 Kings Parade, Cambridge, Cambs., CB2 1SN.
Tel: (0276) 66104 & 21282.

GAMES NEWS



BATTLE OF THE PREHISTORIC GIANTS

Beam back to prehistoric times when the land was covered in swamps and terrifying dinosaurs fought bloody battles to the death.

That is the setting for one of the games available for Tandy's latest machine, the TRS-80 Colour computer. Called Dinowars the 3D game is for two players, or one player against the computer.

When you switch on the computer — Tandy promises it will be available this month — a pair of dinosaurs flash up on the screen. One is red, the other blue. Each of the beasts is controlled by a joystick and can be moved backwards, forwards, to the left and right. The picture on the screen runs around so that the monsters can walk off the screen at one edge and reappear on the other side.

With tails swishing the two dinosaurs leap ferociously into action when the button on the joysticks is pressed. Then the fight to the death begins complete with gruesome sound effects.

The players have to manoeuvre their monsters into a good position to kill each other. To do that they have to plant a lethal bite on the back of the neck. If the dinosaur dies from his wounds he literally drops dead in front of your eyes. If a monster dies the player in control of him loses 10 points.

One unusual feature is that the dinosaurs can be killed when they are off the screen. As you can't actually see what they're doing it's more a matter of luck than judgement. It costs £22.95 and is available from your local Tandy store.

TOWERING INFERNO

They say there is no smoke without fire and in Towering Inferno it is truer than ever.

Recently produced for the Sharp MZ-80K by Sharpsoft, the game is definitely not for the squeamish. The object is to find your way out of a multi-storey building which is on its way to being gutted by fire.

The only way out is to go down to the bottom floor — you are stuck on the 10th storey — or to go up to the roof of the building.

There is no time to panic on your escape. As you make your way from one floor entrance across the room to the exit you have to judge the quickest way to avoid the fast-spreading flames. You control a man with the cursor keys and have an aerial view of each floor.

If you are not careful where you tread you might find yourself overcome temporarily by smoke



fumes. When that happens the man under your control disappears from the screen for a second.

If you manage to reach the roof it is not certain that you will survive the ordeal. With luck a helicopter will swoop down, dropping a rope ladder to whisk you away.

If you reach the bottom and emerge safely, an ambulance will drive to the building and take you away to recuperate in hospital. It costs £5.85.

EAT OR BE EATEN

An addictive new Pet game will keep you glued to screens trying to avoid fast-moving monsters.

Avid fans of the Mazeman or Puckman arcade game, who also happen to own a Pet, will be eager to try this rather different version in their homes.

Called Super Gloop, the object is to gobble up as many monsters as you can. A difficult job because they move very quickly and can turn on a heel suddenly while you are in hot pursuit of them and without hesitation will eat you up.

The hectic chase takes place in a maze with points being scored for swallowing up dots along the path and for monsters

which you catch up with and manage to devour.

The Gloopers travel that much faster than you can go and the game has been written in machine code to give it extra speed. It is available from Pet software supplier Supersoft, costing £8.00



PERIL ON THE SEABED

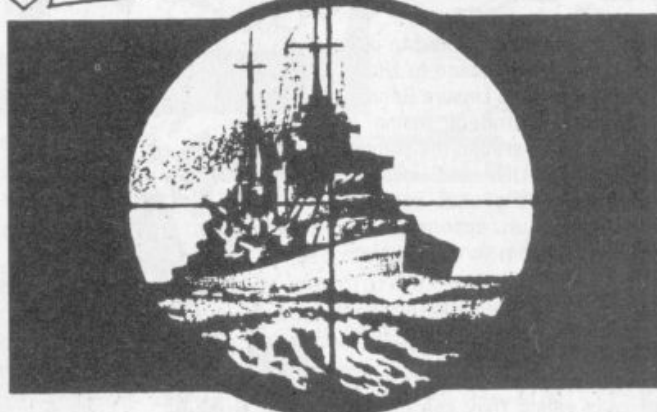
Not for the claustrophobic, Sea Wolf recreates the perils of submarine warfare complete with mines tumbling off the decks of enemy destroyers.

At war with an enemy fleet the commander of the submarine must shoot down ships sailing above him on three different levels. Coloured purple, red and white the ships are worth varying number of points when they are successfully destroyed.

Each ship moves at a different pace, the fastest ones sailing at the top of the screen farthest away from the submarine making it more difficult to get a direct hit. Use a joystick to move the submarine and the button to fire an unlimited supply of torpedoes.

There are two levels of play: for beginners and expert shoot-

SEAWOLF



ers. The submarine commander is firing against the clock which ticks away from 60 seconds down. A minute has never gone so quickly.

But the commander has to keep a wary eye out for destroyer mines released by enemy

shipping. These hover in the sea blocking the path of torpedoes. If a torpedo hits one by mistake it's a wasted shot. Don't worry too much about the mines because they cannot sink down to your level in the sea.

The ships sailing at the lowest

level (coloured white) are the slowest moving and the easiest target. They are only worth five points at skill level one or 10 points at level two.

Next up are smaller ships which travel more quickly. The red ships are worth more points, 15 at level one and 25 at level two.

And ruling the waves at the top of the screen are the smallest and fastest ships in the fleet. They zip along, barely giving the submarine commander time to take aim let alone fire. These purple coloured ships score 50 (level one) and 60 (level two). They are the ones to go for to boost your score. Once the score reaches a magic 800 the time limit is extended giving you scope to shoot down more ships.

The extras needed are a joystick, the game is supplied by Adda Computer's VIC Centre. The cassette with two other games on it costs £14.95.

CHESS ON THE CHEAP

Computerised chess games have now reached Christmas stocking prices with the launch of Acetronic's Electronic Chess.

Retailing at only £24.95, it compares very favourably with other chess games on the market, which can set you back anything up to £500. And it includes a lot of the standard features you would expect.

The console looks like a pocket calculator with a liquid crystal display and keys representing the pieces and numbered squares of the board.

But you will need to provide your own board and pieces.

Only two levels of play but the Electronic Chess owner can choose to play black or white, or — if he wishes — watch an instructive game with the computer playing against itself.

It will tell the player if he made an illegal move and can delete the move he made with a cancel

key. It also allows the player to verify the positions at any stage during the game and program in opening variations using a special key.

Other features include setting up and removing individual pieces and placing a game position from which the computer will continue to play.

This offers a good game to the keen chess youngster who is short of an opponent and will help him improve his standard. It will also fit into most family budgets.

DEATH AMONG THE STARS

An action-packed space game which looks set to be a scorching success is Starmines.

It first reached Apple screens in the States and has just been released in the U.K. Take command of a starship fighter on a mission in the galaxy to defend your own civilisation from the threat of invasion.

You control the starship flying through hyperspace dodging attacking missiles, meteorites, and small spaceships all out to get you. The action is fast and you barely have time to press the fire button to exterminate an alien ship before a shower of rocks falls at the speed of light towards your ship.

To hit the objects you must line them up in your sights and press the fire button.

The game follows in the Star Raiders and Space Battle vein, retails at £14.95.

GO FOR REAL GOLD

One computer game destined to follow the success of Kit Thomas' treasure book "Masquerade" is Goldrush.

"Masquerade" was the book which became a best-seller by offering clues to a £5,000 piece of jewellery in the shape of a hare. Since it first appeared many treasure hunters have dug up various stately homes and searched numerous river beds in the mistaken belief that they have solved the clues and will find the treasure.

Whether Mr Micro's VIC game Goldrush will keep its players guessing for as long, we will have to wait and see — but there is no shortage of interested people waiting to try solving the problem.

The prize for the winner is real gold nuggets provided by Mr



Micro.

The game is an Adventure type based on the 1849 Californian gold-rush. Participants start trekking across to California with a number of clues to be found on the way. Once there, you have to stake a claim and try to find the Golden Word.

First person to get in touch with Mr Micro with the correct word wins the gold.

A review appears on page 88.

Coming soon for the just-released Commodore VIC 20 is a variety of new games including versions of Puckman, the popular arcade game, Galaxians, Cosmic Jailbreak, Space Invaders and Moon Lander. These were scheduled for release in October at the earliest and will be covered in more detail in future issues.

FINGER ON THE BUTTON

Polaris is the Tandy version of the popular arcade game Missile Command.

The player has to protect cities from an onslaught of ballistic missiles, alien space ships and other extra-terrestrial beings. Saving the cities from obliteration is in your hands — you control the ground base where anti-ballistic missiles are launched.

Polaris is designed to run on the TRS-80 models but though the game's concept is exciting without the colour graphics available on arcade games and other microcomputers, it still loses a lot of its attraction. It is also expensive for a computer game at £27.95 so only keen fans of the original are likely to spend that amount of money on it.



GAMES
NEWS

Tread warily to save your skin when you are playing Minefield, one of the latest games available for the Acorn Atom.

In this game introduced by Leeds software supplier Program Power, the only protection is a metal detector to pick out the mines.

The minefield spreads across the screen with the one safe patch being your home square on the far side of the field.

On the same tape, which costs £5.95, are two other Atom games, Snake and Awari. The first is a variation on the barriers type game. Two serpents grow in length and the object is either to cut off the opposing snake, or make his snake cross over itself.

In the Atom version, the serpent is trapped in a square box which has electrified walls. Numbers flash in the box and the snake has to gobble-up as many as possible. If he touches the walls, or doubles back and touches itself, 50,000 volts are shot through his body. Like most of these games it proves a good test of your reactions.

The third game is another computerised version of an ancient African pebble game, Awari. A strategy game for thinkers, the object is to win as many pebbles from your opponent as possible to dominate his territory.

Each player is given six pits on which they place his pebbles. Then in turn the pebbles are moved according to certain rules. The game finishes when one player has put his stones on the opponent's territory.

DEATH

Apple owners are invited to dice with Death as opposed to Life in a new game from Leisure Genius.

This new strategic game is based loosely around the computer classic, Life, and involves building-up cells until you can dominate your opponents by destroying them through disruption of their cell structures.

There are 10 cell structures to play with and from which evolve your own universe.

Each player starts with a stock of cells which they can choose before the game kicks-off. First you have to decide how many cells each player is allowed and then select the structures you want to play with.

Also take into consideration how quickly you want the cells to

THE OPPOSITE
OF LIFE

generate and the number of generations carried-out during the multiplying period. It is for the players to set the game rules. Another option available is sound.

EXECUTIVE CHESS

A new chess game is out for the dedicated enthusiast at the top end of the Chess Challenger range.

This version's attributes lie in its design and the capabilities and scope for play.

There are 10 levels of difficulty which the player selects going right from beginner to expert. So the 'Decorator Challenger' can be used by inexperienced chess players as a learning tool but still give a good game to club players.

A book comes with the game which lists 40 different chess openings, with approximately 1200 book opening moves programmed in. The Decorator plays either black or white and is capable of repeating all the positions of the pieces left on the board at any stage of the game at the press of a button in case the player's memory fails him.

If the player gets stuck the friendly Decorator will automati-

cally suggest the best move the player can make by doing a quick assessment of the pieces positions.

This deluxe chess game is a full size board concealing the electronics and microprocessor but with an attractive playing surface. It is made of hardwood, stained to obtain the light and dark colours. The pieces too are made of the same wood and can be stored in containers next to the board. The calculator styled keyboard console is also on the same section.

The whole unit stands in a carved frame with four small legs.

But it is expensive, selling at the moment for the grand price of £395.95. Included in that price is a booklet of opening moves.

It is marketed in the UK by Computer Games and is definitely the executive computer chess set.



The rules of the game are complicated and therefore take some getting used to but once you have decided exactly what to do and the conditions necessary for cells to regenerate the game, it is difficult to stop playing.

Conditions for regeneration must be three cells next to an empty space — in that space a new cell will pop up so you can literally see your empire grow. If a cell has two or three cells positioned next to it, that cell is safe and will survive, but if it has fewer than two or more than three the cell cannot cope and will shrivel and die.

The two players fight it out on the screen, each placing cells in desired positions. You can move the cells into any position on the screen, the idea being to get them in the proper place to see them regenerating.

It demands absolute concentration to keep track of your cells and those of your opponent. The generation cycle begins when both of you have finished placing your cell structures.

Once you have learnt how to play Death you can vary the levels and intensity of the game with the selection controls. Made by the London-based firm Leisure Genius, you get your money's worth for £15.

TWO-IN-ONE
SPACE TRIAL

Two popular arcade games, Missile Command and Asteroids, have been combined to transfer to the Pet screen.

Called Meteorites, the aim of the game is to protect seven bases from a swarm of meteorites descending from the heavens.

The only way to survive is to blast the rock showers with your laser gun, but you will find that often it serves only to shatter the meteorites into even smaller — yet just as deadly — fragments.

Altogether you have to fight-off six waves of meteorite storms, scoring points on the way for each hit. Other hazards to avoid are alien ships which swoop down intermittently to fire at the bases under your protection. Shoot down one of those and you score bonus points.

Meteorites is from the Harrow-based firm Supersoft who also supplied Hitchhikers Guide to the Galaxy addicts two months ago by producing a Pet version of the Douglas Adams book and TV series.

CHESS



OF ALL the innumerable games appearing on computers, large and small, Chess is one of the few which has a genuine existence in the same form outside the computer environment. The history of the ancient game covers many hundreds of years and, indeed, among the first books ever printed in English — by Caxton — was one on Chess.

The success of computers in making in-roads into the complex field of intellectual endeavour has been remarkable, with the best programs now performing at a level to which few regular club or county-level players could ever aspire and beginning to cause problems even for experienced masters.

Exactly what has been achieved, and what has not, will be one of the perennial topics of this series. In each issue I hope to include a combination of historical and background material, together with up-to-date reports on tournaments — particularly microcomputer tournaments — and product reports.

The idea of a chess-playing machine has a long history, pre-dating that of the electronic computer by many years. An automatic chess-player built in 1769 by the Hungarian, Wolf-

By Max Bramer

gang Von Kempelen, was demonstrated to the court of Empress Maria Theresa of Austria two centuries ago.

The automaton chess-player was built in wood in the form of a man, approximately life-size and dressed in the clothing of a Turk, complete with turban and cloak. The figure was seated at a chest on which a chess-board was placed. Before each game the doors of the chest were opened to reveal a complex collection of gears, pulleys and levers.

During the game the opponent's moves were made on the board in the usual way, with the Turk's moves being played by itself with its left hand.

Needless to say, Von Kempelen's Turk was no more than an elaborate hoax, with a man hidden inside the chest, detecting the opponent's moves by means of magnets and working the Turk's arm by means of a pantograph, while being confined to a small area lit by a candle.

Even knowing of the hoax, the Turk remains an extremely impressive invention. Not only did the public demonstration appear to show that the whole of

the chest was either empty or occupied by machinery, but the engineering required to make the hoax work was highly complex, so much so that even those scientists convinced that there must be a hoax found it almost impossible to explain how it was achieved.

The Turk's secret survived intact from 1769 to 1834. Twenty years later the ingenious creation was destroyed by fire, its final resting place being the Chinese Museum in Philadelphia. The story of the Turk is told in fascinating detail in *The Great Chess Automaton* by Charles Michael Carroll.



As an incentive to the ambitious chess programmer, the Fredkin Foundation of Cambridge, Massachusetts has recently established a prize of \$100,000 for the first computer program to beat the world human champion in a match.

Although the goal still seems well out of reach, the improvements made in the last few years are most impressive. The purpose-built chess machine Belle — much larger than Sensory Voice Challenger but probably still just qualifying as a microcomputer — won the world computer chess championship convincingly in Linz last year against computers of all sizes and has since attained a performance rating around 2,300 on the U.S. Chess Federation scale, a very high master rating.

The second world microcomputer championship was held in West Germany in September, under the auspices of both the International Computer Chess Association (ICCA) and the International Chess Federation (FIDE).

Here is the decisive game between the first and second prize winners from the first world microcomputer championship, played in London last September.

- | | |
|------------------|----------------------|
| 1. P-K4, P-K3; | 11. QXQch, RXQ; |
| 2. P-Q4, P-Q4; | 12. B-Q3, B-Q2; |
| 3. N-QB3, B-N5; | 13. O-O, QR-Q1; |
| 4. P-K5, N-QB3; | 14. QR-N1, B-B1; |
| 5. Q-N4, P-KN3; | 15. B-KR6, R(B1)-K1; |
| 6. N-B3, P-B4; | 16. KR-K1, N-KN1; |
| 7. Q-N5, BXNch; | 17. N-N5ch, K-K2; |
| 8. PXB, KN-K2; | 18. B-N7, P-KR3; |
| 9. Q-R6, K-B2; | 19. N-R7, K-B2; |
| 10. B-KN5, Q-B1; | 20. B-B6, NXB; |

- | | |
|----------------------|---------------------|
| 21. NXN, R-K2; | 33. R-QN1, P-B3; |
| 22. P-KR4, P-N3; | 34. PXP, R-Q7d; |
| 23. P-R5, P-KN4; | 35. K-N1, B-R3; |
| 24. P-N3, P-R3; | 36. N-Q7, RXBP; |
| 25. P-B3, N-R4; | 37. PK6ch, K-K1; |
| 26. P-N4, P-N4; | 38. N-B6ch, K-B1; |
| 27. K-N2, N-B5; | 39. N-Q5, R-QR2; |
| 28. BXN, QPXB; | 40. PK7ch, K-K1; |
| 29. PXP, PXP; | 41. N-B6ch, K-B2; |
| 30. P-Q5, B-N2; | 42. P-K8=Qch, K-N2; |
| 31. R (N1)-Q1, B-B1; | 43. Q-N6ch, K-B1; |
| 32. K-B2, P-R4; | 44. RK8 mate. |



Position after Black's 29th move

ARCADE ACTION

YOUR NAME IN LIGHTS

How do you go about putting your name up in lights on the high score chart of your favourite machine?

Short of carrying pockets full of 10p pieces down to your local

pub or arcade, is there any faster way to master the new video game which has you hooked?

We think so and every month in our Tips section we will be giving advice that will keep Computer & Video Games readers ahead of the pack on the popular arcade games of the moment.

The tips will come from experts who have already worked their way inside the head of the game's programmer and

discovered ways of prolonging each 10p's worth of life from a particular machine.

No game is ever really mastered but this column will give practical ideas to help you survive as long as possible against the indefatigable creatures that inhabit every video games cabinet.

In this issue we look at the Mazeman — also known as Pacman and Puckman — type of game. While next month we will offer some hints on the difficult game of Asteroids De Luxe.

In this same column we are going to print machine "slang". Any terms or expressions you and your friends use to describe certain events or creations in a game. One example is how quickly Space Invaders became known as "Green Meanies".

Also on the irreverent side, let us know about any programming "bugs" on a machine. These are areas on a game where the programmers have not foreseen that a certain sequence of actions will produce a peculiar response on the screen. Tell us about these strange happenings and how to recreate them.

The "Ghosts" that inhabit the Mazeman type of arcade machine go by many names but, whatever you are invited to call them, most players find a few more names of their own.

The machine itself varies in title from Pacman, Puckman or Picman to the more descriptive Mazeman. But whatever the name of the machine you have been cussing over, the tips to help you achieve a high score remain the same. Here are some hints to help you increase your fruit yield at the bottom of the screen.

Firstly it is important to develop an opening strategy for the early "walls" (each cleared screen generates a new "wall"). Study the early movements of the ghosts and you will see that

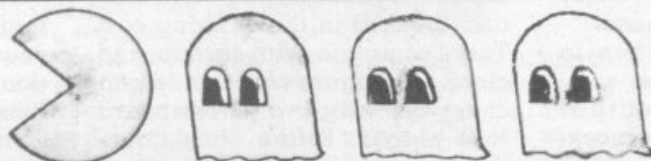
FLAW SHOW

Two interesting little programming flaws can be found in the Mazeman game. If you persuade your friends to devote the money for a little experimentation you may be able to re-create them on a screen.

It is possible to send an errant pair of eyes flitting around the area of screen just above the ghosts' base.

This can be achieved, sometimes, if you catch a ghost just as he emerges from his base and eat him. This must be attempted early in a wall, by eating a flashing dot and then speeding to the exit of the ghosts' base, to consume the ghost as he bounces out.

It is also possible to turn the ghosts bright orange. This often occurs when you eat a ghost just as he turns from a flashing blue consumable back to his normal colour. Of course, trying this automatically means you lost a life.



BEAT THE MACHINE

these only vary if you go very close to them. Experiment to find a path which will each time keep you clear of them for longest and finally lead you, with the ghosts in close pursuit, to a flashing dot.

Good tips for this are to clear the bottom row as this is the easiest place to get trapped. You will only manage to do this in the first two walls. Then change your route for the third wall but still make sure you clear at least half of that bottom line. The ghosts speed up again for the fifth wall so a new opening strategy will be needed for this one. Good opening gambits leave both the flashing dots at the bottom of the screen to last — insurance for the time you get caught with a half-finished wall.

When you come around to those final few dots, be patient. Key areas of the screen here are the tunnel, through which you

travel much faster than the Mazeman ghosts. If you can lead three through here it should provide enough time to tidy up the screen.

Another important area is the network directly above the ghosts' base. With a cool head you can manoeuvre this part of the maze with ghosts in close attendance and still stay out of danger — there is also a possibility of swooping down to swallow a fruit when one appears.

When you do find yourself trapped in a corner, (at the top and bottom of the screen the ghosts travel faster than you can) a violent change of direction will work wonders.

If the position looks really hopeless a vigorous shake of the lever can confuse the ghosts and send them off in different directions. Remove drinks from on top of the machine when employing

this tactic.

Now let me give you something to aim for. After a run of various fruits — worth more for each wall — a creature I can only describe as a "Galaxian" appears on the screen. This wall, when cleared, rewards you with an intriguing little display involving the red ghost.

STREET TALK

A collection of machine slang or strange expressions overheard while watching people play the Mazeman variety of game. Complete with a likely interpretation of the meaning.

● A monster munch — eating all four ghosts to score a 1,600 point bonus.

● An expensive fruit — caught by a ghost after being tempted to eat a fruit.

● Get them in the nest — trying to eat the ghosts while they are still inside their base (a rather pointless exercise as you can't get in).

● Fangs in the backside job — escaping after a ghost seemed certain to catch you.

off on the wide plains, facing anti-aircraft fire from guns and tanks.

The enemy's chase missiles are fired from impressive installations built well off the ground or, in the underwater caverns, from rocky niches above you.

Their missiles will chase your craft and their hit rate is high so beware. U.F.O.s are another menace of the air but are equipped with radar to help you see them approaching.

In the sea, the enemy's submarine missiles and his own subs are just some of the problems, as mines and depth bombs feature along the route you have to take.

SEA-SPACE MISSION

Cosmic Avenger sends you off on a hazardous mission, through space and along undersea passages to destroy the enemy's secret station.

Among the dangers you will have to overcome are tanks, U.F.O.s mines, submarines, missile stations and the task is made ever more difficult as you approach the secret base.

The game is along the lines of Defender with your craft starting



JOIN THE SPACE PILOT ELITE

Mastering the Omega Race will number you among the known galaxies' elite space fighter pilots.

For this training method was invented originally by the Omega Star System to make its pilots the most respected force around.

Sitting in the cockpit of your craft, the city of Komar panoramically spread below you, you must engage and destroy the android forces and the mines they have planted in your path.

The player uses a guidance control knob to steer his craft and a thrust button for force to take his craft into the energy field. As the alien droid fleet and its mines fill your screen, pressing the fire button sends out deadly laser rays to destroy the enemy targets.

Photon and Vapor mines are worth 350 and 500 points respectively. Droid Ships bring you 1,000 points and the Command Ships 1,500.

Most dangerous is the enemy Death Ship which appears at random and has far greater speed and manoeuvrability than the rest of the targets. Its tactic is to bump and demolish the Omega Fighter.

Bonus Omega Fighters are awarded for high scores and top scores are kept on the screen for all to challenge. The backdrop of this game, which is distributed by Bally U.K., is impressive but the ship and mine graphics are disappointing by present standards.

RETURN OF THE MEKON

Remember the evil Mekon? A little green creature with a large head who hovered on a saucer and was to Dan Dare what the Daleks are to Doctor Who.

Well, a similarly sinister creature — albeit with only one eye — turns up in the new arcade game of Space Fury to insult your playing ability, boast of the superiority of his battle forces and generally give the player a difficult time.

Monsters and magicians bring fantasy to the world of arcade games in the highly original Wizard of Wor.

It also brings back the ping-pong video games idea of letting two players loose on the controls simultaneously, so giving the feeling that this game is man against man, rather than man against machine.

It does not dictate that you have to fight one another and will allow teamwork against the strange monsters which inhabit the Dungeons of Wor.

Players control a separate squadron of "warriors" — blue or yellow-clad humanoids dressed in space suits and armed with "unified field-disturbance rifles".

They venture out into the dungeons, a maze of passages of random design with escape doors at either end, with a view to destroying the monsters which inhabit the labyrinths.

There are four kinds of monster plus the Wizard himself. The blue Burwors are worth 100 points each and six of them inhabit the first dungeon. When all six are shot, yellow Garwors — 200 points and often invisible — and speedy red Thorwors — 500 points — join the battle.

When all are killed the next maze appears containing more

At the end of the game he will give his honest, if patronising, opinion on what kind of opposition you provided for him to test his forces.

The game is similar to a colourful asteroids except that the opposition is provided by the one-eyed monstrosity's battle fleet.

These is a variety of whirling dervishes which are harmless until they have joined together to form a larger space craft and will then either ram your own craft or fire an accurate orange bomb towards you.

When you have demolished his first collection of unlikely-looking space ships with your



THE FANTASY GENERATION

monsters to shoot or eat the warriors. The opposing warriors are also allowed to shoot one another's men for 1,000 points.

This time a Worluk, the Wizard's favourite, flies through the dungeon when the last Thorwor is shot. If either player can shoot this creature before he escapes it means double points on the next dungeon.

That may prompt the Wizard to

own rather ordinary craft, this video Mekon expresses his surprise at your survival and assures you that his next fleet will finish the job.

One novel feature of the game is that you are invited to dock with a new spacecraft which will help you tackle the next battle.

You dock with the craft you think best-suited to the next conflict.

Plenty of scope for tactics in this game so long as you can live with being described as a mediocre or, more commonly, adequate, opponent.

This Sega game is distributed over here by Alca Electronics of Manchester.

appear, teleporting at magical speed and hurling lightning bolts at the players.

Throughout the game the Wizard talks to the players over the sounds of battle and a haunting melody which adds to the dungeon mood.

A radar screen enables the player to keep a check on invisible monsters and this becomes more critical as the dungeons become more spacious.

A Midway game, distributed here by Bally U.K., Wizard of Wor has brought a new world of fantasy to arcade games.



OTHELLO

By Tom Napier

LET us start by clearing-up the terminology, Reversi is better known these days as Othello but that is a recent name for a game the programming of Othello in Reversi for at least 100 years.

I hope to give some guidelines to the tactics of the game and then show how a relatively simple-minded Basic program can play a reasonable game. I believe that it is possible to write an unbeatable Othello program but that would require a larger computer than most readers are likely to have available and it would have to be written in Assembler language to be fast enough to suit a human's idea of reasonable thinking time.

If one rates games by the ratio of the subtlety of their strategy to the simplicity of their rules, Othello rates very high indeed. Unlike most games which evolve slowly from move to move, the position of an Othello game can change dramatically with a single move.

Indeed, a good computer program can beat even expert human opponents regularly, simply by being better-equipped to keep track of a succession of complex board positions.

A beginner, and a very simple computer program, might play by always looking for the move which turns over the most opposing pieces. That strategy will lose to any player with a little experience because the Othello player soon learns that what matters in the early stages of the game is not how many pieces one has but where they are situated.

It is not until the last dozen or so moves that sheer numbers of pieces are important. What matters is how useful a piece is as a back-stop to help the capture of other pieces and how vulnerable it is to being captured.

That means that the board corners are very important, for a corner piece can never be captured. Positions on the edge of the board are also useful, since they can be captured only by other edge moves. A great deal

Reversi, now popular under the trade name Othello, is a two player game, played on an eight by eight square board with 64 double sided counters, let's suppose them to be black and white. Each player places a piece in turn with his own colour uppermost. The first four pieces are played on any of the four centre squares of the board but thereafter a piece can only be placed next to an opponent's piece so as to create a line of one or more adjacent opposing pieces between the piece just played and one of one's own.

The intervening opposing pieces are then turned over to exhibit one's own colour. If more than one line of pieces meet these conditions at a single move then all the 'trapped' pieces are turned over.

If at any stage a player cannot make a legal move he passes and his opponent makes the next move. If neither can make a legal move, for example, when the board is full, the game is over and the winner is the player with the most pieces of his colour visible on the board.

	A	B	C	D	E	F	G	H
1				●	1			
2			2	●				
3		3	○	●	4			
4		5	●	○	●	○		
5	6	●	●	●	○	○		
6		7	●	○	○	○		
7			8	●				
8		○	○	○	●	9		

of the strategy of Othello consists of forcing your opponent into a position where he is obliged to move adjacent to an edge or a corner and so allowing you to establish a piece in one of those strategic locations.

The correct positioning of pieces along an edge so as to minimise an opponent's gains requires considerable thought on the part of either a human or

electronic player but a reasonable game can be played by adopting some fairly simple tactics. These tactics can be translated into estimating a desirability figure for each square on the board — much the same as the points system in chess. The idea is then to move to achieve the highest sum of desirables of all the captured squares.

In essence, that is a one-move, look-ahead strategy. A more sophisticated program would look ahead for many more moves.

The figure shows the position at an early stage of a typical game. White has played first and it is White's turn to play. He has a choice of nine legal moves, indicated by the numbered squares. Of those, 1 and 9 would capture one black piece; 2, 3, 4, 5 and 7 would capture two; 8 would capture three; and 6 would not only capture three black pieces but would also establish White on a previously-unoccupied side.

Unfortunately, to play on 6 would be a fatal error, since Black could move immediately into the bottom left corner by capturing the three white pieces in the bottom row. That would establish him in a very advantageous position. Thus White's only safe move is in square 9, since that avoids the threat to his pieces on the bottom row.

If this threat had not been present the move at 6 would have been the best choice, whereas a move at 1, though on an edge square, would have been rather pointless since the piece placed at 1 would be re-captured immediately.

● Next month this page will deal with the problems of programming a microcomputer to play that increasingly popular game of Go.

The January issue will feature Bridge. Tom Napier will be back to give you further insights into the programming of Othello in our February issue.



If you want to feel at home in the world of computers, you'll want the best home computer in the world.

We live in the age of computers.

Coming to terms with them and enjoying them is part of coming to terms with the twentieth century.

A few years ago, a computer would have filled a fair-sized room. Now microtechnology has allowed Commodore to produce a home computer, the VIC 20, that's no bigger than a typewriter yet performs miracles.

FOR BUSINESS. OR PLEASURE.

VIC can keep your diary up to date. Teach you mathematics. Play an enormous range of video games. Even play a piece of music to soothe your worried brow.

In fact, you and VIC can do almost anything better. Keeping records of family finances, sorting out and working out household accounts, being one step ahead of the bank manager or helping your own business be more businesslike.

VIC'S THE BEST. BY FAR.

Contrary to popular belief, computers are really rather friendly. VIC is particularly easy to understand. It's what the computer people call 'user friendly.' The typewriter-type keyboard is easy to use. It even tells you about mistakes you might make.

If you're technically minded, here's a reminder. VIC has a 5k memory expandable to 29k. (That means you can put in an almost endless amount of information.)

But what makes the VIC the best home computer by far are features that are just not available in most other home computers. Features like colour, computer graphics and sound.

PLUG IN AND YOU'RE OFF.

VIC plugs in to any television set, colour or black and white. (We even fit a 13 amp

plug, so you can play with VIC, right away.) You don't have to learn a special language. VIC speaks English, just like you. With the help of our handbook, you will begin to feel at home to the world of computers in no time at all.

COMPUTER SUPERMARKET'S GUARANTEE.

Buy through Computer Supermarket and you get exactly what's promised. We guarantee you that.

Every machine is thoroughly tested before it's despatched. And every machine is guaranteed for twelve months on parts and labour. (Not that you'll need it, of course.)

In the unlikely event that you don't want to keep your VIC, just return it, in its original packaging, within 30 days and your money will be completely refunded.

FREE PROGRAMS.

Apart from the more practical things like accounting, and the more pleasurable

things like video games, you can put VIC to literally hundreds of uses.

There are pre-recorded programs on many different subjects. You can develop your own programs and store them by using ordinary cassette tape.

The special Commodore cassette deck is on offer at only £44.95. If you buy VIC and the deck together we'll send you a 6 program pack to start you off that's absolutely free.

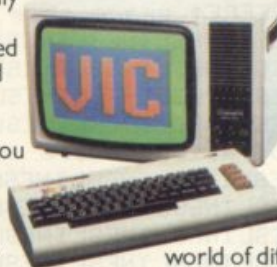
YOUR FUTURE WITH VIC.

It's a big step into the future. Understanding the future.

Having fun in the future. Even saving money in the future.

Every member of the family, especially the young, will feel at home with VIC right away. So send in the coupon. We're sure you'll find the best home computer in the world will make the

world of difference to you and your family.



Computer Supermarket Ltd., Unit 8, Southolds Road, Oakley Hay Industrial Estate, Corby, Northants. Tel: (0536) 744015. Reg. No. 2646589. Prestel No. 400400.

Computer Supermarket Ltd., Unit 8, Southolds Road, Oakley Hay Industrial Estate, Corby, Northants. Please accept my order for _____ VIC 20's at £189.95 each inclusive of packing, carriage and insurance. Please send me _____ Cassette Decks at £44.95 incl. Free 6 program cassette if VIC 20 and Cassette Deck ordered together. *Please debit my Access/Barclaycard/American Express/Diners Card. Account no. _____ I enclose Cheque/P.O.

Please allow twenty-one days for delivery. *Credit Card orders can be telephoned to (0536) 744015 anytime.

Name: Mr/Mrs/Miss _____

Address: _____

Signature _____

COMPUTER SUPERMARKET

A Commodore Appointed VIC Dealer. Please make remittances payable to Computer Supermarket Readers Account.

Circle No. 122

COMPUTER & VIDEO GAMES 31

The Invaders runs on a Nascom 2. By Karl Parker and Terry Brown.

```

0);PRINT"PLAV"
TAB(15);PRINT"SPACE INVADERS"

;PRINT"Score 1500 for extra base"
48 TO 2058+24 STEP -1
POKE V-1,32:POKE V+1,32
100=NEXT

24 TO 2058+48 STEP 1
POKE V+1,86:POKE V-1,32
100=NEXT D

48 TO 2058+24 STEP -1
POKE V-1,89:POKEV+1,32
100=NEXT D

4,32
object of the game is to destroy the";
ancing aleins before thay land on earth"
ave 3 bases to start with and if you ";
se to score 1500 points you will be ";
led an extra base"
keys which move your base are the rig";
row to move your base right and the l";
arrow to move your base left and the ";
e bar to fire "
$ ANY KEY TO CONTINUE ";N$

```


This is the game that needs no introduction. Can you stop the advance of the "green meanies" from outer space.

Sat in your battle tank, dodging deadly fire from the oncoming hordes of alien horrors. Darting out from behind your crumbling defence wall to zap one of their leaders before he gets too close.

The object of the game is to destroy the advancing creatures

BATTLING

before they can land on the Earth. You have three bases to start with and if you manage to score 1,500 points you will be awarded an extra base.

The keys which move your bases are the right arrow and the left arrow and you fire by depressing the space bar.

This game by Terry Brown and Karl Parker, runs on a Nascom 2 and is a good likeness of the arcade game which gave its name to a whole genre of machines.

The fate of the Earth is in your hands.

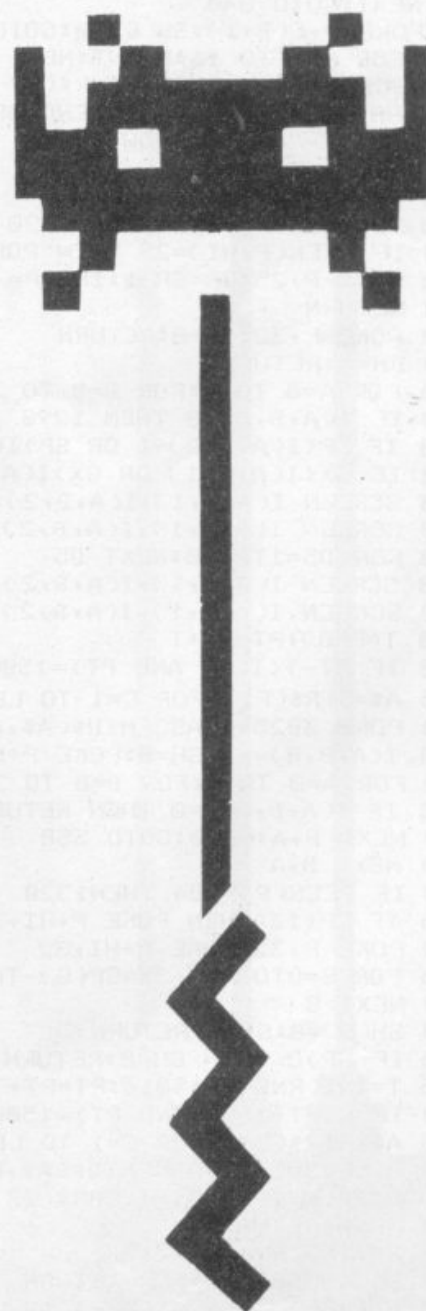
The large area of this listing which reads "LINES" is a Nas-Basic "Reserve Word". For each "Lines" replace it with a CHR\$(152); graphics symbol.

