

JUNE 1983
75p

COMPUTER & VIDEO GAMES

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THE TEN COMMANDMENTS
GAMES LISTINGS FOR
THE VIC SPECTRUM
ATARI T.I. BBC AND
MANY MORE**



HUNT EMERSON

News & Reviews

GAMES NEWS 16

The first game in four-D! Melbourne House goes one D better. And every TV games centre addicts' favourite title has translated to computer. Play Demon Attack on the Vic and Atari. Four pages of the latest software for all machines.

ARCADE ACTION 30

Tips on surviving beneath a pyramid on the trail of Tutankhamun's gold. Plus Roc n' Rope for other intrepid adventurers and pinball can now be played by couples. Take on a friend on the tilting joust pintable.

REVIEWS 104

The decline and Fall of the Roman Empire on your Spectrum, arcade hit Qix converted for the Atari, plus Spectrum owners end up down a Blind Alley.

NEXT MONTH 5

News of our July offering including another fascinating competition for Bug fans and a games supplement for the keen collectors of our games listings.

Listings

QUICKDRAW 32

Howdy partners. This town ain't big enough for both of us — so you and your darn Apple computer better saddle up and git out. Either that or learn a quick draw pretty swift. You catch my drift stranger.

SUBSTRIKE 40

They run silent and run deep these deadly denizens of the deeps. The good ship TI 99/4a is out to hunt them down.

BAT AND BALL 44

Howza! Get in shape for the cricket season with this reincarnation of one of the very first video games. For the BBC models A or B.

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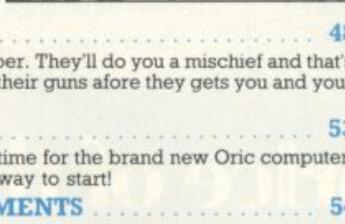
Perched like a vulture high atop a heavily armed battle tower you await the enemy attack. Cosmic action for the ZX81.

THE BLACK BOX 70

Dare you open the Black Box and discover its inner secrets? We dare you! Unlock the mysteries of the box with your Spectrum.

TRENCH 78

The deadly Death Star is back — and twice as mean. Can you destroy it before it wipes out your corner of the Dragon universe?



Swords and surgery

Do adventurers get you down? Does the troll on the bridge, refusing all treasures make you tense?

Can trying to find a way out of the coloured mirror maze, make you look at yourself in a new light? Here at *Computer & Video Games* we've seen too many fine adventurers go to the wall — and end up banging their heads on it.

We know the pain and suffering a tough adventure can cause and we've opened up a helpline to Keith Campbell. Keith knows his way out of more adventures than most trolls have had hot dinners. Those he can't help with, he will throw open to the *C&VG* readership, to find an answer. All on page 83.

Features

MAILBAG 7

More of your questions answered.

COMPETITION 10

Write a program for Dixons and you could win an Atari 800.

BUGS 25

Will the Bugs be converted to a user friendly frame of mind?

GO 27

Find out why this game is more popular than *The Times* crossword — in Japan.

DRAGON GAMES 28

Ron Potkin tells you how to get more software for your Dragon ... courtesy of the Tandy Colour Computer.

SOFTWARE FORM 68

All you need to know about getting your game printed in your favourite magazine.

ADVENTURE 83

Reached an impasse on your latest adventure? Now help is at hand.

CHESS 84

Max Bramer and the Duchess!

WARPATH 86

It's Ron Potkin again — this time hoping the cavalry arrives in time!

GRAPHICS 93

Garry Marshall brings eyesight to "blind" micros.

MACHINE CODE 98

Ted Ball's half term test. Have you been paying attention? Find out here!

Editor Terry Pratt, Staff Writer Eugene Lacey, Editorial Assistant Clare Edgeley, Reader Services Robert Schifreen, Art editor Linda Freeman, Designer Linda Skerry,

Production editor Tim Metcalfe, Advertisement manager Rita Lewis, Advertising executives Louise Matthews, Mike Cassall, Advertisement assistant Louise Flockhart,

Publisher Tom Moloney

Editorial and advertisement offices: Durrant House, 8 Herbal Hill, London EC1R 5JB; Telephone Editorial 01-278 6556, Advertising 01-278 6582

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NOW LET OFF SOME STEAM

We've had a few unfortunate experiences with software but luckily in our privileged position we can vent off some steam through the C&VG Reviews pages.

Up until now, you have not had the same opportunity to warn people about your own software disasters.

Now, things are different. C&VG is going to give over a page or two each month to Great Software Disasters, which will be written by you, the readers.

If you have bought a piece of software — or a peripheral, or even a computer — which you feel does not live up to its marketing blurb please write in and tell us.

Reviews of bad software are just as important as reviews of good. And we strongly feel that the software houses which really do believe in quality rather than putting out any title which may make a killing in the short-term, should be supported. The only restriction we will put on this column is that the manufacturers will be allowed a right of reply before we publish.

The first offering is a delightful rundown of one man's experiences with an Oric Computer. Keith Ollett is the man behind Aeiric Bloodaxe or How I Learnt to Live With an Oric. Not only does it tackle one man's struggle to adapt to a new micro but it does so in a way that had most C&VG staff stifling giggles and we also get the feeling that before too long Mr Ollett is going to form an undying affection for the new companion in his life.

Read about Aeiric Bloodaxe next month and if it reminds you of some of your own experiences in the microcomputer market then write and let us know. It doesn't have to be as long as Mr Ollett's piece, just long enough to get your views across.

NEXT MONTH!

Hot on the heels of the Book of Video Games comes an expanded Video Screens section for C&VG's TV games centre readers.

There is a whole host of new games cartridges plus a range of new machines, like the Vectrex and the Colecovision. All of which gives us more to tell you about each month.

C&VG already leads the rest in its information on the video games scene, so for the latest news and the most trustworthy reviews test out our expanded Video Screens section next month. After all, the next generation of microcomputers may well burst out of this market.

NEXT MONTH!

Vibra seats, holophonics and laser discs may still be a little bit beyond what Britain's arcades are currently capable of. But they are still ready to pull out a few surprises.

Like Tip Top, a 3D version of Donkey Kong which sets an explorer down in the jungle, dodging 3D coconuts as he tries to get his own back on a mischevious ape.

There's also a rundown of Buck Rogers, the futuristic space ace who has found his way into a video games cabinet and the right way to approach the World War II game Frontline.

Plus arcade tips on new favourite Donkey Kong Junior.

NEXT MONTH!

There's games in them thar pages of the July C&VG.

Games enough for everyone as we are packing in an extra listings-only section. 32 pages packed with versions of popular games for all kinds of microcomputer — on top of our normal selection of games programs.

Spectrum owners are in for a bouncing climbing treat with both Donkey Kong and Donkey Kong Junior putting in an appearance on their machine. Donkey Kong features the second screen of the arcade game with fires and ladders and Mario knocking the plugs out of the construction below Kong's feet.

DK Junior features the vines, snap-jaws and fruits of this increasingly popular arcade game.