THE INVADERS

```

350 WIDTH 255
360 B$="JJJJ":D$="\LINESDEFLINES/"
370 M=-1
380 DIM I(6,3,2)
390 FOR A=3328 TO 3348 STEP 2:READ B
400 DOKE A,B:NEXT:DOKE 4100,3328
410 BA$=" LETREAD "
420 FOR A=1 TO 2:READ A$(A,0):NEXT
430 FOR A=1 TO 2:READ A$(A,1):NEXT
440 FOR A=0 TO 3:READ P(A):NEXT A
450 FOR A=0 TO 6:READ C(A):NEXT
460 BN=3:PT=0
470 A$="SCORE = 0 *SPACE INVADERS* "
480 A$=A$+"BASES LEFT":FOR A=1 TO LEN(A$)
490 POKE 3018+A,ASC(MID$(A$,A,1)):NEXT A
500 FOR A=0 TO 2:POKE 3040+A,170:NEXT
510 FOR A=1 TO 4:FOR B=13 TO 14
520 SCREEN A*11-5,B:PRINT B$;:NEXT B,A
530 BP=1:GOSUB 640
540 GOSUB 550:GOTO1780
550 ST=0:KB=0:FOR A=0 TO 6:FOR B=0 TO 3
560 I(A,B,0)=INT(RND(1)*2)
570 I(A,B,1)=A*6+4:I(A,B,2)=B*2+2+IH
580 NEXT B,A
590 FOR Y=0 TO 3:FOR X=0 TO 6
600 GOSUB 1550
610 NEXT X,Y:X=0:Y=0:SH=0:KB=1
620 ST=1:IH=IH+1:IF IH>4 THEN IH=4
630 KB=1:RETURN
640 SCREEN BP,15:PRINT BA$;:RETURN
650 IF MP>1 THEN 670
660 SCREEN 1,1:PRINT "ANDFREFREFRE↑"
670 MP=MP+1:SCREEN 1,1:PRINT CHR$(22);
680 IF MP=49 THEN MS=0
690 RETURN
700 D=0:C=USR(0):IF C=0 THEN RETURN
710 IF C=17 THEN D=-1
720 IF C=18 THEN D=1
730 IF C=32 AND SH=0 THEN SH=1:SX=BP+D:SP=13
740 IF BP+D<1 OR BP+D>42 THEN D=0
750 BP=BP+D
760 SCREEN BP,15:PRINT BA$;
770 RETURN
780 FOR C=0 TO 6:IF SH(C)=0 THEN 850
790 P=SC+SP(C)+HI*SH(C)
800 POKE P-HI,32
810 IF PEEK(P)<>32 THEN 890

```

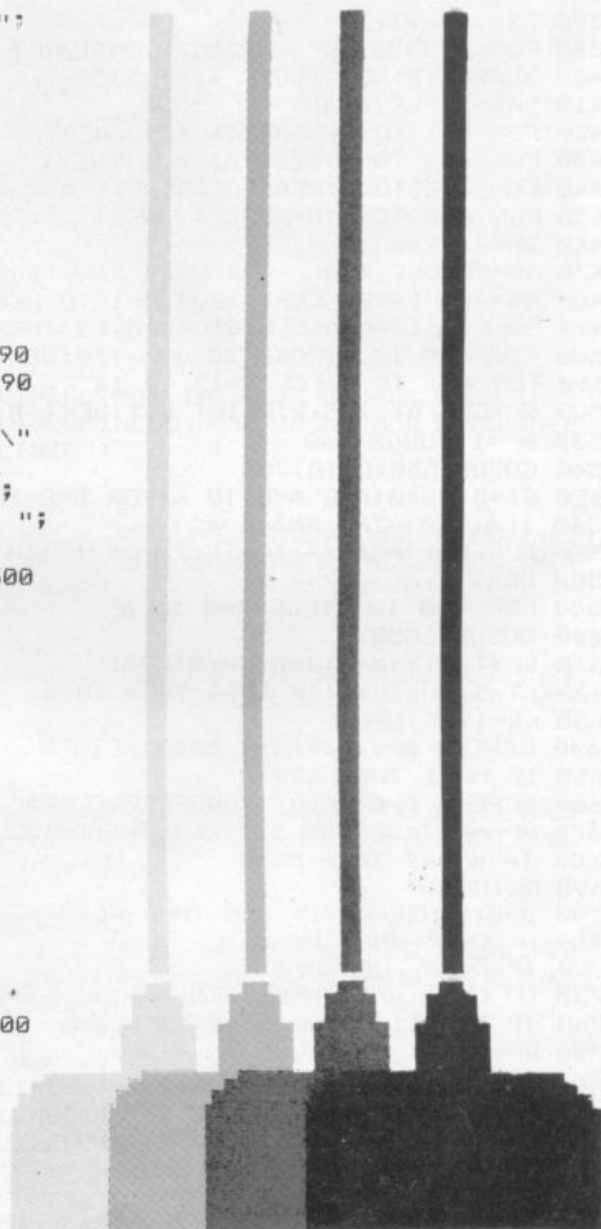
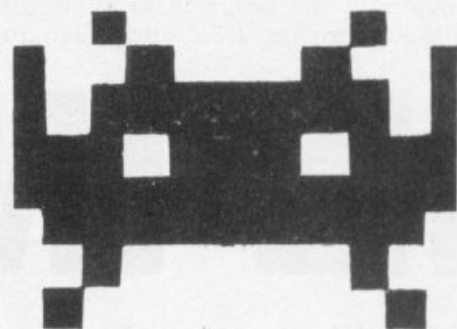



```

820 POKE P,184
830 SH(C)=SH(C)+1:IF SH(C)>15 THEN 850
840 SH(C)=0:POKE P,32
850 NEXT C
860 FOR C=0 TO 6:IF SH(C)=0 THEN RETURN
870 NEXT C
880 BM=0:RETURN
890 IF SH(C)>14 THEN 970
900 SCREEN 1,15:PRINT CHR$(27);
910 FOR T=1 TO 500:NEXT
920 BN=BN-1:POKE 3060+BN,32
930 SH(C)=0
940 IF BN=0 THEN 1000
950 SCREEN BP,15:PRINT BA$;
960 RETURN
970 FOR S=1 TO 5:IF PEEK(P)=C(S) THEN 990
980 NEXT:GOTO 840
990 POKE P,C(S+1):SH(C)=0:GOTO 850
1000 FOR N=1 TO 16:PRINT:NEXT
1010 SCREEN 1,7:PRINT CHR$(27);
1020 PRINT "THIS IS THE END OF CIVILIZATION ";
1030 PRINT "AS WE KNOW IT!"
1040 GOTO 1510
1050 P=SC+SX+HI*SP
1060 IF PEEK(P)>32 THEN 1120
1070 IF PEEK(P+HI)=25 THEN POKE P+HI,32
1080 POKE P,25:SP=SP-1:IF SP=-1 THEN 1100
1090 RETURN
1100 POKE P,32:SH=0:RETURN
1110 BM=0:RETURN
1120 FOR A=0 TO 6:FOR B=0 TO 3
1130 IF I(A,B,0)<0 THEN 1290
1140 IF SP<I(A,B,2)-1 OR SP>I(A,B,2) THEN 1290
1150 IF SX<I(A,B,1) OR SX>I(A,B,1)+4 THEN 1290
1160 SCREEN I(A,B,1),I(A,B,2):PRINT D$;
1170 SCREEN I(A,B,1),I(A,B,2)+1:PRINT"/"DEF "\"
1180 FOR D5=1 TO 20:NEXT D5
1190 SCREEN I(A,B,1),I(A,B,2):PRINT " ";
1200 SCREEN I(A,B,1),I(A,B,2)+1:PRINT " ";
1210 T=P(B):PT=PT+T
1220 IF PT-T<1500 AND PT>=1500 THEN GOSUB 1500
1230 A$=STR$(PT):FOR C=1 TO LEN(A$)
1240 POKE 3025+C,ASC(MID$(A$,C,1)):NEXT C
1250 I(A,B,0)=-1:SH=0:POKE P+HI,32
1260 FOR A=0 TO 6:FOR B=0 TO 3
1270 IF I(A,B,0)=0 THEN RETURN
1280 NEXT B,A:SH=0:GOTO 550
1290 NEXT B,A
1300 IF PEEK(P)=184 THEN 1320
1310 IF SP<13 THEN POKE P+HI,32:GOTO 1360
1320 POKE P,32:POKE P+HI,32
1330 FOR S=0 TO 6:IF SX=SP(S) THEN 1350
1340 NEXT S
1350 SH(S)=0:SH=0:RETURN
1360 IF SP>0 THEN SH=0:RETURN
1370 T=INT(RND(1)*501):PT=PT+T
1380 IF PT-T<1500 AND PT>=1500 THEN GOSUB 1500
1390 A$=STR$(PT):FOR C=1 TO LEN(A$)
1400 POKE 3025+C,ASC(MID$(A$,C,1)):NEXT C
1410 SCREEN 1,1:PRINT CHR$(27);
1420 MS=0:RETURN
1430 BB=INT(RND(1)*7)
1440 IF SH(BB)=0 THEN RETURN
1450 FOR C=3 TO 0 STEP -1

```

BATTLING



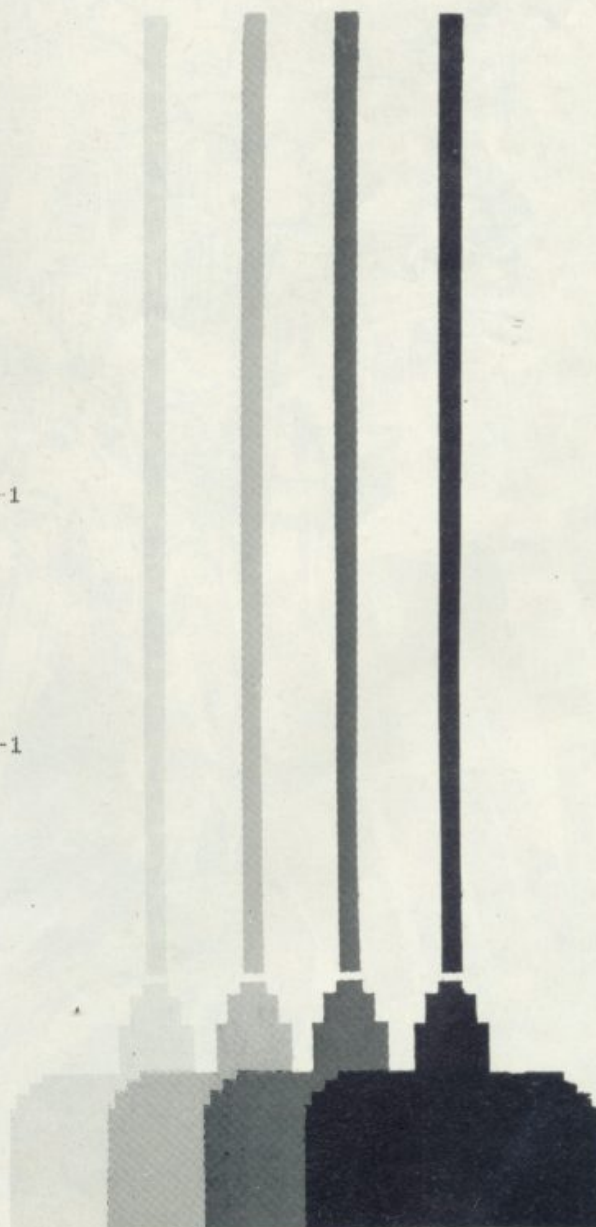
THE INVADERS



```

1460 IF I(BB,C,0))=0 THEN 1480
1470 NEXT C:RETURN
1480 SH(BB)=I(BB,C,2)+1:SP(BB)=I(BB,C,1)+2
1490 BM=1:RETURN
1500 POKE 3060+BN,170:BN=BN+1:RETURN
1510 SCREEN 10,9
1520 PRINT "TYPE 'ENTER' FOR ANOTHER GAME"
1530 A=USR(0):IF A<>13 THEN 1530
1540 RUN
1550 IF ST=0 THEN 1730
1570 IF MS=1 THEN GOSUB 650
1580 IF MS=1 THEN GOSUB 650
1590 IF MS=1 THEN GOSUB 650
1600 IF KB=1 THEN GOSUB 700
1610 IF KB=1 THEN GOSUB 700
1620 IF KB=1 THEN GOSUB 700
1630 IF BM=1 THEN GOSUB 780
1640 IF BM=1 THEN GOSUB 780
1650 IF BM=1 THEN GOSUB 780
1660 IF RND(1)>0.4 THEN GOSUB 1430
1670 IF SH=0 THEN 1710
1680 FOR Z=1 TO 16:IF SH=0 THEN 1710
1690 GOSUB1050
1700 NEXT
1710 IF I(X,Y,0)<0 THEN RETURN
1720 IF MS=0 AND RND(1)>0.99 THEN MP=1:MS=1
1730 SCREEN I(X,Y,1),I(X,Y,2)
1740 PRINT A$(1,I(X,Y,0)):
1750 SCREEN I(X,Y,1),I(X,Y,2)+1
1760 PRINT A$(2,I(X,Y,0)):
1770 RETURN
1780 F=0
1790 FOR Y=3 TO 0 STEP -1:FOR X=6 TO 0 STEP -1
1800 IF I(X,Y,0)<0 THEN 1840
1810 I(X,Y,0)=1-I(X,Y,0)
1820 I(X,Y,1)=I(X,Y,1)+M
1830 IF I(X,Y,1)=2 OR I(X,Y,1)=42 THEN F=1
1840 GOSUB 1550
1850 NEXT X,Y
1860 IF F=0 THEN 1780
1870 F=0
1880 FOR Y=3 TO 0 STEP -1:FOR X=6 TO 0 STEP -1
1890 IF I(X,Y,0)<0 THEN 1920
1900 I(X,Y,2)=I(X,Y,2)+1
1910 IF I(X,Y,2)=14 THEN F=1
1920 GOSUB 1550
1930 SCREEN I(X,Y,1),I(X,Y,2)-1
1940 PRINT " "
1950 NEXT X
1960 NEXT Y
1970 IF F=1 THEN 1000
1990 M=-M:GOTO 1780
2000 DATA 289,1548,13833,8960,-1264
2010 DATA 25055,312,18351,10927,-9179,233
2020 DATA " LETJtREAD "," VAL hy "
2030 DATA " LETtJREAD "," hy VAL "
2040 DATA 50,30,15,10
2050 DATA 32,201,219,255,246,228,32
Ok

```



Try to outwit the computer opponent and make yours the last piece on the board. A game of careful strategy.

Supernim will run in Apple II systems with 16K. By Jerry Dubnoff

Supernim is a tactical game of skill which goes one better than the old traditional game of Nim. An ideal candidate for computerisation, Nim has roots stretching back far into the Middle Ages. From a line up of pieces two players take it in turns to remove 1-3 from the board. However if more than one is taken then they must be

removed adjacently, either horizontally or vertically. The player with the last piece on the board wins the game.

Nim has already proved a popular computer game with the machine a worthy opponent, taking pieces from a screen display. However it is normally played in one dimension. In Supernim another dimension is added to

make the game a great deal more thought-provoking. Ideally Supernim will run in Apple II systems having Firmware, Applesoft and 16K free memory. It should also run in 24K systems with Applesoft in RAM.

Supernim will amuse and challenge you. It has three standards of play and you can move on from a beginner rating to an intermediate and finally an advanced player.

You can also vary the initial number of sections and choose whether you would rather go first or second.

As famous eastern philosopher and Nim player, Ali Hazeer once said: "May you pick the last camel and be aboard his back, five minutes before it occurs to him to spit!"

```

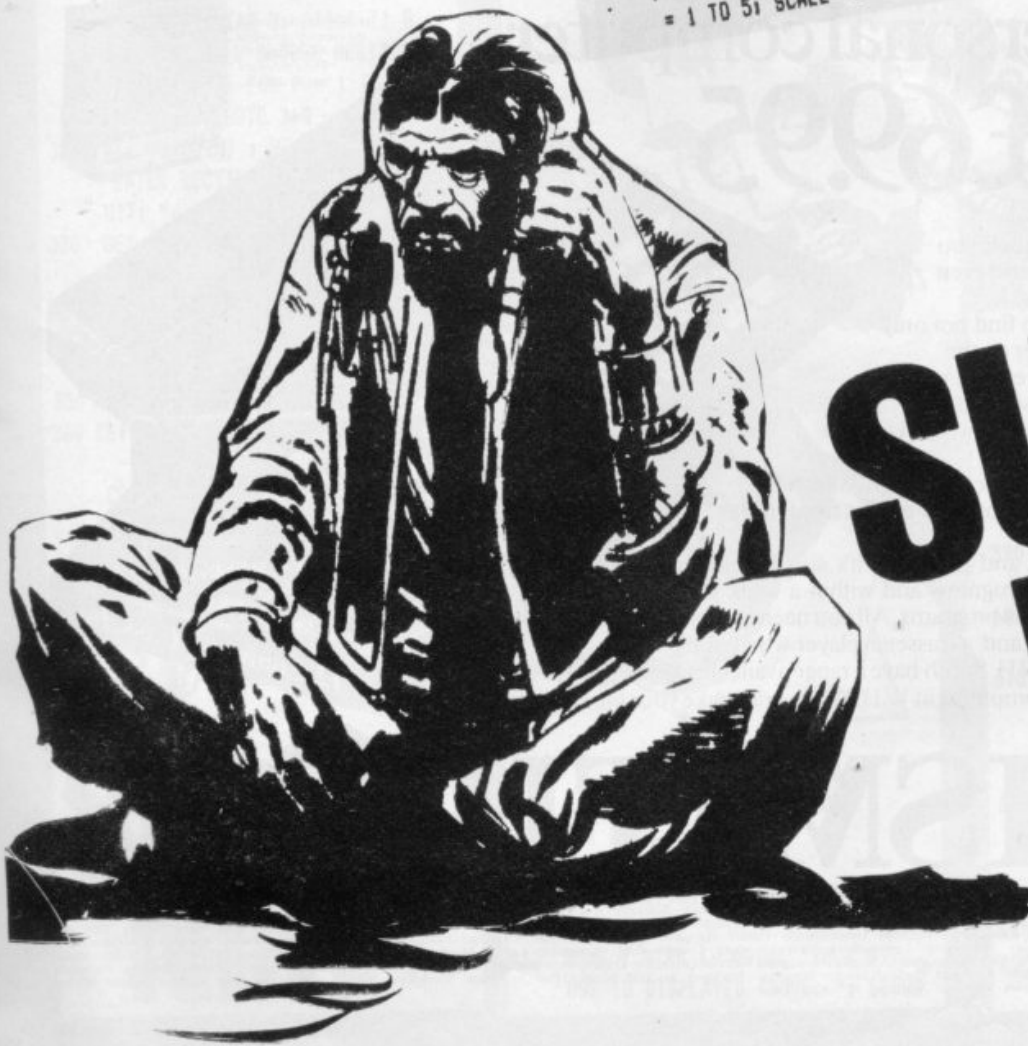
10 REM SUPER-NIM
20 REM A MULTI-DIMENSIONAL GAME
30 REM COPYRIGHT 1979
40 REM BY JERRY DUBNOFF
50 FOR I = 770 TO 906: READ J: POKE
  I,J:K = K + J: NEXT I: IF K <
  > 8431 THEN STOP: REM DAT
  A ERROR
60 DATA 173,48,192,136,208,5,206
  ,1,3,240,9,202,208,245,174,0
  ,3,76,2,3,96,169,0,73,0,141,
  31,3,96,0,5,0,12,0,47,0,63,0
  ,84,0,87,0
70 DATA 219, 219,27,56,46,62,9,
  88,48,46,36,17,37,55,14,9,39
  ,172,171,33,44,86,104,34,44,
  54,1,88,48,14,36,53,40,54,0,
  219,155,36,44,45,222,43,45,5
  4,73,33,36,63,9,45,0
80 DATA 219,219,34,36,53,53,53,3
  7,36,9,54,14,33,36,45,18,36,
  45,54,6,0,34,36,0,219,19,36,
  63,84,41,37,9,54,46,37,36,63
  ,73,49,54,45,36,4,0
90 IF PEEK (175) + 256 & PEEK
  (176) > 8157 THEN 130
100 POKE 232,32: POKE 233,3: TEXT
  : HOME : HGR : ROT= 0: FOR I
  = 1 TO 5: SCALE= 1: GOSUB 1

```

```

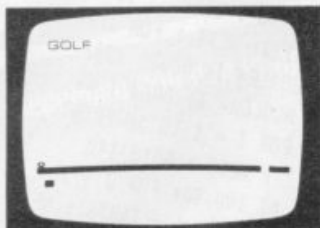
20: NEXT I: FOR I = 0 TO 128 STEP
4: ROT= 1: GOSUB 120: NEXT I:
  FOR I = 1 TO 15: SCALE= 1: GOSUB
  120: NEXT
110 FOR I = 15 TO 1 STEP - 1: SCALE=
  1: GOSUB 120: NEXT I: FOR I =
  1 TO 8: SCALE= 1: GOSUB 120:
  NEXT I: HCOLOR= 6: DRAW 1 AT
  140,90: FOR I = 1 TO 5: PRINT
  CHR$ (7): NEXT I: GOTO 140
120 XDRAW 1 AT 140,90: FOR J = 1
  TO 5:K = PEEK ( - 16336): NEXT
  : XDRAW 1 AT 140,90: RETURN
130 TEXT : HOME : VTAB 12: HTAB
  11: PRINT "### SUPER-NIM ###"
140 GOSUB 1170: TEXT : HOME : GOSUB
  1180
150 VTAB 12: HTAB 10: PRINT "WAN
  T INSTRUCTIONS? ": GOSUB 110
  0: IF X = 217 THEN PRINT B$
  : GOSUB 1040
160 TEXT : HOME : VTAB 10: HTAB
  7: PRINT "I CAN PLAY AT DIFF
  ERENT LEVELS OF": HTAB 7: PRINT
  "SKILL. TELL ME IF YOU ARE:"
  : PRINT
170 HTAB 7: PRINT "1) A BEGINNER
  ": HTAB 7: PRINT "2) AN INTE
  RMEDIATE PLAYER": HTAB 7: PRINT
  "3) AN ADVANCED PLAYER": PRINT
  : HTAB 7: PRINT "ENTER 1, 2,
  OR 3: "B$
180 GET A$: FOR DF = 1 TO 3: IF
  A$ = STR$ (DF) THEN PRINT
  B$: GOTO 200
190 NEXT : GOTO 180

```

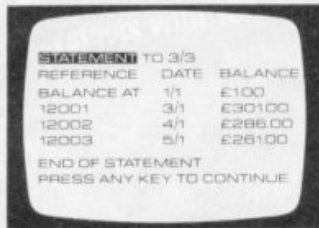


SUPER NIM

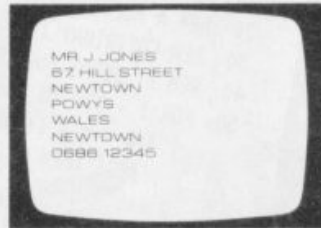
What would I do with a computer?



Play golf. Estimate your drive force on the fairway.



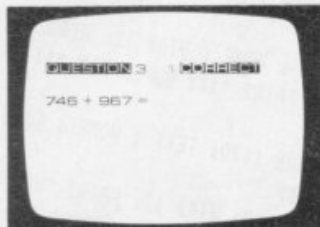
*Fummock your Bank Manager by keeping your finances at your finger tips.



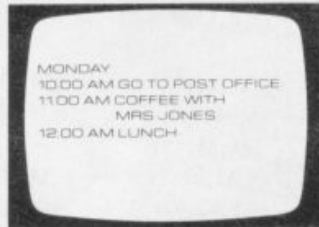
*Keep the rundown on friends, everything from their telephone numbers to birthdays.



Play Orbit and captain a spacecraft.



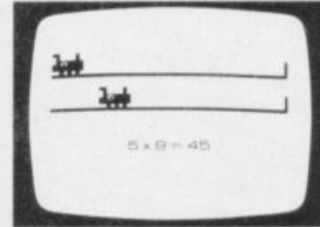
Teach the children maths from Division to Volume.



*Keep a diary of future appointments and past events.



*Catalogue all your collections from coins to stamps.



*Teach the children multiplication and play trains at the same time.



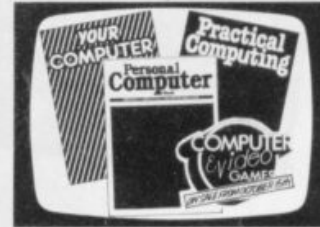
Or within a week you can write your own complex programs.



All you need to know for £34.95.



And a great range of books...



...and magazines to help you become an expert.

The first personal computer that only adds up to £69.95

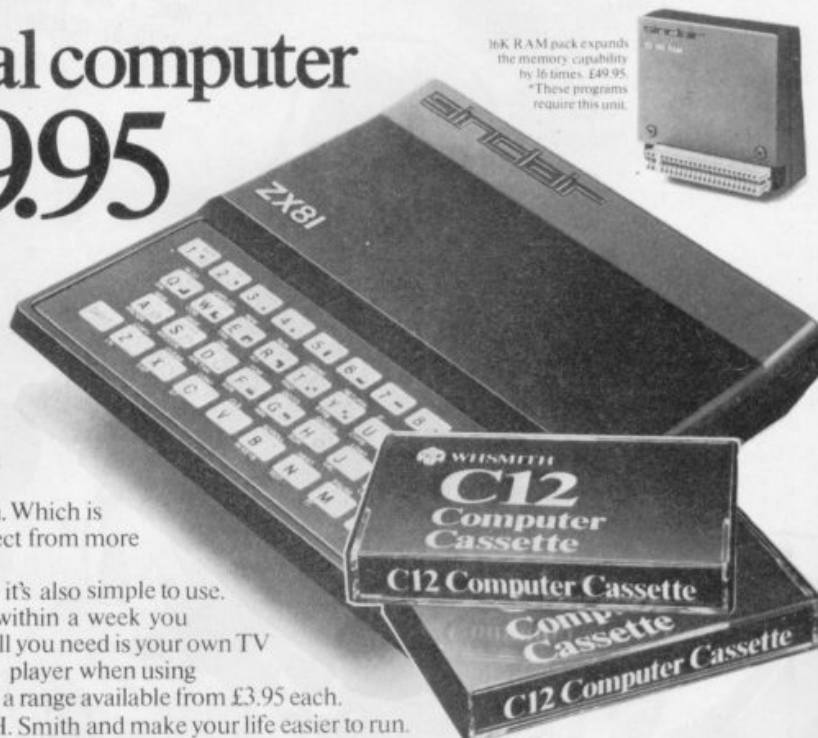
You'll be surprised how much you can do with a personal computer and even more surprised at how little it costs.

We made it our business to find not only the best-value-for-money computer on the market, but also the best books to enable you to progress from a beginner to an advanced user. And W.H. Smith is the only retail chain where you can buy the incredible ZX81.

The Sinclair ZX81 is a masterpiece of design. Which is why it can carry out programs you'd normally expect from more expensive computers.

Although the ZX81 is fast and powerful, it's also simple to use. Within hours you can learn to run programs and within a week you could be writing your own complex programs. All you need is your own TV (any model that receives BBC2) and a cassette player when using pre-programmed cassettes. And W.H. Smith have a range available from £3.95 each.

So take your first steps in computing at W.H. Smith and make your life easier to run.



16K RAM pack expands the memory capability by 16 times. £49.95. *These programs require this unit.

WHSMITH



Prices correct at time of going to press.

Available at these branches only:- Altrincham · Basildon · Bedford · Birkenhead · Birmingham · Bolton · Bournemouth · Bracknell · Bradford Broadway · Bradford Kirkgate · Brent Cross · Brighton · Bristol Broadmead · Bromley Burgess Hill · Burnley · Cambridge Lion Yard · Canterbury · Cardiff · Carlisle · Chatham · Chelmsford · Chester · Chichester · Chippenham · Colchester · Coventry · Crawley · Croydon · Darlington · Derby · Doncaster · Ealing Broadway · Eastbourne · Edinburgh · Eltham · Exeter · Gloucester · Guildford · Hammersmith · Hanley · Harrogate · Hartlepool · Hemel Hempstead · Holborn Circus · Hull · Ilford · Ipswich · Kensington · Kidderminster · King's Lynn · Kingway · Leamington Spa · Leeds · Leicester · Letchworth · Lewisham · Lincoln · Liverpool · Loughborough · Lowestoft · Luton · Macclesfield · Maidenhead · Maidstone · Manchester · Middlesbrough · Milton Keynes · Newcastle · Newton Abbot · Northampton · Norwich · Nottingham Listergate · Nottingham Victoria · Orpington · Oxford · Peterborough · Plymouth · Pontefract · Poole · Portsmouth · Putney · Reading · Richmond · Romford · Salisbury · Sheffield · Slough · Solihull · Southampton · Southend · Stafford · Staines · Stevenage · Stockport · Stockton · Stratford East · Streatham · Sunderland · Sutton Coldfield · Swindon · Taunton · Telford · Watford · Winchester · Woking · Wolverhampton · Wood Green · Woolwich · Worcester · Worthing · Wrexham · York.


```

200 HOME : VTAB 12: HTAB 7: PRINT
    "ENTER # OF SECTIONS (2-6):
    "
210 GET A#: FOR MX = 2 TO 6: IF
    A# = STR# (MX) THEN PRINT
    B#: HOME : GOTO 230
220 NEXT : GOTO 210
230 FOR J = 3 TO 6: S(J) = 0: NEXT
    J: MV = 0: S(1) = 63: FOR J = 3
    TO MX: S(J) = FN R(19) + 45
    : NEXT : IF MX = 2 THEN S(3)
    = 0
240 MV = FN R(42) + 10: FOR J =
    1 TO 15: IF MV = MT(J) THEN
    240
250 NEXT : S(2) = 63 - MV: MV = 0:
    GOSUB 680
260 HOME : HTAB 11: PRINT "WANT
    TO GO FIRST? " : GOSUB 1140
270 GET A#: IF A# = "Y" THEN 300
280 IF A# = "N" THEN 490
290 GOTO 270
300 HOME : HTAB 13: PRINT "IT'S
    YOUR TURN." B#
310 FOR I = 1 TO MX: IF TB(I) =
    TB THEN FOR P = 1 TO 1000: NEXT
    : PRINT : HTAB 3: PRINT "I G
    UESS YOU WILL CHOOSE SECTION
    "I" !" B# B#: FOR P = 1 TO 45
    00: NEXT : GOTO 360
320 NEXT : PRINT : HTAB 4: PRINT
    "ENTER SECTION #, OR Q FOR Q
    UIT: "
330 GET A#: IF A# = "Q" THEN TEXT
    : HOME : CLEAR : GOTO 920
340 FOR I = 1 TO MX: IF A# = STR#
    (I) AND S(I) THEN PRINT B#:
    GOTO 360
350 NEXT : GOTO 330
360 CS# = "": FOR B = 5 TO 0 STEP
    - 1: IF SB(1,B) THEN CS# =
    CS# + STR# (6 - B) + " : GOTO
    380

```

```

370 CS# = CS# + ". "
380 NEXT : POKE 34,15: HOME : HTAB
    18: PRINT LEFT# (CS#,6): HTAB
    18: PRINT MID# (CS#,7,6)
390 IF TB(1) = 1 THEN PRINT : HTAB
    2: PRINT "NOT MUCH CHOICE! I
    'LL MOVE FOR YOU. " B# B#: GOSUB
    1170: MV = S(1): S(1) = 0: GOSUB
    680: GOTO 470
400 PRINT : PRINT "THE PIECES IN
    SECTION "I" ARE SHOWN ABO
    VE." : POKE 34,20
410 PRINT "ENTER YOUR MOVE AS 1-
    3 ADJACENT DIGITS": INPUT "I
    N ASCENDING ORDER, & HIT 'RE
    TURN' " : A#: IF LEFT# (A#,1)
    = "Q" THEN TEXT : HOME : CLEAR
    : GOTO 920
420 FOR J = 1 TO 15: IF LM#(J) =
    A# THEN GOSUB 820: GOTO 450
430 NEXT
440 HOME : FLASH : HTAB 5: PRINT
    "THAT MOVE DOES NOT COMPUTE!

```

```

1140: FOR P = 1 TO 2000: NEXT
    : IF TB = 0 THEN 840
480 MV = 0: GOSUB 680
490 HOME : HTAB 14: PRINT "IT'S
    MY TURN." B#: PRINT : FOR P =
    1 TO 1500: NEXT : IF TB < 5 OR
    DF = 3 THEN 510
500 IF DF = 1 OR ( RND (1) > .5 AND
    TB > 7) THEN 640
510 POKE QL,QX: POKE Q3, FN G(S(
    1)): FOR J = 2 TO MX: POKE Q
    1, PEEK (Q3): POKE Q2, FN G(
    S(J)): CALL QB: NEXT J: SUM =
    PEEK (Q3)
520 IF NOT SUM AND TB < 5 THEN
    FOR P = 1 TO 1000: NEXT : FLASH
    : HOME : VTAB 15: HTAB 15: PRINT
    "I GIVE UP! " : GOSUB 1160: GOSUB
    1170: NORMAL : GOTO 840
530 IF NOT SUM THEN 640
540 IF TB < 3 THEN HTAB 3: PRINT
    "SORRY ABOUT THIS NEXT MOVE,
    BUT..." : GOSUB 1120: GOTO 5
    60
550 IF TB < 5 THEN HTAB 3: PRINT
    "I DON'T THINK MUCH OF YOUR
    CHANCES!": GOSUB 1130
560 FOR P = 1 TO 500: NEXT : POKE
    Q1,SUM: FOR I = 1 TO MX: POKE
    Q2, FN G(S(I)): CALL QB: IF

```

```

    FN G(S(I)) > PEEK (Q3) THEN
    580
570 NEXT : STOP : REM PROGRAM ER
    ROR
580 W# = PEEK (Q3): FOR J = 1 TO
    15: GOSUB 820: IF NOT OK THEN
    600
590 IF FN G(S(I) - MT(J)) = W# THEN
    610
600 NEXT : STOP : REM PROGRAM ER
    ROR
610 MV = MT(J): S(I) = S(I) - MV: GOSUB
    680: HOME : HTAB 2: PRINT "I
    'VE REMOVED "TM" PIECE": IF
    TM > 1 THEN PRINT "S"
620 PRINT " FROM SECTION "I": GOSUB
    1140: FOR P = 1 TO 2000: NEXT
    : IF TB = 0 THEN 1030
630 MV = 0: GOSUB 680: GOTO 300
640 FOR P = 1 TO 1000: NEXT
650 I = FN R(MX) + 1: IF NOT S(
    I) THEN 650

```

```

    : NORMAL : PRINT : GOSUB 11
    60: GOTO 410

```

```

450 IF NOT OK THEN 440
460 MV = MT(J): S(I) = S(I) - MV: GOSUB
    680
470 HOME : HTAB 6: PRINT "YOUR M
    OVE IS DISPLAYED ABOVE. " : GOSUB

```

SUPER NIM



GAMES

Get all the latest APPLE
GAMES here!

- Raster Blaster**£16.95
Have your own pinball machine within the Apple II.
- Apple Panic**£14.95
Don't let the apples eat you as you race up & down the ladders
- Pool 1.5**£18.95
Play pool on your Apple, improve your game.
- Zork**£24.95
The best adventure game yet.
- Sneakers**£16.95
There are Sneakers, Cyclops, Saucers, Fangs, H-Wings ... and more
- Autobahn**£14.95
Drive your car down the Autobahn, avoid collision if possible.
- Epoch**£19.95
Guide your spaceship through the galaxy. Shoot down the aliens, go through time warps, refuel on friendly bases.
- Gorgon**£24.95
- The Warp Factor**£24.95
This galaxy game is one of the trickiest on the market.
- Cranston Manor**£17.95
The latest in the Hi-res Adventure series.
- Pegasus II**£17.95
- Missile Defence**£17.95
Defend the cities against rocket attack. Three ground bases.
- And of course we still have all your favourites: The Galactic Saga, Alien Rain, Alien Typhoon, Snoggle, Old-or's Revenge, Draw Poker, The Wizard & the Princess ... & lots more.*
- All prices plus VAT, postage & packing free.
Dealer Enquiries welcome.

Contact: **SBD Software**
15 Jocelyn Road Richmond TW9 2TJ
Tel: 01-948 0461

Circle No. 124



Why Wait — ATOMS in Stock

Contact the ACORN SPECIALIST IN YORKSHIRE

- New Hardware
- *ACORN GP-80 Printer + Cable £232.00
 - *ATOM Word Pack ROM £ 30.00
 - *ATOM Word Processor = Expanded ATOM + GP-80 + ATOM Word Pack ROM + Cable £475.00
 - *Extra Memory per 1K £ 3.20
- New Software from ACORNSOFT
- *GAME 1 Asteroids + Subhunt + Breakout £ 11.50
 - *GAME 2 Dogfight + Mastermind + Zombie £ 11.50
 - *GAME 3 Rat trap + Lunar Lander + Black Box £ 11.50
 - *GAME 4 Star trek + Four Row + Space Attack £ 11.50
 - *GAME 5 Invaders + Wumpus + Reversi £ 11.50
 - *GAME 6 Dodgems + Simon + Amoeba £ 11.50
 - *GAME 7 Green Things + Ballistics + Snake £ 11.50
 - *GAME 8 Stargate + Go-Moku + Robots £ 11.50
 - *SOFT VDU New character set design £ 11.50
 - *MATHS PACK 1.MATHS PACK 2.MATHS PACK 3. £ 11.50
 - *UTILITY PACK 1. Disassembler + Fast COS + Renumber £ 11.50
 - *ATOM DATABASE Versatile & efficient £ 11.50
 - *PEEKO-Processor Simulates micro £ 11.50
 - *ATOM FORTH Full implementation £ 11.50
 - *ATOM FORTH User's Guide £ 5.00

BOOKS

- *ATOM Business by J. Phipps £ 6.95
- *ATOM Business (Cassette) £ 8.63
- *The ATOM Magic Book £ 5.50
- *Getting Acquainted With Your ACORN ATOM £ 7.95

ALL PRICES INCLUDE UK P&P + VAT WHERE APPLICABLE



ELTEC SERVICES LIMITED
232 MANNINGHAM LANE
BRADFORD BD8 7HH
TEL: 0274-491372



Circle No. 125

FROM THE PUBLISHERS OF THE BEST SELLING BOOKS FOR THE SINCLAIR COMES:

Not Only
But Also...
PROGRAMS FOR THE
SINCLAIR ZX81...1K

Not Only...does this book contain over 30 fully debugged and exciting programs, every one of which will fit into the basic 1K memory of your Sinclair ZX81 — including programs such as STAR WARS, LUNAR LANDER, BLACKJACK, MINI ADVENTURE, DRAUGHTS, BREAKOUT.

But Also

- * Detailed explanation of how these programs were written.
- * Lots of hints on how you can write exciting programs for your ZX81.
- * Numerous space saving techniques — obviously invaluable to the ZX81 owner.
- * PEEKS and POKES and all the other 'complicated' functions are clearly explained.
- * MUCH, MUCH MORE...



£6.95

£8.95



Understanding Your ZX81 ROM

Plus special section: How to use machine code routines in your BASIC programs. by DR. I. LOGAN.

Dr Logan was the first person to disassemble the Sinclair ZX80 Monitor and was the co-author of the ZX80 COMPANION.

In UNDERSTANDING YOUR ZX81 ROM Dr. Logan illustrates all the facilities of the ZX81 Monitor, how it works and how you can use it in your own programs. A special section shows you how you can squeeze more power into your ZX81, by using machine language and machine language subroutines.

An essential book for those who really want to understand the full working of the SINCLAIR ZX81.

Published by MELBOURNE HOUSE PUBLISHERS LTD.
Send Stamped, self-addressed envelope for FREE catalogue.

THE ESSENTIAL SOFTWARE COMPANY (Visconti Ltd)
47 Brunswick Centre, London W1CN 1AF (01-837 3154)

- ☐ Please rush me NOT ONLY 30 PROGRAMS FOR THE SINCLAIR ZX81 1K: at £6.95 each
- ☐ Please also rush UNDERSTANDING YOUR ZX81 ROM by Dr. I. Logan at £8.95

I enclose a cheque/postal order for £..... +50p post and pack.

Name
Address

Circle No. 126


```

660 J = FN R(13) + 1: GOSUB 820:
    IF NOT OK THEN 660
670 GOTO 610
680 TB = 0: FOR J = 1 TO 6: TB(J) =
    0: TX = S(J): FOR B = 0 TO 5:
    T = TX / 2: TX = T: SB(J,B) =
    SGN (T - TX): TB(J) = TB(J) +
    SB(J,B): NEXT TB = TB + TB(
    J): NEXT J: IF NOT MV THEN 7
    00
690 TM = 0: TX = MV: FOR B = 0 TO
    5: T = TX / 2: TX = T: MB(B) =
    SGN (T - TX): TM = TM + MB(B
    ): NEXT
700 FOR J = 1 TO 6: ST(J) = "": FOR
    B = 5 TO 0 STEP - 1: IF J <
    > I THEN 730
710 IF NOT MV THEN 730
720 IF MB(B) THEN ST(J) = ST(J)
    ) + "D ": GOTO 750
730 IF SB(J,B) THEN ST(J) = ST(
    J) + "X ": GOTO 750
740 ST(J) = ST(J) + ". "
750 NEXT: NEXT
760 J = 2: K = 1: L = 1: GOSUB 770:
    J = 3: L = 7: GOSUB 770: J = 7
    : K = 4: L = 1: GOSUB 770: J =
    8: L = 7: GOSUB 770: GOTO 780

770 PR(J) = " " + MID$(ST(K),
    L,6) + " " + MID$(ST(K
    + 1),L,6) + " " + MID$(
    ST(K + 2),L,6): RETURN
780 TEXT: HOME: VTAB 2: IF MX <
    4 THEN VTAB 5
790 FOR J = 0 TO 4: PRINT TAB(
    7): PR(J): NEXT J: IF MX < 4 THEN
    810
800 FOR J = 5 TO 10: PRINT TAB(
    7): PR(J): NEXT
810 POKE 34,15: RETURN
820 OK = 0: POKE Q1,Q1: POKE Q1,S
    (1): POKE Q2,MT(J): CALL QB:
    IF PEEK(Q3) = MT(J) THEN
    OK = 1
830 RETURN
840 CLEAR M = 5
850 TEXT: HOME
860 IF PEEK(175) + 256 & PEEK
    (176) < 8157 THEN H8R: GOTO
    890
870 VTAB 12: HTAB 15: IF M = 5 THEN
    PRINT "YOU WIN!": GOTO 910
880 PRINT "I WIN!": GOTO 910
890 ROT = 0: SCALE = 8: GOSUB 980:
    GOSUB 990: GOSUB 1010: GOSUB
    980: FOR I = 8 TO 1 STEP -
    1: SCALE = 1: GOSUB 940: NEXT

```

```

900 SCALE = 8: GOSUB 990: FOR I =
    1 TO 32 STEP 4: ROT = 1: GOSUB
    950: NEXT: ROT = 32: GOSUB 9
    90: ROT = 0: FOR I = 1 TO 8:
    SCALE = 1: GOSUB 960: NEXT:
    GOSUB 1000
910 FOR I = 1 TO 5: PRINT CHR$(
    7): NEXT: FOR I = 1 TO 300
    0: NEXT
920 GOSUB 1110: VTAB 21: PRINT "
    WANT TO PLAY ANOTHER GAME? "
    : GET A$: IF A$ = "Y" THEN
    FOR I = 770 TO 906: READ J:
    NEXT: TEXT: HOME: GOSUB
    1180: GOTO 160
930 TEXT: HOME: VTAB 11: HTAB
    7: PRINT "IT'S BEEN FUN PLAY
    ING WITH YOU.": PRINT: HTAB
    7: PRINT "SO LONG UNTIL NEXT
    TIME!": PRINT CHR$(7): END
940 GOSUB 980: GOSUB 970: GOSUB
    980: RETURN
950 GOSUB 990: GOSUB 970: GOSUB
    990: RETURN
960 GOSUB 1000: GOSUB 970: GOSUB
    1000: RETURN
970 FOR J = 1 TO 5: K = PEEK(-
    16336): NEXT: RETURN
980 XDRAW 2 AT 140,60: RETURN
990 XDRAW 3 AT 140,100: RETURN
1000 XDRAW W AT 140,60: RETURN
1010 FOR I = 1 TO 3: FOR J = 100
    TO 30 STEP - 10: K = 5: GOSUB
    1020: NEXT: FOR J = 30 TO 1
    00 STEP 10: K = 5: GOSUB 1020
    : NEXT: NEXT: RETURN
1020 POKE 768,J: POKE 769,K: CALL
    770: RETURN
1030 CLEAR M = 4: GOTO 850
1040 HOME: HTAB 5: PRINT "IN TH
    IS GAME, YOU AND I TAKE": PRINT
    "TURNS REMOVING PIECES FROM
    A DISPLAY": PRINT "SHOWN ON
    THE SCREEN. FROM 1-3 PIECES"
1050 PRINT "MAY BE REMOVED AT EA
    CH TURN, BUT IF": PRINT "2 O
    R 3, THEY MUST BE ADJACENT E
    ITH": PRINT "HORIZONTALLY
    OR VERTICALLY.": PRINT
1060 HTAB 5: PRINT "WHEN IT IS Y
    OUR TURN TO PLAY, CHOOSE": PRINT
    "FIRST THE SECTION OF THE DI
    SPLAY WHERE": PRINT "YOU WIS
    H TO MOVE, AND THEN SPECIFIC
    ": PRINT "PIECES, WHICH YOU
    CAN PICK BY NUMBER.": PRINT
1070 HTAB 5: PRINT "THE PLAYER W
    HO TAKES THE LAST PIECE": PRINT
    "OF THE ENTIRE DISPLAY WINS
    THE GAME.": PRINT: HTAB 5: PRINT
    "YOU CAN VARY MY LEVEL OF SK
    ILL,"

```

```

1080 PRINT "AND CAN ALSO VARY TH
    E INITIAL NUMBER": PRINT "OF
    SECTIONS, FROM 2 TO 6. YOU
    HAVE": PRINT "YOUR CHOICE, A
    FTER SEEING THE INITIAL": PRINT
    "DISPLAY, OF GOING FIRST OR
    SECOND."
1090 PRINT "THEORETICALLY, YOU C
    AN WIN EVERY GAME!": PRINT:
    GOSUB 1170: PRINT "HIT ANY
    KEY WHEN YOU ARE READY TO PL
    AY.": GOSUB 1110
1100 X = RND(1): X = PEEK(- 1
    6384): IF X < 128 THEN 1100
1110 POKE - 16368,0: RETURN
1120 POKE PI,255: POKE DU,190: CALL
    BE: FOR PA = 1 TO 50: NEXT:
    POKE DU,127: CALL BE: POKE
    PI,190: POKE DU,255: CALL BE
    : RETURN
1130 POKE PI,180: FOR K = 1 TO 3
    : POKE DU,75: CALL BE: FOR P
    A = 1 TO 50: NEXT: NEXT: POKE
    PI,228: POKE DU,255: CALL BE
    : RETURN
1140 FOR I = 1 TO 8: J = 240 / I:
    POKE PI,J: POKE DU,I: CALL
    BE: NEXT: RETURN
1150 POKE PI,230: POKE DU,255: CALL
    BE: RETURN
1160 FOR K = 1 TO 300: L = PEEK
    (CL): NEXT: RETURN
1170 FOR P = 1 TO 3000: NEXT: RETURN
1180 PI = 768: DU = 769: BE = 770: C
    L = - 16336: B$ = CHR$(7):
    Q6 = 791: Q1 = 792: Q2 = 793: Q
    2 = 794: Q3 = 799: QA = 41: QX =
    73
1190 G$ = "0112102312030334102301
    3223303215100323340312302123
    31320534254152": IF LEN(G$
    ) < > 64 THEN STOP: REM E
    NTRY ERROR
1200 DEF FN B(J) = VAL ( MID$(
    G$,J + 1,1)): DEF FN R(J) =
    INT ( RND (1) & J)
1210 DIM LM$(15): FOR J = 1 TO 1
    5: READ LM$(J): NEXT
1220 DATA 1,2,3,4,5,6,12,23,45,
    56,14,25,36,123,456
1230 DIM MT(15): FOR J = 1 TO 15
    : READ MT(J): NEXT
1240 DATA 32,16,8,4,2,1,48,24,6
    ,3,36,18,9,56,7
1250 PR$(0) = " 1 2
    3: PR$(10) = " 4
    5 6"
1260 PR$(1) = " "
    $: PR$(4) = PR$(1): PR$(6) =
    PR$(1): PR$(9) = PR$(1): PR$(5
    ) = "*****"
    $$$: RETURN

```


Can you find the passage which will beat the computer and give your pieces victory? A colourful boardgame comes to life on the screen.