Defend, Bug Battle, Spike Attack, Meteor, Draughts, Labyrinth and old favourites, like: Munchmen and Ninek's Invaders will be among the titles to take your mind off the forthcoming summer holidays.

COMPUTER GAMES TOP TEN

Sinclair Spectrum

- 1 The Hobbit (Melbourne House)
- 2 Arcadia (Imagine)
- 3 Penetrator (Melbourne House)
- 4 Horace Goes Skiing (Psion)
- 5 Time Gate (Quicksilva)
- 6 Flight Simulation (Psion)
- 7 3D Tunnel (New Generation)
- 8 Blind Alley (Sunshine)
- 9 Spectral Invaders (Bug Byte)
- 10 Planetoids (Psion)

Atari 400/800

- 1 Defender (Atari)
- 2 Pacman (Atari)
- 3 Galaxians (Atari)
- 4 Star Raiders (Atari)
- 5 Zaxxon (Calisto)
- 6 Centipede (Atari)
- 7 Miner 2049'er (Tigervision)
- 8 Missile Command (Atari)
- 9 Choplifter (Creative software)
- 10 Qix (Atari)

Vic 20

- 1 Jelly Monsters (Commodore)
- 2 Choplifter (Creative Software)
- 3 Star Battle
- 4 Blitz
- 5 Sargon II Chess
- 6 Skramble (Rabbit)
- 7 Gorf
- 8 Cosmiades (Bug-Byte)
- 9 Vic Panic (Bug-Byte)
- 10 Hoppit

ZX-81

- 1 Flight Simulation (Psion)
- 2 3D Defender
- 3 Mazogs (Bug-Byte)
- 4 QS Galaxians/Gloops (Quicksilva)
- 5 Space Radiers (Psion)
- 6 Thro the Wall/Scramble (Psion)
- 7 3D Monster Maze (J. K. Greye)
- 8 Gulpman II (Campbell)
- 9 Gobbleman (Artic)
- 10 Chess (Psion)

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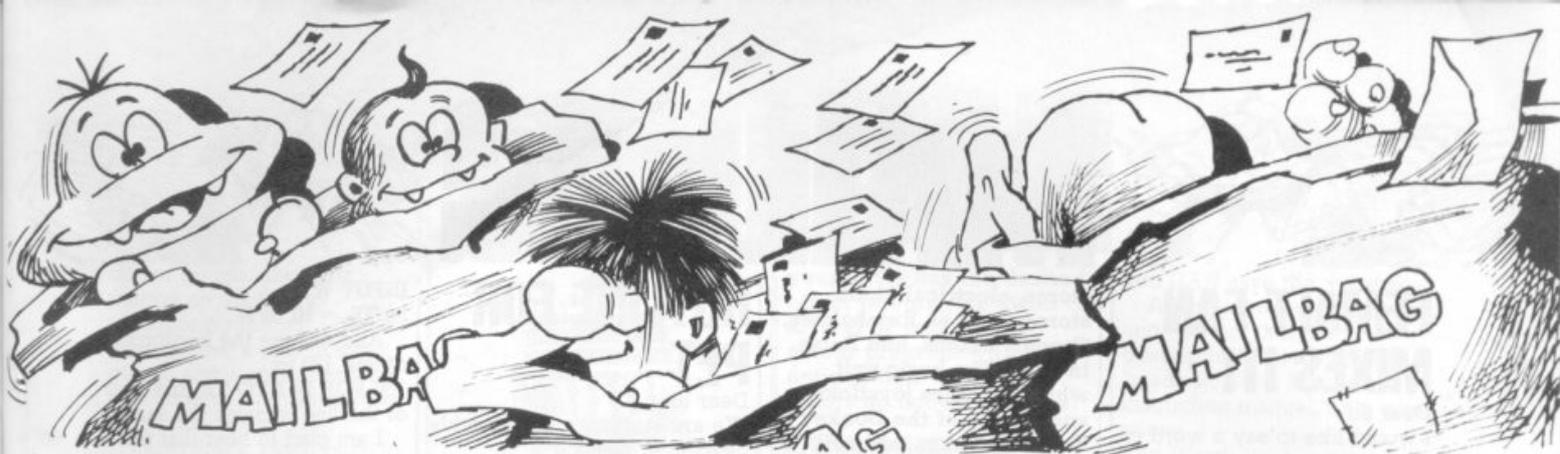
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Please drop us a line at: Computer and Video Games, EMAP, Durrant House, 8 Herbal Hill, London EC1R 5JB.

JUMBO AND SUBMARINE

Dear Sir,
I would like to point out that our program Jumbo Jet Pilot, currently available for the Atari 400 and 800, is not being developed for, and shall not be available for, any other computer.

Submarine Commander is currently under development for the Commodore Vic-20 and is being considered for development for the Texas Instruments 99/4A. No release date has yet been set for either program.

Mike Dixon,
UK Sales Manger,
Home Computer Software,
Thorn-EMI,
London.

RETURN OF KRAZY KONG!

Dear Sir,
A friend of mine consulted me about a game program from your magazine for the Pet called Krazy Kong (February 1983 issue) as it would not work.

Apart from typing errors, the main cause was that it was written for a 9 inch screen Pet and used a PEEK to find the value of key pressed (PEEK 151). Unfortunately, 12inch screen 4000 series Pets give different values to the earlier small screen, a fact not widely known.

To convert the program to be universal (on all except the Basic 2 version machines) it is necessary to change the following lines in the program.

Line 20: Replace with lines 15 to 25
Line 170 to 240: Change variable S to S1
Lines 1050 to 1090: To use variables Z1, Z2, Z3 & Z4
Lines 1220 and 1230: Change variable S to S1

With these amendments, the program will run on most Pets . . . an excellent game in my opinion. If anyone wants to check the value for any key pressed, the following program will show them.

```
1 A = PEEK (151) : PRINT A
2 GO TO 1
```

Amendments

```
Line 15: K = 41: P = 40: H = 39: REM FOR CURSOR
```

```
Line 18: REM 9INCH
```

```
SCREEN VARIABLES
```

```
Line 22: REM 12INCH
```

```
SCREEN VARIABLES
```

```
Line 25: IF PEEK (57344) =
```

```
76THENS=52:Z156:Z2==50:
```

```
Z3=62:Z4=60:Z5=54
```

```
Line 1050:
```

```
IFA=Z1THENIFPEEK(J-P).....
```

```
Line 1060:
```

```
IFA=Z2ANDA1.....
```

```
Line 1080:
```

```
IFA=Z3THENGOSUB500
```

```
Line 1090:
```

```
IFA=Z4THENGOSUB600
```

John Bloore,

Kingswinford,

West Midlands.

ROCKFALL DODGES!

Dear Sir,
There are two reasons why readers may have difficulty in getting Rockfall printed in your March 1983 issue, to work. First, the printer used to obtain the listing appears to have a different character set to the one on the BBC.

This, of course, has the effect that certain BBC characters are replaced by certain non-BBC characters on the listing.

This effect occurs on the following lines:

```
LINE 10, "↑" SHOULD BE "[↑" (WHICH IS DISPLAYED AS "←" IN MODE 7)
```

```
LINE 10, "↓" SHOULD BE "[↓" ("½" IN MODE 7)
```

```
LINE 60, "←" SHOULD BE "[←" ("→" IN MODE 7)
```

Secondly, the program does not work on an Operating System 1.2 machine due to the method

it uses to read the keyboard. Corrections should be made as follows:

```
530 Z% = Y% + X% : A% = INKEY (-26) - INKEY (-122)
```

```
600 M% = A% : C% = Z% : X% = X% + A% : IF X% C0
```

```
X% = 0
```

It would also be a good idea to replace "OPT0" on line 10 with "OPT2".

David Mc Keran,
Sunderland,
Tyne & Wear.

WHERE CAN I TURN TO?

Dear Sir,
I am keen to learn more about my Oric computer but do not know who to turn to as I am new to computing. Can you please advise me whether any groups or any other organisations for Oric users that I can turn to for help exist at the moment?

Julian Douglas,
Hartsholme,
Lincoln.

Editor's reply: The Tangerine Users Group (TUG for short) is offering its services to Oric owners and the organisation can be contacted at: 1, Marlborough Drive, Worle, Avon BS22 0DQ.

But Bob Green of TUG tells me he is currently overwhelmed with response from Oric owners and delays of 14 days before the organisation can get back to enquirers, are inevitable.

COLOURFUL SKYSCRAPER

Dear Sir,
I have a few modifications to suggest that will introduce a dash of colour to the Skyscraper program printed in April's C&VG. For example, the following changes will give, a yellow plane, a red bomb, black

background and blue skyscrapers:

```
30 FOR K = 0 TO RND(12): POKE J-K*32,175: NEXT: NEXT: REM SKYSCRAPER COLOUR
```

```
40 PLS = CHR$(158)+CHR$(155)+CHR$(146): REM PLANE COLOUR
```

```
50 NP$ = STRING$(3,CHR$(128)): PO = 32: BOS = CHR$(177): RA=5: SC=0: REM BOMB COLOUR
```

```
80 IF PEEK (PO+1026) = 175 THEN CLS: PRINT @ 150, "SPLAT" : PRINT "YOU CRASHED INTO A SKYSCRAPER!": PRINT "YOUR SCORE WAS: "; SC: GOSUB 2500: PRINT "DO YOU WANT ANOTHER GO?"; INPUT US : IF LEFT$(US,1)="Y" THEN 5 ELSE END: REM DETECTS SKYSCRAPER COLOUR WHEN CRASH OCCURS
```

```
1000 IF SP + 32 479 THEN BD = 0: POKE SP + 1024,128: RETURN ELSE IF PEEK (SP+32+1024)=175 THEN POKE SP + 32 + 1024, 128: ..... (Rest of line as printed): REM DETECTS WHEN BOMB HITS SKYSCRAPER
```

The colours can be changed to any of the eight colours available, simply by adding the appropriate CHR\$ codes, listed on page 138 of the user manual, to the values given in the, all green, original version printed in your magazine.

E. U. Lovesay,
Norwich,
Norfolk.



MAILBAG



FEMALE FAN MIXES IT!

Dear Sir,
I would like to say a word of appreciation for your magazine. We have had Texas TI99/4a for around four months.

Yours is the only magazine which regularly has listings and adverts for our super fantastic machine. The machine is great — wonderful keyboard, excellent display, clear sound, enormous ROM (Edit Mode is super!)

For other Texas TI 99/4a fanatics here is a colour mixing program discovered by Ian Ellis, aged 10, a friend of my son's:

- 100 CALL CLEAR
- 110 CALL SCREEN (16)
- 120 INPUT "FIRST COLOUR":A
- 130 INPUT "SECOND COLOUR":B
- 140 CALL COLOUR (9,A,B)
- 150 CALL CHAR (97,"55AA55AA55AA55AA")
- 160 CALL HCAR (1,1,97,768)
- 170 GOTO 170

It gives an apparently unlimited number of shades and colours.

By the way — are there any other female computer fans out there?

Hazel Perkins,
Adel,
Leeds.

PLUGGING A NEW MACHINE

Dear Sir,
Please could you tell me the price of the new Colecovision you have mentioned in your magazine, and when it will be available. I have an Intellivision games machine and was wondering if I could put Intellivision games onto the Colecovision or vice-versa. I have also read in your magazine about a module which plugs into the Colecovision and allows it to take Atari games — will I be able to fit this module to my Intellivision?

Paul Hanks,
Stroud,
Gloucestershire.

Editor's reply: The Colecovision will be on sale at most major high street

stores, electrical chain stores, such as Rumbelows, Greens, Dixons, and Boots, in May. The basic unit, which includes joysticks and a copy of the Donkey Kong cartridge, will sell for £149.99. The Atari adaptor, which enables you to play VCS games on the Colecovision will be available at a slightly later date and will retail at £55. No Intellivision adaptors are available yet.

HIGH SCORE FOR PENGU

Dear Sir,
In the February issue you gave a good description of Pengo. Which was great because my local newsagent had just installed the game.

Now in the March issue some idiot called "Terry Pratt" has a high score of 17,410. Seeing this I thought that my high score is slightly better. It stands at 374,950. I had to clear 45 screens of snow-bees.

If there is any chance that my high score is the record could you send me a reply, so I could show my friends who have high scores on machines but they don't think its worth writing because they never get a reply.

Martin Stone,
Chalfont St Peter,
Buckinghamshire.

Editor's reply: This "idiot" realised his score wouldn't stand for long — but thought it might set a target for other Pengo freaks to aim at Martin.

Please tell your friends to use their top scores by entering our 1983 Video Games Championships. See page 10 of this issue.



HOTLINE FOR PET

Dear Sir,
We are starting a Pet Monthly newsletter service.

It will contain programming hints and tips plus information regarding copyright, submission to periodicals/publishers, etc., technical information for hardware circuitry plus program listings, plus a "hotline" telephone service. Annual subscription is £7 and should be sent to the address below.

Aquarius Software,
10 Kenneth Road,
Pitsea,
Basildon,
Essex.

DOGFIGHTER CONVERSION

Dear Sir,
I tried to enter the Vic-20 Dogfight program featured in your December '82 issue into my schools' Vic. My school has the Vic 1211A Hi-Res super expander but no joysticks. Listed below are the conversions needed to run the program without joysticks.

The following lines should be changed:

- 40 GET S\$
- 45 IF S\$="r" "THEN GOSUB S\$\$
- 46 IF S\$ "THEN X=X:Y=Y
- 50 IF S\$="S" THEN B=1
- 60 IF S\$="A" THEN B=2
- 67 IF S\$="W" THEN B=3
- 70 IF S\$="X" THEN B=4

These conversions give the following controls:
Dive=W, Climb=X, Left=A, Right=S, Fire=Space bar.
Kevin Hall,
Hull,
N. Humberside.

SLOW DOWN DRAGON!