Rainbow Passage runs on a VIC-20. By Ivor Stones

RAINBOW PASSAGE

Rainbow Passage is a first class example of how a board game can be brought to life on a computer screen.

A simple strategy game, Rainbow Passage makes good use of the Commodore VIC-20's colour graphics facilities and the addition of appropriate sound effects give a dimension which cardboard games cannot match.

Your objective is simply to get one of the diamond-shaped pieces at the bottom of the screen to the top of the board before the computer can move one of his tokens to the bottom.

Taking alternate turns, you and the computer each move one of your four tokens forwards,

either to the square directly in front or the one diagonally left or right.

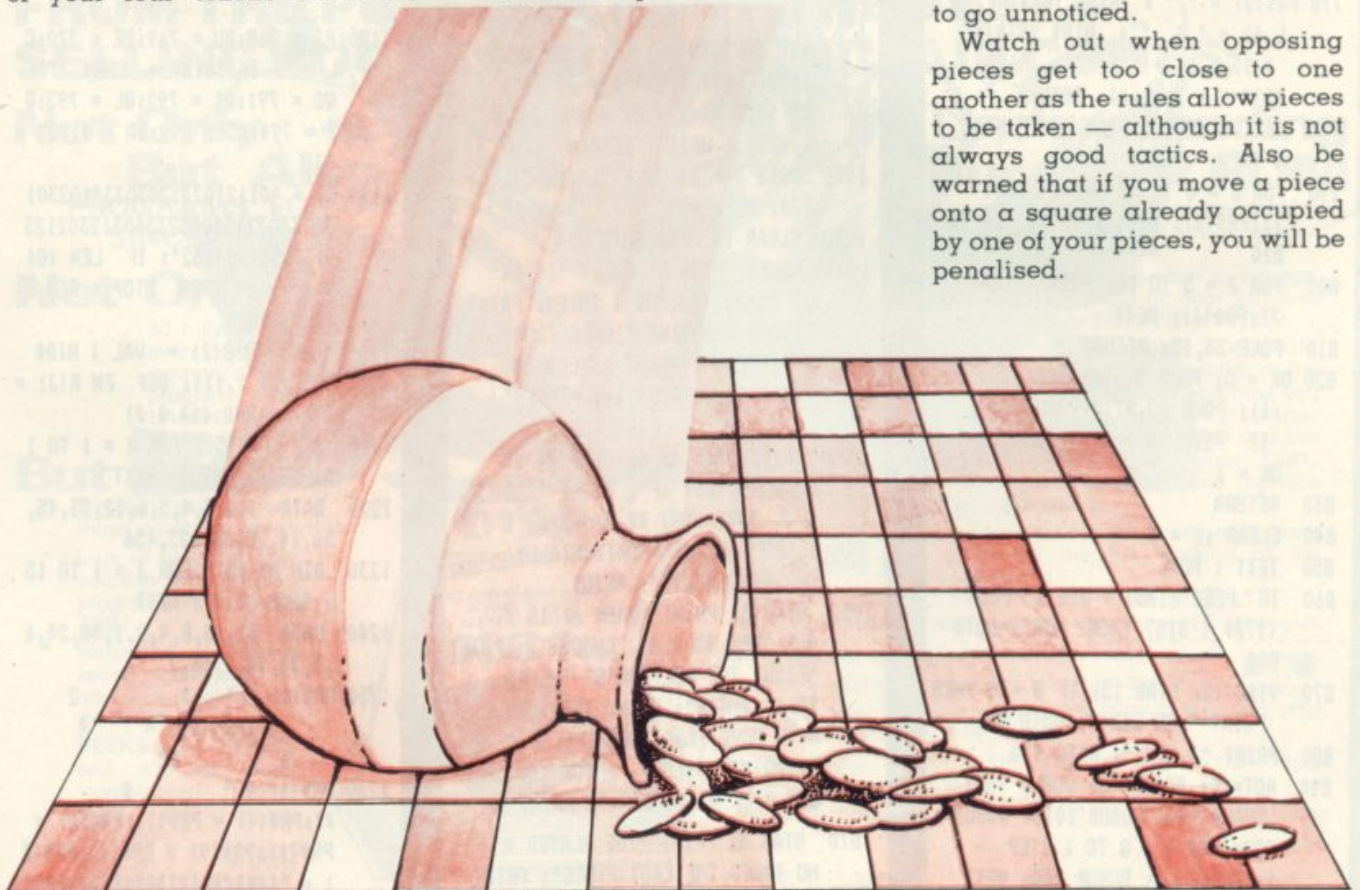
You go first and indicate which piece you wish to move. Then the computer asks which of the three possible squares you wish to move onto. The only rule you have to follow is that the colour of the square you move onto must be the same as one of the colours directly in front of a computer piece.


These simple rules are the

foundation on which you will build a cunning colour strategy. Ideally you should select a route to the other side of the board which will always put the same colour directly in front of you, taking care first to position your other three tokens so that they are behind the same colour.

Should the idea of the computer beating you prove unbearable, fear not because the understanding VIC will let you cheat a little. But don't expect it to go unnoticed.

Watch out when opposing pieces get too close to one another as the rules allow pieces to be taken — although it is not always good tactics. Also be warned that if you move a piece onto a square already occupied by one of your pieces, you will be penalised.





```

1 REM RAINBOW PASSAGE--FOR A 3.5K VIC-20
2 REM (C) I.A.STONES..MR.MICRO.LTD
3 D$="XXXXXXXXXXXXXXXXXXXX"
4 DIMBK%(13,13),F%(13,13)
5 G=7680:C=38400:B=36879:POKEB,8:PRINT" "
6 BL=209:DI=218:BK=208:SO=36876:V=36878:N=36877
7 PRINT" " RAINBOW PASSAGE "
8 FORI=1TO12:FORJ=1TO12:BK%(I,J)=RND(1)*6+1.4:NEXTJ,I:GOSUB9:GOTO21
9 REM
10 U=0
11 FORI=1TO12
12 P=G+89+22*I
13 POKEP,103:POKEP+13,101
14 FORJ=1TO12
15 POKEJ+P,80+128
16 POKEJ+P+30720,BK%(I,J)
17 NEXTJ,I
18 PRINT"XXXXXXXX ABCDEFGHIJKL "
19 PRINT"XXXXXXXX";:FORI=65TO76:PRINTCHR$(I):NEXT
20 PRINT"X"LEFT$(D$,17)"
21 REM
22 FORI=1TO12:FORJ=1TO12:F%(I,J)=BK:NEXTJ,I
23 F%(1,3)=BL:F%(1,5)=BL:F%(1,7)=BL:F%(1,9)=BL
24 F%(12,4)=DI:F%(12,6)=DI:F%(12,8)=DI:F%(12,10)=DI
25 GOSUB26:GOSUB32:POKESO,0:GOSUB72:GOTO25
26 FORX=1TO12
27 P=G+89+22*X
28 FORZ=1TO12
29 POKEZ+P,F%(X,Z)
30 NEXTZ,X:POKEN,0
31 RETURN
32 PRINT"X"LEFT$(D$,19);:FORI=1TO44:PRINT" ";:NEXT
33 FORI=1TO20:GETA$:NEXT
34 PRINT"X"LEFT$(D$,18)"POSSIBLE MOVES ARE-":GOSUB47:PRINT:PRINT".?M' IF YOU'
RE STUCK
35 PRINT"XXXXXXXX"TAB(16)"XYOURXXXXMOVEXXXXXXROW ";
36 GETA$:IFA$=""THEN36
37 IFA$="M"THENRETURN
38 IFA$>"M"ORA$<"A"THEN36
39 PRINTA$:PRINTTAB(16)"XCOL ";
40 GETB$:IFB$=""THEN40
41 PRINTB$;:IFB$>"L"ORB$<"A"THENPRINT"|| ";:GOTO40
42 PRINT:PRINT"X"TAB(16)"XUP,XXXXXLEFT,XXXXXRIGHTXXXXX?";
43 GETC$:IFC$=""THEN43
44 PRINTC$:IFC$<"U"ANDC$<"L"ANDC$<"R"THENGOSUB96:GOTO35
45 GOTO59
46 PRINT"XXXXX":FORI=1TO10:PRINTTAB(16)"
47 X=0:FORI=1TO12:FORJ=1TO12
48 IFF%(I,J)=BLTHENL%=BK%(I+1,J):GOSUB50
49 NEXTJ,I:RETURN
50 C(X)=L%X=X+1
51 PRINT"X";:ONL%GOTO52,53,54,55,56,57,58

```


NewBear Limited



sharp operators go to Newbear



Newbear is the biggest Sharp dealer in the country.

FOR THE MZ-80K HARDWARE

MZ80-K 48K RAM	£410.00
MZ80-K 48K RAM	£410.00
MZ80K-FD DUAL DISC UNIT	£589.00
MZ80K-P3 PRINTER	£385.00
MZ80K-105 SLOT I/O BOX	£87.00
BI-DIRECT. V24/RS232 CARD	£99.50
UNIVERSAL I/O CARD	£45.00
RS232 I/O BOX WITH PSU	£64.95
(SINGLE DIRECT NO I/O BOX REQD. O/P ONLY)	

GAMES BOOKS. WORD PROCESSING. EDUCATION PRINTERS. DISCS. + THE LATEST MZ-80B!

GAMES

ANIMATE	£5.50	GUESS WORD	£5.50	RACING	£5.50
BLOCKADE	£5.50	GUN	£5.50	RACETRACK	£5.50
BOMBER	£5.50	HANGMAN	£5.50	RAIDER	£5.50
BREAKOUT	£5.50	HEADON	£5.50	REACTOR	£5.50
CAMELOT	£5.50	HOME BUDGET	£5.50	ROAD HUNTER	£8.00
CATCH 2000/INVADER	£5.50	HUNTER KILLER	£5.50	RHYMES	£5.50
CHESS	£10.50	INTRUDER	£5.50	SHAPEMATCH	£5.50
COMBAT	£5.50	J.S. LINE 4	£5.50	SHARP DEMO (GRAPHICS)	£5.50
CONCENTRATION	£5.50	LARGE DISPLAY	£5.50	SHOWJUMPING	£5.50
CRIBBAGE	£10.50	LIFE	£8.00	SNAKES & LADDERS	£5.50
DONKEY DERBY	£5.50	LUNAR	£5.50	SPACE BATTLE	£5.50
ELECTRONIC ORGAN	£5.50	LUNAR LANDER	£5.50	SPACE INVADERS	£5.50
ENIGMA	£5.50	MAP OF ENGLAND	£5.50	SPACE PURSUIT	£5.50
EVASION	£5.50	MASTERMIND	£5.50	STAR TREK	£5.50
EXECUTIVE	£8.00	MIZ MAZE	£8.50	STOMPER	£5.50
EXPLORING AFRICA	£5.50	MONKEY CLIMB	£5.50	SUBMARINE	£5.50
FALL OUT	£5.50	MORTAR ATTACK	£5.50	SUPER FIRE	£5.50
FIREBALLS	£5.50	PATIENCE	£5.50	SUPER SIMON	£5.50
4 INAROW	£5.50	POKER	£5.50	SWORDMAN	£8.00
FRUIT MACHINE	£5.50	PONTOON	£5.50	MAZE TANKWARP/WALL	£5.50
GRAPHICS/MUSIC PACK	£5.50	PRINCESS & MONSTER	£5.50	TEN PIN BOWLING	£5.50
TYCOON	£5.50	3D	£5.50	TRADER SMITH	£8.00
				U.F.O.	£5.50

UTILITY PACKAGES

APOLLO WORD PROCESSOR V1.9	£10.50	DISASSEMBLER (ZEN COMPATIBLE)	£10.50
ANIMATE	£24.95	CRYSTAL BASIC	£40.00
CASSETTE DATABASE	£5.50	SUPER COPY	£10.50
BASIC EXTENSIONS	£29.50	PROGRAM FILING INDEX	£5.50
ARDENSOFT TOOLKIT	£13.00	MUSIC COMPOSER-EDITOR	£10.50
CP/M (INCLUDES HARDWARE MOD., CP/M DISC & FULL DOCUMENTATION)	£35.00	DOUBLE PRECISION BASIC FOR THE MZ80K DISC SYSTEM	£10.50
ZEN EDITOR/ASSEMBLER	£150.00	PASCAL SP4015 (CASSETTE)	£4.00
SHARP EDITOR/ASSEMBLER	£19.50		£50.00
ZEN-DOS	£45.00		
SHARP MACHINE CODE TAPE & MANUAL	£37.50		
	£22.50		

**SEND
FOR FULL
CATALOGUE**

Please add V.A.T. to all prices

Newbear Limited. (Head Office) 40 Bartholomew St., Newbury, Berks.
Tel: (0635) 30505. Telex: 848-507 NCS
Newbear Limited. First Floor Offices: Tivoli Centre, Coventry Road, Birmingham.
Tel: (021) 707-8255
Newbear Limited. Stockport Road, Cheadle Heath, Manchester.
Tel: (061) 491-2290

EDUCATIONAL PACKAGES

TIMETABLING AID	£19.50
CHILDRENS MATHS	£5.50
PHONE FOR LATEST LIST	

BUSINESS PACKAGES

STOCK CONTROL (DISC)	£95.00
MAILING LIST (DISC)	£19.50
MAILING LIST (CASSETTE)	£14.50

Please send me details of:

Name _____
Company _____
Address _____

VIC

RAINBOW PASSAGE

```

52 PRINT "WHITE"; RETURN
53 PRINT "RED"; RETURN
54 PRINT "CYAN"; RETURN
55 PRINT "PURPLE"; RETURN
56 PRINT "GREEN"; RETURN
57 PRINT "BLUE"; RETURN
58 PRINT "YELLOW"; RETURN
59 A=ASC(A$)-64: B=ASC(B$)-64
60 IFC$="U" THEN C=0
61 IFC$="L" THEN C=-1
62 IFC$="R" THEN C=1
63 IFF%(A,B) <> D THEN GOSUB 96: GOTO 35
64 F%(A,B)=BK
65 IFA-1=1 THEN PRINT "YOU WIN!!!!": GOTO 105
66 F%(A-1,B+C)=DI
67 F=0: FOR X=0 TO 3: IFBK%(A-1,B+C)=C(X) THEN F=1
68 NEXT X: IFF=1 THEN F=0: GOTO 71
69 PRINT "CHEAT!"
70 POKEV, 150: POKEV, 15: GOSUB 97
71 GOSUB 103: GOSUB 26: GOTO 46
72 PRINT "MY MOVE"
73 FOR I=1 TO 2000: NEXT
74 PRINT "
75 Z=0: FOR I=1 TO 12: FOR J=1 TO 12
76 IFF%(I,J)=D THEN Q%(Z)=BK%(I-1,J): Z=Z+1
77 POKEV, 7: POKEV, 0: RND(1)*128+128
78 NEXT J, I: POKEV, 0
79 FOR I=1 TO 12: STEP -1
80 FOR J=1 TO 12: STEP -1
81 IFF%(I,J)=BL THEN GOSUB 85
82 NEXT J, I
83 IF K=0 THEN PRINT "I'M STUCK"
84 K=0: RETURN
85 K=0
86 FOR Z=-1 TO 1: FOR Q=0 TO 3
87 IFBK%(I+1,J+Z)=Q%(Q) THEN F%(I,J)=BK: F%(I+1,J+Z)=BL: J=1: Q=3: Z=1: K=1
88 IF K=1 THEN POKEV, 9: GOSUB 103
89 NEXT Q, Z
90 GOSUB 26: IF K=1 AND I=1 THEN PRINT "HOOORAY I'VE WON!": GOTO 105
91 POKEV, 0: IF K=1 THEN I=1
92 IF K=0 THEN PRINT "HMMM!!"
93 FOR X=1 TO 1000: NEXT
94 PRINT "
95 RETURN
96 PRINT "INVALID MOVE!"
97 PRINT "
98 FOR I=1 TO 11
99 PRINT TAB(16) "
100 NEXT
101 FOR Z=1 TO 6000: NEXT
102 PRINT "
103 POKEV, 15: FOR S=128 TO 200: POKEV, S: NEXT
104 POKEV, 0: POKEV, 0: RETURN
105 FOR I=1 TO 50: GOSUB 103: NEXT: RUN
READY.

```



On patrol above the dam and town you are sworn to protect, you suddenly notice huge creatures with drooling snapping jaws coming out of the east . . .

Nibblers runs on a 32 column Pet in 8K. By Paul Jay

A swarm of locusts has nothing on the Nibblers. And trying to keep the little devils in check can be a fulltime occupation as they try to eat their way through a dam protecting the town lying next to it.

From a bomber plane, patrolling the skies above the town, your task is to blast the Nibblers as they swoop over the town to bite chunks out of the dam with their iron-like jaws.

The dam is located on the left hand side of the screen and players can choose their own thickness — but be warned, Nibblers make short work of thin dams. While you're getting the hang of the game it is best to keep the dam at its thickest.

BEWARE OF...

From the right hand side of the screen come the high speed nibblers flying at different levels. Some attack the dam at its highest point. Others are low-flying and move in to take chunks out of the town on the way.

For each Nibbler bombed the player scores one point. The game is over either when

you have notched up five points (then you get another round of the game) or, if the Nibblers are a better aim than the bomber pilot, when they bite through any section of the dam.

Can you kill off the Nibblers without destroying the town underneath — it's a real test of marksmanship and panic firing can do as

much damage to the town you are trying to protect as the Nibblers themselves.

Follow those gleaming jaws across their flight paths and aim carefully. When the plane is hovering directly above the Nibbler drop your bomb, then speed back ready for the next creature.

It's fairly easy to shoot down the high flying Nibblers but watch out for those crafty low-flying ones — especially those hard to spot ones just above building level.

Once you've got the knack of defending the town from the Nibblers with a thick dam, then try with a thinner one.

Paul Jay has come up with an original game which is still addictive and enjoyable.



10 M1=59467:M2=59466:M3=59464

20 GOTO760

30 PRINT"J":SC=0:BU=33589

40 INPUT"THICKNESS OF DIKE 1-3 (1=HARDEST)":DT:PRINT"J"

50 IFDT>30RDT<1THEN40

60 REM DIKE

70 FORI=32848TO33728STEP40:FORJ=0TO10:POKEI+J,160:NEXTJ:NEXTI

80 FORI=32819TO33739STEP40:POKEI,230:NEXT

90 IFDT=1THEN120

100 DT=DT-2

110 FORI=32820TO33740STEP40:FORJ=0TODT:POKEI+J,102:NEXTJ:NEXTI

120 REM BUILDINGS

130 POKEBU,236:POKEBU+1,251:POKEBU+40,252:POKEBU+41,254

140 POKEBU+47,236:POKEBU+48,97:POKEBU+79,97:POKEBU+80,252:POKEBU+81,254

150 POKEBU+84,88:POKEBU+87,236:POKEBU+88,97:POKEBU+91,225:POKEBU+97,225

160 POKEBU+114,233:POKEBU+115,223:POKEBU+116,225:POKEBU+119,97:POKEBU+120,252

170 POKEBU+121,254:POKEBU+123,233:POKEBU+124,227:POKEBU+127,236:POKEBU+128,97

180 POKEBU+125,223

190 POKEBU+131,225:POKEBU+132,254:POKEBU+133,254:POKEBU+134,254:POKEBU+135,254

200 POKEBU+136,254:POKEBU+137,254:POKEBU+154,252:POKEBU+155,254:POKEBU+156,225

210 POKEBU+157,108:POKEBU+158,233:POKEBU+159,97:POKEBU+160,252

220 POKEBU+161,254:POKEBU+162,236:POKEBU+163,227:POKEBU+164,236

230 POKEBU+165,227:POKEBU+167,236:POKEBU+168,97:POKEBU+169,98:POKEBU+170,98

240 POKEBU+171,254:POKEBU+172,227:POKEBU+173,227:POKEBU+174,227

250 REM RANDOM POS IN RIGHT COLUMN

260 REM NIBBLER ON

270 QQ=1:BB=INT(23*RND(1)+1)*40+32847

280 B1=PEEK(BB)

290 POKEBB,61

300 FORI=1TO20:NEXT

310 POKEBB,62

320 FORI=1TO20:NEXT

330 IFB1=230THENPOKEBB,32:POKEBB+41,223:GOTO540

340 IFB1=102THENPOKEBB,32:POKEM1,16:POKEM2,60:POKEM3,180:POKEM1,0:GOTO270

350 IFB1=102THENPOKEBB,32:POKEM1,16:POKEM2,60:POKEM3,180:POKEM1,0:GOTO270

360 P=151:L=PEEK(P)

370 IFL=1ANDQQ=1THENGOTO410

380 POKEBB,B1

390 BB=BB-1

400 GOTO290

410 FORZ1=32768TO32807

420 POKEZ1,62

430 POKEM1,16:POKEM2,35:POKEM3,200:POKEM1,0

440 P=151:L=PEEK(P)

450 IFL=6THEN490

460 POKEZ1,32

470 NEXTZ1

480 GOTO380

490 FORXX=21TO33767STEP40:POKEXX,46

500 IFPEEK(XX+40)=62THENPOKEXX,32:POKEXX+40,32:POKEXX+80,32:GOSUB680:GOTO120

510 IFPEEK(XX+40)<>32THENPOKEXX,32:XX=33767

520 POKEXX,32:NEXTXX:QQ=0

530 GOTO380

540 FORI=BB+81TO33767STEP40:POKEI,160:NEXTI

545 POKEM1,16:POKEM2,25:POKEM3,120:POKEM1,0

NIBBLERS

THE SHARP MZ-80K HAS GOT IT ALL

STOP PRESS... NOW AVAILABLE
BASIC COMPILER
PASCAL (CASSETTE BASED)
DOUBLE PRECISION DISC BASIC

NOW ONLY
R.R.P.
£460 +Vat
48K



Since its introduction the Sharp MZ-80K has proved to be one of the most successful and versatile microcomputer systems around. Sharp now have a comprehensive range of products ready to make the powerful MZ-80K with its Printer and Disc Drives even more adaptable.

Products include: - Universal Interface Card, Machine Language and Z-80 Assembler packages, CP/M* plus a comprehensive range of software.

*Trade mark of Digital Research Ltd.

You'll find all the help and advice you need about the MZ-80K at your Specialist Sharp Dealer in the list below.

If there is no dealer in your area, or if you require any further information write to: - Computer Division, Sharp Electronics (UK) Ltd., Sharp House, Thorp Road, Newton Heath, Manchester M10 9BE.

SHARP
First, and foremost

GET IT ALL HERE ...

AVON
BCG Shop Equipment Ltd
Bristol, Tel: 0272 425338
Decimal Business M/Cs Ltd
Bristol, Tel: 0272 294591
BEDFORDSHIRE
H.B. Computers (Luton) Ltd
Luton, Tel: 0582 416887
BERKSHIRE
Newbear Computing Store Ltd
Newbury, Tel: 0635 30505
BIRMINGHAM
Camden Electronics
Small Heath, Tel: 021-773 8240
E.B.S. Ltd
Birmingham, 1, Tel: 021-233 3045
Electronic Business Systems Ltd
Birmingham, Tel: 021-384 2513
Jax Rest Ltd
Birmingham, Tel: 021-328 4908
Newbear Computing Store Ltd
Birmingham B26, Tel: 021-707 7170
BUCKINGHAMSHIRE
Interface Components Ltd
Aylesbury, Tel: 0245 223037
CHESHIRE
Charlesworth of Crew Ltd
Crewe, Tel: 0270 56342
Cash Register Services
Chester, Tel: 0244 317549
Cheshire Computer Services Ltd
Levenshulme, Tel: 061-225 4763
Fletcher Worthington Ltd
Hale, Tel: 061-928 8928
Newbear Computing Store Ltd
Stockport, Tel: 061-491 2290
Ors Group Ltd
Warrington, Tel: 0925 67411
CLEVELAND
Hunting Computer Services Ltd
Stockton-on-Tees, Tel: 0642 769709

DERBYSHIRE
Chandos Products
New Mills, Tel: New Mills 44344
Lowe Electronics Ltd
Matlock, Tel: 0629 2817
DEVON
Crystal Electronics Ltd
Torquay, Tel: 0833 22699
Plymouth Computers
Plymouth, Tel: 0752 23042
EXETER
Peter Scott (Exeter) Ltd
Exeter, Tel: 0392 73309
DORSET
South Coast Business M/Cs
Ferndown, Tel: 0202 893040
ESSEX
Pronole Ltd
Vale of Rea, Tel: 0702 335298
GLOUCESTERSHIRE
Gloucestershire Shop Equipment Ltd
Gloucester, Tel: 0452 36012
HAMPSHIRE
Advanced Business Concepts
New Milton, Tel: 0425 618181
Xitan Systems Ltd
Southampton, Tel: 0703 39890
KENT
Video services (Bromley) Ltd
Bromley, Tel: 01-460 8833
LANCASHIRE
B & B Computers Ltd
Bolton, Tel: 0202 26644
H. R. Control Systems Ltd
Chorley, Tel: 02572 75234
Sound Service
Burnley, Tel: 0282 38481
Sumita Electronics Ltd
Preston, Tel: 0772 51696
The Micro Chip Shop
Blackpool, Tel: 0253 403122

LEICESTERSHIRE
Gilbert Computers
Lubenham, Tel: 0838 65894
G.W. Cowling Ltd
Leicester, Tel: 0533 556268
Leicester Computer Centre
Leicester, Tel: 0533 556268
Mayes Hi-Fi
Leicester, Tel: Leics 22213
LINCOLNSHIRE
Howes Elect. & Autom. Servs.
Lincoln, Tel: Lincoln 32379
Z. R. Business Consultants
Lincoln, Tel: 0522 680087
LONDON
Bridgewater Accounting
Whetstone, Tel: 01-446 0320
Butel-Compos Ltd
Hendon, Tel: 01-202 0262
Central Calculators Ltd
London EC2, Tel: 01-729 5588
Digital Design & Development
London W1, Tel: 01-367 7388
Euro-Calc Ltd
London WC1, Tel: 01-405 3223
Euro-Calc Ltd
London EC2, Tel: 01-729 4955
Euro-Calc Ltd
London W1, Tel: 01-636 5560
Lion Computer Shops Ltd
London W1, Tel: 01-637 1601
Personal Computers Ltd
London EC2, Tel: 01-626 8121
Hart House
London EC2, Tel: 01-729 3035
Sumlock Bondain Ltd
London EC1, Tel: 01-253 2447

MANCHESTER
Sumlock Electronic Services Ltd
Manchester M3, Tel: 061-834 4233
Sumlock Software Ltd
Manchester M3, Tel: 061-228 3502
MERseyside
Microdigital Ltd
Liverpool, Tel: 051-227 2535
Sota Communication Systems
Liverpool L14, Tel: 051-480 5770
NORFOLK
Sumlock Bondain (East Anglia)
Norwich, Tel: 0603 26259
NORTHAMPTONSHIRE
Computer Supermarket
Corby, Tel: 0536 62971
H.B. Computers Ltd
Kettering, Northamptonshire, Tel: 0536 520910
NORTHERN IRELAND
Bronac (U.K.)
Co. Antrim, Tel: 023831 3394
O & M Systems
Belfast, Tel: 0232 49440
The Microcomputer Centre (N.I.)
Belfast, Tel: Belfast 682277
NOTTINGHAMSHIRE
Mansfield Business M/C Ltd
Mansfield, Tel: 0623 26610
OXFORDSHIRE
Oxford Computer Centre
Oxford, Tel: 0869 45172 or 0865 49349
REPUBLIC OF IRELAND
O'Connor Computers Ltd
Galway, Tel: 0009 61173
Tennant's World Ltd
Dublin 2, Tel: 0001 776961

SALOP
Computer Corner
Shrewsbury, Tel: 0743 599788
SCOTLAND
A & G Knight
Aberdeen, Tel: 0224 630526
Business and Electronics M/Cs
Edinburgh, Tel: 031-226 3434
Micra Centre
Edinburgh, Tel: 031-556 7354
Microforth
Dundee, Tel: 0383 34954
Money Instruments Ltd
Glasgow, Tel: 041-332 3621
Ponister Business Equip Ltd
Glasgow, Tel: 041-332 3621
Tyson Computers Ltd
Aberdeen, Tel: 0224 573111
SOMERSET
Norsett Office Supplies Ltd
Cheddar, Tel: 0934 742184
SOUTH HUMBERSIDE
Silicon Chip Centre
Grimsby, Tel: 0472 49353
STAFFORDSHIRE
W. B. Computer Services
Carnock, Tel: 0543 79995
SUFFOLK
C. J. R. Microtek Co. Ltd
Ipswich, Tel: 0473 50152
SURREY
I.M.B. Ltd
Croydon, Tel: 01-684 1134
Savadan Electronic Services
Wokingham, Tel: 01-669 9483
T & V Johnson (Microcomputers)
Canterbury, Tel: 0276 20446

SUSSEX
Gower
Brighton, Tel: 0273 698424
Jax Rest Ltd
Brighton, Tel: 0273 687667
M & H Office Equipment
Brighton, Tel: 0273 697231
Oval Automation
Worthing, Tel: 0903 501395
WALES
Limrose Electronics Ltd
Vintners, Tel: 097 863 5595
Morrisson Computer Centre
Swansea, Tel: 0792 795617
Sigma Systems Ltd
Cardiff, Tel: 0222 21515
WARWICKSHIRE
Business & Leisure Microcomputers
Kenilworth, Tel: 0826 512127
WORCESTERSHIRE
Capricorn Computer Systems
Worcester, Tel: 0903 21541
YORKSHIRE
Bits & P.C.s
Vetherby, Tel: 0937 63744
Dalton Micro-Centre Ltd
Sheffield, Tel: 0742 585490
Huddersfield Computer Centre
Huddersfield, Tel: 0484 20774
Neecox (D.P.) Ltd
Darlington, Tel: 0325 69540
Superior Systems Ltd
Sheffield, Tel: 0742 755005
Ram Computer Services Ltd
Bradford, Tel: 0274 391166

THE NIBBLERS



```

550 FORI=32848TOBBSTEP40:FORJ=0TO10:POKEI+J,32:NEXTJ:NEXTI
560 FORI=33767TOBB+40STEP-1:POKEI,160:NEXTI
570 PRINT"#####THE TOWN IS FLOODED!"
580 PRINT"#####AND IT'S ALL YOUR FAULT!"
590 PRINT"#####YOUR SCORE IS ";SC
600 IFSC>TSTHENTS=SC
610 PRINT"#####THE TOP SCORE IS ";TS
620 PRINT"#####ANOTHER GAME?"
630 POKE158,0
640 GETA$
650 IFA$=""THEN640
660 IFA$="Y"THEN30
670 END
680 SC=SC+1
690 POKEM1,16:POKEM2,25:FORKK=155TO1STEP-1:POKEM3,KK:NEXTKK:POKEM1,0
700 FORI=0TO100STEP10
710 IFSC-I>9THEN750
720 POKE33332,(I/10)+48
730 POKE33333,(SC-I)+48
740 RETURN
750 NEXTI
760 FORI=1TO100
770 PRINT"?"
780 PRINT"#####NIBBLERS":NEXTI
790 PRINT"#####BY PAUL JAY. 1981"
800 PRINT"#####RULES? (Y/N)"
810 GETA$:IFA$=""THEN810
820 IFA$="Y"THEN840
830 GOTO30
840 PRINT"YOU ARE THE MISSILE-LAUNCHING MAN"
850 PRINT"OF A SMALL DUTCH TOWN. (A DUTCHY)"
860 PRINT"OR MISSILE-LAUNCHING MAN (OR WOMAN'S)"
870 PRINT"JOB, IN CASE YOU DON'T ALREADY KNOW,"
880 PRINT"IS TO PROTECT THE TOWN'S DIKE FROM"
890 PRINT"#####NIBBLERS FROM OUTER SPACE !!"
900 PRINT"TO LAUNCH A MISSILE,PRESS 3=!"
910 PRINT"TO DROP A BOMB, PRESS 2SPACE!"
920 PRINT"IF THE DIKE SHOULD BE NIBBLED THROUGH"
930 PRINT"THE SURVIVING TOWNSFOLK WILL GRAB YOU "
940 PRINT"BY THE DRAFFODILS AND CAST YOU"
950 PRINT"ASUNDER!(WHATEVER THAT MEANS).GOOD LUCK."
960 POKE152,0:WAIT158,1:POKE152,0
970 GOTO30
READY.

```



Let the computer become
your lifeline to fate through the mysteries of the Tarot

Tarot runs on a Tandy TRS-80 in 16K. By Frank Rowlett

SECRETS OF

TAROT



LA FORCE



LE DIABLE.



LE MAT.



ROI DE BÂTON.



LA MORT

Something about the mysterious Tarot appeals to even the most sceptical of us. It is one of the ancient arts mankind turned to when superstition held more sway than it does now.

And with its elaborate decorations and air of mysticism, the Tarot pack was always predestined to find favour again in the 20th Century. Whether the secrets of the Tarot can transfer successfully to that fortune teller of our age, the computer, we'll leave you to judge. It is also up to you whether you use the intriguing program as a party piece or give it some deeper significance.

The Tarot pack is the forerunner of modern-day playing cards. There are 78 cards in all, divided into 22 major arcana, or trump-cards, and 56 minor arcana cards, with four suits of 14: cups, coins, swords and wands (or sceptres).

As in a modern pack, there are 10 numbered cards in each suit but there are four face cards: youth, horseman, queen and king (in some packs the knave

and horse
Some natu
resent
that en
man, th
that the
random
forces.
This T
Egyptian
card "Yes
The com
enter a q
answered b
have done
deals out fiv
left. The first
the past as it
tion. The cer
represents the
last two cards
— indicate the
The answer to
then determined
cards are dealt
upside down. A
the bottom of each
right way up.
A card right side
a "yes" response, u

OF THE

TAROT



and knight replace the youth and horseman).

Some believers in the supernatural think that the pack represents a system of philosophy embracing the true nature of the universe and God. And at the fall of the cards is not random but guided by unseen forces.

This Tarot program uses the traditional Tarot deck and the five "Yes or No" spread.

The computer first asks you to pose a question that can be answered by yes or no. Once you have done so, the computer deals five cards from right to left. The first two cards indicate the question relates to the present, the centre, or key, card indicates the present and the future — those on the left indicate the future.

Answer to your question is determined by whether the card is dealt right side up or upside down. A bar appears at the bottom of each card if it is the

right side up indicates good, upside down it indicates bad.

indicates a "no". The centre card counts twice. When all five cards have been dealt, the tally of "yes"s and "no"s determine the answer. It is possible to have an equal number of these. If this happens the answer is uncertain. This situation is caused by not concentrating properly on the cards or not asking the question sincerely — or possibly, the person who asked the question was concentrating on another question.

At times a man or woman of some astrological temperament is indicated. This does not refer to the questioner's birth sign, but means they are of that sign's temperament.

The gender of the person of astrological temperament referred to is determined by the position of the cards. When right side up, the youth and king cards mean male, upside down, female. With the queen this rule is reversed.