Dear Sir,
I typed in the 'Dragon Run' listing in your April '83 issue, which worked perfectly. Try adding these few extra lines. They will slow the game down if you think it's too fast!
31 ? CHR\$(125)
32 ?? "ALSO, PLEASE ENTER SKILL LEVEL"
33 ? "(1=hard, 9=easy)":

INPUT WW
34 TE = 10*WW

And change the beginning of line 130 to:
130 FOR I=1 TO TE (the rest of the line remains the same).

I am glad to hear that the Atari range of computers have gone down in price again. The 400 may still not be the best value, but for the little extra money you get some of the best sounds and graphics of any home micro. A look at a few of the new game cartridges, like Defender, will prove me right.

I would like to send a message to all Atari owners — to get the most from their machine, they should join an owners club, and if there isn't a local one, be adventurous enough to start one.

Edward Tilsley,
Eastcote,
Middlesex

THE PLANET OF DEATH

Dear Sir,
I felt compelled to write after playing my first ever adventure. I need help!

What do I need the slimy gloves for? Why is the green man so unfriendly? What does the dance music mean? Why won't the computer — down the pit, behind the wind tunnel — talk to me?

These are just some of the many questions arising after having entered Artic's 48K Planet of Death for the ZX Spectrum. The story so far:

I found myself on a mountain plateau, with only a piece of sharp flint for company. I pick it up, and move into a damp limestone cave with a picture of a man climbing down a pit using a rope.

Moving on, I finally collect rope, a pair of boots, a broken floorboard, a laser gun and some stones.

Making my way to the bottom of the pit, I find the green man. I shake his hand, and he throttles me. Oh no not again!

Sometime later I arrive once more at the side of the green man who sleeps on the mirror. This time I shoot him and he goes up in a puff of smoke leaving behind him a broken mirror. I pick the



MAILBAG



mirror up too, after first putting on the boots.

Exploring further, I find a wind tunnel, a pair of slimy gloves and a computer with a keyboard — which refuses to communicate.

I also find a key. I have to drop an object now (the floor-board which I have used and broken) and pick up the key which in nearly all adventure games is like the heart of an artichoke — you have to go through an awful lot to get at it, but it is usually worth it in the end.

Having loaded myself up with miscellaneous objects I try the key in all the prison cell doors — it doesn't fit any of them. (You have to kick the barred window to get out.)

I fix my laser at the force field, twice weakening it, but the third shot having no effect. Where to go now?

Please, anyone out there, tell me what to do. This must be one of the most annoyingly addictive adventures for the Spectrum. I'm hooked anyway. I'll find my spaceship if it's the last thing I do. Anyway I'm stuck in the maze to the north of the strange house.

*A. Buchan,
Aberdeenshire,
Scotland.*

Editor's reply: Sounds like you are in dire straits Mr. Buchan. But help is at hand. Keith Campbell is offering aid to lost adventurers on his page and we have forwarded your letter to him for answer in a future column.

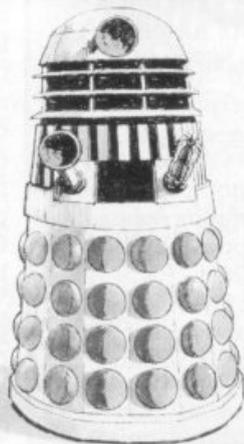
FULL SCREEN ON TEXAS

Dear Sir,

As a TI 99/4a owner I would very much like to thank you for the two games published recently, it is most gratifying to find a popular magazine taking an interest in this excellent machine at last.

I would also like to take the opportunity to say how much I enjoy your magazine and appreciate its excellent layout and use of diagrams. I do love a good picture or two!

If anyone is interested, here is a little technique I use for printing full screens on



the Texas.
100 CALL CLEAR
110 CALL
CHAR(97,"FF01FF80FF01FF00")
120 CAL
CHAR(98,"EEEEEEEEAAAA
AABA")
130 FOR I=1 to 24
140 PRINT "aa(two
spaces)bababababbbbabab-
aba (two spaces)aa"
150 NEXT I
160 GOTO 160

Lines 110 and 120 redefine characters "a" and "b" and the print statement in line 140 positions them where they are required. Most of the other console characters can be used in a similar fashion.
*S. W. Sorsbie,
Tenterden,
Kent.*

COLOUR ON THE WAY

Dear Sir,

I am a proud CoCo owner and would be obliged if you could please print a program for the TRS-80 colour computer.

There are many CoCo users who receive your excellent magazine but we still wait for a program to be printed within the pages of *Computer and Video Games*. I am nearing completion of a program at this moment, and when I have finished, shall send it in.

If you print this letter, I'm sure it will inspire many users of this most versatile computer on the market, to put finger to keyboard.

*Jeremy Hughes,
Haverfordwest,
Dyfed.*

Editor's reply: We hope

your letter has the desired effect Jeremy. We await the arrival of your TRS-80 colour program with anticipation. So far our vaults do not contain any!

EXPANDING GRAPHICS

Dear Sir,

I live in Hong Kong and have a Vic-20. Recently I bought a 16k RAM expansion pack for my Vic. Over the last few days I have been ripping my hair out trying to create my own characters in my expanded Vic machine.

Before I expanded I used location 7168 to place my programmed characters. To protect it from being overwritten by Basic I changed the pointers to the top of available RAM at locations 52 and 56 so that they point below the character set.

Needless to say, this precaution is fruitless when the Vic is expanded because some RAM vectors are altered, e.g. those pointing to the Basic program and the screen.

*Wai Keung,
Tuen Mun,
Hong Kong.*

Editor's reply: To protect your character set use the following program, it will relocate the screen to its proper address. You can then put your character set in locations 4096 to 7696.

```
10 for X = 1 TO 7
20 READ LOC,DAT
30 POKE LOC,DAT
40 NEXT X
50 SYS(0)
60 DATA 648,30,642,32,
36869,240,36866,150,0,108,1,
0,2,192
```

This resets the appropriate pointers on an expanded Vic and then performs a reset.

HELPING THE DOCTOR . . .

Dear Sir,

Whoever checked the Dr Who game in the March issue wants putting down a black hole! It's impossible to get into the Doctor's Tardis!

If however, you change line 520 to read . . . IF L<>46

you CAN save the universe.

Apart from that small error, and the fact that the description page read like a "made in Hong Kong" instruction manual, it's a good game!

*Ken Ward,
Lakenham,
Norwich.*

Editor's reply: Even a black hole can't swallow the *Computer and Video Games* office!

APPEAL FOR NEW CLUB

Dear Sir,

I would like to ask your readers if there is anyone in the Manchester area who would be interested in forming a computer club for the TI 99. If so, perhaps they would contact me with any ideas they may have.

*T. A. Grimshaw
Longsight,
Manchester.*

Editor's reply: Anyone who is interest should contact the *Computer and Video Games* office for Mr. Grimshaw's complete address.

COLOURS ON THE ORIC

Dear Sir,

I think you ought to warn people about the Oric 1 advertisements which have been appearing in computer magazines like yours.

It says that the Oric 1 has sixteen colours, which is not true. It has eight colours, like the majority of computers in the £100-£200 price range.

The reason why Oric say it has sixteen colours is that they think that the background colour and the ink colour is completely different.