The horseman card indicates either good or bad situations. Right side up it represents good, upside down it indicates bad.

```

10 RANDOM: CLEAR 100: DIMA(84)
40 CLS: GOSUB 4000
50 GOTO 40
1000 REM # GET NEXT CARD #
1010 A(D)=RND(78): IFA(D+A(D))=0 GOTO 1010
1020 A(D+A(D))=0: IFA(D)>70A(D)=10*(A(D)-56)+5: GOTO 1040
1030 V=INT((A(D)-1)/5): A(D)=V*10+10+A(D)-V*5
1040 V=RND(78): IFV>39A(D)=0-A(D)
1050 RETURN
1100 REM # DRAW LAYOUT #
1110 CLS: PRINT#12, CHR$(34); "YES AND NO"; CHR$(34); " SPREAD USING
TAROT CARDS";
1120 PRINT#522, "FUTURE";: PRINT#540, "PRESENT";: PRINT#562, "PAST";:
PRINT#576, " ";
1130 FORX=0T01: SET(X,24): SET(X+48,24): SET(X+52,24): SET(X+74,24):
SET(X+78,24)
1140 SET(X+126,24): NEXTX: FORX=1T019: SET(X,25): NEXTX: FORX=32T048:
SET(X,25): NEXTX
1150 FORX=53T055: SET(X,25): NEXTX: FORX=70T074: SET(X,25): NEXTX
1160 FORX=79T099: SET(X,25): NEXTX: FORX=108T0126: SET(X,25): NEXTX
1170 FORX=0T0104STEP26: FORX=0T023: SET(X+Z,4): SET(X+Z,22): NEXTX: N
EXTZ
1180 FORX=0T0104STEP26: FORX=5T021: FORX=0T01: SET(X+Z,Y): SET(X+Z+2
,Y): NEXTX: NEXTX
1190 NEXTZ: PRINT#388, "(5)";: PRINT#401, "(4)";: PRINT#414, "(3)";: PR
INT#427, "(2)";
1200 PRINT#440, "(1)";: PRINT#961, "QUESTION: "; CHR$(34); A#: CHR$(3
4);: RETURN
1500 REM # PRINT CARDS #
1520 FORV=0T01000: NEXTV: IFS=56GOTO1640
1530 PRINT#261+13*(X-1), "OF";: W=322+13*(X-1): IFS=1PRINT#W, "SCEPT
ER";
1540 IFS=2PRINT#W, " CUPS";
1550 IFS=3PRINT#W, " COINS";
1560 IFS=4PRINT#W, " SWORDS";
1570 W=194+(X-1)*13: IFR<11PRINT#W+2,R;: GOTO1620
1580 IFR=11PRINT#W, " YOUTH";
1590 IFR=12PRINT#W, " QUEEN";
1600 IFR=13PRINT#W, " KING";
1610 IFR=14PRINT#W, "HORSEMAN";
1620 W=9+(X-1)*26: Y=21: IFA(D)<0Y=5
1630 FORV=WTOW+5: SET(V,Y): NEXTV: RETURN

```



```

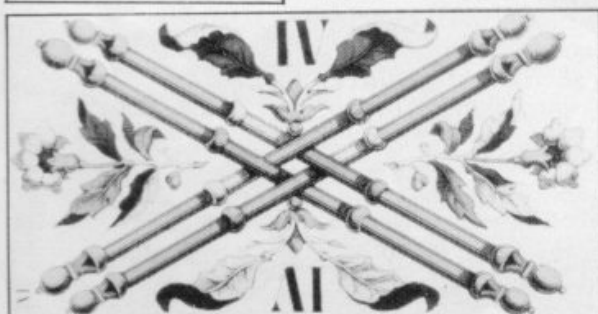
1640 PRINT@195+(X-1)*13,"MAJOR";:PRINT@258+(X-1)*13,"ARCANUM";
1650 W=323+(X-1)*13:IFR=1PRINT@W," I";
1660 IFR=2PRINT@W," II";
1670 IFR=3PRINT@W," III";
1680 IFR=4PRINT@W," IV";
1690 IFR=5PRINT@W," V";
1700 IFR=6PRINT@W," VI";
1710 IFR=7PRINT@W," VII";
1720 IFR=8PRINT@W," VIII";
1730 IFR=9PRINT@W," IX";
1740 IFR=10PRINT@W," X";
1750 IFR=11PRINT@W," XI";
1760 IFR=12PRINT@W," XII";
1770 IFR=13PRINT@W," XIII";
1780 IFR=14PRINT@W," XIV";
1790 IFR=15PRINT@W," XV";
1800 IFR=16PRINT@W," XVI";
1810 IFR=17PRINT@W," XVII";
1820 IFR=18PRINT@W," XVIII";
1830 IFR=19PRINT@W," XIX";
1840 IFR=20PRINT@W," XX";
1850 IFR=21PRINT@W," XXI";
1860 IFR=22PRINT@W," XXII";
1870 GOTO1620
2000 REM # DATA FOR CARDS #
2010 DATA1,5,WILL POWER
2020 DATA1,1,NEWS OF A BUSINESS OPPORTUNITY
2030 DATA1,2,MODS
2040 DATA1,3,REWARD,S
2050 DATA1,4,COMMUNICATION PROBLEMS
2060 DATA2,5,REVELATION THROUGH SCIENCE
2070 DATA2,1,SUCCESS IN BUSINESS VENTURES
2080 DATA2,2,A WORK OF LOVE
2090 DATA2,3,FINANCIAL GAIN THROUGH WORK
2100 DATA2,4,MARTYRDOM AND STRENGTH
2110 DATA3,5,MARRIAGE OR ACTION
2120 DATA3,1,TAKE ACTION FOR THE FUTURE
2130 DATA3,2,ROMANTIC ACTIVITY
2140 DATA3,3,GAIN THROUGH SOCIAL ACTIVITIES
2150 DATA3,4,ACTIVITY TO OVERCOME ADVERSITY
2160 DATA4,5,ABUNDANT CREATIVE ENERGY
2170 DATA4,1,SUCCESSFUL ENTERPRISE
2180 DATA4,2,RESOURCEFULNESS
2190 DATA4,3,UNEXPECTED FINANCIAL GAIN
2200 DATA4,4,FINANCIAL REVERSES
2210 DATA5,5,HELP THROUGH INSPIRATION
2220 DATA5,1,GAIN THROUGH SPECULATION
2230 DATA5,2,RESPONSIBILITY
2240 DATA5,3,PROFITABLE EVENT
2250 DATA5,4,OBSTACLES OVERCOME BY FAITH
2260 DATA6,5,STABILIZE EMOTIONS
2270 DATA6,1,AMBITION
2280 DATA6,2,USE CREATIVE IMAGINATION
2290 DATA6,3,PROFIT FROM SOCIAL AFFAIRS
2300 DATA6,4,TEMPTATION RELATING TO BUSINESS
2310 DATA7,5,SUCCESS THROUGH INTELLIGENCE
2320 DATA7,1,SPREAD OF CONSTRUCTIVE IDEAS
2330 DATA7,2,RESOLUTION OF DOMESTIC DISCORD
2340 DATA7,3,PROFITABLE VENTURE
2350 DATA7,4,PROGRESS AFTER CONFLICT
2360 DATA8,5,MODERATION IN ALL THINGS
2370 DATA8,1,BUSINESS INITIATIVE SUCCESS
2380 DATA8,2,BLEND OF PRACTICAL WITH IDEAL
2390 DATA8,3,FINANCIAL PROBLEMS

```

```

2400 DATA8,4,STRUGGLE TO MAINTAIN BALANCE
2410 DATA9,5,WISDOM AND PRUDENCE
2420 DATA9,1,WISE AND PROFITABLE FRIENDSHIP
2430 DATA9,2,EMOTIONAL STABILITY
2440 DATA9,3,INCREASE OF INCOME
2450 DATA9,4,LOSS OF FRIENDSHIP
2460 DATA10,5,CHANGE OF FORTUNE
2470 DATA10,1,A CHANGE IN STATUS
2480 DATA10,2,INCONSISTANT EMOTIONS
2490 DATA10,3,FINANCIAL LOSS AND GAIN
2500 DATA10,4,UNCONVENTIONAL ACTIONS
2510 DATA11,5,MORAL FORCE
2520 DATA12,5,DISAPPOINTMENT
2530 DATA13,5,DEATH OR TRANSFORMATION
2540 DATA14,5,DILIGENCE TO REACH GOAL
2550 DATA15,5,FATALITY OR BLACK MAGIC
2560 DATA16,5,ACCIDENT OR CATASTROPHE
2570 DATA17,5,OVERCOMING PROBLEMS
2580 DATA18,5,DECEPTION
2590 DATA19,5,HAPPINESS OR JOY
2600 DATA20,5,AWAKENING OR RESURRECTION
2610 DATA21,5,SUCCESS OR ATTAINMENT
2620 DATA22,5,SUFFERING FOLLOWED SIN
2630 DATA13,1,OF AN ARIES TEMPERAMENT
2640 DATA13,2,OF A TAURUS TEMPERAMENT
2650 DATA13,3,OF A GEMINI TEMPERAMENT
2660 DATA13,4,OF A CANCER TEMPERAMENT
2670 DATA12,1,OF A LEOPARD TEMPERAMENT
2680 DATA12,2,OF A VIRGO TEMPERAMENT
2690 DATA12,3,OF A LIBRA TEMPERAMENT
2700 DATA12,4,OF A SCORPIO TEMPERAMENT
2710 DATA11,1,OF A SAGITTARIAN TEMPERAMENT
2720 DATA11,2,OF A CAPRICORN TEMPERAMENT
2730 DATA11,3,OF AN AQUARIAN TEMPERAMENT
2740 DATA11,4,OF A PISCES TEMPERAMENT
2750 DATA14,1,ADVANTAGEOUS THOUGHTS
2760 DATA-14,1,THOUGHTS OPPOSED TO BUSINESS
2770 DATA14,2,THOUGHTS FOR PROMOTION
2780 DATA-14,2,PLANS AND DESIRES FOR DOWNFALL
2790 DATA14,3,THOUGHTS TO INCREASE POSPERITY
2800 DATA-14,3,PLOTS FOR UNFAIR ADVANTAGE
2810 DATA14,4,SINCERE THOUGHTS
2820 DATA-14,4,DECEIT AND LIES
3000 REM # PRINT MESSAGES #
3015 RESTORE:IFX=5PRINT@897,"(1) ";
3020 IFX=4PRINT@833,"(2) ";
3030 IFX=3PRINT@769,"(3) ";
3040 IFX=2PRINT@705,"(4) ";
3050 IFX=1PRINT@641,"(5) ";
3060 IFS=5GOTO3120
3070 IFR>10GOTO3350
3080 READU,V,A#,B#
3090 IF(R=U)*(S=V)GOTO3110
3100 GOTO3080
3110 PRINTA#;B#;:RETURN
3120 PRINT*(");:IFR=1PRINT"THE MAGUS";
3130 IFR=2PRINT"VEILED ISIS";
3140 IFR=3PRINT"ISIS UNVEILED";
3150 IFR=4PRINT"THE SOVEREIGN";
3160 IFR=5PRINT"THE HIEROPHANT";
3170 IFR=6PRINT"THE TWO PATHS";
3180 IFR=7PRINT"THE CONQUEROR";
3190 IFR=8PRINT"THE BALANCE";
3200 IFR=9PRINT"THE SAGE";

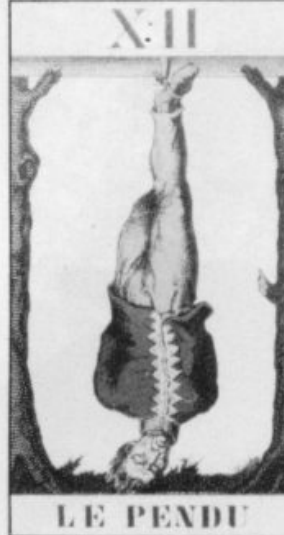
```

SECRETS OF THE TAROT

```

3210 IFR=10PRINT"THE WHEEL";
3220 IFR=11PRINT"THE ENCHANTRESS";
3230 IFR=12PRINT"THE MARTYR";
3240 IFR=13PRINT"THE REAPER";
3250 IFR=14PRINT"THE ALCHEMIST";
3260 IFR=15PRINT"THE BLACK MAGICIAN";
3270 IFR=16PRINT"LIGHTNING";
3280 IFR=17PRINT"STAR";
3290 IFR=18PRINT"MOON";
3300 IFR=19PRINT"SUN";
3310 IFR=20PRINT"SARCOPHAGUS";
3320 IFR=21PRINT"ADEPT";
3330 IFR=22PRINT"MATERIALIST";
3340 PRINT" " ;:GOTO3080
3350 IFR=14GOTO3390
3360 IF((A(L+X)>0)*(R=11)+(R=13))+((R=12)*(A(L+X)<0))GOTO3380
3370 PRINT"A WOMAN " ;:GOTO3080
3380 PRINT"A MAN " ;:GOTO3080
3390 Y=R:IFA(L+X)<0Y=0-Y
3400 READU,V,A$,B$:IF(U=Y)*(S=V)GOTO3110
3410 GOTO3400
4000 REM * START A NEW LAYOUT *
4010 D=0:FORX=1TO78:A(D+X)=X:NEXTX:L=78:FORU=1TO5:GOSUB1000:A(L+
U)=A(D):NEXTU
4020 CLS:PRINT212,CHR$(34);"YES AND NO";CHR$(34);" SPREAD USING
TAROT CARDS";
4030 PRINT2192,"PLEASE ASK A QUESTION THAT CAN BE ANSWERED BY ";
CHR$(34);"YES";CHR$(34);" " ;
4040 PRINT"OR " ;CHR$(34);"NO";CHR$(34)
4050 PRINT2320,"";:INPUTA$:PRINT2576,CHR$(34);A$;
4053 IFRIGHT$(A$,1)<>"?"THENPRINT"?";A$=A$+"?"
4056 PRINTCHR$(34)
4060 PRINT2704,"IS THIS YOUR QUESTION (YES OR NO)";:INPUTX$
4070 IFX$="NO"GOTO4020
4075 IFX$="N"GOTO4020
4080 GOSUB1100:FORX=5TO1STEP-1:IFX>0PRINT2577,"HIT 'ENTER' FOR C
ARD";:INPUTA$
4083 PRINT2577," " ;:A(D)=A(L+X):R=INT(ABS(A(D
))/10):S=ABS(A(D))-10*R
4090 GOSUB1500:GOSUB3000:NEXTX:Y=0:FORX=1TO5:IFA(L+X)>0Y=Y+1
4100 IF(X=3)*(A(L+X)>0)Y=Y+1
4110 NEXTX:PRINT2577,"";:IFY=3PRINT"THE ANSWER IS UNCERTAIN.";
4120 IFY<3PRINT"THE ANSWER IS " ;CHR$(34);"NO";CHR$(34);"." ;
4130 IFY>3PRINT"THE ANSWER IS " ;CHR$(34);"YES";CHR$(34);"." ;
4140 INPUT" (HIT 'ENTER' FOR ANOTHER READING)";A$:RETURN
  
```



A Fast finger on the bomb-bay doors is needed to blast
your way through the city to a safe landing.

City Bomb runs in 2K on a Sinclair ZX80 or ZX81. By Stephen Adams

CITY BOMB



BOMB

This is the game for those people who think only of themselves. Flying above a city full of people you find yourself running out of fuel and not a landing strip in sight.

Hmmmm! No parachutes either!

There's only one thing for it. You'll have to blow away the entire city to make a landing strip for yourself. If you attempt to land before the city has been cleared then you will crash.

The program produces a city from lines 11 down to 19 across on the screen. Should you wish to make it harder for yourself alter the first "11" in line number 60 to a greater number and the second to a smaller number.

The program was written for an 8K ROM ZX80. To convert to a ZX81, remove lines 170 and 520 to improve the picture. Both programs are under 2K long.

```
10 PRINT "DO YOU WISH INSTRUCTIONS"
20 INPUT CS
30 IF CODE CS=62 THEN GOTO 800
40 CLS
50 FOR X = 0 TO 31
60 FOR Y = INT(RND*11)+11 TO 19
70 PRINT AT Y,X: "■";
80 NEXT Y
90 NEXT X
100 LET AS="> = J L L"
110 LET CS=" "
120 FOR H=1 TO 20 STEP 2
130 FOR X=0 TO 31
140 PRINT AT H,X:AS;
150 LET F = PEEK(PEEK 16398 + 1 + PEEK 16399*256)
160 IF NOT F=118 AND F>
170 PAUSE 100
180 IF INKEY$("<") THEN GOTO 500
190 PRINT AT H,X:CS;
200 NEXT X
210 NEXT H
220 PRINT AT 0,10:"WELL DONE"
230 STOP
500 FOR Y = H+1 TO 19
510 PRINT AT Y,X: "■";
520 PAUSE 5
530 PRINT AT Y,X: "□";
540 NEXT Y
550 PRINT AT H,X:CS
560 LET X = INT (RND*2)+X
570 GOTO 170
700 PRINT AT 0,10: ">=YOU CRASHED
<=.H*31+X:POINTS". "ANOTHER GO?(Y)"
710 INPUT CS
720 IF CS = "Y" THEN GOTO 10
730 STOP
800 PRINT "CITY BOMB BY S.C.ADAMS"
810 PRINT "-----"
820 PRINT "YOU MUST BOMB AWAY THE CITY"
830 PRINT "BY PRESSING THE NEW LINE"
840 PRINT "KEY BEFORE LANDING"
850 INPUT CS
860 GOTO 40
```


PET HI-RES!

If you're a PET owner then there must have been a few occasions when you wished that it had the graphics capabilities of the APPLE.

Of course there has been a high-resolution board around for some time — but only now can you buy one for under £300. The HR-40 HIGH RESOLUTION GRAPHICS BOARD offers maximum possible resolution (320 by 200), but costs just £149 plus VAT, half the price of the competition! Because the HR-40 board was designed and manufactured in Britain we've been able to keep the price down without restricting its capabilities. And if you're really hard-up and a dab hand at soldering you might prefer to wait for the kit version (due later this year) which will cost £99 plus VAT without software.

The assembled board is supplied with 8k of RAM and utility software in EPROM, so that PET's own RAM is entirely available to the user. Though the graphics RAM uses addresses normally represented by the ROM sockets UD3 and UD4, these sockets are duplicated on the HR-40 board and are software selectable. The board may be installed **WITHOUT SOLDERING OR TRACK-CUTTING!**

At present the board will fit a standard PET or CBM computer with the nine inch screen, but we hope to have a version for twelve inch models very soon. Write or telephone for more details and up-to-date information.

SUPER GLOOPER

First in our new range of ARCADE style games for the PET, SUPER GLOOPER will have you on the edge of your seat. Your task is to clear the screen of little dots scattered in a maze, but **WATCH OUT FOR THE GLOOPER EATERS**, they're liable to escape from their pen and come after you.

You've got to be very nimble with the eaters on your trail. Best bet is to make for one of the four corners where (unless you've been there before) you will find a much larger dot which refreshes the parts that other dots cannot reach! Now you've got the glooper eaters on the run — catch one and you'll earn a bonus, but you must be quick, because any moment they'll recover from their shock and come after YOU!

METEORITES

An all-action game in the style of INVADERS. Your mission — to defend seven moon bases against a shower of meteorites by blasting them out of the sky. If you survive the first wave there are five more to face, and then — well you'll find out! The graphics are really superb — just watch the way that the ground shakes when a meteorite crashes into the lunar surface.

SUPERSOFT arcade games are written in machine code for speed and run on all 40 column PETs with BASIC 2, 3 or 4. At just £8 plus VAT, they're really good value and you won't find a more exhilarating game at any price! We've more great games on the way — including some for the 8032 and VIC-20!



SUPERSOFT

First floor, 10-14 Canning Road,
Wealdstone, Harrow, Middlesex
Phone: 01-861 1166.
ASK FOR OUR FREE CATALOGUE!

Relive the final climactic battle of Star Wars.

TRENCH RUNS ON AN ATARI 400 OR 800 IN 16K. By Tim Hays.

As you thrilled to *Star Wars* back in 1978 you probably didn't realise that you would be able to partake in that climactic battle against the Death Star just three years later.

The object of this program is to destroy the Death Star by manoeuvring your ship away from the crossfire until you reach the exhaust vent of the artificial planet and there you fire your photon torpedoes down the trench... hence the name of the game.

At the beginning you are already in the trench flying down the corridor at your ship's top speed. There are laser posts located on the left and right walls and on the floor bottom.

These lasers flash by you and fire on your ship at random intervals. The frequency of the fire from the laser posts is determined by the level of difficulty you choose, (1-19), with version No. 1 being the hardest.

All three lasers will aim independently. Each will fire at the mid point between you and the last spot fired upon. So as long as you keep your ship moving away from the three laser shots — and keep track — you should not get hit.

You will see the number of miles you still have to travel along the Death Star's surface at the bottom of the screen. This will be further at the more difficult levels of play.

When the distance to go reaches 20, the on-board attack computer

will be activated, the lasers will stop firing at you and the end of the trench will come into view. You now have to quickly line up the centre (one pixel) of this screen so well that the exhaust vent is dead centre of your sights.

When you approach the last 30 miles, set your ship close to the centre so you can line up the approaching target more easily.

When everything is lined up (you hope), fire on the vent after the bottom wall is below the bottom of your sights and the target is close enough to be hit accurately (the computer will prompt you with 'Fire Now!').

If you succeed in hitting your target, you must immediately pull back on your joystick to bring yourself up and out of the trench. Failure to do this will mean your mission ends with you and the spacecraft splattered all over the end of the trench wall.

As you pull out of the trench the screen will go back to normal mode and show a window view of your ship moving out of the trench, before switching to a rear view showing the Death Star being destroyed.

During your flight down the trench, remember that if you go too close to the sides of the corridor or the floor, you will run into them and be destroyed. Should you go off the top of the screen, you will be out of the trench and your mission will be aborted, so a steady hand is needed on the controls.

Variables used in the game are as follows (please note that many are used more than once, or for more than one item storage or loop):

- A Looping (FOR-NEXT).
- B RND GOSUB of laser fire dependant on 'R'.
- C Screen refresh (redraw what was erased by ship & lasers).
- D 'X' Position of upper-left laser post.
- E 'Y' Position of upper-left laser post.
- F 'X' Position of upper-right laser post.
- G 'Y' Position of upper-right laser post & 'X' size of the target wall.
- H 'X' Position of bottom laser post & 'Y' size of target wall.
- I 'Y' Position of bottom laser post.
- J Looping.
- L Length of time until ship runs into wall.
- R Input level of difficulty.
- T Miles left to target.
- U FOR-NEXT loops, control var., colour locate var.
- X Ship positioning.
- Y " "
- Z Used as a TRUE/FALSE var. (eg. IF Z = 1 THEN GOTO ...).
- STRIG Status of joystick trigger.
- JS Joystick positioning status.
- Z1 Used the same as 'Z'.
- L1 Looping (nested with 'L').
- U1 Nested looping with 'U'.
- J1 Wait looping — nested with 'U1' above.

ATARI

```
0 REM THE TRENCH 6/10/80
1 REM BY TIM HAYS SEBREE'S COMPUTING
2 REM 456 Granite Ave., Monrovia, CA.
  91016
3 REM When INPUTing this Program, DON'
  T leave unnecessary SPACES. You may ru
  n over the program LINE if you do.
4 REM Then the ATARI will NOT accept t
  he line. Pay particular attention to t
  he long lines FROM 60 TO 110.
5 TRAP 10:GRAPHICS 0:POKE 752,1:F=90:G
  =20:H=130:I=30:POKE 764,255:POSITION 6
  ,10: ? "INPUT LEVEL OF DIFFICULTY"
10 INPUT R:T=125-(R*5): ? "## Press TRI
  66ER to start TRENCH ##"
```

```
13,55:PLOT 145,9:DRAWTO 145,72:COLOR 3
:PLOT 159,0:F=(F+X)/2:G=(G+Y)/2:DRAWTO
  F,G
72 IF (F>X-5 AND F<X+5 AND G>Y-2 AND G
  <Y+2) THEN 400
73 COLOR 4:PLOT 159,0:DRAWTO F,G:SOUND
  1,0,0,0:RETURN
80 COLOR 2:PLOT 63,49:DRAWTO 96,49:PLO
  T 43,59:DRAWTO 113,59:PLOT 18,71:DRAWTO
  143,71:COLOR 4:PLOT 63,49:DRAWTO 96,
  49
81 SOUND 1,40,8,8:PLOT 43,59:DRAWTO 11
  3,59:PLOT 18,71:DRAWTO 143,71:COLOR 3:
  PLOT 0,79:H=(H+X)/2:I=(I+Y)/2:DRAWTO H
  ,I
82 PLOT 159,79:DRAWTO H,I:IF (H>X-5 AN
```

```
170 COLOR 2:GOSUB 50:IF B<0.5 THEN GOS
  UB INT(RND(1)*3)*10+60
180 IF T<20 THEN GOTO 600
190 COLOR 4:GOSUB 50:C=C+1:IF C=5 THEN
  GOTO 110
200 GOTO 130
300 TRAP 310:SOUND 0,99,8,8:SOUND 1,75
  ,8,8:SOUND 2,60,8,8:SOUND 3,20,8,8
305 FOR L=1 TO 16:POKE 712,15*(RND(1)*
  17):NEXT L:RETURN
310 FOR L=8 TO 0 STEP -2:FOR L1=1 TO 8
  :POKE 712,15*(RND(1)*17):NEXT L1
320 SOUND 0,99,8,8:SOUND 1,75,8,8:SOUN
  D 2,60,8,8:SOUND 3,20,8,8:NEXT L:POKE
  712,0
330 IF Z1=10 THEN RETURN
380 ? "DO YOU WISH TO RISK YOUR LIFE A
  GAIN?":POKE 764,255
390 IF PEEK(764)<>255 THEN RUN
395 GOTO 390
400 GOSUB 300: ? " YOU'VE BEEN HIT BY A
  LASER POST!!"
```

```
20 IF STRIG(0)=1 THEN 20
30 GRAPHICS 7:POKE 752,1:COLOR 2:D=80:
  E=10: X=20:Y=20: ? " MILES TO TARGET=
  "
```

```
40 FOR A=1 TO 25:PLOT RND(1)*87+38,RND
  (1)*18:NEXT A:GOTO 110
50 PLOT X-5,Y:DRAWTO X+5,Y:PLOT X-2,Y+
  1:DRAWTO X,Y-2:DRAWTO X+2,Y+1:RETURN
60 COLOR 2:PLOT 62,32:DRAWTO 62,48:PLO
  T 47,24:DRAWTO 47,55:PLOT 17,9:DRAWTO
  17,70:COLOR 4:PLOT 62,32:DRAWTO 62,48
61 SOUND 1,90,8,8:PLOT 47,24:DRAWTO 47
  ,55:PLOT 17,9:DRAWTO 17,70:COLOR 3:PLO
  T 0,0:D=(D+X)/2:E=(E+Y)/2:DRAWTO D,E
62 IF D<X-5 THEN IF D>X-5 THEN IF E>Y-
  2 THEN IF E<Y+2 THEN 400
63 COLOR 4:PLOT 0,0:DRAWTO D,E:SOUND 1
  ,0,0,0:RETURN
70 COLOR 2:PLOT 96,32:DRAWTO 96,49:PLO
  T 113,24:DRAWTO 113,55:PLOT 145,9:DRAM
  TO 145,72:COLOR 4:PLOT 96,32:DRAWTO 96
  ,49
71 SOUND 1,60,8,8:PLOT 113,24:DRAWTO 1
```

```
D F<X+5 AND I>Y-2 AND I<Y+2) THEN 400
83 COLOR 4:PLOT 0,79:DRAWTO H,I:PLOT 1
  59,79:DRAWTO H,I:SOUND 1,0,0,0:RETURN
110 COLOR 1:PLOT 2,0:DRAWTO 157,79:PLO
  T 0,0:DRAWTO 159,79:PLOT 157,0:DRAWTO
  2,79:PLOT 159,0:DRAWTO 0,79
120 COLOR 3:PLOT 80,40:PLOT 79,39:PLOT
  79,40:PLOT 80,39:C=0:SOUND 0,RND(1)*1
  1+4,8,3
130 JS=STICK(0):IF JS=7 OR JS=6 OR JS=
  5 THEN X=X+4:IF X>153 THEN GOTO 410
140 B=RND(0)*R:IF JS=11 OR JS=10 OR JS
  =9 THEN X=X-4:IF X<5 THEN GOTO 430
150 IF JS=14 OR JS=6 OR JS=10 THEN Y=Y
  -2:IF Y<3 THEN ? " OUT OF TRENCH! MIS
  SION ABORTED!!":END
160 T=T-0.5:POKE 656,0:POKE 657,23: ? I
  NT(T): ? " :IF JS=13 OR JS=9 OR JS=5 THE
  N Y=Y+2:IF Y>77 THEN GOTO 420
```

```
401 GOSUB 300:FOR U=4 TO 20:SOUND INT(
  RND(1)*4),RND(1)*99,8,8
402 COLOR RND(1)*8:PLOT X,Y:DRAWTO RND
  (1)*159,RND(1)*79:PLOT X+U,Y+U:DRAWTO
  RND(1)*3+X+U,Y-U-RND(1)*3
403 DRAWTO X-U+RND(1)*3,Y-U-RND(1)*3:D
  RAWTO X-U+RND(1)*3,Y+U+RND(1)*3:DRAWTO
  X+U+RND(1)*3,Y+U+RND(1)*3
404 POKE 712,U:NEXT U:GOTO 310
410 GOSUB 300: ? " HIT THE RIGHT WALL!!
  ":FOR U=150 TO 80 STEP -1:SOUND INT(RN
  D(1)*4),RND(1)*U,8,8
415 COLOR RND(1)*8:PLOT X,Y:DRAWTO X-R
  ND(1)*45,10+RND(1)*65:POKE 712,U:NEXT
  U:GOTO 310
420 GOSUB 300: ? " RAN INTO THE TRENCH
  BOTTOM!!":FOR U=150 TO 80 STEP -1:SOUN
  D INT(RND(1)*4),RND(1)*U,8,8
425 COLOR RND(1)*8:PLOT X,Y:POKE 712,U
```


RELIVE THE CLIMACTIC FINAL BATTLE OF STAR WARS

```

: DRAWTO RND(1)*159,40+RND(1)*39:NEXT U
: GOTO 310
430 GOSUB 300: ? " HIT THE LEFT WALL!!"
: FOR U=150 TO 80 STEP -1: SOUND INT(RND
(1)*4),RND(1)*U,8,8
435 COLOR RND(1)*8:PLOT X,Y:POKE 712,U
: DRAWTO X+RND(1)*45,10+RND(1)*65:NEXT
U: GOTO 310
600 FOR J=1 TO 16: SOUND 2,30,12,4:POKE

```

```

+1
670 IF JS=13 OR JS=9 OR JS=5 THEN Y=Y+
1
675 IF STRIG(0)=0 THEN 800
680 IF JS=14 OR JS=6 OR JS=10 THEN Y=Y
-1
681 IF L=16 THEN ? " CLOSE ENOUGH TO T
ARGET! FIRE NOW! "
682 IF L>28 THEN ? " TOO LATE!! RAM IN

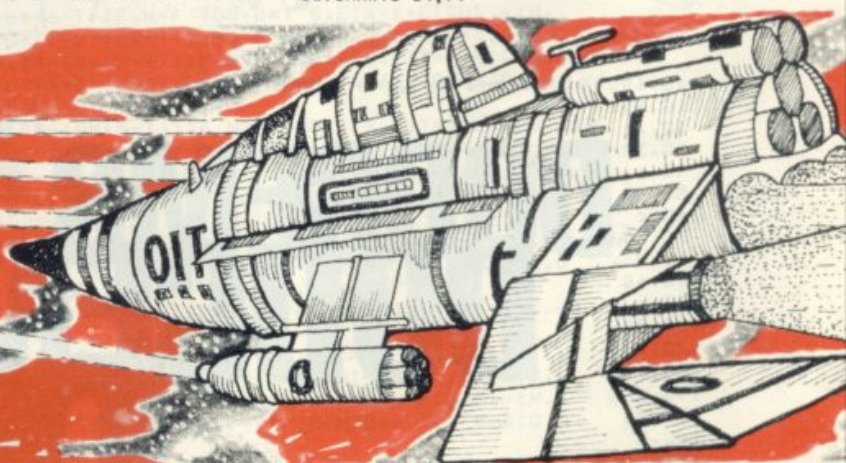
```

```

0 9: SOUND 1,60,12,4:POKE 84,2:POKE 85,
2: ? "PULL UP & OUT OF TRENCH!!"
860 SOUND 1,122,12,4:IF STICK(0)=13 TH
EN SOUND 1,0,0,0:GOTO 890
870 FOR U=1 TO 7:NEXT U
880 POKE 84,2:POKE 85,2: ? "PULL UP &
OUT OF TRENCH!!":NEXT J:L=30:GOTO 682
890 FOR U=0 TO 79 STEP 4:GRAPHICS 23:CO
LOR 2:PLOT 0,U:DRAWTO 70,U/3+30:PLOT
159,U:DRAWTO 98,U/3+30:PLOT 17,87:DRAW
TO 70,U/3+56
891 COLOR 1:PLOT 72,43-U/3:DRAWTO 96,4
3-U/3:PLOT 84,31-U/3:DRAWTO 84,55-U/3:
COLOR 2
895 IF U>46 THEN PLOT 0,U/3+23:DRAWTO
159,U/3+23
900 PLOT 142,87:DRAWTO 98,U/3+56:PLOT
70,U/3+30:DRAWTO 98,U/3+30:DRAWTO 98,U
/3+56:DRAWTO 70,U/3+56:DRAWTO 70,U/3+3
0
910 NEXT U:GRAPHICS 7:POKE 712,16:PLOT
0,79:DRAWTO 40,65:DRAWTO 80,60:DRAWTO
119,65
920 DRAWTO 159,79:PLOT 73,62:DRAWTO 79
,68:DRAWTO 81,79:PLOT 75,62:DRAWTO 81,
68:DRAWTO 84,79

```

TRENCH



```

84,2:POKE 85,1: ? "ATTACK COMPUTER EN
GAGING":SOUND 2,61,12,4:G=1:H=1
609 L=0:TRAP 401:REM REVERSE VIDED LET
TERS
610 FOR U=1 TO 13:NEXT U:POKE 84,2:POK
E 85,1: ? "ATTACK COMPUTER ENGAGING":N
EXT J
620 GRAPHICS 7:POKE 712,43:POKE 708,0:
POKE 710,255: ? " ATTACK COMPUTER ACTI
VATED!!":POKE 709,105
630 COLOR 1:PLOT 56,60:DRAWTO 105,60:DR
AWTO 105,25:PLOT 0,43:DRAWTO 159,43:P
LOT 84,0:DRAWTO 84,79
640 COLOR 2:FOR U=56 TO 98 STEP 7:PLOT
U,56:DRAWTO U,59:NEXT U:FOR U=25 TO 5
9 STEP 6:PLOT 100,U:DRAWTO 104,U:NEXT
U
650 SOUND 2,RND(1)*11+4,8,3:G=6+1:H=H+
1:JS=STICK(0):IF JS=7 OR JS=5 OR JS=6
THEN X=X-1
660 IF JS=11 OR JS=10 OR JS=9 THEN X=X

```

```

TO WALL!!":GOSUB 300:GOTO 401
685 L=L+1:GOSUB 690:Z=1:GOSUB 690:GOTO
630
690 COLOR 1:LOCATE X,Y,U:IF U>0 THEN CO
LOR 4
695 PLOT X,Y:COLOR 3:IF Z THEN COLOR 4
:Z=0
700 PLOT X+G,Y+H:DRAWTO X+G,Y-H:DRAWTO
X-G,Y-H:DRAWTO X-G,Y+H:DRAWTO X+G,Y+H
710 PLOT 0,0:DRAWTO X-G,Y-H:PLOT 159,0
:DRAWTO X+G,Y-H:PLOT 0,79:DRAWTO X-G,Y
+H:PLOT 159,79:DRAWTO X+G,Y+H
720 RETURN
800 IF L<15 THEN ? " FIRED TOO SOON!!"
:GOTO 680
810 SOUND 1,80,8,8:COLOR 1:PLOT 27,79:
DRAWTO 84,43:DRAWTO 137,79:IF X=84 AND
Y=43 THEN 850
820 ? " MISSED!! THE UNIVERSE IS DOOME
D!!":GOTO 310
850 ? " THE SHOT IS GOOD!!":FOR J=1 T

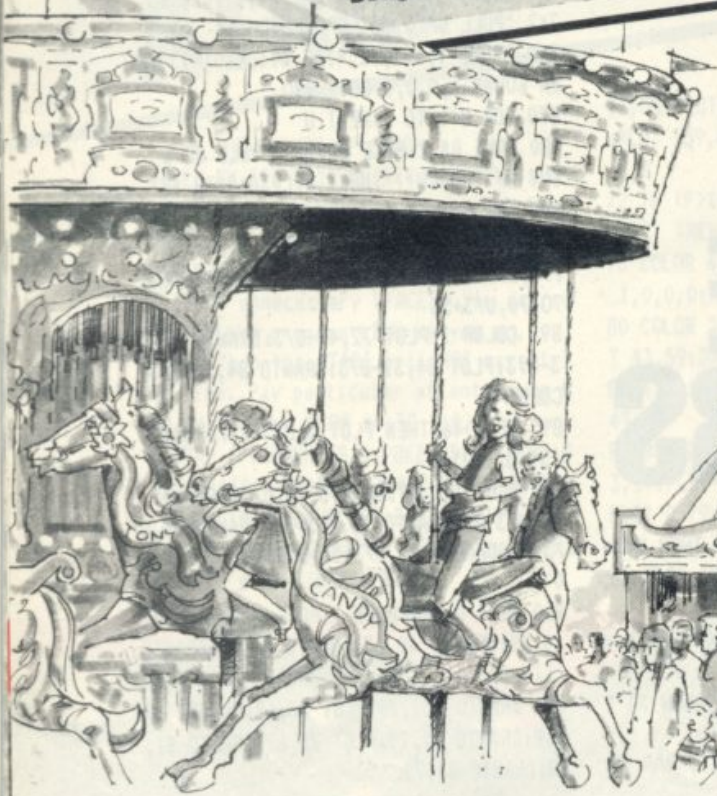
```

```

925 FOR U1=1 TO 10:SOUND 2,61,10,4:POK
E 84,2:POKE 85,1: ? " AFT VIEW R
ANGE CRITICAL!!":SOUND 2,123,10,4
927 FOR J1=1 TO 16:NEXT J1:POKE 84,2:P
OKE 85,1: ? " AFT VIEW RANGE CRI
TICAL!!":POKE 709,15*(RND(1)*17):NEXT
U1
930 FOR U=1 TO 99:POKE 709,15*(RND(1)*
17):NEXT U:GOSUB 300:FOR U=170 TO 80 S
TEP -1:SOUND INT(RND(1)*4),RND(1)*U,8,
8
940 COLOR RND(1)*8:PLOT RND(1)*159,79:
POKE 712,U:DRAWTO RND(1)*159,RND(1)*79
:NEXT U:Z1=10:GOSUB 310
950 POKE 709,15: ? " CONGRATULATIONS!!
YOU'VE SAVED THE UNIVERSE!!!"
960 ? " DO YOU WISH TO PLAY AGAIN?":P
OKE 764,255
970 IF PEEK(764)<>255 THEN RUN
980 GOTO 970

```


Dodgems runs on an Acorn Atom in 3K. By John Dyson



0G.10000;dodgems by john dyson (LEEDS)

```

1G.20
2G.a
3G.30
4G.b
5G.40
6G.c
7G.50
8G.d
9G.60
10G.e
11G.70
12G.f
13G.80
14G.g
15G.90
16G.h
17IFG=16;G.h
20S=S+SGN(T-S);B=8*(6-S);M=7+8*S;G=2
21aA=A-E;M=M-E;IFM<F;G=3
22G.q
30A=8*(6-S);M=8*S;G=4
31bB=8+E;M=M-E;IFM<F;G=5
32G.q
40S=S+SGN(T-S);A=8*(6-S);M=8*S;G=6
41cB=8+E;M=M-E;IFM<F;G=7
42G.q
50B=88-(8*(5-S));M=8+8*S;G=8
51dA=A+E;M=M-E;IFM<F;G=9
52G.q
60S=S+SGN(T-S);B=88-(8*(5-S));M=8+8*S;G=10
61eA=A+E;M=M-E;IFM<F;G=11
62G.q
70A=104-(8*(5-S));M=8*S;G=12
71fB=8-E;M=M-E;IFM<F;G=13
72G.q
80S=S+SGN(T-S);A=104-(8*(5-S));M=8*S;G=14
81gB=8-E;M=M-E;IFM<F;G=15
82G.q
90B=8*(6-S);M=9+8*S;G=16
91hA=A-E;M=M-E;IFM<F;G=F
92G.q
100pPLOT13,X,Y;PLOT15,V,W
105IFX=A;IFY=B;G.20000
106IFV=A;IFW=B;G.20000
110V=X;W=Y;IFZ;Z=0;G.G
120IF?#8002&#40=0;Z=F;R.
130WAIT;WAIT;G.G

```

DODGEMS

DODGE

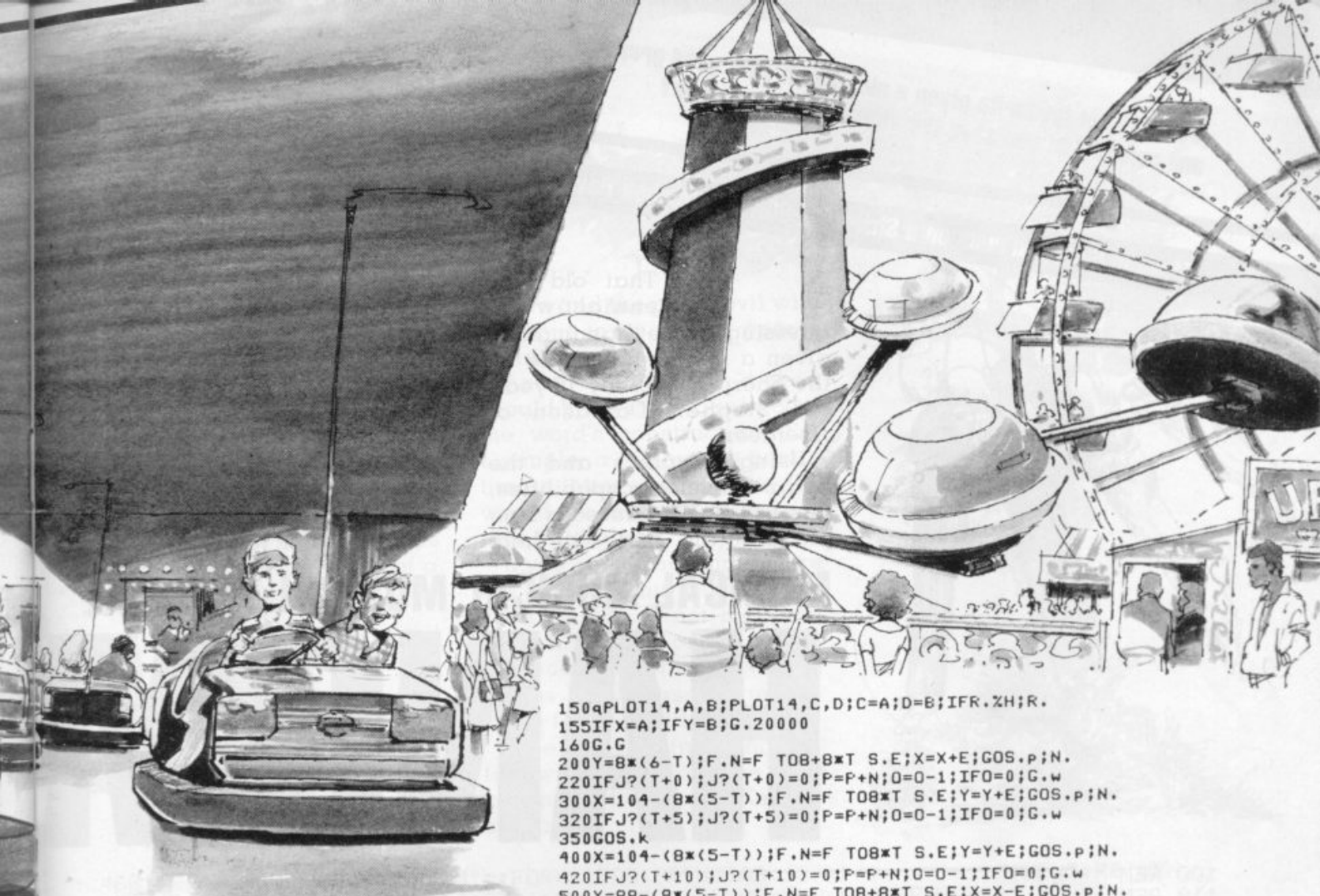
**HOW LONG CAN
YOU AVOID THE
COMPUTER'S CAR,
HELL BENT ON
DEADLY COLLISION.**

Dodgems is the Acorn Atom version of the "Head-on" collision game.

It's you against the computer, can you outwit it? You are driving a car around a circular series of tracks in an anti-clockwise direction.

But who is that lunatic driving around the same track clockwise? An American? A lunatic with suicidal tendencies? No it's the computer who is out to get you, before you can clear the screen of dots.

The screen is divided up into a series of concentric circles with a number of crossover points which



EMS

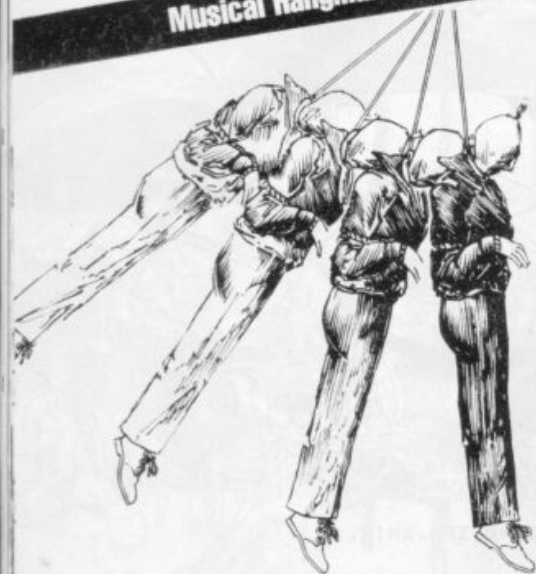
allow you to switch lanes to avoid the computer's car.

These lanes are filled with dots and the object of the game is to run over as many dots as possible before the inevitable crash. Every dot adds to your score at the end of the game. The computer can switch lanes as well and it will be trying to guess which one you will be in as the two of you cross over each circuit.

Your safest tactic is to wait until the computer has already committed itself before switching to that crucial lane — but don't leave it too late!

```
150qPLOT14,A,B;PLOT14,C,D;C=A;D=B;IFR.XH;R.
155IFX=A;IFY=B;G.20000
160G.G
200Y=8*(6-T);F.N=F T08+8*T S.E;X=X+E;GOS.p;N.
220IFJ?(T+0);J?(T+0)=0;P=P+N;O=0-1;IFO=0;G.W
300X=104-(8*(5-T));F.N=F T08*T S.E;Y=Y+E;GOS.p;N.
320IFJ?(T+5);J?(T+5)=0;P=P+N;O=0-1;IFO=0;G.W
350GOS.k
400X=104-(8*(5-T));F.N=F T08*T S.E;Y=Y+E;GOS.p;N.
420IFJ?(T+10);J?(T+10)=0;P=P+N;O=0-1;IFO=0;G.W
500Y=88-(8*(5-T));F.N=F T08+8*T S.E;X=X-E;GOS.p;N.
520IFJ?(T+15);J?(T+15)=0;P=P+N;O=0-1;IFO=0;G.W
550GOS.k
600Y=88-(8*(5-T));F.N=F T08+8*T S.E;X=X-E;GOS.p;N.
620IFJ?(T+20);J?(T+20)=0;P=P+N;O=0-1;IFO=0;G.W
700X=8*(6-T);F.N=F T08*T S.E;Y=Y-E;GOS.p;N.
720IFJ?(T+25);J?(T+25)=0;P=P+N;O=0-1;IFO=0;G.W
750GOS.k
800X=8*(6-T);F.N=F T08*T S.E;Y=Y-E;GOS.p;N.
820IFJ?(T+30);J?(T+30)=0;P=P+N;O=0-1;IFO=0;G.W
900Y=8*(6-T);F.N=F T08+8*T S.E;X=X+E;GOS.p;N.
920IFJ?(T+35);J?(T+35)=0;P=P+N;O=0-1;IFO=0;G.W
950GOS.k
1000G.200
2000kIF?#B001&#40=0;IFT>F;T=T-F
2010IF?#B001<128;IFT<5;T=T+F
2050R.
100000=42;P=0;@=4;DIHLB,I64;$L="G.11240";?16=L;?17=L&#FFFF/256
11110P.$12;DOP." " ;U.C.=7;P."DODGEMS BY J.DYSON"
11111IFF;P."YOUR SCORE WAS"(P-(43-0)*4)/8"
11112IFF>1159;P."WELL DONE TRY THIS";E=E*2;LINK#FFE3;G.11125
11113IFF=0;P."CTRL=IN SHIFT=OUT"(ONLY FUNCTION IN :--- ---)
11114IFF=0;P."---"THE CENTRE OF GAP:--- ^ ---"REPT=SPEED"
11115INPLOT1,"SKILL LEVEL A,B,C"$I;$I+1="";IF$I="A" E=1;G.11125
11116IF$I="B" E=2;G.11125
11117IF$I="C" E=4;G.11125
11118IF$I="C" E=8;G.11125
11120G.11115
11125CLEAR3;COLOUR2;F.N=12T048 S.8
11130MOVE(48-N),(48-N)
11140PLOT1,N,0;PLOT0,16,0;PLOT1,N,0
11150PLOT1,0,(N-8);PLOT0,0,16;PLOT1,0,(N-8)
11160PLOT1,-N,0;PLOT0,-16,0;PLOT1,-N,0
11170PLOT1,0,(8-N);PLOT0,0,-16;PLOT1,0,(8-N)
11180N.;MOVE44,44;PLOT1,24,0;PLOT1,0,8;PLOT1,-24,0;PLOT1,0,-8
11200MOVE0,8;F.A=0T04;F.B=0T05;PLOT9,8,0;N.;PLOT8,8,0;F.B=0T05
11210PLOT9,8,0;N.;PLOT8,-104,8;N.
11220MOVE0,56;F.A=0T04;F.B=0T05;PLOT9,8,0;N.;PLOT8,8,0;F.B=0T05
11230PLOT9,8,0;N.;PLOT8,-104,8;N.
11240X=56;Y=8;V=X;W=Y;T=5;G=1;S=5;A=55;C=-1;F=1;F.R=1T01
11250H=5+R.X2;COLOUR1;P=0;O=T.+9;F.J=0T040;O?J=1;N.;J=T.+9;O=40
11300G.200
20000F.A=0T0400;?#B002=A;N.;N.R;;G.11110
20010W.N.R;G.11110
```


Musical Hangman runs on a Sharp MZ-80K. By Stephen Davidson



Using graphics and the Sharp's musical capabilities, Stephen has produced a simple program that will help

If you have a photographic memory you might have to ask a friend to program in the DATA statement words. Although there are enough there to still keep you guessing.

For those of you who have

HANGM

62 COMPUTER & VIDEO GAMES

never played Hangman, it is a test of your vocabulary and knowledge of word structure. You are presented with a series of empty spaces, which represent a word the computer has committed to memory.

The computer then invites you to guess one letter which might be included in the word. If the letter is there somewhere then it appears in the correct place on the screen.

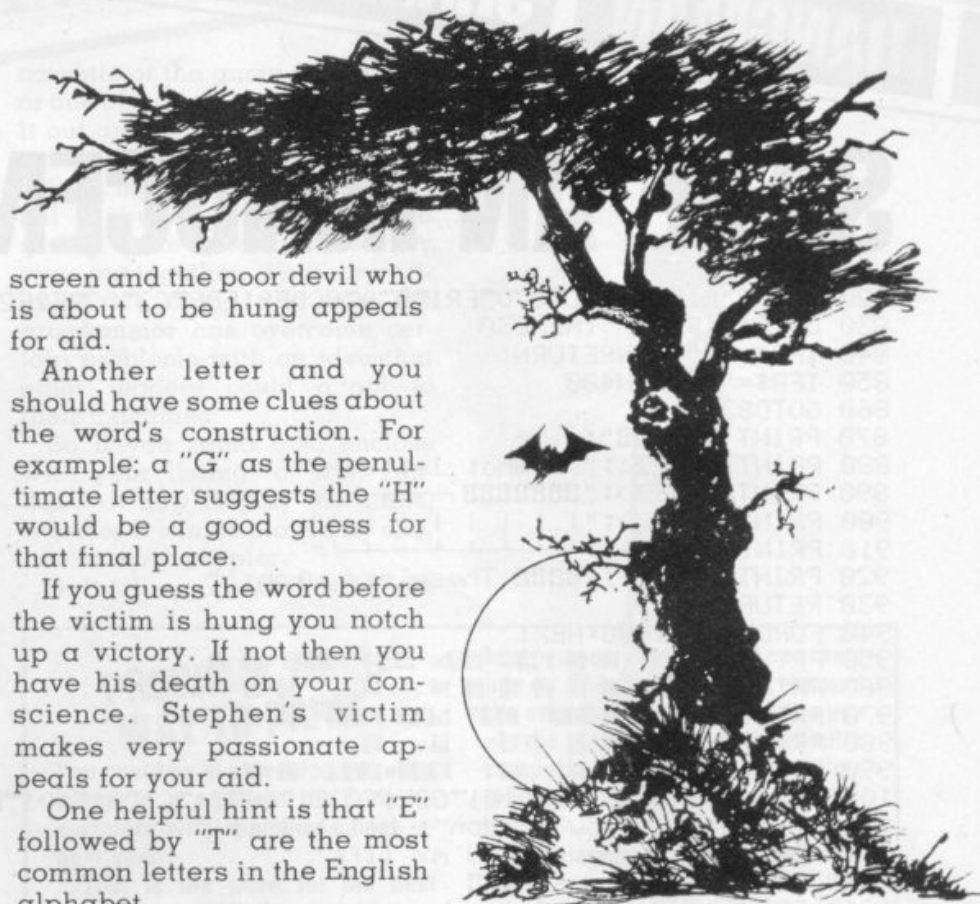
If it does not feature in this word then the first struts of a gallows are drawn on the

screen and the poor devil who is about to be hung appeals for aid.

Another letter and you should have some clues about the word's construction. For example: a "G" as the penultimate letter suggests the "H" would be a good guess for that final place.

If you guess the word before the victim is hung you notch up a victory. If not then you have his death on your conscience. Stephen's victim makes very passionate appeals for your aid.

One helpful hint is that "E" followed by "T" are the most common letters in the English alphabet.



```

460 PRINT"#####";:FORX=1TO8:PRINTTAB(18);"
470 POKE53554+K,ASC(A$)-64:AT=1:SUB=SUB+1:IFSUB=LEN(R$)THENSU=11
480 MC$(20-SUB)=A$:RETURN
490 H$=" | ##### 4# ##### 0##### V #####4######## 11##### 111"
500 H$=H$+"##### 11##### 11##### 11 " :LI$="#####"
510 TAB$="#####"
520 SN$="00 /##### | - 1##### -/#####4######## 111##### 111#####"
530 SN$=SN$+" 11##### 11##### 11 "
540 HI$="##### 100 100 100 / 0 00 00 OH NO !"
550 HJ$="##### 00 00 0 V 0 00 00 "
560 HK$="#####/000 100 100 100000 00 00 000 "
570 HL$="##### 000 00 00 ##### 00 00 000 ":RETURN
580 PRINT"000";
590 PRINT"##### "
600 PRINT" | "
610 PRINT" | "
620 PRINT" | =Hangman= "
630 PRINT" | "
640 PRINT" | Help! I am about "
650 PRINT" | to be killed for "
660 PRINT" | a crime I did not "
670 PRINT" | commit! (as usual!) "
680 PRINT" | Only you can save "
690 PRINT" | me by guessing the "
700 PRINT" | the right word "
710 PRINT" | before I am lowered "
720 PRINT" | into a vat of shark "
730 PRINT" | infested custard!! "
740 PRINT" | "
750 PRINT" | "
760 PRINT" | Will you help ? "
770 PRINT" | NASTY (Y OR N) "
780 PRINT" | STUFF "
790 PRINT" | "
800 PRINT" | "
810 PRINT" | "

```


IT MAN

E2D2C6"

E1C1D1E1E1B1D1C6"

HI: NEXT
IN ?"

6"

GAME OF THE YEAR

A MAGAZINE IN NEED

Only with your help can we continue to make *Computer & Video Games* a worthwhile purchase.

Our continued existence as a magazine depends on you, the readers, deluging us with games program listings which you have invented for your own microcomputer.

We are willing to pay £10 for each games listing we publish and for those listings we are particularly keen on there is a further financial incentive.

We will professionally market the best games that appear in our magazine through high street chain stores and if your game proves a winner it could mean a flood of royalties coming your way.

Those are just the start of the temptations we are offering you to become a *Computer & Video Games* contributor.

Please check your programs carefully before you send them into us. I know the temptation is to look at our creations through gold-tinted spectacles, but, just before you run it off on the printer, check to see that if the biggest moron going tried to play the game (I may well do so when it gets to the office) he could do so without crashing it.

Another please now: Please do not send us programs that you have copied from professional tapes or spotted in other publications, these may be spotted by our eagle eyes or they may slip through and cause untold problems.

We will look more favourably on games which show an original touch and have a new approach to solving the inevitable problems which crop up in mid-game conception. I'm sure you know the sort of thing: that bomb which, when fired, wipes out all that carefully put-together background along with the target; the space invader deserter who decides to disappear off the screen and roam around in limbo rather than returning to the fray.

If possible could you include a

cassette of the game so that we, or one of our review team, can try it out and give us a rundown on just how good it is.

Each month we will be picking out a couple of programs and giving a run down on how they were put together. What the variables are doing and how the programmer has overcome certain problems with an idea that other readers could adopt to their machines.

So if you could also enclose with your listing, a brief rundown of how to play the game; whether it can be played by one, two or more people.

A brief synopsis of what the

PROGRAM YOUR WAY TO PARIS

You could be in a position to treat a friend to a weekend in Paris — complete with spending money — next year.

That is the prize for the best games program listing sent in to us in the first 12 months of this magazine's life.

Paris may not be the games capital of the world but it does have its attractions and, when you are spending our money, I'm sure it will be all too easy to turn what could have been "just another weekend", into the weekend of a lifetime.

Come next October a panel of judges will sit down to play all the

best games that have been sent into us. They will take into account the originality of the game, the use of the facilities that particular computer had to offer, playability, programming prowess and presentation.

After some soul searching and, doubtless, a few arguments, the winner will be announced in our November 1982 issue.

So if you send in a games listing try and keep a friend in mind. The competition is open to everyone barring myself and the judges whose word will be final.

There is also the prestige of having your name and, if suitably photogenic, your picture spread all over the magazine as a top game writer. Who knows where that could lead?

game is about will also be of benefit. And finally we would like to have a list of what the variables or certain subroutines are doing; which part of the program makes the trees grow; or how you shot all the deserting space invaders and made them fall on the poor defender instead.

Computer & Video Games is an opportunity for the nameless thousands who have been alone with a microcomputer for too long. So whether you have written a massive adventure in 48K for your Apple, or a 1K bat and ball program for the Sinclair ZX81, we are waiting to hear from you.

I'm sure there must be plenty of easier ways to earn a tenner but are there any as rewarding?



Sounds

HAS anyone played Space Invaders with the sound turned off? The game immediately loses an enormous amount of its appeal. Even the familiar "Plonk", "Plonk", of the ball bouncing backwards and forwards goes a long way to stop a game of video tennis becoming a total bore immediately it is turned on.

The reason for this is not hard to explain, a fourth exciting dimension, sound, has been added to these games which we find both stimulating and satisfying. Equally exciting is listening to a favourite piece of music being played in four-part harmony by your own computer, especially if you entered it yourself straight from a manuscript.

This page will deal exclusively with this fourth dimension. I intend to describe practical circuits which will enable you to add simple sound to your own programs, make good use of any inbuilt sound facilities, control external sound sources and also take advantage of the excellent commercial music programs which are becoming available. I will also mention any good books or articles on the subject which I come across. Of necessity, several of these packages will be dedicated to one make of computer but I will try and keep as wide a spectrum as possible.

THE SPOKEN WORDS

A computer can control all kinds of external sound generators. It can cause a siren to sound or a starting-gun to fire. It can easily be made to modify sounds already being generated by some other electronic device, e.g. change its volume, add vibrato or change pitch.

Some electronic organs and synthesisers now being marketed have facilities built in which allow them to be directly interfaced to a computer.

There is also a new generation of dedicated sound making chips such as the AY-3-8910 which have been expressly designed to



BY DAVID ANNAL

be controlled by computer. These chips contain several generating circuits which produce both musical tones and noise.

In-built registers on the chip are filled with control instructions by the computer which can then forget about sound and perform some other task, leaving the sound chip to get on with making noise. Sounds from three-part music to terrifying explosions can be produced.

Exciting new forms of this type of circuit are now appearing on the scene, they are the speech synthesisers. Individual words or phrases can be stored permanently in memory chips (R.O.M.s) mounted on an external speech board. The words are "spoken" under control of the computer and whole sentences can be constructed. Another, more versatile, method is to have only phonetic parts of speech available which can then be strung

together by the computer to make an infinite number of words.

WIRED FOR SOUND

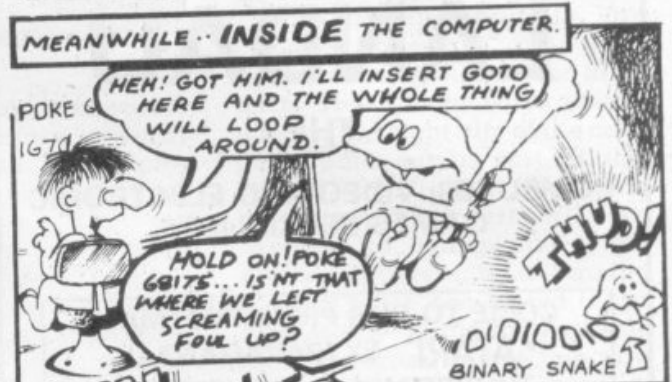
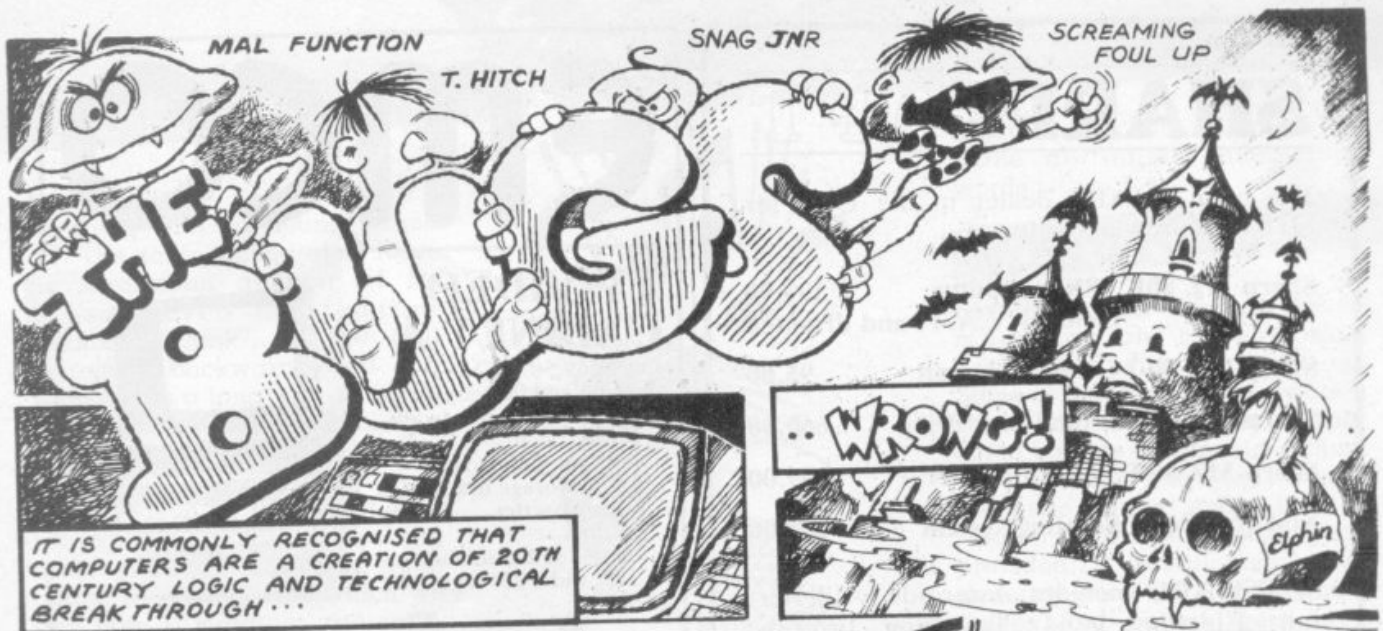
Several micros are now being made which have sound generating circuits built in. Some of these are quite sophisticated and can generate complicated sounds and music. Others are intended only as warning bleeps to signify "end of line" or "error". If no direct facilities are provided, it is still possible to generate even quite complicated noises and output them to a small amplifier via one of the ports. Indeed, even a direct connection may be unnecessary, sound from the computer being picked up by a small radio placed nearby! Computers work at high frequencies and some of this energy is radiated.

How a computer can actually make sounds itself is something which I will discuss in future articles. Here I will just say that signals can be produced which come out of one wire "endways", in a serial form.

Alternatively, signals can come out "sideways", or in parallel form, using eight wires all at once. These eight wires correspond to the eight bits of the computer data output port. If this form of output is used, some kind of external circuit will be required to change the eight digital signals into a varying voltage which can be fed to the amplifier — a digital/analogue (D/A) converter — but this is a subject for the future.

Anyone near the International Pet User Group stand when the Pet pantologist Jim Butterfield was there, would have heard a new program which he brought over from Canada (not yet available commercially). Full four-part music was demonstrated together with attack, sustain and decay, all computer controlled. In addition the word "Commodore" could be "sung" to a scale played on the keyboard. I wonder when we'll hear the first opera written and performed by computer... any suggestions for a title?

COMPUTER & VIDEO GAMES 67



ComServe

COMPUTER SHOP PRESENTS



THE ELEGANT, EXPANDABLE

COMSERVE VIDEO GENIE HOBBYIST PACKAGE

This is a package of all the items we feel a beginner will need when he first starts to use his Genie.

The offer comprises a Video Genie EG3003 with 12K BASIC, 15770 bytes of user programmable memory, upper and lower case and graphics display, built in tape recorder and QWERTY keyboard, with sound kit and joystick sockets installed and two joysticks.

There is a user manual and a BASIC manual, and a programming for beginners book.

There are three cassettes with demonstration programs and games and useful routines including a STARTREK type game, SURROUND, CHECKOUT, HANGMAN, WORDFIND, FRUIT, MAGIC CARPET, a name and address list program and a pre-school letter recognition game. Four other games tapes will be included.

There are three blank computer quality cassettes for your own use.

There is also a head cleaning tape with a demagnetising action for the tape recorder.

There are four coloured folders for the manuals or for screen overlays.

The television is not included.

There is a one year's guarantee on parts and labour.

This package is available on ten day delivery, send your cheque for £395 with your order.

This machine is fully expandable NOW, a printer and/or Aculab may be connected to the console, or an expansion interface may be connected, which includes disk and printer drivers and spare S100 slots. The S100 bus in the expansion interface can take a huge selection of boards to cover most hardware needs, and this includes the ability to run other processors, including 16 bit ones. There is a massive selection of good quality software for all small computer applications including word processing, accounts, stock control, engineering applications, and educational use. It can run many other languages apart from BASIC, compilers and assemblers too.

Epson and Seiko printers stocked, from £230 inclusive.

Graphic games at £11.20 each inc. GALAXY, METEOR MISSION, NOVA (asteroids), ATTACK FORCE, COSMIC FIGHTER, INVADERS, SHOWDOWN, BASKETBALL, PINBALL, DEATH MAZE, LABYRINTH. Adventures at £13.85 each, ADVENTURELAND, PIRATE, GHOST TOWN, VOOODOO CASTLE, THE COUNT (Dracula), SAVAGE ISLAND, SPACE ODESSY. Many, many others available NOW.

**98 TAVISTOCK STREET,
BEDFORD, BEDFORDSHIRE
TELEPHONE (0234) 216749**

Circle No. 133

WIDED SCREENS

The Space Monster is a horrendous scarlet blob complete with sprawling tentacles. It lurks behind an army of 10 robots flinging deadly missiles groundwards.

When it senses victory over the ground forces (you) it rushes earthwards to finish them off and the whole thing can be a very nasty experience — especially if you have a phobia about spiders.

A Philips G7000 spin-off from the Space Invaders craze, Space Monsters does not have rows of advancing horrors, just the monster and his 10 robots, each of which is equipped with a cannon and a shield to hide behind.

Your ground forces consist of a large- and easily-hit tank, with three reserves and three shields. Each time the monster or his robots score a hit you appear on the screen as a vulnerable little figure which has to dash behind a shield and press the button to put yourself into a new tank. Any hits on you while tankless give an instant win to the monster.

With each new tank for which you press, one of your remaining shields disappears. This makes the opening period of each new wall critical, for if you lose some shields before creating a breach in the robot's line, your large tanks are easy to hit.

The robots and their cannons are vulnerable only for a split second while their shields move to one side for them to fire.

Around £15 from your local G7000 dealer.



WIMBLEDON WITHOUT TANTRUMS

The TV game of Tennis has come a long way since that first simple paddle-and-ball version appeared in the darkest corner of your local and then re-materialised in the living room.

The latest Tennis games capture much more of the atmosphere of Wimbledon and that sport played by the Bjorn Borgs of this world.

One such cartridge, produced by the U.S. firm of Activision for use with the Atari Video computer system, offers a skilful challenge which compares favourably with the Atari Basketball game.

Two small figures whack a ball around a three-D simplification of a tennis court, rackets swinging whenever they are within arm's reach of the ball, in an attempt to out-manoeuvre one another. You cannot hit the ball out of play or into the net but it is possible to misjudge the bounce which is gauged by following the shadow of the ball along the court. It is all too common to find yourself set an impossible chase across the court after a sharply-angled shot from a superior opponent.

The skill to acquire is leaving the ball until the last moment to hit it at an acute angle.

Using this technique it is possible to reproduce much of the excitement of the real thing, including ace serves, serve-and-volley play, baseline duels and "running around" a shot to put it into the opposite corner.

Another recent launch from Activision is Boxing. This gives a view from above a boxing ring as two competitors slug it out.

Points are scored in ones and twos for hits to the opponent's head. Each hit, rocks him back and the best tactic is to trap him against the ropes and score as many points as possible before he fights his way clear again.

The defensive boxer will find few places to hide in this ring and sheer aggression, combined with feverish button pummelling, usually wins the day. Knockouts occur when a fighter scores 100 points, otherwise it is two minutes of frantic action.

Only two versions here, against either a human or a computer opponent, but the computer often takes a beating.

These two cartridges are the first written by Activision for the Atari and are being distributed here by Computer Games at a cost of £16.95 each. More are due soon.

ALIENS IN YOUR SIGHTS

Space themes are still eye-catchers in the video games world — even though Space Invaders enjoyed its heyday in 1979. Each TV games centre manufacturer makes sure he has a few alien titles in his range.

Space Battle is one of the latest of these offerings, running on the Database video unit. It has a "Star Wars" theme to it with the player looking through the cockpit of his spaceship as a fleet of fast-flying alien spaceships approaches.

As the attackers home-in on you, the skill is to dodge their fire while replying with your own lasers when an alien ship is within your sights.

Points are scored for each one destroyed, with three for a Starship; an Alien nets you five and seven for a Spacefighter. Only three lives are granted.



Also out now is a golf cartridge, played on an 18-hole course and offering players a choice of club for each shot. Among the hazards to avoid are rough, bunkers and trees. To increase the difficulty of the game further you can change the wind speeds and directions.

Database cartridges are somewhat cheaper than the rest of the market brands and Golf and Space Battle are £13 each.



It is back to the Middle Ages and siege warfare in Stone Sling. Just to prove that technology can take you back into the past as well as the future — and still satisfy all those destructive urges.

With Stone Sling you could soon rival Oliver Cromwell in the number of castles you batter down. The scenario is extremely simple — two knights, each with a catapult, slinging rocks over their own castle and a lake in an effort to reduce their opponents' castle to a pile of rubble.

Tactics can be varied either by disabling your opponent's catapult or smiting him with a well-aimed rock. Both of these tactics cause the opposition to retire for a few seconds while you get in some ranging shots on the castle.

This cartridge is one of the latest batch from Philips for its G7000 video unit. Among the other new Videopacs on the market are Laser War and Catch the Ball. All Philips cartridges have a recommended retail price of £15.

FOR PINBALL WIZARDS

You can steal a march on the pin-ball wizards by practicing at home on Super Knockout.

This version of the old amusement arcade favourite game runs on the Acetronic MPU 1000 entertainment centre. This TV test of quick reactions and co-ordination is complete with flippers, bouncing balls and flashing lights — and you can't tilt!

Shooting gallery takes you back to the fairground — except that there is no goldfish to be won when you achieve a high score. It incorporates 32 versions of the aim-and-fire game to test your eye and timing.

These two games are not so imaginative as some of those already in the Acetronic catalogue but will help fill in the range. The Acetronic cartridges retail at £14.95 each.

ASTEROIDS

Vaporising ever-larger clusters of meteors before they belt your spaceship are the ingredients which turned Asteroids into a classic pub and arcade game.

It has survived the conversion to the living room, remaining just as addictive and offering a good deal more colour and versatility.

Both the original Asteroids arcade game with the hyperspace button and the more recent Asteroids de Luxe, with the shields innovation, are to be found among the 66 versions of the game on the Atari cartridge.

The action centres on a small arrow-head-shaped spacecraft, controlled by you. This can be rotated in either direction, it can fire at a reasonably rapid rate at a push of the button and — for the more advanced — thrust off in the direction you are heading.

This ability takes some controlling, for although you start slowly it is possible to whizz across the screen faster than any asteroid with a very good chance of crashing. There is also the worry that unless you get back to the centre of the screen before the last asteroid is destroyed you will find an asteroid materialising on top of you.

There are also three special features — hyperspace, shields and flip. Hyperspace is a classic panic button. When destruction seems inevitable push the joystick back and you disappear off the screen, only to re-appear split seconds later elsewhere. There is no guarantee that you will not re-appear on top of an

asteroid, though, and that split second it takes you to re-orientate yourself may also be your last.

Shields last for only two seconds. They enable you to pass through the asteroids but if you put them down too soon it is fatal — and the same applies when you keep them on for more than two seconds.

Flip gives the ability to turn 180 degrees instantly and fire at any asteroids trying to sneak up behind you.

One difficulty switch "A", alien satellites add to your problems by flying across the screen firing at you. A large blue one of these emerges early without appearing very adept at either dodging asteroids or firing accurately. His little green brother which appears more frequently in the later stages of the game is far more accurate.

The asteroids split in half when hit with those half-size pieces of rock splitting again upon another hit. These small boulders are destroyed on the next successful shot but being faster and more difficult to hit are worth more points.

Arcade Asteroids machine players will have to learn to use the joystick instead of pressing buttons and may need to re-think their tactics but otherwise this is very close to the game they already love. Whether they can afford the £34.50, which makes Asteroids one of the more expensive cartridges for the Atari Video Computer system, is another matter.

CLOSE ENCOUNTERS OF A HAZARDOUS KIND

Take command of a space ship on a dangerous mission into the uncharted depths of space filled with hazardous encounters.

In Astromash, new from ACE for the Mattel Intellivision 3D home video unit, you control the command space ship on a mission into outer space, navigating through meteor showers. The safety of the ship depends on your expertly-aimed laser fire. If you miss the falling stars and they get you instead, it's too late — you're dead.



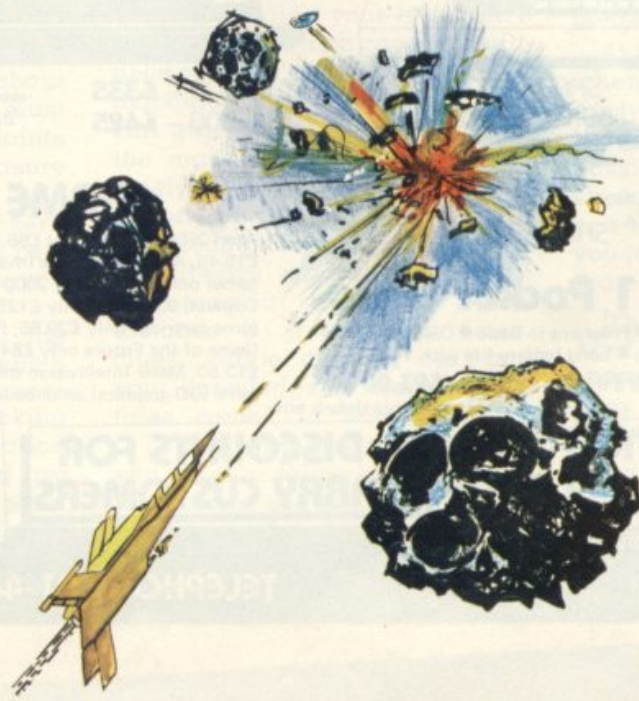
Only three lives are yours to play with, on the way to totting-up your score, which is boosted by the number of meteorites destroyed.

The beauty of Intellivision is the high standard of the graphics and realistic effect of a three-dimensional picture. The whole game is given a visual depth which ordinary video units cannot equal. Instead of the stilted movements which are an eyesore on so many games, Intellivision graphics flow when they move, making them much more realistic.

Intellivision really comes into its own on the sports games in which the players look more like real humans. You can see their leg joints move and flow as if they really are running.

The latest game in the range titled Major League Sports Network, is Bowling, which is out this month. The game incorporates standard bowling rules with a bowling alley and skittles on the screen, all in perspective.

You operate the bowler using the hand controllers to get the angle of the shot correct. The cartridges cost £18.95 each.



MACRONICS

ZX81

26 Spiers Close
Knowle, Solihull
West Midlands
B93 9ES England

ZX80

1K Space Invaders



A superb version of the famous arcade game in fast interactive graphs. A 4x2 array of aliens descend moving right & left and they can detect your Laser Base so keep it on the move. Previous and current game 'On screen' scoring. Destructable protective shields and keyboard control of the Laser Base & Laser Bolt firing using \uparrow & \downarrow and the 'Rubout' key

1K Breakout



An interactive graphs 9 ball game, as Invaders written in m/c for good graphs. Try your skill and patience at knocking all bricks from the wall. Use \uparrow & \downarrow to control the paddle

1K Music



From a range of 8 notes you can use your ZX as a toy piano. Your selected notes are written to cassette - continuous prompt for new selection of notes - play back your cassette and just listen to it sing. Example tunes

Please specify 4k ROM or 8k ROM m/c when ordering

Introductory Offer for 1K ZX machines
3 cassettes & program listings for ONLY £6.95 !!

Lots more software for all ZX machines from 1K-16K.
Send S.A.E. for catalogue

Circle No. 134

FROM LEADING MANUFACTURER

£2.50

NEW



2708
£2.00

2532/2732
£4.75

COMPLETE EPROM SERVICE

COPYING

➤ ERASING

➤ CUSTOM PROGRAMMING EG TWO 2708 INTO ONE 2716 and ADDRESS CHANGES ETC (all prices subject to VAT p + p 60p)



THIS COULD BE FUN! (TECHNICAL SERVICES) LTD.

307 New Kings Rd., London SW6 4RF.

Tel. 01-736 5503/4

Circle No. 135



COMPUTER SYSTEMS FOR THE HOME & BUSINESS ENTHUSIAST

SHARP MZ 80K

Sharp MZ-80K 48K £434, Twin Disk Unit for MZ-80 £660, 80-Col. Printer for MZ-80 £399, *A complete business system for less than £2000.00.

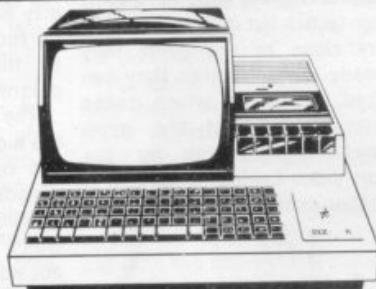
Now available Sharp MZ-80B P.O.A. ring for details of this outstanding system.

SHARP 3201

Business computer 64K Ram 32K Rom expandable to 112K Ram 72K Rom P.O.A.

SHARP PC 1211 Pocket Comp

Sharp PC1211 Pocket computer • Programs in Basic • Qwerty Alphabetic Keyboard • 1.9K Ram • Long battery life with interface £105.00, Printer for SHARP PC 1211 - £93.00 PC1211 £67.00



SHARP MZ 80K - £399

SHARP 3201



ATARI 400/800

Atari 400 - 16K Ram expandable to 32K - Amazing graphics - amazing 3D games - the game computer of the future - must be seen to be believed - programs in "Basic" "Assembler" "Pilot"

ATARI 400 - £335
ATARI 800 - £625

PRICES INCLUDE VAT

GAME COMPUTERS

Atari 2600 plus Combat £95.45, Game cartridges from £15.45, Atari 2600 Space Invader Package plus Combat, 139 games only £119, Atari 2600 Asteroids package plus Combat, 93 games, only £125, *"Asteroids Launched" game cartridge only £29.95, Philips G7000 Computer Game of the Future only £84, Game cartridges from £13.50, Matel Intellivision the most advanced computer game (3D graphics) an unbelievable £199.

CREDIT FACILITIES AVAILABLE

SPECIAL DISCOUNTS FOR CASH & CARRY CUSTOMERS

MAIL ORDER AVAILABLE

VIDEO SERVICES (BROMLEY)
8 SUNDAIRGE PARADE
PLAISTOW LANE BROMLEY KENT
near Sundridge Park Station

Prices include VAT
& may change during month

TELEPHONE 01-460 4169/8833

Circle No. 136

Mainline



BY ALEX GATES

PLAYING Adventure on a main-frame computer is a tough nut to crack, taking months and months to solve. But that doesn't stop people sneaking into the computer room after dark to tackle it.

Most large makes of computers can run a variety of games but Adventure is the most popular and best suited. It is much more of a test than a micro based game because of the massive storage capacity mainframes have, extending the vocabulary into the thousands.

Many more details of scenery are available than on a micro and there are far more places to get lost in, more treasure to find, more dangerspots and hazards to overcome.

The principle of the game is the same as any adventure game. You have to find a certain number of treasure pieces which are dotted about an area littered with dangerous objects and evil beings.

Not only do you have to find the treasure but there is also a points system clocking up your score. You get 10 points for finding a piece of treasure, 10 points for getting it safely back to the store room, one point for each room you manage to enter but you lose 10 points if a piece of treasure is stolen by pirates, dwarfs or trolls, who are all out to trick or trap you.

Usually the top score is about the 350 mark: obviously you must try not to give away any points while you're on the treasure trail.

When you get down to a serious game of Adventure, it is best to keep a record of where you have been in map form.

The sooner you find out the boundaries of the area in which the treasure is hidden, the sooner you can positively start looking for it by gathering information and clues. Be brave and try going in every direction possible and in to every building (whether it's a safe looking barn, an evil smelling dungeon or a mysterious mist shrouded tower).

What it boils down to is that the game can only successfully be played by trial and error, frustrating though it may be.

A noteworthy tip in case you foolishly set foot in the labyrinths of underground mazes is to leave behind some of the least valuable clobber you are carrying. By leaving a marker behind you'll save a lot of time aimlessly walking through corridors and tunnels which look exactly alike.

If you leave a pointer, say some food (which always attracts the malicious dwarfs), or



your water bottle or a couple of coins (providing your lamp isn't going dim in which case you will need them to put in the vending machine for new batteries), you can quickly establish a map of the maze and get yourself out safely.

Console yourself with the knowledge that the computer is not always as tight-lipped as you may at first think. For instance it gives away some clues, subtle as they are, but your knowledge of classic fairy tales comes in handy.

To find any piece of treasure you have to follow each step in the correct sequence. You'll be hitting your head against a wall if you get to a stage when you know you should be able to use the tantalizingly near object to

obtain some treasure but you are lacking a vital item. An obvious example is the bird chirping happily in the sky. You know you need it for something but forgot to pick up the cage to catch the flighty creature in at the previous step.

Before, during and after you experience a close encounter of the kind you would rather not have, with trolls, dwarfs, wizards and elves, you are bound to have the opportunity of picking up a variety of objects. Some of these are worth having, the lamp, money and weapons are good bets for a kick off, but some are just put there to lead you astray. It's up to you to decide which you are going to need.

And unfortunately it's only your good judgement and luck which will reveal the three or four magic words which are vital for finding the treasure. Often you just stumble against them, and sometimes you're given a clue in the form of a riddle which you have to puzzle out.

There are going to be times when you will want to beat up the computer yet the only way to vent your anger and frustration is to swear at the machine. It only makes you feel even worse. It will either answer you back with whatever expletive you used, or it will chastise you with: "tut, tut. Mind your language, please".

At the end of the game, either when you have found all the booty or been killed or committed suicide (yes, even that's possible if you can't take the strain), the print out will give you an assessment of how well you fared, along with your points score.

It's just as well there are no hard and fast rules to stick to. If there were it would be far too easy and the fun would be taken out of it.

And once you have been whisked away by a crowd of laughing elves into the sunset having found all the treasure there is little left to hold your attention.

While it is not difficult to learn enough Basic in a short time to be able to write short, simple programs, the language was not intended to be used for large, complicated programs.

In fact, it was designed before modern structured programming techniques had been formulated. As most of us are stuck with Basic on our home computers we have little choice but to write our large programs in this language.

My aim in this series is to present algorithms and programming methods which make it easier to write programs which work properly. Where routines are given in Basic they will be written with a minimal subset which should be easy to understand but is not intended to follow the syntax



required for any specific machine.

All questions, seemingly unsolvable programming problems, and suggestions for topics to be covered will be welcomed. This series is intended to help you program efficiently and the content of future articles will be governed largely by the comments and ideas received.

the TV but on some machines the programmer must insert his own routine to ensure a true random start for the RND function.

A games program will usually begin by printing instructions and waiting for a response from the player before starting the game. This is a convenient point to insert the randomising, and a simple way to do it is:

```
100 PRINT "PRESS ANY KEY
    WHEN READY"
110 GET AS$
120 LET X = RND
130 IF AS$ = " " THEN 110
```

When the program continues the next value used from the random number sequence will depend on how long the player waited before pressing a key.

That, however, is not very satisfactory for two reasons; first Basic is rather slow and normal variations in the speed of pressing a key may produce only three or four starting points; and second someone sitting with his finger on a key while the instructions are being printed will defeat the object of the routine.