With that assumption in mind, you could say that the ZX Spectrum has a total of around fifty-six colours, a different combination of colours using FLASH, BRIGHT, PAPER, INK and BORDER.

Keep up the good work with your fantastic magazine, and the great artwork!

*Shaun Dodson,
Haxby,
York.*

SCORES START TO MOUNT

The high arcade scores of would-be champions are beginning to mount in the Computer & Video Games office.

A whole host of machines are proving their popularity but few clear leaders have so far emerged. Many players have stayed with tried and true favourites which have been languishing in arcades for years while others proudly sign their name beside the latest games on the market.

Asteroids, Pacman and Scramble feature among the older games still finding favour with video gamers. James Thomas of Fishguard has taken an early lead with his signed Scramble score of 3,672,820 from the Cleddau Leisure Centre in Haverford West. But the rest of the Scramble scores are languishing well behind.

Jonathan Rees must be suffering from a bad case of Pacman finger

BE A CHAMP

A brand spanking new arcade game, not previously released in the UK is still to be claimed from Taitel Electronics.

The prize will go to our 1983 Video Games Champion when he has seen off all opposition at the grand final on July 7th.

To qualify for that final, simply cut out the form below and take it down to your local pub or arcade or wherever your favourite machines can be found.

Put up the best score you can on the machine and when you reach a

score you're happy with, ask the arcade or pub manager to sign the form to witness it. You can repeat this process on any two other machines which you fancy your chances on, or purely send the form off to us at C&VG in an envelope marked: 1983 Video Games Championships, Computer & Video Games, Durrant House, 8 Herbal Hill, London EC1R 5JB.

If you mess up this form write or phone and we'll send you another one. You can enter as many times as you like before the June 23rd closing date — but don't leave it too late as the vagaries of the post may mean your scores arrive too late.

after achieving over two million at the Carousel Amusements in Southport. Another two million plus score was notched up by Andrew Freeman of Pitsea Pool in Basildon on Asteroids.

Donkey Kong and Robotron are among the games being battled over by other arcade veterans. Some 569,000 from Mark Neale was witnessed in the Boscombe Pier

Amusements on Donkey Kong while current top Robotron ace is R. Cooper whose score of over nine million stirred the locals in the De-Luxe arcade in Hastings.

Among the recent games vying for position are: Amidar and the popular Mr Do plus my own favourite, Pengo... but I won't be featuring in the final after seeing the latest scores on that.

Please enter the following scores in your 1983 Video Games Championships

My high score is:

.....

It was scored on a:

..... machine

Date:

The manager of the pub/ arcade who witnessed my score is:

.....

His signature:

Name & address of pub/ arcade:

.....

.....

My name is:

Address:

.....

My high score is:

.....

It was scored on a:

..... machine

Date:

The manager of the pub/ arcade who witnessed my score is:

.....

His signature:

Name & address of pub/ arcade:

.....

.....

My high score is:

.....

It was scored on a:

..... machine

Date:

The manager of the pub/ arcade who witnessed my score is:

.....

His signature:

Name & address of pub/ arcade:

.....

.....

Tel:



The three best scorers on each of the most popular machines will be given expenses paid trip to London to take part in the final against one another and a star personality.

Please ensure your entries are witnessed by the arcade manager or operator so we can verify the scores. And be prepared to keep July 7th free if you're particularly proud of your top scores.

If your arcade or pub owner is displaying a 1983 Video Games Championships poster he will also have a dispenser of application forms for you to enter on, should you be reluctant to cut this form out of your copy.

HELP BUYERS MAKE THE RIGHT CHOICE

When you bought your computer did you go for the one with the impressive pattern display or the one conducting its own sales patter.

Well, Atari is giving you a chance to influence the way its computer is represented in the future.

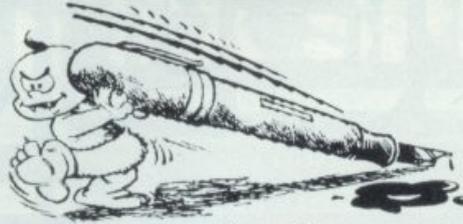
In conjunction with the high street electronics chain of Dixons and ourselves, Atari is setting up a competition to get your ideas on how its computers can best be presented to the perusing public.

Dixons provides a good example of how high street stores have taken home computers to their hearts. The Dixons shelves are now packed with many different brands battling for attention and giving buyers a chance to run their hands over a host of different keyboards.

But trying out a quick loop can hardly be a buyer's benchtest. He should see the micro running at its best before he makes his judgement. Obviously Atari are confident about their machine but how would you show it in its best light?

An Atari 800 microcomputer goes to the winner, or — if you already own an Atari — you can opt for a disc drive and an equivalent value in Atari software as a prize.

To enter the competition, simply write a program in Atari Basic which sets the computer off to the

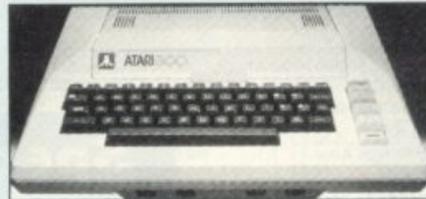


Confessions of a Bug

Dear all,

Only one thing to come clean on this issue. For all you T.I. 99-ers who couldn't pass our colour blindness test on Ski-ing in May, I've got to warn you about the perils of snow glare.

Any irate phonecall or a letter to the offices of C&VG will result in a



best advantage. Making the best use of the colour graphics and sound facilities of the machine.

The best of the programs will hopefully feature in future Dixons store demonstrations, helping to entice people to buy Atari computers.

There will also be three runners-up prizes of the latest Atari software.

SEVENTH CHANCE TO ENTER

The reappearance of The Seventh Empire has been met with roars of approval from the players and groans of horror from the poor devils who are tied to the Empire computer while it decides the fate of the galaxy.

But with a Colecovision as the star prize in the game, we couldn't let the game suffer its demise for too long. So it will soon be making a triumphant return — allowing a fresh start to all those who may have lost a fleet.

We can now replace players who have had to drop out of the game for one reason or another. So if you have been disappointed in the past, not to be playing Seventh Empire, then we are offering another chance.

First come, first served I'm afraid

purely black and white listing being returned to you in the post.

The editor assures me that hands have been chopped off and the people responsible been assigned to work on the Seventh Empire.

Meanwhile here are some corrections.

300 FOR M=A TO B
 730 IF (C=70) + (C=73) ...
 980 CALL CHAR (35, " 3C4299 ...
 1310 FOR M=1 to 600
 1430 DATA 30, 11, 1, 1, 12, 10, 11, 12, 29,
 30, 12, 1, 1, 13, 9, 14, 13, 22, 30, 13, 1, 1, 14,
 5, 15, 14, 21, 3, 0, ...
 1450 DATA 3, 8, 3, 5, 5, 5, 8, 2, 11, 4, 11,
 4, 17, 6, 17, 3, 22, 5, 22, 7, ...
 1460 DATA 13, 19, 10, 15, 12, 15, 8, 10, 10,
 10, 10, 7, 12, 17, 13, 2, 13, 4, 16, 4, 16, 2, 17,
 9, 19, ...
 1580 FOR X=8 TO 14 ...
 2230 CALL HCHAR (24, 1, 32, 32) ...
 2260 CALL HCHAR (XX, Y, 9, 120)

Yours Mal.