The second objection can be overcome in Basic, by adding an extra test at the beginning of the routine, but to ensure a wide range of starting values for RND

A WILD CARD

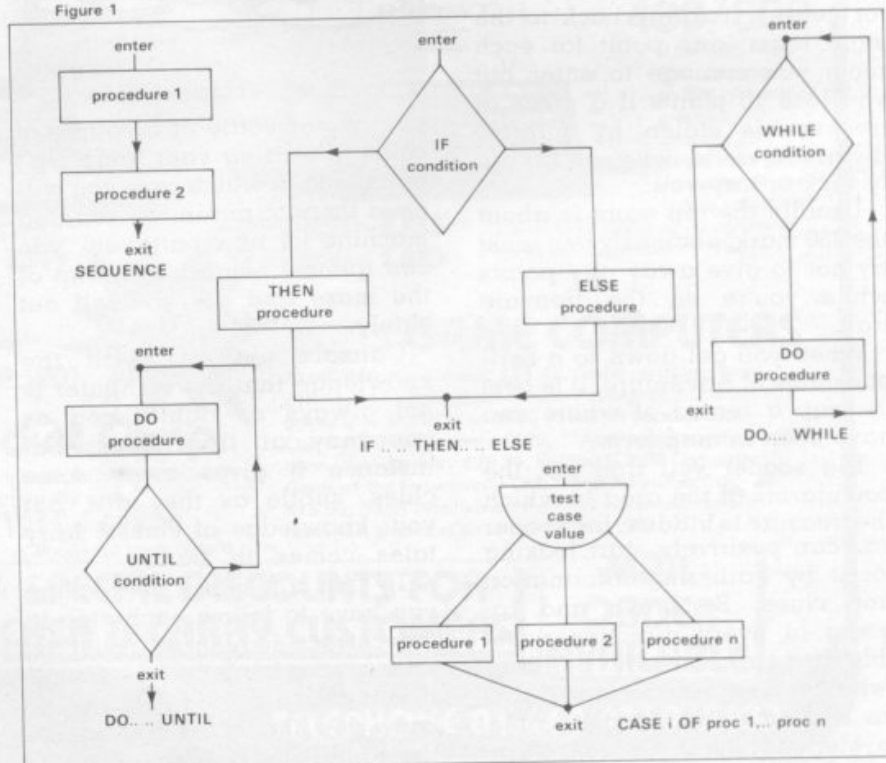
Most games programs use random numbers, so it is important to know something about how random number functions work, what their limitations are, and how to use them efficiently. The RND function in Basic gives pseudo-random numbers, calculated by a procedure which is designed to produce a sequence with no easily-detectable relationship between successive numbers, and with the numbers spread evenly over their range.

The method used on the ZX-81 and described in the manual is typical of the pseudo-random number generators used in microcomputers. The ZX-81 keeps a number between 1 and 65535 as a seed for the random number and a random number is produced by first calculating a new value for the seed as $75 * (\text{seed} + 1) - 1$ (taking the remainder after division by 65537 if the result exceeds 65536) and then returning the new seed divided by 65536 to give a number between 0 and 1.

Those pseudo-random numbers are good enough for most purposes but as the same se-

quence appears every time the machine is switched on it is often necessary genuinely to randomise the starting value. Some Basics make a provision for this — for example, RAND on the ZX-81 and RND(-TI) on the PET — which initialise the random number seed from the number of frames displayed on

Figure 1



a machine code subroutine is advisable.

Another problem arises with random numbers when you need all the numbers to be different. Shuffling a deck of cards can be regarded as a problem of this kind, requiring a routine to generate a list containing the numbers 1 to 52 in random order.

When only a few numbers are needed it is simple enough to test each number as it is generated and discard those which have already been used. With a longer list required this procedure can take a long time and, even worse, with a bad random number generator it may not terminate.

A simple way to perform a shuffle is first to fill an array with the numbers in order and then work through the array, exchanging each element with a randomly-chosen element. A simple routine to do this is:

```
10 DIM A(52)
100 FOR I = 1 TO 52
110 LET A(I) = I
120 NEXT I
130 FOR I = 1 TO 52
140 LET R = 1 + 52*INT(RND)
150 LET X = A(I)
160 LET A(I) = A(R)
170 LET A(R) = X
180 NEXT I
```

STAY IN CONTROL

Structured programming is a method of program design which, used properly, produces programs which are reliable, easy to maintain, and easy to read. A fundamental principle of structured programming is that a program should be constructed from modules with a single entry point and a single exit point.

Any program can be written by refining the modules successively to include more and more detail using only three control structures: SEQUENCE, IF ... THEN ... ELSE ..., and DO ... WHILE ... Two additional control structures, DO ... UNTIL and CASE, are useful in practice but are not theoretically necessary. Flowcharts for these control structures are not available in Figure one.

An important property of structured programs is that program

flow goes straight on from top to bottom and never jumps about the way Basic programs do when GOTO is used indiscriminately.

There are many reasons why structured programming is impossible in Basic but programming in Basic can be made easier by using structured methods as much as possible. Although most of the fundamental control structures are not available in Basic it is possible to obtain the same effect using the language.

SEQUENCE is no problem, as it is just a matter of one block of statements following another, and CASE corresponds to the Basic statement ON variable GOSUB line no, line no ...

DO ... WHILE ... and DO ... UNTIL can be implemented in Basic with IF ... Then ... and GOTO. The example shows DO ... WHILE ...; DO ... UNTIL ... is similar, but the test should be

made after the DO procedure instead of before.

```
99 REM WHILE
100 IF condition THEN 120
110 GOTO 200
119 REM DO ROUTINE
STARTS HERE
120 ...
.....
189 REM DO ROUTINE ENDS
HERE
190 GOTO 100
199 REM START OF NEXT
BLOCK
200 ...
```

A few microcomputer Basics — including TRS-80 Level II — allow IF ... THEN ... ELSE ..., but where it is not available it can be implemented by using ON variable GOSUB line no, line no. The variable must first be set to a value of 1 or 2 depending on the result of the IF test. The straightforward way to do this is:

```
100 IF condition THEN 130
109 REM ELSE
110 LET X = 2
120 GOTO 140
129 REM THEN
130 LET X = 1
140 ON X GOSUB line no, line no
```

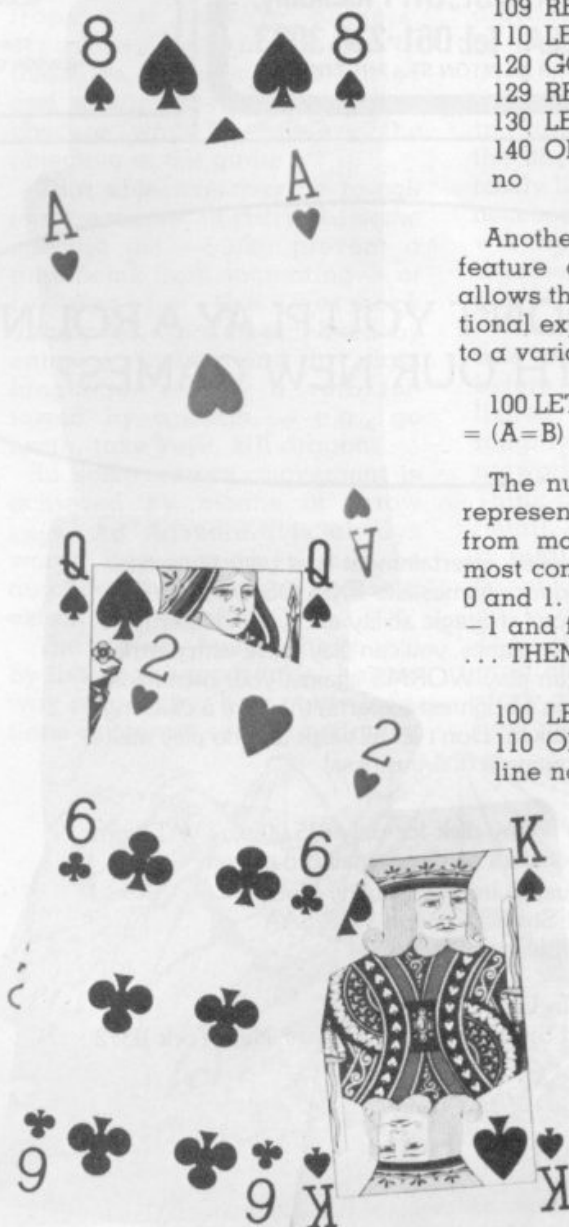
Another method is to use the feature of some Basics which allows the truth value of a conditional expression to be assigned to a variable, for example:

```
100 LET X = (A < B) or 100 LET X = (A = B)
```

The numerical values used to represent "true" and "false" vary from machine to machine, the most common being -1 and 0 or 0 and 1. If true is represented by -1 and false by 0 we can get IF ... THEN ... ELSE by:

```
100 LET X = condition
110 ON X+2 GOSUB line no, line no
```

Before you use this method you should, of course, check that your Basic allows assignment of truth values and find out what values are used.



ATARI APPROVED DEALER

ATARI 400 & 800

IN MANCHESTER

★ SOFTWARE ★ PERIPHERALS
★ COMPUTER CHESS GAMES
(FULL RANGE IN STOCK)

BARCLAYCARD
VISA

MANCHESTER'S
ATARI BEST ATARI DEALER

ATARI
VIDEO/COMPUTER SYSTEM

SPACE INVADERS
£24.95

FULL RANGE OF
CARTRIDGES IN STOCK
AT LOWEST PRICES!

SPECIAL MAIL ORDER
SERVICE WRITE OR
PHONE FOR FULL DETAILS

Commodore VIC due shortly!

GEMINI ELECTRONICS
Dept. VG. 50 Newton St., Off Piccadilly,
Manchester M1 2EA. Tel: 061-236 3083.
WE ARE AT THE CORNER NEWTON ST./ HILTON ST.

Circle No. 137

1K ZX81 MINI SPACE INTRUDERS £5.95

Yes! Our machine language programmers have scored another first! Now you can play this super game on your 1K Sinclair ZX81. All the fun of the arcade game in the comfort of your own home.

HINTS & TIPS for the ZX81 £4.25
by Andrew Hewson

- *80 pages explaining clearly how to squeeze a computing quart out of a Sinclair pint pot.
- *Saving Space — vital reading for all ZX81 owners.
- *Understanding the Display File — using the display file as memory, clearing a part of the display, using tokens in PRINT statements.
- *Converting ZX80 programs — explaining simply but comprehensively how to convert the hundreds of published ZX80 programs.
- *Chaining Programs — revealing techniques for passing data between programs, calling subroutines from cassette and establishing data files.
- *Machine Code Programs — all you want to know about Z80 machine language. Explaining how to write, load, edit and save machine code and how to debug your routines.

Routines and programs are scattered liberally throughout the text and the final chapter consists of twelve useful, interesting and entertaining programs such as LINE RENUMBER, BOUNCER, SHOOT, STATISTICS etc.

Cassettes for 16K ZX81

SPACE INTRUDERS — fight the marauding alien as you battle to save the Earth. All the dynamic parts of this program are written in machine code for super fast fun. **£6.50**

PROGRAMMERS TOOL KIT — line renumber including GOSUBs and GOTOs. Hexadecimal Loader/Printer, Find, Edit and Replace BASIC program strings **£8.50**

Cassettes for 1K ZX81

STATISTICS — Mean, standard deviation, regression, trend analysis, chi squared test, graph plot **£3.75**

PLANET LANDER + space docking, clock, stopwatch **£3.75**

780 Op Codes — this handy ready reckoner lists all 600 plus, Z80 machine codes in decimal and hexadecimal with their mnemonics. Each code is succinctly explained and cross referenced. Complete with protective transparent wallet **£2.00**

BLANK C12 CASSETTES 5 for £2.75, 25 for £13.25
Send SAE for full catalogue

Cheque with order or quote Access number to:
HEWSON CONSULTANTS, 7 GRAHAME CLOSE, BLEWBURY,
OXON OX11 9QE. TEL: (0235) 850075

Circle No. 138

WHY DON'T YOU PLAY A ROUND
WITH OUR NEW GAMES?

Now a whole world of skilled entertainment is at your fingertips. LEISURE GENIUS introduces games like EXPLOSION, DEATH, and WORMS to test your strategic ability and your dexterity. Unlike most other computer games, you can play these with partners and opponents and you can play WORMS against your own micro. Invented by some of Britain's brightest experts, they are a challenge you can't pass up or put down. Don't let all work and no play make computing a dull business!

Each game is available on floppy disk for only £15.00 plus VAT from most computer retailers or direct mail order from:

Leisure Genius, Suite 504, Albany House,
324 Regent Street, London W1R 5AA
Telephone: 01-580 6361

In U.S. write to:
Leisure Genius, 34-36 83rd Street, Jackson Heights, New York 11372



**Leisure
Genius**

Circle No. 128

Adventure

BY KEITH CAMBELL

ADVENTURE is arguably the most popular game so far adopted by the computing fraternity. It tempts the data processing professional to give up his lunch hour to search for hidden treasure in the mainframe and is also finding its way onto many a home and even business microcomputer.

It is a game which generates fervent enthusiasts. I was staying overnight at Brighton on a business trip and, to pass the evening, walked along the seafront, finding myself eventually in a little back street pub. Armed with a pint, I found the only spare seat next to a young man and started a conversation, during which it emerged that I wrote for a computer magazine.

"I know nothing about computers", said my companion, a microbiologist, "but I suppose you have one of those Pet things". Whereupon, a fellow sitting on a nearby bar stool interrupted. "Are you in computing? I am half of a software firm writing commercial software for Pets."

"I'm a Tandy man myself," I told him, feeling that was almost like a declaration of war. A lengthy discussion followed on the relative difficulties of programming the Z 80 against the 6502. Neil, our biologist, yawned and sipped his tequila. Until the conversation turned inevitably to Adventure.

"Isn't that a computer version of *Dungeons and Dragons*?" he asked, suddenly awake again. From that moment, the only lull in the conversation before closing time was when a round was bought. Three enthusiasts could not be stopped.

Adventure did originate from *Dungeons and Dragons*. It has appeared on many mainframe computers around the world. The original was written in Fortran and required 64K storage plus disc back-up. In this age of the micro, a fairly complex Adven-

ture consisting of about 30 locations and a similar number of objects can be loaded into 16K of RAM.

Scott Adams scarcely exaggerates when he proclaims in the instructions appended to the Adventure series, that the player is able to experience an adventure without leaving his chair. For the Adventure formula is a game suited ideally to computers. A good Adventure can be totally absorbing and the danger of making a false move can become very real, as can the excitement of discovering a new exit or chamber.

So, for the uninitiated, what is Adventure? The game consists usually of a logical network of locations which must be explored or traversed. The locations can contain objects, creatures/monsters, and/or treasures, which may be carried and manipulated in sometimes obscure ways to achieve the objective of the game.

That objective may be to collect treasures, to carry out some specific act — like prevent a time-bomb from detonating — or to escape the network unharmed. That is achieved by entering instructions in plain language, usually a verb followed by a noun — e.g., go north, take keys, kill dragon.

In some games, movement is achieved by means of arrow keys. An Adventure is always words but sometimes may be augmented to a greater or lesser extent with graphics.

The player — unless he cheats by listing the program — has no way of knowing how many locations or objects exist but can plot

a logical geo-schematic map of the network to aid him in his travels.

Most Adventures are written in source code, rendering them more difficult to analyse by listing, or disassembling, than to solve.

Machine-code games, as well as having the advantage of space economy, have an apparently instantaneous response adding to the dramatic effect of surprise.

If your machine-code Adventure is baffling you and you want to cheat, try breaking, re-setting or quitting the game — without turning off — and then enter this from command mode: `FOR I = (start address of user RAM) TO (end address of user RAM): PRINT CHR$ PEEK (I);: NEXT`

That will not give you an instant solution, but all the displayable characters will scroll up the screen, giving you a few good clues!

The most difficult part of writing an Adventure is to establish the theme and the plot. It is really like writing fiction, as it is necessary to have some theme which will hang everything together, while absorbing the player.

When you have hit on a theme, ask yourself if it has been done before. Once you have established your theme and plot, roughly draw the map of the network and place your objects. Think through your plot in some detail, making sure you have an in-built impossibility — e.g., you cannot get the axe until after you have chopped down the tree. Then think around some of the programming difficulties. I will start giving you tips on them next month.



TEARY ROGERS

CHRISTMAS PARADE

LIGHTS, ACTION! CUE SIMON'S BIG BROTHER

The musical memory game Simon, has a big brother out this Christmas.

Super Simon is a deluxe version of the Simon game which made such a big impact in the shops last year. This one has five different games to play and up to eight people can join in.

Super Simon is square shaped, unlike its predecessor and has selectors for the game variations, the number of players and the skill level. Press the large coloured keys to follow the sequence Super Simon's memory throws out and see how long it is before you get the sequence wrong.

Or a more difficult game is to try and follow Super Simon at the same time as its colours light up and it blares out its musical tones.

For more than one person Super Simon can cleverly pick a person to follow his sequence by selecting one of the four colours, red, yellow, green or blue, assigned to each person.

One of its special features, which the original does not have, is an arbitration key. If controversy develops about the result of a game, at the touch of a button, Super Simon will indicate the winner by flashing the right coloured key.

Super Simon is built to last in robust plastic panels to withstand heavy hands. You should easily be able to find the game in most toy shops and department stores. It costs anything between £24-£29.

Apart from the original of this game there is also a baby brother: hand-held Pocket Simon which sells for £9-£14. Simon itself now costs £15-£20 and is still the most popular of the trio.



DIG FOR VICTORY

Toy manufacturers are still cashing in on the space invaders band wagon.

The hand-held Earth Invaders toy is no exception. It first came out at the beginning of this year as a follow-up to Computer Games' successful hand-held version of space invaders, called Galaxy Invaders.

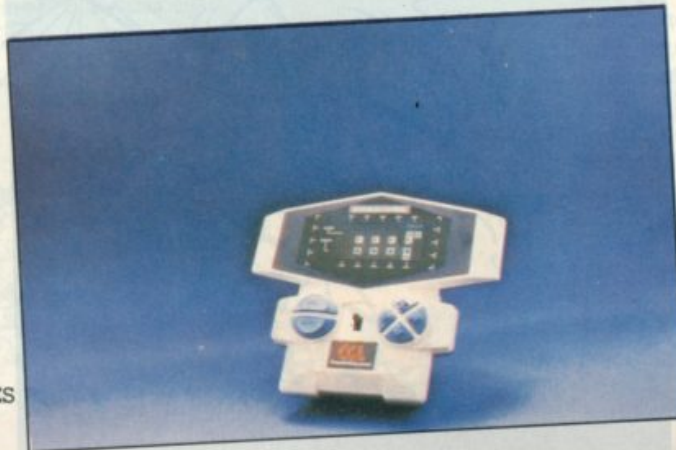
Flying saucer shaped and made in blue and white plastic with a large display screen, the game has a microchip inside to program in different difficulty levels.

The aim in Earth Invaders is to defend your general from invading aliens which move around a grid of squares. There are six squares which are safe ground. If you are caught in a square when an alien moves in, you are dead.

Your only defence is complicated and relies on quick thinking and concentration as well as dexterity. You have to dig holes in the squares around you and wait for an alien to land in one. When he does the red aliens can only be killed by pressing both the 'bury' button and the correct directional button. But you must do it as soon as the alien lands in the hole or he will escape and destroy you.

You get points for each alien you successfully destroy and bonus points for each phase of the game you complete.

Earth Invaders costs £26.95 and is battery operated.



THE LOGIC OF COMPUTERISED MASTERMIND

The popular logical-deduction peg game of Mastermind was always an ideal candidate for computerisation.

Mastermind suffered from needing two people to play but being deadly dull for the one that set the problem, who could only tap his fingers while his partner thought through the numerous permutations needed to come up with the right answer.

Invicta's Supersonic Electronic Mastermind turns it into an absorbing one-player game with the computer taking over the part of the problem setter — and no distracting table-tapping either!

The game comes in a hand-held format and resembles a calculator with a liquid crystal display and a small keyboard on which to enter your guesses. It is compact enough to make a good travelling companion and comes complete with a plastic cover to hold your scorecards and a biro.

Skill levels mean you can set problems to fit your brain's powers of deduction at any given time. From just three numbers for those early morning sessions to a full six when you feel ready for a bigger challenge. On the right-hand side of the L.C.D. are two columns which tell you, firstly, how many of your guesses were correct and how many were correct and in the right place.

When you feel you have hit upon a sequence which will further your knowledge of the hidden number, hit the "try" key and the machine checks your effort against the code and returns its two clues. You make a note on your scorepad, try a bit of deducing and then have another go. The machine keeps a check of how many tries and how long it took you to work out the answer.

Supersonic Mastermind is battery powered by two HP7s (not supplied) but also runs off the mains and costs £19.95.



WATCH OUT! NEW EASTERN ADDICTION

The Japanese have moved on from digital watches to produce an incredibly addictive series of game watches.

There are six in the series, each about the size of a credit card and designed to fit in your pocket — but it is unlikely that they will spend much time there.

The liquid crystal display screens show the game in progress and provide accurate time at the press of the button.

Although compulsive the games are rather morbid in nature, with titles like: Fire, Vermin, Headache, Manhole, Lion and Ball. In the game Fire, for example, the aim is to catch babies — as they leap from a flaming building — on stretchers. If you miss, the baby dies and is chalked up at the top of the screen as an angel.

Each game has two versions — fast and slow depending on your skill. You get three lives and as long as you have a life left you can work up your score. The tiny toy records the top game score at the press of a button.

If the idea of burning babies does not appeal to you, try saving a parachutist from dropping into a shark infested sea, or saving a man from being beaten to death by heavy tools raining down on his head.

He is only safe when he is inside one of two doors on either side of the screen and you get a point whenever he goes inside. But beware, just when you think you are safe the door slams shut in your face.

The original games are only displayed in black and white and cost £17.95. The latest versions come in colour, are slightly larger and more expensive at £21.95.

The series is called "Game and Watch" and is marketed by Computer Games through a variety of electrical and toy shops.

LOTS MORE VROOOM!

There's a new look to those model planes which children can whirl around their heads whilst making "Vrrrrrooomm" and "Neeeeeoww" sounds.

For a start these microprocessor-controlled craft make their own "Vrrrrrooomm" noises, they are built along spaceship lines and when pointed at one another

accurately, they actually register a laser beam hit.

Dads will be as intrigued by these new generation models as the 7-14-year-old youngsters which they are designed to appeal to.

Called the Starbird Avenger and the Starbird Intruder the two ships come complete with a cardboard cutout "star base" with a target to fire at from your ship.

They are made of tough plastic to withstand batterings from over-enthusiastic owners and look like spaceships from out of the *Star Trek* and *Blake's 7* T.V. series.

Both the Avenger and Intruder have laser beam weapons and when the ship is pointed at the star base targets it makes an exploding sound.

The ship's engine noises are realistic and you can engage in dogfight battles with one person holding each ship. When you point the ship's nose upwards the engine sounds as if its power is increasing to full throttle. When you point the ship downwards, the engines slow down to come into a landing.

If it is 'hit' by the enemy, your engine dies for a second or two before being stirred back into action. Both cost £15 and are from the stable of Milton Bradley.

What makes these toys stand apart from other hand-held planes, that you can buy, are the sounds. No other toy has the same sound effects incorporated in them. They run on a 9 volt battery (not supplied).



INVADERS ON HAND

The original hand-held Space Invaders which kicked off the craze in the home is still selling well and looks set to do the same this Christmas.

The plastic built game was designed to imitate the space invaders arcade game and cash in on its success. After A. A. Hales of Leicester brought it into this country other manufacturers took up the idea.

The aliens rain down in rapid succession and become faster and faster — and more numerous — as the game progresses. There are two levels, for the "beginner" and the "expert" and the game comes complete with the familiar grunting sound effects. It runs off six HP7 batteries.

Other relatives in the Space Invaders family include *Astro Invaders*. In this you have to defend yourself from aliens, bombs, missiles, galaxy ships and moving stars.

THE PORTABLE GAMES CENTRE

The versatile hand-held electronic game centre Microvision, has had two extra cartridges added to the range for this Christmas.

These portable games follow in the hand-held space invaders vein but are not as sophisticated. There is a "mother" unit with a cartridge which you have to buy in the first instance.

Like the T.V. games centres the idea is to slot cartridges for different games into the master console which is microprocessor based.

At the top of the master console is a small screen on to which the cartridge is fitted. The games currently available include:



Blockbuster, Shooting Star, Ten-pin Bowling, Pin Ball, the popular strategy game Connect 4 — and the latest additions, Sea Duel and Space Blitz (yet another version of Space Invaders).

Each game cartridge has a different screen to fit in with the game's theme and is ready for

instant action when slotted into the main unit. The actual unit is quite large and made of strong plastic. The manufacturer, Milton Bradley, says it will easily go into a pocket but I have my doubts. It will certainly fit into a briefcase without any trouble.

Although there is nothing else like this game on the market, it does not live up to its competitors in the hand-held field. Because the actual screen is so small the game is limited and sometimes difficult to see.

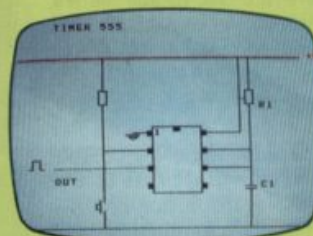
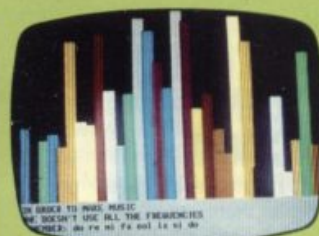
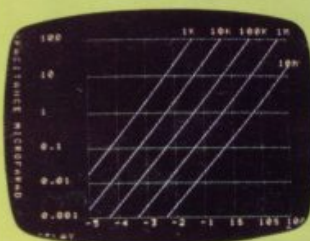
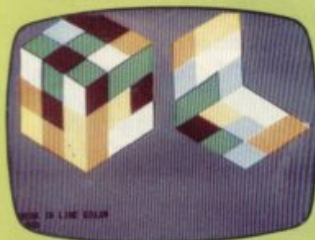
You can either play by yourself or with another player. The initial cost of the console and cartridge ranges from £29 to £39 while the cassettes alone are £9. Microvision can be found in most department stores toy sections and other shops selling electrical leisure goods.

Cash price
ONLY £595 + VAT
BEAT THAT FOR VALUE

The DAI Personal Computer is Here

High Performance

High Value



Standard Features

- * 24k Resident High-Speed Basic
- * 16 Colour High-Resolution Graphics (255 × 335)
- * Scrolling Screen Editor
- * Sound Commands for Music Generation
- * Very High Speed Hardware Maths Option
- * Resident Monitor for Machine Language Programming
- * 3 Programmable Parallel Ports
- * Standard TV Interface via Aerial Socket
- * RS232 Serial Port and Dual Cassette Interfaces

Manufactured by:

DAI

THE
MICROCOMPUTER
ENGINEERING
COMPANY
Brussels, Belgium.

Available from:

Data Applications (UK) Ltd.

Personal Computer Division
16b Dyer Street
Cirencester
Gloucestershire
GL7 2PF
Tel: Cirencester
(0285) 61902

For further information please complete and post to:
Data Applications (UK) Ltd, 16b Dyer Street, Cirencester, Glos GL7 2PF

NAME _____

ADDRESS _____

MY INTEREST IS: _____

Kit Korner

BENEFITS AND PITFALLS

IF YOU are thinking of acquiring a home computer, the easiest decision you will have to make is whether or not to buy it in kit form. Kits, as an idea, are a great advantage to hobbyists as they offer a greater range in what is usually a small budget.

The reasons for choosing one computer over the others are dealt with in another section. Here, I will be dealing with the problems of kit building including special tips on certain machines as they crop up. Some kits have pitfalls for the unwary, and I will hopefully cover them before anyone gets caught! There will also be notes on fault-finding and repair for those who have already been caught.

Undoubtedly you will benefit from building your own kit. Not only will you be better prepared for larger projects, but also you will learn a good deal about the system and how it works.

You must, however, be prepared to spend a lot of time in constructing the kit, and perhaps even longer in getting it to work. Someone who has done little or no construction work before can expect to spend 4-5 hours on even the simplest of kits.

Remember that the components, *not* the kits, are guaranteed by the makers, so you will have to pay them to put it right if it is your fault. However, if you stick to the instructions, take care over soldering and select the correct components, you should have no trouble.

Once you have decided on a kit, the next step is to get the necessary tools if you do not already have them. They really fall into two categories — essentials and extras.

The essentials are soldering iron, solder and cutters. The extras, which you will need if you are to get a professional and reliable finish, are pliers, a form of desolderer, either a small solder sucker or solder wick and a steady pair of hands.

The soldering iron should be

mains-operated, unless you can afford a temperature controlled one, with a small bit for light work. It should be rated at around 20 watts, and definitely no more than 30 watts, as this will tend to destroy components through overheating.

The solder should be of a fine multicore flux type of 22 gauge preferably. This type does away with pots of flux.

The cutters are needed to trim the ends of the soldered-in components. They should be side cutting and quite light to get a smooth finish on the underside of the board.

The pliers will be needed to bend components to fit into the board. This can be done with small fingers, but is often unreliable and causes stress in the components.

The desolderer is useful when too much solder has been put on a joint. The solder sucker does what its name suggests, and the wick is a woven copper strip which, when heated and pressed on to the joint by the iron, draws the solder off. Very useful for beginners.

If you are going to be any good at construction, you will need a steady pair of hands. Funnily enough, women and children make the best solderers! Do not give up, though, if you are in neither category!

FOLLOW THE INSTRUCTIONS

With all the good kits you will find comprehensive instructions for assembly. If you don't, ask. Most of them tell you to read them first. Do so! Even if you are an expert at construction, the order in which you assemble the components may be important.

So long as you read and follow the instructions, you should have no trouble with identification and assembly. If you are not used to soldering, this will be the point at which you will fall down.

Most kits advise you to build up the components on the board in layers, so that when all of one lot — say, resistors — are in, you can turn it over and place it flat on your working top. This allows you two free hands to solder with and ensures that all components are flat on the board.

Transistors, however, should be raised as much as a quarter-of-an-inch off the board and soldered with care as they are easily destroyed through overheating. This also goes for the other components, although these are not so critical.

There is no hard and fast rule about soldering. If in trouble, seek advice. Do not continue if you feel unsure. It will cost you dearly in time and money if you make too many mistakes.

Have fun while you are building your kit, as it may not last. Once you have finished it, everyone else will want to have a go.



BY KEITH MOTT

Prime yourself for the computer revolution...

... and save £1.50 on this Educational Computing special offer!

Sooner or later, every teacher will have to know something about computers. And a few hours' reading of *The Good Computing Book for Beginners* will give you a comprehensive grasp of the fundamentals. Written in simple English, it does for computers what Berlitz did for languages.

Simple English is also the language of *Educational Computing*. This magazine is essential reading for all those interested in the teaching of computing or the use of computers as teaching aids.

Educational Computing shows you how to get started and how to choose the right system for your needs. Each issue reviews a different computer with information about applications, systems, software, prices and what users think about the system.

You'll also find out how other schools, colleges and universities started in computing; what systems they use; and how they are working. There's a software directory of what is available for education, listed by subject, supplier and price. In fact, all you need to know about computers in the educational environment.

Send off the coupon today – and prime yourself for the shape of things to come.



Educational Computing normally costs £6.50 for ten issues per annum; and The Good Computing Book for Beginners £1.95 + 50p postage and packing. Get the two together for £7.45* including postage – and save £1.50 – by sending this coupon or a written copy

Please send me the next ten issues of *Educational Computing* plus *The Good Computing Book for Beginners* at the combined discount rate of £7.45*. Continue to send me *Educational Computing* until I cancel my subscription.

I enclose a cheque for £_____ made payable to ECC Publications.

Name _____

Position _____

Establishment _____

Address _____

Tel: _____

Signed _____ Date _____

Now post please to ECC Publications,
30-31 Islington Green, London N1 8BJ.
Telephone enquiries: 01-359 7481.

* UK rate only. Overseas rate: £10.95

Brainwave



WIN OUR CHAMPAGNE

Two bottles of champagne are up for grabs on this page every month. The first correct answers out of the hat for both the Mind Routines problem and the crossword on 15 November will have bottles of champagne rushed to them. Ian Pedder's Mind Routines problem will test both your ability to think through a puzzle and set it out as a program. These lend themselves to solving by program. If you are more literary minded try Nevera's Crossword and see how you get on.

● For details of Computer & Video Games competition rules see page 20.

NEVERA CROSSWORD

ACROSS

1. Effervescent ordering (3,6,4)
6. COBOL abbreviation For game man (3)
8. Incremental pests (5)
11. 12 when associated with a star on the Horizon (5)
12. DEC mainframe software Greek to the Pet (5)
13. Atari Computer recording equipment initially measure (4)
16. Enjoyable 3 (3)
17. The tops in binary (3)
19. What to do in a Grand Prix game to reset itself (5)
20. Count illicit contents of a procedural controller (5)
21. 3 Tree bit (3)
22. Sounds like fun on the IBM mainframe (4)
23. Stop the I/O transfer unit (5)
24. Single example of 17 (4)
25. Alternative condition for one (2,2)
26. A rap ends vices which revolutionised the video games scene (5,8)

DOWN

1. Conditional companions (4,4)
2. Single bit restructured to lure (4)
3. Primary purpose RND (5,8)



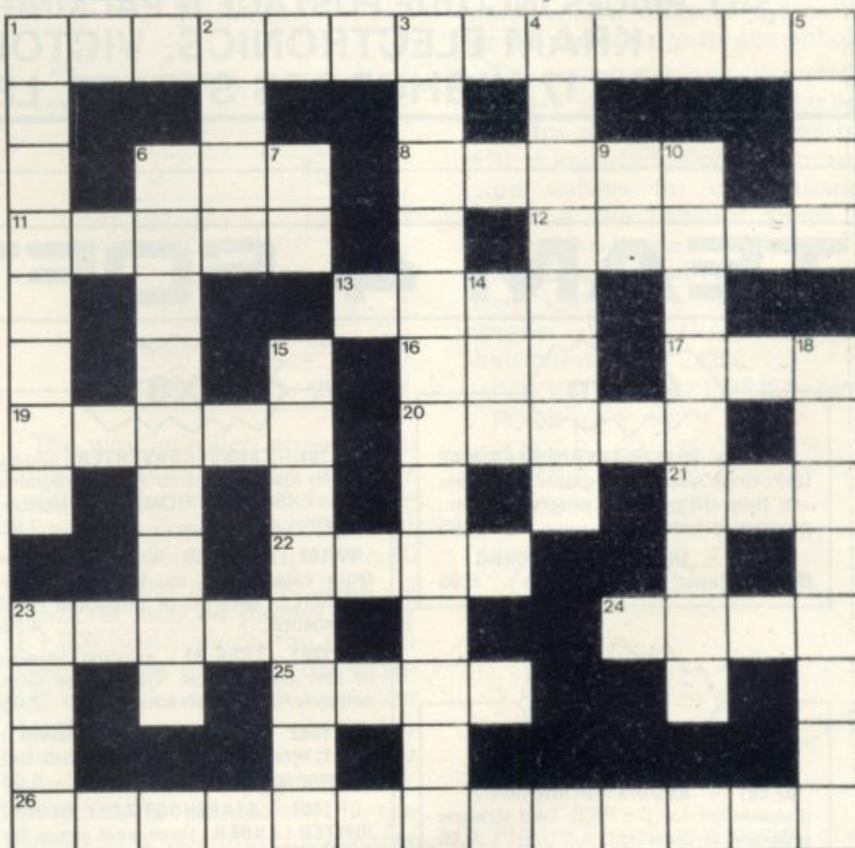
MIND ROUTINES

The four planets nearest the sun have perfect circular orbits around the sun as a centre point. Their orbit periods are given in the table below:

Planet	No. of days for one orbit
Mercury	87.97
Venus	224.64
Earth	365.25
Mars	686.79

They are currently all in a straight line with the sun.

- (1) When is the next time that three of them will be in line with the sun again?
- (2) Which three planets are they?



4. Cu, Fe, Co array members (8)
5. Text editor widely used amongst student ecologists (4)
6. Hub of the computerised pea packers (8)
7. Small but highly esteemed character (2)
9. Meaty sounding constant (2)
10. Screen feature From the Dead Sea? (8)
14. Make the program go fast (3)
15. The first record on a disk? (5,3)
18. Hex 50, Binary 1010000, INT (4*20-1) For the present time (8)
23. Word pieces (4)



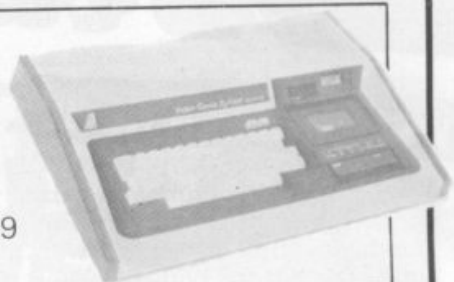
FREE SOUND WITH VIDEO GENIE



SEIKOSHA GP80A
PRINTER
NOW ONLY £179

**OHIO
SUPERBOARD**
COMPLETE WITH
SOUND, POWER
SUPPLY,
MODULATOR
FULLY BUILT &
TESTED FOR
BRITISH T.V.
STANDARDS
ONLY **£159**

WE CAN OFFER THE
INCREDIBLE VIDEO GENIE
FOR ONLY £299 INCLUDING
SOUND! 32K EXPANSION
INTERFACE FOR ONLY £279
AND 40 TRACK DISKS FOR
ONLY £189 SINGLE AND £359
DUAL!



CENTRONICS 737 LETTER
QUALITY PRINTER ONLY
£339

EPSON MX80T £329
MX80F/T £379

APPLE - CENTRONICS
INTERFACE
ONLY **£79!**

ALL PRICES INCLUDE POSTAGE & PACKING BUT EXCLUDE V.A.T.
**KRAM ELECTRONICS, VICTORIA HOUSE,
17 HIGHCROSS STREET, LEICESTER**

FREEPOST
(No stamp
required)

Circle No. 141

TEAM 4 SOFTWARE

Atom

UP 201 - SHAPEMAKER/SCREENSWAP
(2k) : draw your own graphical shapes
and store them in your programs. Demo
program included7.95

UP 2001 - INVADERS/HEDGEHOG
(6+6k) : 'classic' addictive games ...6.95

PET

UP 501 - ASS/DIS : an assembler/
disassembler for the PET. Two separate
programs on cassette9.95

UP 502 - MACHINE-CODE LOADER :
allows you to load machine-code with
a line-by-line editing facility5.95

GP 5001 - LAS VEGAS #1 : why go all
the way to the States when you can
gamble your money away in the
comfort of your own home. Can you
beat the bank at STUD POKER or win
the jackpot on the FRUIT MACHINE
(16k)5.95

ZX81

UP 101 - ZX80/81 CONVERTER : allows
you to load ZX80 (old RDM) programs
onto ZX81 (new RDM). Full instruc-
tions included,7.95

UP 102 - DATABAS : write to or read
from cassette up to 14k of data +
REMKILL : gets rid of unwanted REM
statements4.95

GP 1001 - TREK '81 : exciting version
of the classic 'Star Trek' game with
computer assisted attacks! (16k) ..7.95

GP 1002 - BATTLECHESS (2 players) :
ZX81 version of 'Star Chess' with full
screen graphics (16k)5.95

GP 1003 - STARSHOOT/ACEY DEUCY/
JUPITER LANDER : three great games for
the 1k ZX81.3.95

Atari

GP 4001 - 3D MICROMAZE : wander
around the insides of your Atari!
Frustration guaranteed4.95

GP 4002 - RAT TRAP : 2-player game of
skill and daring4.95

Video Genie TRS-80

UP 301 - XBAS : add eleven new BASIC
commands in TRS-80 level II non-disc
BASIC (also Video Genie) + instructions
+ free BREAKOUT program to demon-
strate the commands7.95

GP 3001 - LUNAR LANDER/3D MAZE/
DOMINOES : 'three of the best' for the
home arcade games addict,7.95

All programs supplied on high-quality
cassettes. Orders to:-

**TEAM 4
SOFTWARE**
Dept. TM
12 Taunton House,
Redcar Road,
Harold Hill,
Romford, Essex.



Circle No. 142

Graphics



BY GARY MARSHALL

THE interest and compulsion of most computer and video games lies in the appeal of their graphics. There are basically three ways to present the state or results of a games program: with numbers, with words or graphically.

While numerical computation is undoubtedly necessary during the course of any reasonably complex game, to present the results numerically is bound to become rather dull sooner or later. To present them in words is better, but books are better for reading from than video screens. A picture is worth a thousand words, and graphics are much more informative and natural than the other alternatives.

Most microcomputers, including the Commodore Pet, Sharp MZ-80K, Tandy TRS 80 and Sinclair ZX80 and ZX81 have a set of graphics keys on their keyboards. With these keys a pictorial display can be typed out in the same way as a paragraph of text. To make it easy to produce a graphic display from a program, these microcomputers also have what is called a memory-mapped screen.

The idea of a memory-mapped screen is that each character position on the screen (that is, each position in which a letter, number or graphic character can be placed) is mapped to a location in a specially reserved part of the memory. By placing a number in a location in this area of memory, the appropriate character automatically appears in the corresponding screen position. So producing a graphic display is reduced to a memory management exercise.

Some machines, including the Apple and Acorn Atom, provide explicit drawing commands. The fundamental ones are "MOVE" and "DRAW". The former permits a drawing position to be established, while the latter causes a line to be drawn from the current

drawing position to a specified position. In terms of drawing on paper with a pen, these commands are equivalent to moving the pen above the paper, leaving no trace, to position it. And moving it while in contact with the paper so that it draws a line as it moves.

The MOVE and DRAW commands allow the programmer to work in terms of screen positions, which is more natural than manipulating memory locations.