Judging will commence on June 16th and we'll need your entries in by then.

My own view of in-store displays of microcomputers is that they era on the side of the technical and verbose, instead of getting down to demonstrating some hot game action. But, luckily, it is being judged by Dixons' and Atari's experts, so you'll have a free reign to produce the best display for all kinds of computer usage.

The competition is not open to employees of EMAP, Dixons or Atari or their relatives and the judges' decision will, of course, be final.

but fill in the form below and we will do our best to include you.

Please include me in the Seventh Empire game when it resumes.

I would like to name my tribe the

My name is:

Address:

Tel:

SPECTRUM

NEWS from SPECTRUM

BBC

Now from SPECTRUM the outstanding BBC 'B' machine plus, Disk Drives & software see ad. opposite for details.

PRESTEL

See PRESTEL Page 600181 for up to date information from SPECTRUM

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Coming soon! a fabulous new range of Disk Drives specially selected by SPECTRUM from under £200 too! suitable for most micros inc. LYNX, COL, GENIE, DRAGON etc Ask your local SPECTRUM dealer for further details.

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Check our address page! - there are many new SPECTRUM dealers throughout the UK so there's a good chance there'll be a SPECTRUM centre near you.

INTRODUCING SPECTRUM FACTS!

Next to many of our offers, you'll find a few lines tagged SPECTRUM FACTS. We pride ourselves on providing you, the customer, with a genuine service as well as super LOW prices, and we want you to know that when you buy from a SPECTRUM dealer, you'll get exactly the right micro for your needs. SO LOOK OUT FOR YOUR SPECTRUM FACTS!

AFTER SALES CARE

SPECTRUM service centres will ensure that should your machine 'go down' we will get it running again as quickly as possible. We also offer extended warranties at reasonable prices too! - ask your SPECTRUM HOME COMPUTER CENTRE for full details.

COMPUTER DEALERS

The SPECTRUM dealer list is virtually closed. If your area is free and you'd like to join the waiting list, please write to MIKE STERN, Spectrum (U.K.) Ltd, Burrowfields, Welwyn Garden City, Herts.

BBC Model 'B' MICRO



Yes, this top selling Micro system is now available from your local SPECTRUM dealer - the BBC Model 'B' offering 32K RAM plus a full back-up of peripherals & software too! It's an infinitely expandable machine, ideal for the home or business and is already widely used for educational purposes in schools - so the chances are your children may already be well familiar with its operation, which must make it the ideal choice for the home too! So if you're thinking of buying a micro you must take a look at the BBC at your local SPECTRUM dealer NOW! - but just one word of warning, initially stocks will be limited and demand is bound to be great, so please 'phone to check the stock position before making a journey.

BBC 'B' with Disk Interface

£470.50

BBC Disk Interface Kit

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BBC Acorn Software Cassette

based from

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BBC Disk based software

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Spectrum Price

£399.00

INC. VAT

Please Note!

We regret that there is a tremendous shortage on all BBC equipment - please phone your nearest store before making a journey to check stock position.

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FREE!
£75 WORTH
of software
with every MZ80A
purchased

Desk top genius! the all-in-one SHARP MZ-80A. Ready to run the moment you get it home. Built-in keyboard. CRT. 9" display and cassette data storage with 48K RAM. The BASIC with extra useful additions, offers quite a powerful micro for the home or business. ■ 4K Byte ROM 48K Byte RAM - 2K Byte Video RAM ■ ASCII profiled keyboard - numeric pad ■ 2page Video RAM allows screen to be scrolled up or down. ■ CP/M available.

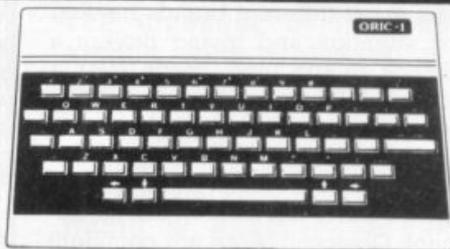
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Price**

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Twin Floppy Disk unit (inc. 1/0 Card, Disk, Cable) £856.75
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**Spectrum
Price**

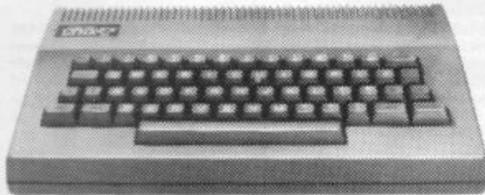
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Text screen 28x40
High Resolution 240x200
Cassette Lead Included

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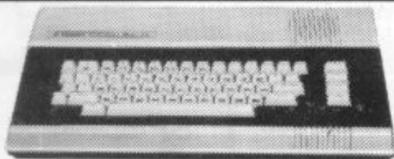
Just look at this super new LYNX Micro - an incredible 16K & 32K video ram and that's expandable up to or beyond 96K. For just £225.00 INCLUDING VAT the LYNX is exceptionally versatile. All LYNX's 'add-on' connections are standard types. The high definition colour graphics make it a top value choice for the home or office (with expansion, the LYNX can become an 80 characters-per-line word processor!) Take a look at the LYNX - a memorable bargain from SPECTRUM. But please phone to check stock position before making a journey as this machine is bound to be in great demand.

Spectrum Price

£225.00 Inc. VAT

VISCOUNT - Teach yourself LYNX BASIC £6.95
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COLOUR GENIE

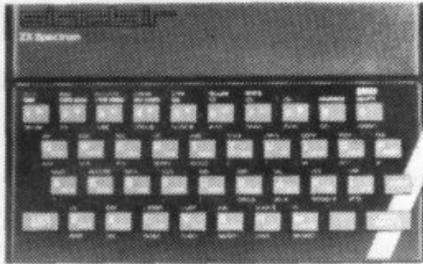


A truly reliable micro and highly recommended by SPECTRUM featuring powerful and sophisticated COLOUR GRAPHICS, allowing you to create full 8-colour Games, Diagrams and charts quickly and simply. Powerful 16KK RAM memory (expandable internally to 32K) for FULL COLOUR video games and POWERFUL COMPUTING with a full range of inexpensive accessories: 16K RAM pack, Joysticks for TV games, Light Pen, Disk Drive and a Printer. The superb Colour Genie is at SPECTRUM now - check it out and see the Genius at work!

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 Printer Interface..... £39.95
 VISCOUNT Teach yourself Colour Genie Basic..... £6.95
SPECTRUM FACTS
 Maximum user RAM..... 14,200 Bytes (approx)
 Text screen..... 24x40
 High Resolution..... 160x90
 Cassette Lead..... Included

SINCLAIR ZX SPECTRUM



Yes, this top selling micro is now available from Spectrum in both 16K and 48K RAM. So now there's no need to send by Mail Order - just call into your local SPECTRUM dealer and pick one up. But just one word of warning: with this added availability advantage, stocks are bound to sell fast - so make it soon!

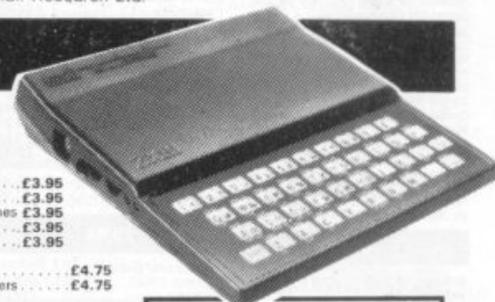
SINCLAIR ZX SPECTRUM 16K - £99.95
SINCLAIR ZX SPECTRUM 48K - £129.95

Spectrum Computer Centres have no connection whatsoever with the ZX-Spectrum Computer manufactured by Sinclair Research Ltd.

SINCLAIR ZX-81

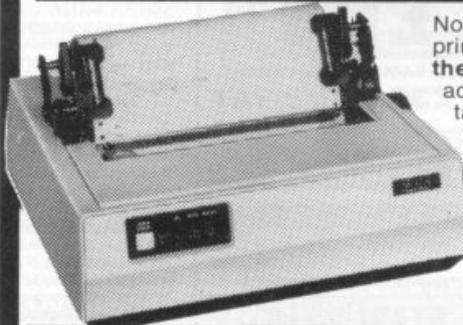
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		English Literature 2	£6.95
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EPSON



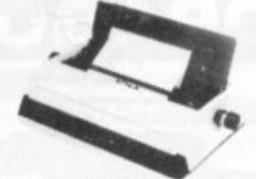
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SPECTRUM

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ATARI 800

Now this proven and tested machine has been upgraded to a massive 48K RAM and its still at the amazing **LOW price of £399.99** from SPECTRUM. It's an ideal Home Micro for graphics, educational and personal finance etc. use it and it will take you from learning up to a small business use. You can add printers, program recorders, disk drives and more, to expand your micro as and when you want, to suit your needs. So if you're looking for a top of the line micro you must see the **ATARI 800 with 48K at SPECTRUM - NOW!**



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ATARI 400 16K RAM



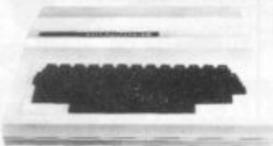
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£39.99 inc. VAT (Basic cartridge extra) (£34.77 ex. VAT)
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Maximum user RAM 13,323 Bytes (with basic Cartridge)
Text Screen 24 x 40
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Cassette Lead Needs own Recorder

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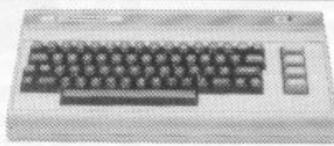
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NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS N GAMES NEWS

DISCOVER THE HIDDEN KEY TO TREASURE

PHAROAH'S TOMB

Travel back in time to ancient Egypt and explore Pharaoh's Tomb. This is the opportunity afforded to Vic owners in the latest game from Anirog Computers.

In order to get into the inner chamber of the tomb you will need to find the four hidden parts of the key. To assist you in your travels you will also have to collect other items such as an axe, a spade, and apple, and a lamp.

Pharaoh's Tomb runs on the 16k machine and is available from Surrey based Anirog at £6.00.

Two other new games from Anirog this month for the Vic 20 are a version of the arcade game Donkey Kong called Krazy Kong, and a space shoot out — Xenoll — both requiring a 16k expansion and both will sell at the slightly dearer price of £7.90.

HUNT THE WIZARD'S TREASURE

KNIGHT'S QUEST

The Knight's Quest is to find Merlin's treasure and take it safely back to the castle.

This part text and part graphic adventure divides the screen in two with a screen for pictures in the top half and scrolling text in the bottom.

In order to find Merlin's gold ingots, jewels, Magic Ring and Seeing Mask you will have to explore 120 rooms.

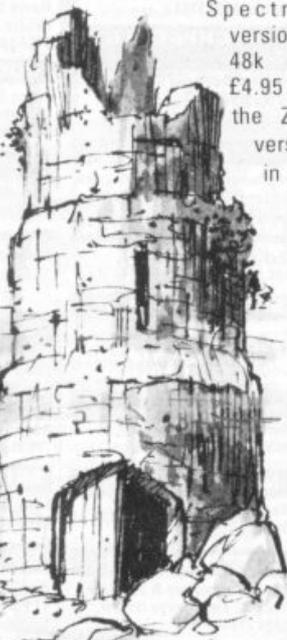


On your journey you will have to battle elves, scorpions and dragons, rescue a beautiful princess from the Wizard of Trill, visit the Witches' Tower and the Valley of the Seven Rocks, and journey underground into secret chambers, which can fill with water and drown you.

The game also features a reincarnation routine which can be useful if you get on the wrong end of an elves spear or a Wizard's spell.

Also useful is a Save fund which enables you to stop the game at a certain point and take up where you left off a few hours or days later.

The Knight's Quest is available from Surrey-based Phipp's Associates at £5.95 for the Spectrum version in 48k and £4.95 for the ZX81 version in 16k.



THE DEMONS INVADE ENGLAND

DEMON ATTACK

America's top selling video game of 1982 is now available in home computer format in the UK.

Imagic's Demon Attack, the shoot 'em up game with no less than 84 waves of exquisitely drawn aliens has been converted for use on the Atari 400/800 and the Vic-20.

The game has been so popular in the US that its designer, Rob Fulop, recently received the award of designer of the year.

The game is imported into the UK by Hales of Yorkshire and costs £29.08. The Atari version is available now and the Vic 20 version will be in the shops in June.

Another well known Imagic video game — Atlantis, an undersea battle — is also in the process of conversion for the Vic and the Atari home computers.

The next large video games manufacturer to follow in Imagic's footsteps is likely to be Parker Brothers of Empire Strikes Back and Frogger fame who have lined up some of their games for a July launch on home computers.

MY, WHAT A NICE GAME YOU'VE GOT

WOLF TRACKS

A villainous wolf haunts the wood in a new computer game idea based around the fairy tale, Little Red Riding Hood.

The game is unique to the Colour Genie computer and welds the elements of the children's story into a tactical game which Genie manufacturers, Lowe Computers, hope will have several spin-offs.

The first version, Wolf Tracks, features Little Red Riding Hood picking primroses in the wood and gradually filling her basket, unaware of the lurking wolf. She must avoid spilling primroses and bumping into trees and the poor girl is occasionally dive-

bombed by aggressive birds.

When a basket is filled it should be taken to granny's house and the primroses used to fill vases on the windowsills of the cottage.

The real danger in the wood is the wolf. He leaves his tracks in a trail of red primroses which our heroine crosses at her peril as the wolf will attack her if she does.

The games also features a woodcutter, who can be called upon to bring his hatchet and try to destroy the wolf. But as time marches on in the wood the march of the red primroses continues leaving even more of the screen unpassable.

The Genie's analogue to digital joystick, which increases the player's speed, the further it is pushed in any direction, plays an important part in Wolf Tracks.