	COLUMN				
	1	2	C	39	40
ROW	1				
	2				
	R		- + + -		
			- + + -		
	24				
	25				

1	2		39	40
41	42		79	80
		- + + -		
		- + + -		
921	922		959	960
961	962		999	1000

The way in which screen positions are mapped to memory locations for the Pet is illustrated in Figure 1. The Pet screen has 25 rows, each with 40 column positions, so that a character may be placed in any of 1,000 positions on the screen. These screen positions are mapped on to the memory locations starting from the one with address 32768. As shown in the figure, they are mapped by rows. To place a character on the screen in a position whose row and column are given, we need to work out the address of the corresponding memory location. A little thought should confirm that if the position at the top left of the screen (in row 1 and column 1) corresponds to location 32768, then the address of the location corresponding to the screen position in column C of

the top row is $32768 + C - 1$ while, generally, the address of the location corresponding to the screen position in row R and column C is

$$32768 + 40*(R - 1) + C - 1$$

The Basic instruction which enables displays to be produced using memory-mapping is the "POKE" instruction. On a Pet, the instruction

POKE 32768, 42

causes the number 42 to be stored in location 32768, so that automatically the character whose code is 42 (an asterisk) appears at the top left corner of the screen.

In this way the tools required to produce a display on a memory-mapped screen are the memory-mapping formula given above and a table of the codes for the available graphic symbols.

The screen size and the area of memory mapped to the screen vary for different machines but with a knowledge of the appropriate values for a particular machine, the formula given for the Pet can be amended.

A space invader can be plotted near the centre of the Pet's screen using the following instructions: P = 33268

POKE P - 1, 255; POKE P, 247;

POKE P + 1, 127

POKE P + 39, 255;

POKE P + 40, 249;

POKE P + 41, 127

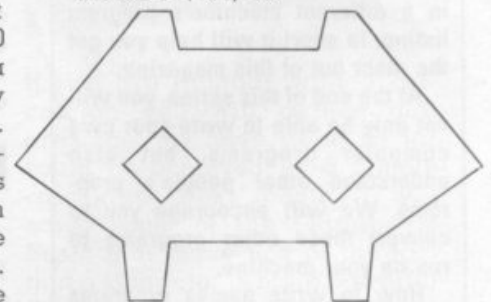


Figure 2 is a line drawing of an invader. Whatever you think of the likeness, it demonstrates that a drawing of one can be made by joining a set of points by straight lines. By varying the positions of the points, or adding more points, it is possible to obtain a more convincing, or even a more aesthetically pleasing, version.

By **MOIRA NORRIE**

You do not need to be able to program to make good use of a home computer but if you can feed instructions to your machine it will be that much more rewarding.

In this series we are going to teach you how to program in Basic, the simplest and most widely used computer language available.

There is a myth built up around computers that only a mathematical genius can understand them. But even 10-12 year olds with no particular skill with figures are among the keenest home programmers these days.

Anyone can learn Basic, you do not need any previous computing experience or even have your own computer — although that would obviously make it more interesting.

If you already have a microcomputer and have learnt how to use its version of Basic you have a head start on the beginners but do not turn the page just yet. Each microcomputer has its own Basic quirks and different functions which make it incompatible with others of its kind.

This series will help you understand some of the functions printed in a different machine's program listing. In short it will help you get the most out of this magazine.

At the end of this series, you will not only be able to write your own computer programs, but also understand other people's programs. We will encourage you to convert these other programs to run on your machine.

How to write games programs will be introduced early on but remember that you can write programs for anything: from keeping a check on your bank balance to storing names and addresses for your Christmas card list.



WHAT IS A COMPUTER PROGRAM?

To get a computer to do something for us, we must give it a list of instructions. This list of instructions is called a 'computer program'. In order that the computer may understand our instructions, we must write them in a language that the computer will understand.

Unfortunately, English is too complex a language for it to understand, therefore we use a specially devised computer language. The computer language we will use is called Basic — this stands for Beginner's All-purpose Symbolic Instruction Code.

There are slight variations in the versions of Basic available on different computers. I will describe the standard version and, when necessary, point out the differences for a number of computers.

GETTING STARTED

First you will have to switch on your computer. Some computers will automatically be ready for you to converse with them in Basic, but with others you may have to go through some preliminaries such as loading something from a cassette tape that will allow the computer to understand Basic.

Often computers will give the response "READY" so that you know that you are in Basic. Once

you have reached this stage you will be able to type in a Basic program.

A VERY SIMPLE PROGRAM

We will start with a very simple program which consists of only two instructions — one per line.

```
10 PRINT 2+3
20 END
```

Each line of a Basic program begins with a line number — the "10" and "20" above. These line numbers determine the order in which the instructions will be obeyed. The computer starts with the instruction with the smallest line number and finishes with the instruction with the largest line number.

You may type in your instructions in any order; the computer will automatically sort them according to the line numbers. It is not necessary that the line numbers go in steps of 10 as I have done above. However, it is fairly common programming practise as it allows for later instructions to be inserted.

Try typing the above program into your computer. Remember to press the key marked "Return" (or "Newline") at the end of each line typed into the computer.

If you make a mistake when typing a line, your keyboard will have a key marked "Delete" or "Rubout" which can be used to erase the last character; typing the key repeatedly will cause it to work back along the line erasing one character each time the key is pressed.

On the Sinclair computers, you do not have to type in the letters individually as there are keys which, when pressed at the appropriate point, will type the whole of the special "keywords" such as "PRINT".

With some of the microcomputer systems, the "END" instruction should be omitted. These include the Sinclair and the Atari.

Once you have typed in your Basic program, you can then tell the computer to obey the list of instructions — you do this by typing the command "RUN" and then "Return" again.

The above program tells it to calculate $2+3$ and then print the answer. You should therefore find that the number "5" is printed.

The computer will then print the response "READY" to let you know that it is ready for you to give it another command. If you again type the command "RUN", then it will again perform the list of instructions. You could type the command "LIST" in which case it will list your program — this is useful in checking what your program looks like at any stage. Alternatively, you could now "edit" your program.

EDITING YOUR PROGRAM

Often you will want to change your program in some way — then you say that you are "editing" your program.

It may be that your program does not do what you wanted, in which case there is an error in the program — this is often referred to as a "bug". You will hear people say that they are "debugging" their program, meaning that they are trying to get rid of their program errors. On the other hand, your program may be correct but you want to amend it in some way. In either case, you will have to edit your program.

Editing Basic programs is very simple. There are three types of change you might want to make. You might want to change a line, add a new line or delete one of the current lines.

To change a line, you simply type in the new version of the

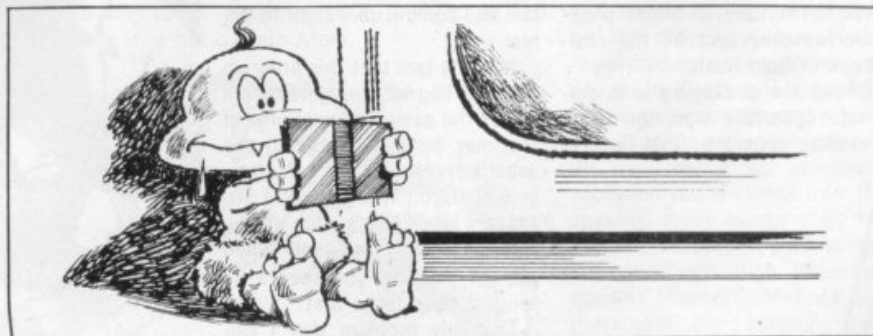


line. Thus, if I wanted to change the previous program so that it multiplied 2 by 3 instead of adding, I would type
10 PRINT 2*3

The old version of line 10 would be replaced with the new version of line 10.

To insert a new line, you type the new line and the line number will determine where it is inserted in the program. If I now typed
15 PRINT 2+3

I would have a program which printed the product of 2 and 3



followed by the sum of 2 and 3.

To delete a line of your program, type the line number then press the "Return" key.

Some computer systems provide you with a cursor that can be moved about the display screen so that you can actually indicate individual characters that you want to change. This would save you re-typing the entire line.

SIMPLE CALCULATIONS

Note that an "*" is used in the above example to indicate multiplication. The remaining arithmetic operations are: subtraction represented by "-", division represented by "/" and exponentiation represented either by "**" or by "^". Exponentiation means calculating powers of numbers e.g. $3**2$ is equivalent to 3^2 .

By using these operations we can perform a whole range of arithmetic calculations. E.g.

$$4.2-3**2/6$$

$$3+2*5$$

In the first of the above examples, there is a "real" number — one that contains a decimal point. In some versions of Basic only integer numbers are allowed — those that do not contain a decimal point. There will always be a limit on the size of numbers that your computer can cope with.

In the second example, the computer is faced with a choice — "will it do the addition or multiplication first?". If it does the addition first, then it will get " $3+2$ " which is 5, and then multiply that by "5" to get a final answer of 25. However, if it does the multiplication first, it will get " $2*5$ " which is 10, and then add "3" to get an answer of 13. Clearly, a specified order must

be laid down for such a situation so that computers will always arrive at the same answer.

NEXT ISSUE

If you are familiar with a calculator, you will realise that anything we have done so far could be achieved by a simple calculator. Next month, I will cover some of the features of Basic that make use of the fact that a computer is more powerful than a simple calculator. These will include the use of "variables" to make your programs more general, and "loops" so that you can repeat calculations for different values without having to re-RUN your program.

NEXT ISSUE

REVIEWS

GOLDRUSH

An adventure with *real* gold for the first solver. Manchester based Mr. Micro's Gold Rush game had inquiries from keen adventurers long before Commodore's VIC-20 Computer was available.

This original program costs £16 and should be available from any VIC dealer. I have no doubt that soon hundreds of VIC owners will be burning midnight phosphor as they take on the challenge of Gold Rush.

Even the packaging is a welcome departure from the usual cassette software. Gold Rush is

supplied in a good looking book type format, containing the cassette, the instructions, the claims registration guide and an assay application form. The cards are used for registering your claim to dig for gold in the program and confirm your right to the real gold.

It is the fact that this program offers a bag of real gold which makes the game unique. Some of you may be aware that in the usual adventure type game any gold that you win, instantly disappears when you switch off the computer. With this game when you get the gold you keep it, — you just have to be first!

The only problem that I can report so far is that finding the hidden word that earns the gold, is going to take a lot of hard work.

You see, the 1849 gold rush consists of not just one game, but what the notes describe as a number of 'challenges'. The first part is easy, since it is a very neat display teaching a little about the real gold rush and giving instructions on how to operate what is described as the "Mr. Micro Time Terminal". This is basically a program which loads another program. A very effective way of overcoming the memory limitations of the standard VIC.

The hard part comes next, because the screen then displays a map showing various numbers. The map is of California, and the numbers are sites that may be visited. Each site can only be visited when you know the key,



and you get to know the key by solving puzzles or by reaching a high score in a game.

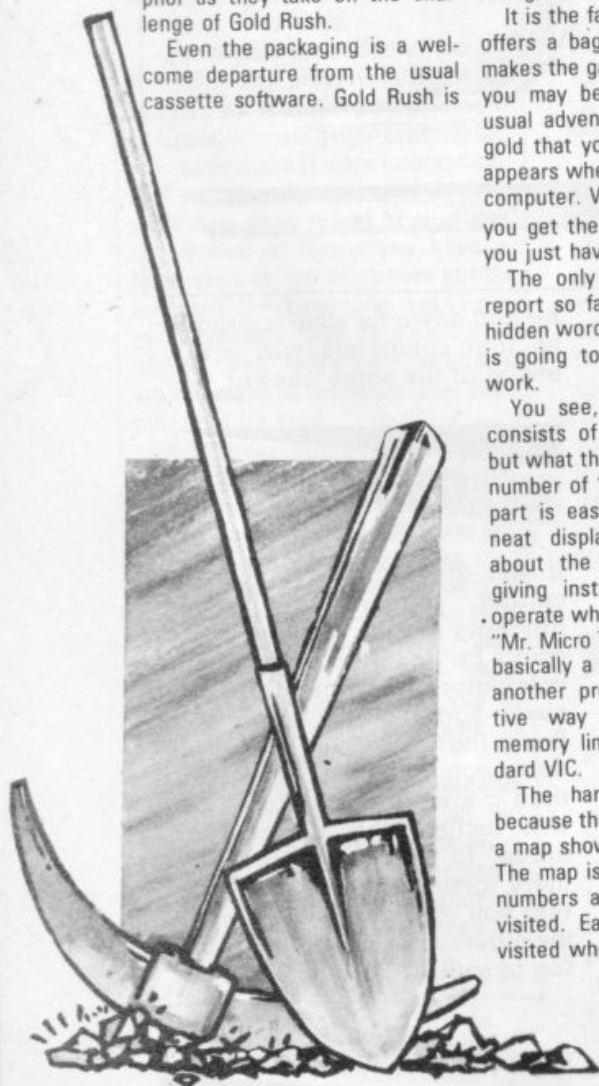
This means that at the start you can only go directly to one of three locations. Once you have fulfilled the requirements then you can enter in the keys to play the next levels, and so on until at last you will reach your own gold mine.

Each time you run the program the keys remain the same so if you like you can re-play the games that you enjoyed. For example I managed to gain access to "the Diggins" only after I had realised the relevance of the Indian Smoke Signals, now I can select that game straight away.

The authors assure me that the games get better as the player gets better, but we shouldn't give too much away

here. For those of you considering a computer and fancying your powers of co-ordination and mental agility the program could even make it worthwhile buying a VIC, since Mr. Micro have guaranteed that the minimum value of the gold will be £150. Furthermore for every program supplied the company will add more gold.

Only one winner but this program must be regarded as good value, even if you do not manage to find the Golden Word. Many original and innovative elements have been incorporated, which I am certain will soon be copied by other software writers. Although no individual game that I have yet reached would justify high praise in its own right. By the way, Mr. Micro estimates no one will solve it for at least six weeks. After that...





Just what every astronaut dreads — an outbreak of the procreative Green Things on his ship.

On a mission in the space exploration ship Znutar, the computer informs you that the Green Things are aboard.

This is the main game on Acornsoft's Games Pack No. 7 (£10), which also includes Ballistics and Snake.

You start off unarmed and as you move round the ship you must find the Green Things and destroy them with the weapons you find — only two of which can be carried at once.

Some of them don't do quite what you would expect — but I'll leave you to find out exactly what they do.

There are three types of Green Things — big Green Things, little Green Things and eggs. The hardest to kill being the big ones.

This game is extremely difficult (well I haven't won yet) since the Green Things seem to multiply too rapidly — in fact, just about whenever you stop to do something. This means it is not

SURVIVAL OF THE GREENEST

worth putting the plan of the ship on the screen since the Green Things may decide to multiply then.

In this game, the Green Things will move around, so that if you find nothing in one room, Green Things may arrive there later. After a while I found this game became a bit tedious because a number of actions to prove effective had to be repeated. It requires 2K to run in on the Acorn Atom.

Now for Ballistics. This game takes about three minutes to load and requires 3K of program and 6K of screen memory to run in. It also requires the floating point ROM.

The game, as you may have guessed, utilises high resolution graphics to print a picture of a hill with little boxes on each side representing the guns.

Players take it in turns to fire at each other and the player who is first to score a direct hit gains a point. The hit has to be accurate since when I played, I appeared to have got my shell to hit the other gun, but it was registered as a miss. When you do get a direct hit, the opponent's gun explodes and a huge Christmas tree shape appears in its place while an unrealistic explosion sound comes from the speaker. When numbers are fed in, they actually appear at the bottom of the high resolution screen, however, because the characters are plotted using Basic, they are slow to appear and when entering figures, digits are often missed out.

Finally, the Snake program. Snake takes about two minutes to load and requires 2K of program and 1/2K of screen memory to run in.

In this game, you have to go round the screen eating up numbers between one and nine which start decreasing after a while. When you eat a number, a sound is produced and the snake increases by the value of the number. If you eat the wall or your tail the game stops until you hit a key, then the next one starts.

This program, although the shortest and simplest, I found was the most addictive — always wanting to beat the previous high score. The game starts off easy, but as your snake grows it becomes more difficult since there is more to avoid. I found the keys difficult to use.

If you are one of those who likes a strategy game, then this is worth buying, otherwise stick to space invaders.

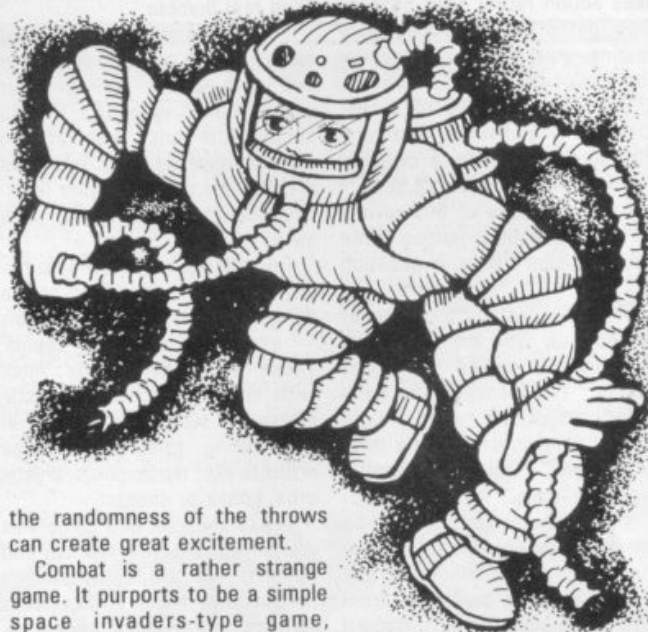
SINCLAIR'S SIX PACK VALUE

Sinclair's six-pack of games for the ZX81 owner with a 16K pack is good value for money at only £3.95.

The pack, available from Sinclair Research is called, unimaginatively, Games Pack 4 and starts off with Cursor Handling which follows some of the early cursor type programs. The screen is full of numbers, with little attempt at graphics to alleviate the numerical information. The piece of paper tucked into the cassette case gives rudimentary instructions, but these are also presented at the beginning of each program on the screen (this applies to all Sinclair games).

The program is fairly long, taking about 3 minutes to load. You are a pilot, you can control the throttle of your craft — keys 1 to 9, and altitude — P for clockwise, Q for anticlockwise. Height, horizontal and vertical velocity, fuel supply, throttle setting, altitude and time are displayed. The screen flashes every two seconds as the 'instrumentation' is updated. A simple graphic display shows height and horizontal position.

Twenty-One is a simple pontoon-type game, but played with dice instead of cards. It is an interesting two-player game, and



the randomness of the throws can create great excitement.

Combat is a rather strange game. It purports to be a simple space invaders-type game, where your craft has to avoid being blown up by the alien. Unfortunately, the control keys — using A, S, Z and X — are not as obvious or easy to use as the cursor keys would be. A simple modification to the program could fix this — rather boring really.

Substrike is very similar — however this time the attacker is on screen! Nobody who has so far played this game, has won!

Code Breaker is a Mastermind game where you have 10 guesses to get the correct four number sequence.

Finally this cassette has May-

day, which is a space rescue game. A body is adrift in a 7x7x7 matrix. You are given 10 attempts at trying to discover the position in this matrix of the body. There is also a time limit. Once you have 'cracked' the method of finding the body from the clues given, it becomes quite easy.

While the games taken individually are not world beaters, this cassette is still good value and no loading problems. A number of different tape recorders were used and none gave any problems.

WIZARD'S CASTLE

These qualities are added to and subtracted from through buying expensive potions of strength off dungeon vendors, being wounded in fights with the monsters, casting spells, or often just plain luck:

You are also given 60 gold pieces at the start of the game and with these pay for your armour and weapon. If you choose the best weapon and plate armour you will not have enough left to buy a lamp (inexhaustible) or flares (usable once each).

These are a bit of a gamble as you can benefit from them or find nasty things happen when you tamper with them. I once went through a 267 turn Adventure with a book stuck to my sword hand for about 250 of them.

each room you have explored includes a symbol of what you found there. Unexplored rooms are marked with an asterisk.

Monsters may be fought for their treasure or you can run away, or — if your intelligence is over 15 — you can cast a spell on them. Stairs lead you to new levels, warps can send you anywhere in the dungeon, pits send you crashing to the next level.

There are strange curses which inhibit your powers and marvellous treasures which will make you whole again.

Wizard's Castle is a well thought out unpretentious game of fun. It generates a random dungeon every time and tactics for survival must be learnt quickly or you'll be an ex-hobbit!

Winning is achieved when you emerge from the castle entrance with the Orb of Zot grasped firmly in your hairy hobbit palms. Wizard's Castle (with Laser Defence and Golf) costs £5.00 and is available on the Sharp MZ-80K from Knights TV & Computers of Aberdeen. May the force be with you hobbits.

Many years ago the great Wizard Zot forged his orb of power and kept it guarded deep in the furthest recesses of his castle.

In Wizard's Castle, an adventure for the games player who likes action rather than obscure clue gathering and vocabulary testing, your task is to recover the Orb of Zot.

But first you have to decide just who — and what — you are. You could be an elf, a dwarf, a hobbit or even a plain old human. For the purposes of this review let's say a hobbit. Having made your decision the next question is "Sex?"

Wizard's Castle's programmer immediately won me over here. For when I replied, none too wittily, "Yes Please!", the computer responded with: "Cute hobbit, very cute! Now try male or female." Duly chastised I typed in "male".

The computer generates three attributes for your hobbit. These are: strength, intelligence and dexterity. These may range from 1-18, the higher the better and if any fall below 1 you lose.



RAIDERS FROM THE HEAVENS

The arcade game Galaxians has now found its way on to many machines but the US Apple version called Alien Rain takes a lot of beating.

Both the waves of bat-like Martians and the space ship under your control move across the screen very quickly with the block of alien creatures reforming and swooping into a fresh formation ready to attack with alarming speed.

Using the right and left direc-

tional cursor control key to move the defending ship you have to niftily change direction to avoid the spray of missiles fired by the invading force.

Of the four-deep block in the deadly enemy fleet there are three different types to blast with your laser gun. Each type of creature is worth a number of points ranging from 30 through to 50 and sometimes going up to 300.

At the start of the game you get three lives, or ships, to play

with. When those three are blown up the game is over. Often it doesn't take long for all three to be exterminated which is frustrating but, of course, addictive.

To fire at the galactic warriors use the A key. The best tactics to adopt are to belt out a continual onslaught of shots while at the same time moving the defence ship to pick off the galaxians working your way from one side of the block to the other.

You must keep moving all the time otherwise the kamikaze type aliens will bomb you in no time.

At first it seems easy while the invading ships are sent individually to begin with and later in pairs swooping down leaving in its wake a shower of missiles.

When these start flying across the screen the pace hots up and you have to fire at the alien while trying to dodge both his shots and the space ship.

The biggest scorers are the topmost galaxian (red if you have colour). One of those shot down during a swooping dive rakes in 100 points. When it doubles up

with one or two of the smaller ships so that they attack in formation it is worth 200 points. Don't let them fly too low before you fire at them because below a certain level your guns are deactivated. Don't let these fool you into a false sense of security with their special computerised tracking device feature which makes them home in on your ship. Yet they wait for a few seconds before they attack.

The magic number of 3,000 is reckoned to be a high score and when you reach that you get a bonus ship to add to your fleet. But so fast moving is the game that it is hard to achieve that figure without a lot of practice to perfect your firing and movement co-ordination. The graphics and sound effects have that air of US professionalism.

In America Alien Rain has recently been hailed as the country's most popular Apple game since Space Invaders took to the screen. Over here it is obtainable from Pete and Pam Computers of Rossendale, Lancashire and costs £13.95 and runs on 48K.

Destroying poisonous sea snakes from an all too vulnerable submarine, while avoiding the deadly killer whales, requires an awareness and dexterity most people have never had to develop.

But then most people have never tried to master the recent addition to the Tandy TRS-80 range of games. It is called, simply, Serpents and the aim is to stay alive as long as possible and destroy as many of the snakes that writhe out from the rocky bottom of the sea bed as you can. You have torpedo tubes both fore and aft for this purpose, but even these are powerless against the marauding killer whales.

Throughout the game these swim across the sea scape. The serpents keep well out of their way and unless you do too, then the game is all over.

The submarine is controlled by the cursor keys for movement up and down or right and left. For diagonal moves, press the horizontal and vertical keys together. Firing left the "Z" key has to be depressed and for firing right the "I" key must be down. All that is difficult to master when you are using three fingers of your left hand and three on your right hand. So be prepared to really concentrate.

Serpents has five levels of skill, Trainee Torpman, Budding Blaster, Capable Captain, Desperate Destroyer, Expert Exter-

POISONOUS PERIL BENEATH THE SEA

minator. A sixth alternative is called Special Missions which is the most exciting to play. In the first five levels the speeds of snakes, submarine and torpedo increase with each.

In the Special Missions section the player can select various levels. The game speed can be set between one and five, the submarine torpedo and serpent speeds between one and three and the torpedo salvo (the number fired) between one and five.

For an average player set the speeds of all elements on the middle number. To get a high score of dead snakes set the torpedo salvo on the fastest setting and the snakes on an average setting. That way you can just about keep control of your fingers, working six for different operations is no mean feat, without panicking when you suddenly find yourself dodging rapidly multiplying snakes and killer whales too.

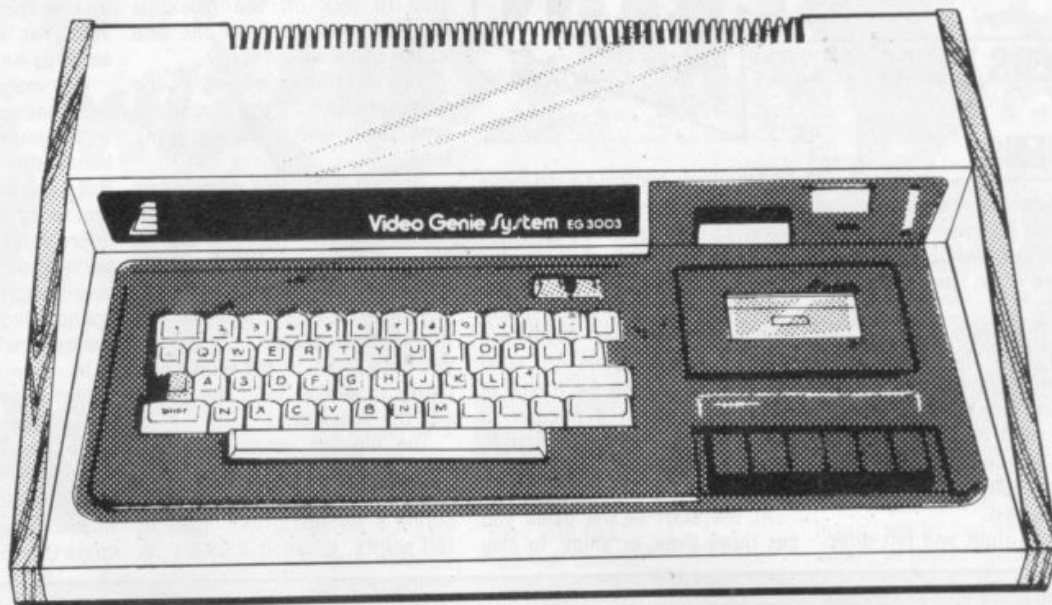
To destroy the snakes the torpedo must hit them just on the head making them sink to the sea bottom. If they are not killed instantly the snakes split up and regenerate at an alarming speed filling up large sections of the screen.

The game could be visually more exciting as the graphics are quite crude. But the game is good to play and the high degree of difficulty in operating the controls only serves to spur you on to master them.

Available from Molimerx, the 16K tape costs £8.75 and the 32K disc costs £11.75.



Video Genie...



Are you a home enthusiast taking your first tentative steps into the enthralling world of micro-computers? If so, the Video Genie is the ideal complete system for you!

It's a real micro-computer, not a pocket one, yet it only needs connecting to a domestic T.V. set to produce superb results.

The Genie is compatible with the popular TRS/80 16K level 2, the best selling computer of all time. As well as its lower price, the Genie offers an in built cassette deck, 16K RAM, 12K ROM with BASIC interpreter, full size keyboard and a stylish carrying case. So it is not only excellent value for money, but an ideal "First computer" on which to learn programming.

There are literally 1000's of pre-recorded programs available,

including educational, leisure and small-business applications, and simple BASIC language means you can write your own programs with ease.

Extended BASIC.

The Microsoft extended BASIC has many powerful features, including double precision variables, scientific functions, formatted printing, extended editing sub-commands, automatic line numbering, multiple dimensional arrays, complete string manipulation, direct access to graphics and machine language sub-routines.

Memory.

The Genie EG 3003 model has 16K

of internal RAM expandable externally to 48K using the special Expansion unit. 12K of ROM contains the Microsoft BASIC.

Cassette.

Two cassette interfaces are provided for both the internal and an external cassette unit.

CPU.

The machine uses the industry Standard Z80 micro-processor.

Display.

64 or 32 characters \times 16 lines are available on the full display.

IOWE

electronics

one giant step for micro-computer systems

12" Monitor.

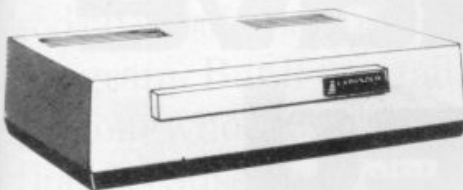
The additional purchase of the EG 100 Monitor offers 3 distinct advantages

- It gives a considerably better quality display.
- It does not interfere with domestic T.V. viewing.
- It comes in an attractive matching style.



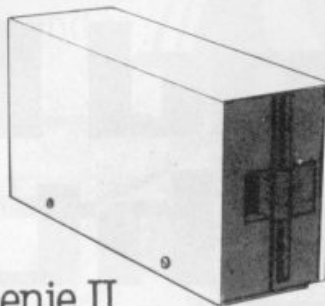
Expander.

The expansion box unleashes the full possibilities of the Genie. It contains a selection of interfaces, allowing the connection of up to 48K RAM, 4 disk drives, printers and S100 cards.



Disk Drive.

As well as the obvious advantage of mass-storage, the addition of the disk system to the Genie means much faster access to other languages and full random access file handling. Up to 4 drives can be used on a system.



... and introducing Genie II



... one giant leap for micro, business systems!

New and exclusive! The Genie II is a breakthrough for small business computers. Harnessing all the advantages of the Genie, including low price, Genie II adapts perfectly to commercial functions with the following features.

- Numeric keyboard
- Four usable, definable function keys.
- Extension to BASIC
- Basic business commands
- Fully expandable for same peripherals.

For full details and demonstrations of the Video Genie system or Genie II contact your local dealer, or write directly to the sole importers at the address below.

Video Genie Approved Dealers

AVON Microstyle, Bath, 0225 334659/319705. **BEDFORD** Computopia, Leighton Buzzard, 0525 376600. **Conserve**, Bedford, 0234 216749. **Cavern Electronics**, Milton Keynes, 0908 314925. **BERKSHIRE** P.C.P. Reading, 0734 589249. **BUCKS** Interface Components Ltd, Amersham, 02403 22307. **Photo Acoustics**, Newport Pagnell, 0908 610625. **CAMBS** Cambridge Micro Computers, Cambridge, 0223 314666. **CHESHIRE** Hewart Electronics, Macclesfield, 0625 22030. **CUMBRIA** Kendal Computer Centre, Kendal, 0539 22559. **DERBYS** Kays Electronics, Chesterfield, 0246 31696. **T. Crossley**, Chesterfield, 0246 850357. **Lowe Electronics**, Matlock, 0629 4995. **DORSET** Blandford Computers, Blandford Forum, 0258 53737. **ESSEX** Emprise, Colchester, 0206 865926. **Compuskill**, Romford, 0708 751906. **Intolab**, Chelmsford, 0245 357111. **CSSC**, Ilford, 01-554 3344. **GLOS** MPL Computers, Cheltenham, 0242 582090. **Petrie Systems**, Cheltenham, 0242 584060. **HERTS** Photo Acoustics, Watford, 0923 41698. **Watford Electronics**, Watford, 0923 40588/37774. **Q Tek Systems**, Stevenage, 0438 65385. **Comp Shop**, New Barnet, 01 4412922. **KENT** Matrix Computer Systems, Beckenham, 01 658 7508/7551. **Business Systems**, Hempstead, 0635 362652. **Thanet Electronics**, Herne Bay, 02273 63859. **The Computer Room**, Tunbridge Wells, 0892 41045. **SMG** Microcomputers, Gravesend, 0474 55813. **LANCS** Computer Business Systems, Lytham St. Anne's, 0253 730033. **Microdigital**, Liverpool, 051 227 2535. **Mighty Micro**, Burnley, 0282 32209/53629. **Leisurronics**, Blackpool, 0253 27091. **Harden Microsystems**, Blackpool, 0253 27590. **ABC Supplies**, Levenshulme, 061 431 9265. **HR Control Systems**, Chorley, 02572 75234/5. **Computercat**, Leigh, 0942 601818. **Micro Chip Shop**, Fleetwood, 03917 79480. **Micro Chip Shop**, Preston, 0722 22669 79511. **Micro Chip Shop**, Blackpool, 0253 403 122. **Sound Service**, Burnley, 0282 38481. **LEICS** Eley Electronics, Leicester, 0533 871522. **Arden Data Processing**, Leicester, 0533 22255. **Kram Electronics**, Anstey, 053721 3575. **LONDON (CENTRAL)** City Microsystems Ltd, London, 01 588 7272. **Sumlock Bondain**, ECL, London, 01 250 0505. **LONDON (NORTH)** Henry's Radio, London, 01 402 6822. **Radio Shack**, NW6, London, 01 624 7174. **Comp Shop**, 311 Edgware Rd, London, 01 262 0387. **Chromasonic Electronics**, N19, London, 01 833 3705. **Davinci Computers**, Edgware, London, 01 952 0526. **Comp Shop**, New Barnet, London, 01 441 2922. **NIC**, Tottenham, London, 01 808 0377. **LONDON (WEST)** Ecobits, Shepperton, 09322 20626. **NORTH EAST** H.C.C.S. Associates, Gateshead, 0632 821924. **3-Line Computing**, Hull, 0482 859169. **Derwent Radio**, Scarborough, 0723 65996. **Briers Computer Services**, Middlesbrough, 0642 242017. **General Northern Microcomputers**, Hartlepool, 0783 863871. **NORTHANTS** Arden Data Processing, Peterborough, 0733 49577. **NOTTS** Electronic Servicing Co, Lenton, 0602 793938. **University Radio Stores**, Nottingham, 0602 45466. **Midland Microcomputers**, Nottingham, 0602 296281. **East Midland Comp. Services**, Arnold, 0602 267079. **Mansfield Computer & Electronics**, Mansfield, 0623 31202. **NORFOLK** Anglia Computer Centre, Norwich, 0663 29652. **OXFORD** Micro Business Systems, Witney, 0993 73145. **Magnus Microcomputers**, Kidlington, 08675 6703. **SALOP** Tarrant Electronics, Newport, 0952 812134. **SCOTLAND** Computer and Chips, St. Andrews, 0334 72569. **Scotbyte Computers**, Edinburgh, 031 343 1005. **Esco Computing**, Glasgow, 041 204 1811. **Silicon Centre**, Edinburgh, 031 332 5277. **SOUTH** Catronics, Wallington, 01 669 6700/1. **Gemsoft**, Woking, 04862 22861. **Castle Electronics**, Hastings, 0424 437875. **Gamer**, Brighton, 0273 698424. **SOUTH WEST** Diskwise Ltd, Callington, 05793 3780. **Electrostore**, Exeter, 0392 56280 56687. **West Devon Electronics**, Yelverton, 082 285 3434. **SUFFOLK** Rebvale Computers, Bury St. Edmunds, 095 381 316. **Marshall Electronics**, Ipswich, 0473 75476. **Microtek**, Ipswich, 0473 50182. **SURREY** Croydon Computer Centre, Thornton Heath, 689 1280. **SUSSEX** Nextra Electronics, Chichester, 0243 512861. **WALES** MRS Communications, Cardiff, 0222 616936/7. **Morrison Computer Centre**, Swansea, 0782 795817. **Tryfan Computers**, Bangor, 0248 52042. **WEST MIDLANDS** Ward Electronics, Birmingham, 021 554 0708. **Allen TV Services**, Stoke on Trent, 0782 616929. **Microprint**, Stoke on Trent, 0782 48346. **YORKS** Advance TV Services, Shipley, 0274 585333. **Amateur Radio Shop**, Huddersfield, 0484 20774. **Thomas Wright**, Bradford, 0274 663471. **Photo Electrics**, Sheffield, 0742 53865. **Allan M. Plainer Ltd**, Leeds, 0532 688397. **Quadruphenia**, Sheffield, 0742 77824. **Scene and Heard**, Halifax, 0422 59116. **Spot Computer Systems**, Doncaster, 0302 25159. **EIRE** Compshop, Dublin, 74933. **D.B. Microcomputers**, Limerick, 061 42733. **NORTHERN IRELAND** Business Electronic Equipment, Belfast, 0232 46161. **Brittain Laboratories Ltd.**, Belfast, 0232 28374. **JERSEY** G.B. Organs, St. Saviour, 0534 26788/23564.

Chesterfield Road, Matlock, Derbyshire DE4 5LE
Telephone: 0629 4995. Telex: 377482 Lowlec G.

"If it wasn't for me, the Russians would have invaded Poland last night?"

Whether your kind of fun is saving Europe in a war game, sharpening your chess strategy or piloting a 747, computer games reach new levels of exhilaration in terms of excitement, intellect and dexterity.

And, to help you get the most fun out of your computer, there's a brand new monthly magazine: **Computer & Video Games**.

It brings the best entertainment out of all types of computer, from personal Sinclairs, Ataris, Tandys, VICs, Apples and PET's right up to mainframe IBMs.

Every issue's packed with pages of games listings for you to program. And you don't have to be a computer expert.

Each month there's reviews of new computer and video games, regular pages on chess, bridge and mainframe games. Brush up or learn programming with our regular workshop, and discover the fun of creating graphics and adding sound to the games you invent yourself. There's also regular brain teasers (some with prizes) plus the secrets of beating Arcade video machines.

Computer & Video Games is packed with new levels of stimulation for people who get fun out of computers.

The first great issue is out today at all good newsagents. And, on the front cover you'll find some free brain torture in the form of the most tantalising little puzzle since Rubik's cube.

It *can* be solved mathematically so you should be able to write the program. But if you fail, you've got four whole weeks of frustration because the solution's not available till the second issue.

The first issue is at your newsagent now.

I would like to take out an annual subscription. I enclose a cheque/P.O. for £10, (£20 overseas) for twelve issues. Computer & Video Games, Bretton Court, Bretton, Peterborough PE3 8DZ.

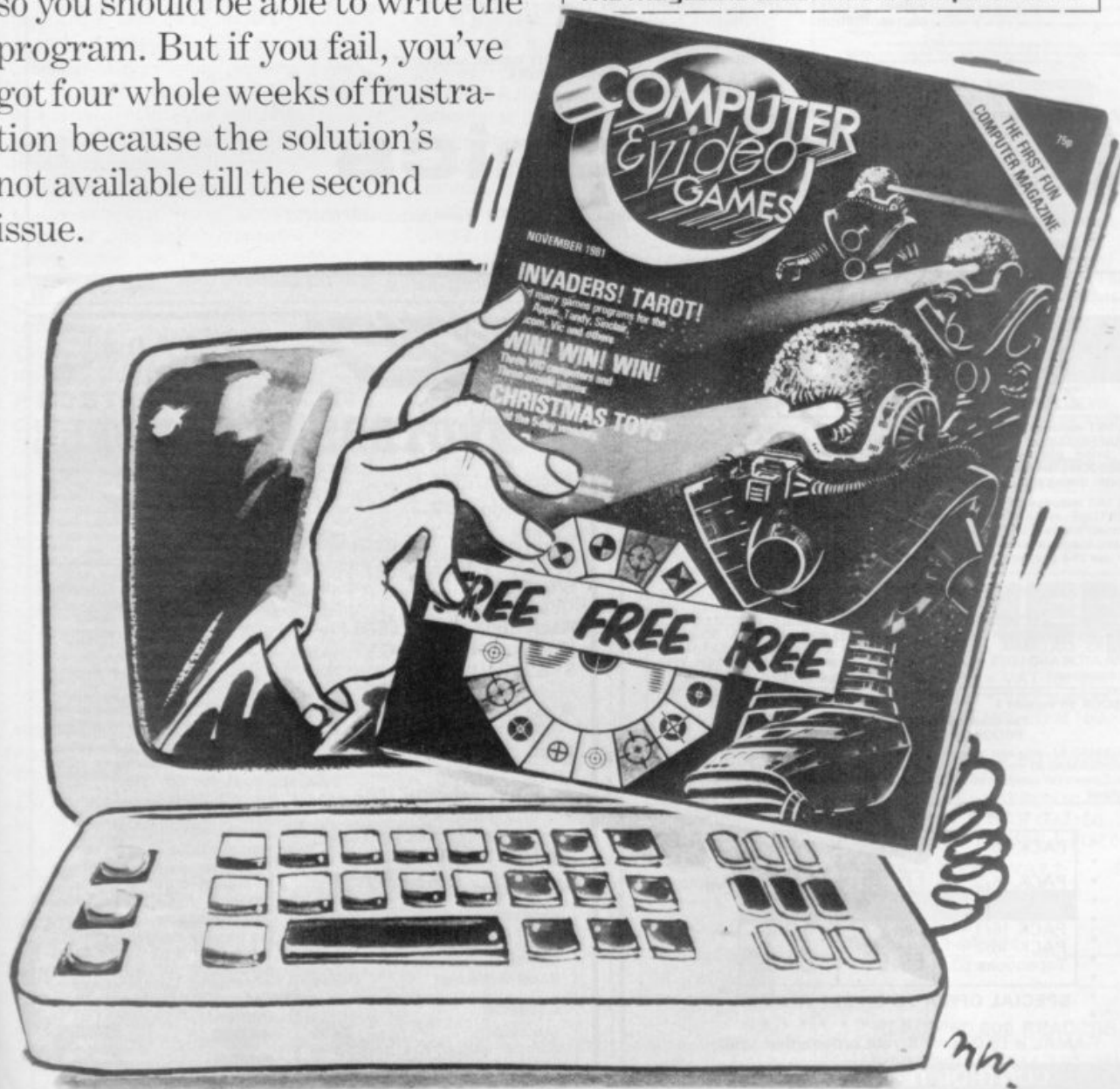
Name _____

Address _____

K1

Computer & Video Games.

The magazine that makes computers fun.



ZX80/81

HARDWARE/SOFTWARE

2K RAM PACK
4K RAM PACK
16K RAM PACK
ZX KEYBOARD
SOFTWARE CASSETTES

£15.95
£22.95
£42.95
£27.95
£3.95

RAM PACKS

All RAM Packs are supplied built and tested, and simply plug into your port on the rear of the computer. The 2K and 4K RAM work with the onboard RAM, example 4K + Onboard = 5K.

KEYBOARD

A full size keyboard for the 80/81. The keyboard has all the 80/81 functions on the keys, and will greatly increase your programming speed. It is fitted with push type keys as in larger computers. Also has facilities for four extra buttons.

16K SOFTWARE

As seen at the ZX Microfair.

DEFLEX This totally new and very addictive game, which was highly acclaimed at the Microfair, uses fast moving graphics to provide a challenge requiring not only quick reaction, but also clever thinking. One and two player versions on same cassette.

LIFE Uses M/C to achieve a processing speed of three generations a second on a 20 x 32 grid with a superbly flexible colony editing system. This is without a doubt the best ZX Life available.

3D/3D LABYRINTH You have all seen 3D Labyrinth games, but this goes one stage beyond; you must manoeuvre within a cubic maze and contend with corridors which may go left/right/up/down. Full size 3D graphical representation.

Please add £1.00 P/P for above items except software
Specify on Order ZX80/81

dk'tronics

23 Sussex Road, Gorleston, Great Yarmouth, Norfolk. Tel: Yarmouth (0493) 602453

Circle No. 144

ZX-81

ZX-81 16K SOFTWARE

PACK 16/1 includes all of:
AIRTRAFFIC CONTROL: Animated radar screen of busy airport shown, you must bring planes into land; INVADERS: INVADERS SELF PLAY: PHONEBOOK: keep friends and relatives numbers on cassette; DATE '81: computer dating program, who will it pick for you? **ALL ONLY £4.95**

PACK 16/2 includes all of:
ADVENTURE ATLANTIC: You may become very rich or you may be marooned forever; BREAKOUT; SQUASH PRACTICE; TRANSLATOR: translates any European language to any other, vocab on cassette; COMPUTAPRINT: use this program to predict horse races, or football pools!! **ALL ONLY £4.95**

Both packs come with full instructions, booklets and are saved on cassette ready to run.

50 PROGRAMS for the IKRAM ZX-81. The latest version includes: SQUASH, INVADERS, COLUMBIA, SPLAT, INTEGRATION, BANK A/C, CREDIT CARD CALCULATOR AND LOTS MORE. All on cassette and ready to run now. With full instructions. **Still amazing value at £6.96 the lot.**

TAPEBOOK 50 version 3

The breakthrough you've waited for:
PROGRAM THE ZX-81 IN ENGLISH

With GAMAL 81, you can now write adventure programs in hours not weeks and with GAMAL 81 you'll have every adventure you'll ever want for the price of one. Comes on cassette with instruction book, £12.95. (requires 16K) (£8.00 see below)

PACK 16/1 + PACK 16/2	ONLY £5.95	SAVE £3.95
PACK 16/1 + PACK 16/2 + Tapebooks 50.3	ONLY £9.95	SAVE £6.90

SPECIAL OFFER TO ZX-81 OWNERS

GAMAL is £8.00 only if your order either offer

CONTROL TECHNOLOGY,

39 Gloucester Rd., Gee Cross, Hyde, Cheshire SK14 5JG 061-368 7558
C+tech — Big ideas for small computer — all software by return of post!!

Circle No. 145

Personal Computer Palace

COMPUTERS FOR PEOPLE



Atari 400 **£345**
WITH FREE JOY/
STICKS

Atari 800 **£625**
WITH FREE JOY/
STICKS

Atari Cassette **£45**

Atari disk drive **£325**

Atari 16k module **£63**

New generation micros for family entertainment and education. Amazing sound and graphics direct from your colour T.V. give you the best games available. Atari from Personal Computer Palace provides easy reliability at a price you can afford.

We also have Apple & Video Genie computers and Centronics, Epson & Atari printers available.

One year parts and labour guarantee on all equipment. Optional maintenance contracts available.

Same day despatch. Please write your order carefully or phone us for information/order form. Callers welcome. Open 9.00-6.00, closed Wednesday.



6 Castle Street,
Reading, Berkshire.
Tel.(0734)589249

Circle No. 146

SOFTWARE GLOSSARY

A beginner's guide to plain jargon

ALGORITHM A process or set of rules to carry out a task or solve a mathematical problem.

ARRAY A series of items (data or information) arranged to form a meaningful pattern.

ARROW KEYS The keys on a computer keyboard marked with arrows. Used for moving the cursor across, or up and down the V.D.U. screen.

BASIC The most widespread computer language, which is one of the easiest to learn and is used on all microcomputers.

BUG A slang term given to a mistake in a computer program which prevents it working. It can refer to a mechanical, electrical or electronic defect in a computer.

CAPACITOR An electronic component used in computers.

CENTRAL PROCESSOR UNIT The part of the computer which carries out the arithmetic and logical processes (sometimes known as "number crunching"), which information has to go through. It also exercises final control over the physical components of the computer system.

CHIP A tiny piece of silicon which holds all the components that make up a micro-processor.

CHRS A Basic function which codes a computer's graphic symbols. It is followed by a number in brackets, e.g. CHR\$(68), which is the coded number of the symbol you want the computer to produce.

COMPUTER LANGUAGES Languages are used to make the computer perform operations. They consist of computer instructions or commands. There are different types of languages for carrying out different tasks, e.g. business, scientific.

CURSOR A small square-shaped mark which indicates where a character will appear on the screen. It can be moved around the screen using certain keys on the keyboard.

DATA OUTPUT PORT This is the part in the computer from which information can be retrieved.

DATA STATEMENT An instruction in a computer language.

DEBUG The process of locating and correcting errors in a computer program.

DIGITAL/ANALOGUE CONVERTER A device to convert information stored in an analogue computer into digital form, so that calculations can be carried out. Most computers are digital. Analogue computers are mainly used for scientific purposes.

DIODE A device that allows electricity to flow in only one direction.

DISC A magnetic storage device. It can be either a hard or floppy disc. Hard discs can usually store more information than floppy discs and are used with mainframe computers.

DOLLAR SIGN \$ See "String"

EDIT Rearranging data to be stored in the computer memory.

EXPONENTIATION A mathematical operation used to calculate powers of numbers.

FORTRAN Is a computer language written in algebraic expression and arithmetic statements. It is thought to be a more precise language.

GOSUB A Basic command instructing the computer to go to a subroutine in a computer program.

GRAPHICS The name given to pictorial representation of data such as plotted graphs, engineering drawing and, of course, computer games.

HARDWARE The general term given to all pieces of electronic and mechanical devices which make up a computer system, i.e. the actual machines.

INPUT Information/data which is fed into the computer.

INTEGER A number which does not contain a decimal point, i.e. a whole number.

K A kilobyte of memory.

LANGUAGE See "Computer Language".

L.C.D. (Liquid Crystal Display) A display containing liquid crystals which light up when electricity touches them. Used in calculators and watches.

L.E.D. (Light Emitting Diode) Provides a simple display and consists of an electron tube which lights up when electricity is passed through it. Used as an alternative to liquid crystal displays.

LINE NUMBER Refers to the number assigned to a line or row of characters contained in a computer program.

LIST (ING) This means to print a line for each item of a computer program. You can either call it up on the screen or, if a printer is attached to the computer, you can get a printout of the program you want to list. Useful to check programs.

LOAD Putting information from auxiliary storage into internal storage of a computer. It can be either a complete program or any data. When you load a program you put the contents of that program into the computer's memory from storage either on a disc or a cassette.

LOOP A Basic function referring to the repeated execution of a series of instructions for a fixed number of times.

SUPERMARKET

TANDY

COMPUTER CENTER

— FOR BUSINESS AND PLEASURE —
FULL RANGE OF TRS 80 COMPUTERS
DISC DRIVES, SOFTWARE, PRINTERS.
OTHER MAKES ALSO AVAILABLE



EXPERT FRIENDLY ADVICE



PJ

EQUIPMENT

3 BRIDGE STREET
GUILDFORD, SURREY

(0483)
504801

GAMES FOR THE TRS-80 (16K, L2)

Cassette 1. SPACE ATTACKERS with sound. Now you can play the popular arcade game without having to feed it 10p's. DIGITAL CLOCK. With alarm facility.

Cassette 2. BREAKWALL (with sound). Knock the bricks out of the wall by bouncing the ball off your paddle. Sounds easy? — it gets more difficult. FOUR IN A ROW. A game for two players. Try and get your counters in a row. Definitely a thinking game.

Cassette 3. SURROUND (with sound). Two time move (one controlled by you, the other by the computer), getting faster as the time. The first to hit a time (switch out for random obstacles) or to hit the computer's time (2 games). FOR AND HOURS. You must stop the computer-controlled box from getting to the top of the board.

Cassette 4. SHOOTOUT (with sound). You and your alien brother against the computer enemy.

COMPUTERISED DIRECTORY. Store up to 100 names, addresses phone numbers. With search facility.

SIX GAMES FOR THE Z80 (1K). Portables. Guess the Number, Battleships, Hot Machine (16K), Maths Quiz, Maze (16K) all on one cassette. Each cassette costs £4.00 (incl. p.p.h.). 16 dual sound and controls with complete instructions from.

BRAMWELL ENTERPRISES,
87 ANDERSON CRESCENT,
GREAT BARR, BIRMINGHAM B43 7ST.

Software for MZ80K £8.50 EACH

Treasure	Word Power
Space Adventure	History
Impossible Maze	Geography
Cowboy Round-Up	Memory Test
MX80 Composer	Mult Tables
Grand Prix	French
One Man One Dog	German
Kaleido	Spanish
Spies	Welsh
The Pit	Math Test
Road Race	Maths Drill
Alligator	Master Mind



MORRISTON COMPUTER CENTRE

46 CROWN STREET,
MORRISTON,
SWANSEA. Tel: 795817



SHARP MZ-80 (£399 + VAT for 48K)
VIDEO GENIE (£289 + VAT for 16K)
ACORN ATOM ASSEMBLED (£150 + VAT)

- + INTELVISION + ACE TV GAMES
- + CHESS COMPUTERS
- + HAND HELD ELECTRONIC GAMES
- + SF, FANTASY & WAR GAMES
- + ALL KINDS OF GAMES & PUZZLES

ATARI 400 £285 plus VAT
ATARI 800 £525 plus VAT

18 SYDNEY STREET
BRIGHTON 0273 698424

REACH 60,000 READERS

FOR £30!! CALL US ON

01-837 3699 Ext. 220

SUPERMARKET

COMPUTERS CALCULATORS COMPUTER GAMES at EXTRA LOW PRICES!

Make your 41C more productive with HP application plug-in modules.

They provide instant access to sets of programs covering diverse ranges of subject matter: Mathematics, Electrical Engineering, Business Decisions, Games, and lots more. Each Module comes in a Pac with a detailed manual containing descriptions and examples plus helpful programming techniques.

HP41C complete plus additional mem. module & stats module. £195.00
HP41C complete plus mem. module & Card Reader. £248.00

*HP33C (8 Mem. prog. Sol/Stst. plus Cont. Mem.) £49.00
*HP34C (50xProg. 20 Mem.) £79.50
*HP41C (Newest Sol from HP) £133.00
*HP41CV (Incorporating quadram) £169.00
*HP41C Card reader £116.95
*HP41C Printer £191.00

HP ECONOMY PACK

HP41C together with card reader and printer. All complete as manufacturer's spec. £399.95

HP BUDGET PACK

HP41CV together with card reader and printer. All complete as manufacturer's spec. £448.00

COMPUTERS

Texas TI994 16K Computer which plugs direct into any T.V. for full colour — ideal learning aid for every member of the family including pre-school children. £750.00

(expandable to 48K)*
Hewlett Packard HP 95 16K Computer incorporating V.D.U. for full colour. Computer with very sophisticated software. £1,995.00

(expandable to 32K)
Apple 48K Computer system complete with disc drive, graphic printer, 12" Video Monitor — inexpensive Scientific Business Education system. £1,980.00
VIC PE ATARI etc. together with *PhotoDisc Drives etc. for all above detailed systems available

SPECIAL OFFER

*TEXAS TI99 together with PC100C (Complete as manufacturer's specifications) £234.50

*TEXAS TI59 (Card prog. 960 Prog Steps or 100mem) £104.00
*TEXAS PC100C (Printing Unit for TI58/TI59) £136.00
*TEXAS TI57 (Key Prog 8 Mem. 150 Key Smokeless Prog Steps) £75.50
*TEXAS TI58C (Key Prog 480 stp or 60 mem. with continuous memory & programme) £95.00
*TEXAS TI PROGRAMMER (Hexadecimal Octal, Dec. Converter) £48.50
*TEXAS TI51/TI11 (10 Dig. 10 Mem. 32 Prog Steps) £27.50

COMPUTER CHESS

Hand held Chess Traveller £30.75
(complete with board men etc.)

Boris Diplomat II £70.00
(lightweight portable — ideal for beginners & travel)

Mini Chess Master "T" £75.00
(low priced portable sensory)

Challenger Mini Sensory £47.00
(the mini version of the Challenger Sensory — ideal for travel)

Challenger "T" £63.50
(ideal all-round Chess Computer)

Challenger Sensory "B" £96.50
(sensory chess to club standard)

Murphy Encore £133.00
(top level chess with fast play)

Great Game Machine £153.00
(mainframe — games centre for games cartridges including Murphy Chess, Bor- chess, Draughts, Las Vegas Blackjack, Reversi etc.)

COMPUTER GAMES

Backgammon Challenger £69.50
Omar II Backgammon £57.50
Advanced Bridge Challenger £174.00

TEXAS ECONOMY OFFER

*TEXAS TI59 Calculator (complete as manufacturer's spec.) PLUS statistics module & extra set of 40 Blank Prog. Cards £133.50

TEXAS LEARNING AIDS

SPEAK AND SPELL £29.50
(for older children 13 years)
SPEAK AND MATHS
(5 yrs and up — 100,000 random maths questions) Price £26.50

*FREE — Mains charger included.

GOODS FULLY GUARANTEED

PRICES EXCLUDE VAT AND P.P.

Company, hospital and Government orders accepted by phone
Orders Barclaycard/Access/Visa accepted by phone

Tel.: 01-455-9824

MOUNTAINDENE
22 Cowper Street
London EC2

SOFTWARE GLOSSARY

A beginner's guide to plain jargon

MACHINE CODE The term used to refer to symbols or numbers assigned to parts of a machine. It is the same as operation code which is the symbol telling the computer which operation to perform. When a game is written in machine code it makes everything move much more quickly.

MAINFRAME COMPUTER The jargon word used to describe a very large computer.

MEMORY MAP A printout provided to aid in processing scattered program fragments in the computer's memory. You can also call up the data on the screen.

MICROCOMPUTER A tiny computer (as the name suggests) consisting of hardware and software. The main processing blocks are made of semiconductor integrated circuits.

MICROPROCESSOR Another name for a chip.

MINICOMPUTER A small, or medium sized computer. It has less memory capacity than mainframes but more than micros.

NUMERIC KEYPAD This is the section of the computer's keyboard where the number keys are located.

OUTPUT The information retrieved from a computer, either shown on a screen or printed out via a printer attached to the computer.

PEEK A statement used in Basic which allows you to read the contents of a specified memory address.

PIXEL The basic element of a T.V. picture derived through various types of scanning processes and is used for computer manipulation.

POKE An instruction used in most versions of Basic allowing you to store integers in a specific place in memory.

PRINT A Basic command which tells the computer to perform a calculation in a program.

PROGRAM (COMPUTER) A series of instructions fed into a computer which will solve a problem or accomplish an objective.

PSEUDO RANDOM NUMBERS These are numbers which are not real random numbers but are close enough to be used for statistical testing.

R.A.M. (Random Access Memory) This is a memory chip which you can load programs and data to and from. There are different sized RAMs capable of storing various amounts of information.

READY The word which is shown on the screen indicating when the computer has loaded Basic and is ready for your further instructions.

REAL NUMBER A number which contains a decimal point.

RESISTOR An electronic component that opposes the flow of electrical current and is used to make up a microprocessor.

RETURN A Basic function and also an important key on the computer keyboard. When used in Basic it is a statement which should always appear at the end of a subroutine. When the key on the keyboard is pressed it tells the computer to carry out the instruction you have just given the computer.

R.O.M. (Read Only Memory) A memory chip which can only be read from and not written into.

ROUTINE A set of coded computer instructions used for a particular function in a program.

RUN A Basic function and instruction which the programmer types in when he wants to execute a program.

SEMICONDUCTOR This is material whose electricity conductivity is between metal and an insulator. Many computers now use semiconductor memory.

SOFTWARE Another name for computer programs. It can also refer to computer documentation.

STATEMENT An instruction in a computer program.

STRING A connected sequence of characters, words or other elements usually symbolised with the \$ (dollar) sign.

STRUCTURED PROGRAMMING A phrase used as shorthand for a collection of techniques thought to make programming much more rigorous.

SUBROUTINE A computer program routine that is translated separately.

SYNTAX The name used to refer to sentence structure rules of a programming language.

TRANSISTOR A vital component of a microprocessor. In fact microprocessors contain many thousands of them.

TRUTH VALUE See value.

VALUE The numerical quantity of a data element and the number assigned to a variable.

VARIABLE A symbol whose numeric value can be changed at all times. It is used when writing programs.

V.D.U. (Visual Display Unit) This is a unit which looks like a television screen, which information stored in the computer memory is displayed on.

Z-80 A make of microprocessor much used in microcomputers.



CHOOSE ATOM POWER

At work or play – everything you need in a personal computer

The Atom is a machine to be used. Every day, day after day. It's a full function machine – check the specification against others. It's rugged, easy to operate built to last and features a full-size typewriter keyboard.

Just look at some of the features!

- More hardware support than any other microcomputer
- Superfast BASIC – can be updated to BBC BASIC if required
- High resolution and comprehensive graphics ideal for games programmers and players*
- Integral printer connection*
- Software available for games, education, maths, graphs, business, word processing, etc.
- Other languages: Pascal, FORTH, LISP
- I/O port for control of external devices
- Built-in loudspeaker
- Cassette interface
- Full service/repair facility
- Users club

* Expanded version only

Optional Extras

- Network facility with Econet
- Disk
- PAL UHF colour encoder
- Add-on cards include 32K memory, analogue to digital, viewdata VDU, disk controller, daisywheel printer, plus many, many more!
- Power supply

FREE MANUAL

The Atom's highly acclaimed manual comes free with every Atom and leaves nothing out. In just a while you'll be completely at ease with your new machine! Within hours you'll be writing your own programs.



YOU AND YOUR CHILDREN

More and more schools are buying Atoms. More and more children will learn on an Atom. You can give them that extra familiarity with an Atom in the home.



4a Market Hill,
CAMBRIDGE CB2 3NJ

When you order your Atom we will include full details of all software packs and the optional hardware.

To: Acorn Computer Limited, 4A Market Hill, Cambridge CB2 3NJ.

I enclose a cheque/postal order for £.

Please debit my Access/

Barclaycard No.

Signature.

Name (please print).

Address.

Telephone Number.

Registered No. 1403810 VAT No. 215400220

Quantity	Item	Item price inc. VAT + P&P	Totals
	Atom Kit 8K ROM + 2K RAM	@ £140.00	
	Atom Assembled 8K ROM + 2K RAM	@ £174.50	
	Atom Assembled 12K ROM + 12K RAM	@ £289.50	
	Power Supply	@ £ 10.20	
	TOTAL		

Computer stores are stocking Atoms – there's a list below. If there isn't one near you, fill in the coupon and we'll rush an Atom to you within 28 days.

MOM, Aberdeen 22863. Micro Style, Bath 334659. Broadway Elect, Bedford 213369. Micro-C, Birmingham 021-233-1105. Owl Computers, Bishops Stortford 52682. Microcentre, Bognor Regis 827779. Eltec Services, Bradford 491372. Gamer, Brighton 698424. Electronic Information Systems, Bristol 774564. Micro-C, Bristol 0272-650501. Cambridge Comp Store, Cambridge 65334. Rhombus, Cambridge 312953. Cardiff Micros, Cardiff 373072. Bellard Elect, Chester 380123. Emprise, Colchester 865926. Silicon Centre, Edinburgh, 332 5277. Mikrotronic, Germany, 05 31 72 223. Esco Computing, Glasgow 204 1811. Control Universal, Harlow 31604. Unifon Elect, Haslington. Castle Elect, Hastings 437875. Curry's Micro Systems, High Wycombe. Customised Electronics, Leeds 792332. Micro-C, Leeds 0532-446601. D.A. Computers, Leicester 708402. Micro-C, Leicester 0533-546224. Microdigital, Liverpool 236 0707. Barrie Elect, E.C.3, 488 3316. Eurocalc, London, 729 4555. Microage, North London, 959 7119. Sinclair Equip. Int (Export), W1, 235 9649. Off Records, SW12, 674 1205. Technomatic, NW10, 452 1500. Micro-C, Luton 425079. Ace Business Comp, Maidstone 677 947/8. Micro-C, Manchester 061-834-0144. NSC Comp Shops, Manchester 832 2269. Customised Electronics, Middlesbrough 247727. Compshop, New Barnet, 441 2922. Micro-C, New Malden, 949 2091. H.C.C.S., Newcastle 821924. Newcastle Comp Services, Newcastle 615325. Anglia Comp Centre, Norwich 29652. Leaslink Viewdata, Nottingham 396976. Micro-C, Nottingham 0602-412455. R.D.S. Electrical, Portsmouth 812478. Computers for All, Romford 751906. Intelligent Artifacts, Royston, Arrington 689. Computer Facilities, Scunthorpe. Datron Micro Centre, Sheffield 585 490. Superior Systems, Sheffield 755005. Micro-C, Southampton 703-29676. Q-TEC Systems, Stevenage 65385. 3D Computers, Surbiton (01) 337 4317. Abacus Micro Comp, Tonbridge. Paddock Wood 3861. Northern Comp, Warrington 601683. Compass Design, Wigan, Standish 426252.

THE ATARI® RANGE



ATARI SOFTWARE

Star Raiders	£29.95
Missile Command	£29.95
Asteroids	£29.95
Space Invaders (Rom)	£24.50
Space Invaders (Cassette)	£12.95
Basket Ball	£24.50



ATARI HARDWARE

400 16K	£345
800 16K	£645
410 (Recorder)	£50
810 Disk Drive	£345
80 Col. Printer	£550
Paddles Pair	£12
Joysticks Pair	£12

ATARI SOFTWARE FROM DYNACOMP

Stud Poker	16K(C) £10.99
Moon Probe	16K(C) £9.99
Alpha Fighter	24K(C) £11.99
Intruder Alert	16K(C) £15.99
Giant Slalom	16K(C) £12.99
Monarch	16K(C) £10.99
Crystals	24K(C) £9.99
Dominoes	24K(C) £15.99
Chomp-Reversi	16K(C) £10.99
Management Simulator	24K(C) £15.99

ATARI SOFTWARE FROM ADVENTURE INTERNATIONAL

Adventures 1-12	24K(C) £16.50
Star Trek 3.5	24K(C) £16.50
Sunday Golf	16K(C) £12.50
Angle Worms	16K(C) £12.50
Mountain Shout	16K(C) £12.50
Deflections	16K(C) £12.50
Lunar Lander	24K(C) £16.50
Galactic Empire	24K(C) £16.50
Galactic Trilogy	24K(C) £16.50

We also carry a large range of software for TRS-80 and Apple computers send 50p for catalogues.

(C) = Cassette

All prices include VAT

Trade enquiries for software welcome.
Mail order available all prices include P & P

CALISTO
COMPUTERS LIMITED

SPECIALISTS IN MICROCOMPUTER HARDWARE & SOFTWARE

119 John Bright Street, Birmingham B1 1BE. Phone 021-632 6458.

TAKE OUT A SUBSCRIPTION TO THE MAGAZINE THAT MAKES COMPUTERS FUN.



It brings the best entertainment out of all types of computer, from personal Sinclairs, Ataris, Tandys, VICs, Apples and Pets right up to mainframe IBMs. Every issue is packed with pages of games listings for you to program. And you don't have to be a computer expert. Each month there are reviews of new computer and video games, regular pages on chess, bridge and mainframe games.

SUBSCRIPTION ORDER FORM

Free information service

Use this card to find out more about products and services featured in *Computer & Video Games*. All you have to do is refer to the numbers at the bottom of the items that interest you and circle them here. On receiving your completed card, we'll arrange for the companies concerned to send you further information. Ring the numbers that interest you.

NOVEMBER 1981

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115
116 117 118 119 120 121 122 123 124 125 126 127 128 129 130
131 132 133 134 135 136 137 138 139 140 141 142 143 144 145
146 147 148 149 150 151 152 153 154 155 156 157 158 159 160
161 162 163 164 165 166 167 168 169 170 171 172 173 174 175
176 177 178 179 180 181 182 183 184 185 186 187 188 189 190
191 192 193 194 195 196 197 198 199 200 201 202 203 204 205
206 207 208 209 210 211 212 213 214 215 216 217 218 219 220
221 222 223 224 225 226 227 228 229 230 231 232 233 234 235
236 237 238 239 240 241 242 243 244 245 246 247 248 249 250
251 252 253 254 255 256 257 258 259 260 261 262 263 264 265
266 267 268 269 270 271 272 273 274 275 276 277 278 279 280
281 282 283 284 285 286 287 288 289 290 291 292 293 294 295
296 297 298 299 300 301

Name _____ Tel: _____

Address _____

CONTENTS

No 1 November 1981

Something more exciting than a computer. What did you do on a trip up the Amazon, scoring a goal for England, landing on the moon, or beating the bank at Monte Carlo? This issue will give you the chance to do any of these in your own time.

Up with some more illicit excitement, then perhaps you should touch with a businessman I met who sends his programs in computer wrappers!

COMPUTER & VIDEO GAMES is the magazine to tell you what's missing out on. If you have already discovered computers at their only limitation is the programmer's imagination — VIDEO GAMES is out to push your imagination to its limits. We are putting the accent firmly on the "games" side. We are not on computers as hardware, but as a means to an end — entertainment.

Use of the microchip and if you are not making the most of it, VIDEO GAMES aims to show you how. Use chips in pub and arcade video games, buy them in toys, play through them on a TV video games centre, or have away inside your computer, we will help you to make more of it.

We will be looking for some help from you in supplying views, most importantly — games listings for us to print. Page 65 has on how to send in copy and the rewards we are offering. You to get the most out of these listings that you possibly can. So turn over pages which aren't featuring your particular machine's ad, look to see how other people have got around problems, have baffled you and if a game interests you then try to convert machine.

On to Basic page won't only teach beginners how to use this but compare each machine's Basic functions and show which does on each machine.

Are any terms you don't understand turn to our software glossary (page 98) and you should find an explanation there. Around the magazine are the Bugs — you'll meet them officially on We've already fallen in love with these creations from the pen of Lloyd-Jones and we hope you will too. I'm sure they would like to join in offering you a big welcome to COMPUTER & VIDEO GAMES.

74 PRACTICAL PROGRAMMING

It's in our interests to turn you all into better programmers. Ted Ball will tempt you further along the Basic trail

77 ADVENTURE

Whether you want to write your own or just play other people's, Keith Campbell looks at the magic behind the most popular computer game

78 CHRISTMAS PARADE

Most Christmas stockings will have a microprocessor in them this Yuletide. We look critically at the new toy generation

81 KIT KORNER

A micro you have built yourself will give you that much more satisfaction. Keith Mott outlines the benefits and warns of the pitfalls

83 PUZZLES AND CROSSWORD

Bottles of champagne are up for grabs in our Mind Routines problem and Nevera Crossword

85 GRAPHICS

The marks on the screen — so often the mark of a good game

86 DOWN TO BASIC

Computer beginners start here. But old hands should not pass by Moira Norrie's revealing look at the most widely used computer language

88 SOFTWARE REVIEWS

An adventure with real treasure! An alien invasion of your spaceship! And many more

97 SOFTWARE GLOSSARY

Don't be thwarted by computerised jargon. It's all here in plain English

...ther of our playing card pack.
...e on a Tandy

...antly destructive computer
...Sinclair owners

...r Atari and destroy the Death

...ar is out to get you. How long
...on?

...N
...s music and graphics but can
...man from the gallows?

...R
...and we're not too proud to
...benefits of becoming a C&VG

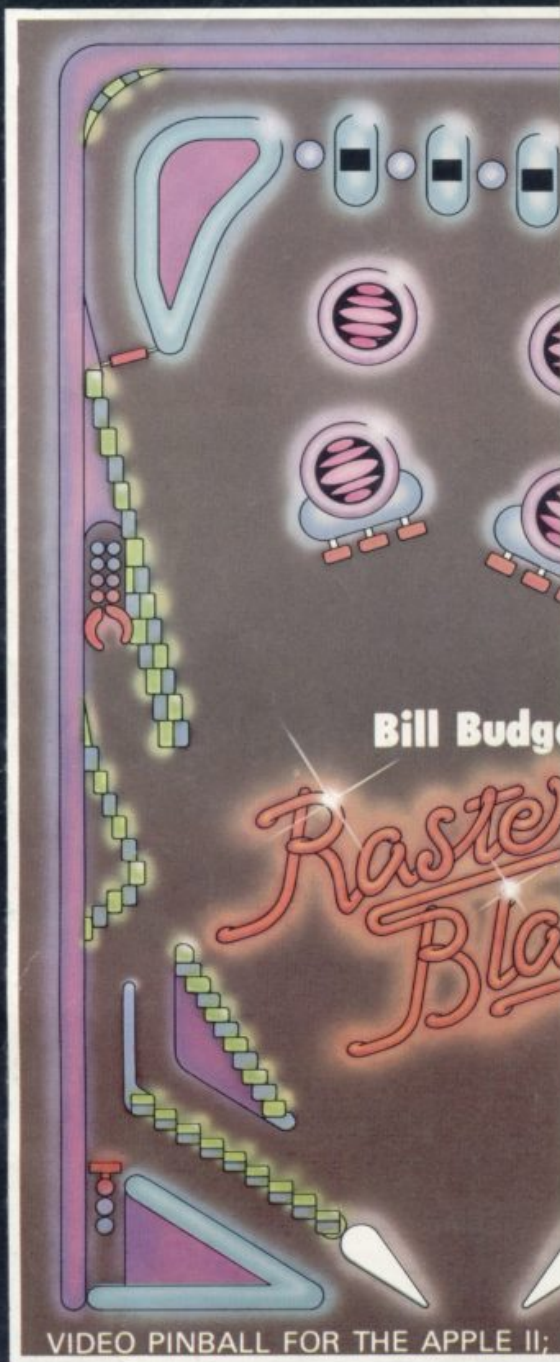
...gical and mysterious. David
...mension to your micro

...nlines that you probably know

...s for every TV video games
...buy

...a game with the power of a
...lex Gates finds out

NEXT ISSUE ON SALE NOVEMBER 18TH



This may be the first Apple II game that is
RASTER BLASTER for the Apple II and Apple II Plus
 play that it is sure to attract the attention of the best
 it right now for you

RASTER BLASTER
 Video Pinball for
 See next month's issue

Apple II is a registered trademark

SUBSCRIPTION ORDER FORM



Please start me a subscription to *Computer & Video Games* and continue to send it to me until I cancel.

I understand that I may stop my subscription at any time and you will refund me the difference.

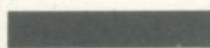
I enclose a cheque/P.O. for £10.00 (U.K.); Overseas £20.00. Twelve issues a year. Cheques should be made payable to Computer & Video Games Ltd.

Name _____

Address _____

Signed _____ Date _____

NOW PLEASE POST TO:
 Computer & Video Games Ltd.,
 Subscription Department, Bretton Court, Bretton,
 Peterborough PE3 8D2



2



Do not affix Postage Stamps if posted in
 Gt Britain, Channel Islands, N Ireland
 or the Isle of Man.

BUSINESS REPLY SERVICE
 LICENCE No: PE79/4

COMPUTER & VIDEO GAMES
 3rd FLOOR
 8 HERBAL HILL
 LONDON EC1 5JB

Postage
 will be
 paid by
 licensee

NEWSAGENT:

Please reserve/deliver
Computer & Video
Games to me every
month, until
further
notice.



Name _____

Address _____

Signed _____

ARE YOU THE BEST ARCADE PLAYER IN THE WORLD?

Find out by entering our great competition. Simply fill out this card and send it to Computer & Video Games Ltd, 3rd floor, 8 Herbal Hill, London EC1R 5JB.

Great prizes to be won ... full details on page 20

I would like to enter The Best Arcade Player in the World Competition.

The machine I play on is called _____

and is manufactured by _____

My highest score is _____

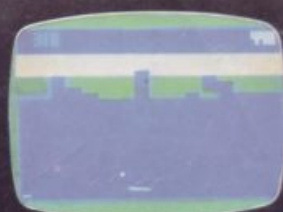
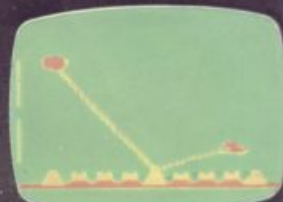
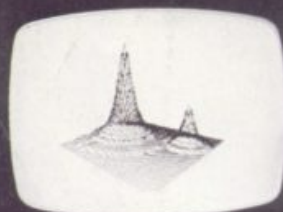
which I scored on (date) _____

The manager of the arcade/pub where I achieved this score was a witness.

Signature of witness _____

Name and address of arcade/pub _____

Continued overleaf



ATOM POWER

Speed in a personal computer

YOU AND YOUR CHILDREN

More and more schools are buying Atoms. More and more children will learn on an Atom. You can give them that extra familiarity with an Atom in the home.



4a Market Hill,
CAMBRIDGE CB2 3NJ

When you order your Atom we will include full details of all software packs and the optional hardware.

To: Acorn Computer Limited, 4A Market Hill, Cambridge CB2 3NJ.

I enclose a cheque/postal order for £.....

Please debit my Access/

Barclaycard No.....

Signature.....

Name (please print).....

Address.....

Telephone Number.....

Registered No. 1403810 VAT No. 215 400 220

Quantity	Item	Item price inc. VAT + P&P	Totals
	Atom Kit 8K ROM+ 2K RAM	@ £140.00	
	Atom Assembled 8K ROM+ 2K RAM	@ £174.50	
	Atom Assembled 12K ROM+ 12K RAM	@ £289.50	
	Power Supply	@ £ 10.20	
	TOTAL		

Circle No. 300

**COMPUTERS
CALCULATORS
COMPUTER GAMES**
at
EXTRA LOW PRICES!

Make your 410 more productive with HP application plug-in modules. They provide instant access to sets of programs covering diverse ranges of subject matter: Mathematics, Electrical Engineering, Business Decisions, Games, and lots more. Each Module comes in a Pac with a detailed manual containing descriptions and examples plus helpful programming techniques.

HP41C complete plus additional mem. module & stats module. £185.00
HP41C complete plus mem. module & Card Reader £248.00

*HP33C (8 Mem. prog. Sci/Stat plus Const. Mem.) £49.00
*HP34C (Sci/Prog. 20 Mem.) £79.50
HP41C (Newest Sci. from HP) £133.00
HP41CV (incorporating quadram) £169.00
HP41C Card reader £114.95
HP41C Printer £193.00

HP ECONOMY PACK

HP41C together with card reader and printer. All complete as manufacturer's spec. £349.00

HP BUDGET PACK

HP41CV together with card reader and printer. All complete as manufacturer's spec. £448.00

COMPUTERS

Texas TI99/4 16K Computer which plugs direct into any T.V. for full-colour — ideal learning aid for every member of the family including pre-school children. £250.00

(expandable to 48K)*
Hewlett Packard HP 85 16K Computer incorporating V.D.U. Printer etc. An advanced Scientific/Business Computer with very sophisticated software. £1,900.00

(expandable to 32K)
Apple 48K Computer system complete with disc drive, graphic printer, 12" Video Monitor — inexpensive Scientific/Business/Education system. £1,880.00
VIC, PET, ATARI etc. together with Printers/Disc Drives etc. for all above detailed systems available.

SPECIAL OFFER

*TEXAS TI59 together with PC100C (Complete as manufacturer's specifications) £234.50

*TEXAS TI59 (Card prog. 960 Prog Steps, or 100mem) £104.00
*TEXAS PC100C (Printing Unit for TI59/TI59i) £136.00
*TEXAS TI57 (Key Prog. 8 Mem. 150 Key Strokes/50 Prog Steps) £25.50
*TEXAS TI58C (Key Prog. 480 stp or 60 mem. with continuous memory & programme) £55.00
*TEXAS TI PROGRAMMER (Hexadecimal Octal, Dec. Converter) £46.50
*TEXAS TI51/111 (10 Dig. 16 Mem. 32 Prog Steps, 8mtSci) £27.50

COMPUTER CHESS

Hand held Chess Traveller £10.75

(complete with board man etc.)

Boris Diplomat II £70.00

(lightweight portable — ideal for beginners & travel)

Mini Chess Master "T" £75.00

(low priced portable sensory)

Challenger Mini Sensory £47.00

(the mini version of the Challenger Sensory — ideal for travel)

Challenger "T" £63.50

(ideal all-round Chess Computer)

Challenger Sensory "B" £96.50

(sensory chess to club standard)

Murphy Encore £133.00

(top level chess with fast play)

Great Game Machine £153.00

(mainframe — games centre for games cartridges including Murphy Chess, Borish Chess, Draughts, Las Vegas, Blackjack, Reversi etc.)

COMPUTER GAMES

Backgammon Challenger £69.50

Omar II Backgammon £57.50

Advanced Bridge Challenger £174.00

TEXAS ECONOMY OFFER

*TEXAS TI59 Calculator (complete as manufacturer's spec.) PLUS statistics module & extra set of 40 Blank Prog. Cards £133.00

TEXAS LEARNING AIDS

SPEAK AND SPELL £29.50

(for older children 8-13 years)

SPEAK AND MATHS

(5 yrs and up — 100,000 random maths questions) Price £36.50

*FREE — Mains charger included.

GOODS FULLY GUARANTEED

PRICES EXCLUDE VAT AND P.P.

Company, hospital and Government orders accepted by phone.

Orders Barclaycard/Access/Visa accepted by phone.

Tel.: 01-455-9824

MOUNTAINDENE
22 Cowper Street
London EC2

TO NEWSAGENT

SC
G

MACHINE (to symbols of a machine. It which is the which operate is written in thing move n **MAINFRAME** word used to ter.

MEMORY I aid in proces ments in the also call up t **MICROCOM** the name sug and software are made of i cuits.

MICROPRO chip.

MINICOMP sized comput ity than main

NUMERIC I of the comp number keys

OUTPUT Th computer, ei printed out v computer.

PEEK A sta allows you specified mem

PIXEL The b derived throu processes an ipulation.

POKE An in sions of Basic gers in a spe

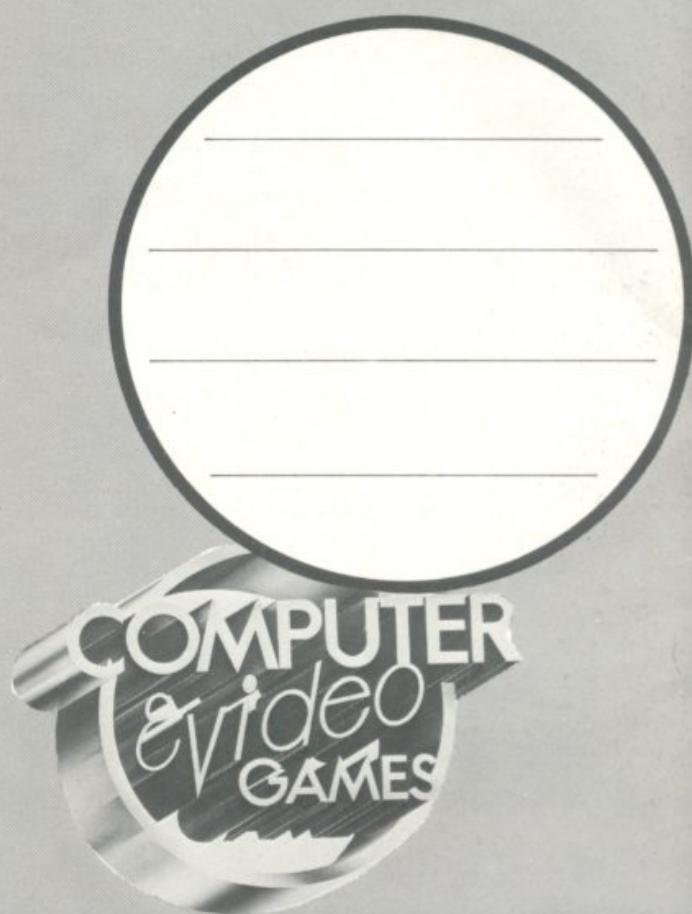
PRINT A Ba computer to program.

PROGRAM instructions f solve a proble

PSEUDO R are numbers numbers but for statistical

R.A.M. (Ra This is a mer programs and different size various amou

READY The screen indica loaded Basic instructions.



Please answer the following questions

1. Do you prefer games which rely on (please ring):
Speed and reaction; Attack; Strategy; Defence;
Other (please name).
2. How do you know when you have found a good video game?
3. How often do you play each week, and where?
4. If you could add one feature to your favourite game, what would it be?
5. Do you read the instructions on how to play a game before you try it?

My name is _____

Address _____

Tel: _____ Signature _____

NOW PLEASE POST TO:
Computer & Video Games Ltd,
3rd. floor, 8 Herbal Hill, London EC1R 5JB
TO ARRIVE NOT LATER THAN JANUARY 2nd. 1982