It will retail at around £5-6 although a final price had not been decided on as we went to press. The game is available through the Colour Genie Users Club at 46 Highbury Avenue, Bullwell, Nottinghamshire or through Lowe themselves in Matlock.

Other versions of the game are currently being planned.

HORRORS FROM THE HEAVENS!

TERROR-DAKTIL

As the sun sets your blood runs cold as an unspeakable horror pours out of the heavens. Swooping monsters after your flesh. Bird-like and scaly. Creatures not of this world.

Armed only with a battered pistol you will need all your skill as marksman as night falls. Darkness follows shortly but still the monsters come. Their eyes shining out brightly like distant twinkling stars.

Terror-Daktil 4D is the latest 48k game from Melbourne House software — the people who brought you the Hobbit and Penetrator.

The games fourth dimension mentioned in the title refers to the fourth dimension of time which is incorporated in the game in the shape of the setting sun. The game is available from W. H. Smith at £6.95.



NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS

GAMES NEWS

GET ALL TIED UP IN KNOTS

KNOT 3D

The Games News team was managed to sneak a preview of the latest game from New Generation Software — the one man software house of 3D Tunnel fame.

Called Knot 3D the game offers a totally original scenario. An X is positioned at the centre of the screen and appears to move into the screen as walls and shapes loom in front of you.

In the words of the game's designer, Malcolm Evans, the idea of the game, "is to avoid collisions with your own green/yellow trail, and those of up to four chasers, as you rush through an empty three dimensional space.

As more trails are laid it becomes increasingly difficult to thread your way through the knots created".

The game will be available at W. H. Smith at the end of June.

It will run on the Sinclair Spectrum in 16 or 48k and will sell for £5.95.

CALLING ALL VORCON WARRIORS!

VORCON WARS

Here's a game which reflects your personality in the way you play it.

The planet Vorcon is open for plunder. Ruthless people will risk all in an attempted attack on Vorcon. More cautious players will cultivate land to feed their people or spend their resources on drilling for oil.

Vorcon Wars is a brand new play by mail game. The ultimate aim it to become a nuclear power. Towards this end you will have to plan projects such as the construction and launch of a satellite for surveillance and to aid in the transportation of men.

Vorcon Wars is the invention of John Nicholson of Bracknell, Berkshire. Each turn costs £1 plus a further £1.50 for the first three maps and the book of rules.

The C&VG Games News team have entered Vorcon Wars and will be keeping you up to date on happenings on the planet.

Each player receives from the organiser two computer printouts. The first of these show the immediate territory around your home base. The various land uses are represented by hexagons, i.e. industrial, agricultural, weaponry.

The second printout gives you a detailed printout of how your resources were used in the previous go with your current status in all areas.

TREASURE HUNT FOR A CHAMPION

ROMIK CHALLENGE

Big cash prizes are being offered by Romik software to players who achieve good high scores while playing some of their new games.

The offer is part of the firm's search for a world champion Romik games player.

Each new cassette contains a yellow entry form for the Grand Master competition. As well as the cash star prize the winner will receive one copy of each new Romik game for one year.

New games this month from the Slough-based firm are Time Destroyers — a scrolling shoot up with a variety of aliens to be blasted. Destroyers is Romik's second space game for the expanded Vic and required 3, 8, or 16k Ram expansion.

Unexpanded Vic owners have also been included in this month's new release — Space Fortress is based on the popular arcade game — Phoenix. Powerblaster is a maze chase game with a shoot 'em up space theme.

Romik have also branched out into two other computers with the launch of their first game for the ZX81 and the BBC machine.

Super Nine is a selection of nine games on one cassette for the 1k ZX81. BBC owners are given Birds of Prey — a shoot up with bird-like aliens.

Romik's Vic games are available from Lasky's and other computer shops at £9.99. Prices have yet to be confirmed on the BBC and ZX81 games.

THE CHICKENS COME HOME TO ROOST!

CHICKEN

What goes cluck, cluck splat? A chicken trying to get across a busy motorway of course!

If you want the chicken to survive then you'll need considerable skill and the latest cassette from the new Vic-20 software house Micro Antics.

Chicken Challenge is based on the arcade game Frogger. You must get five chickens safely across the road in as short a time as possible.

Just one thing you should know. This is no ordinary motorway. Along with the lorries and cars you will also see Diving Ducks, and chicken pies on the conveyor belts, and a thieving fox.

Also new from Micro Antics this month is a childrens game. The game is Called Brain Panic and, like Chicken Challenge, is for the unexpanded Vic. In it you have to match up trains, animals and other objects. Brain Panic is based on a childrens card game.

Both games are available now from Micro Antics of Staffordshire at £5.90.

TALK ME THROUGH THIS ONE!

PARSEC

"Good shot pilot" croons the female voice of your ships battle computer as you hurtle through space, guarding your eyes from the blinding flashes of light as your laser fire blasts the aliens.

Two light years further and she speaks again, "Time to refuel". This is a tricky exercise as you must fly your craft through a narrow tunnel. But take heart. Your electronic companion is quick to congratulate you if you successfully complete the exercise.

Parsec is one of two new games from Texas Instruments for the TI 99/4a incorporating their add-on speech synthesiser.

You are at the controls of a space ship scrolling from left to

right against a background of stars. But don't let your one directional movement lead you into the mistaken belief that the aliens will conveniently attack from one direction as well. They won't. They will come at you from behind as well as from the front.

There are sixteen different types of aliens to be destroyed — all capable of unique attack strategies.

The second new talking game is called Alpinar and features a far wider vocabulary than Parsec.

You play the part of the intrepid mountaineer, bravely clambering over the slippery slopes, falling boulders, battling snakes, avoiding fires, and even an eagle which attempts to bomb you with a giant golden egg.

Your commentator is always ready with a cutting remark when you make a false move. "Did you mean to do that?" she sarcastically enquired when I tumbled to the ground after being hit by a falling boulder.

It is difficult to resist making mistakes on purpose in Alpinar just to see what will be said next!

Alpinar and Parsec are available from your Texas dealer now at £31.95. The speech synthesiser is available at £49.95.



Illustrations: Jon Davis



NEW PRODUCTS NEW PRODUCTS NEW PRODUCT

GAMES NEWS

BACK TO THE BATTLE OF BRITAIN

SKYHAWK

The scene is a sleepy village set among the hills in the heart of the English countryside. The date is 1943 — the height of World War II and the Battle of Britain.

Suddenly, the tranquility of a hot summer day is broken by the roar of German aircraft engines flying in low to dodge coastal radar.

The lives of many people depend on you — a lone fighter pilot facing a squadron of enemy aircraft. This latest game from Quicksilver, called Skyhawk, for the Vic-20 puts you in the hot-seat — defending your homeland from a deadly attack. Keep a careful eye on your fuel supply. You may have to land to refuel during the battle.

Skyhawk runs on the Vic with 3k or 8k expansion and is the second game from Quicksilver for the Vic. It is available now from the Southampton-based firm at £7.95.

Spectrum owners have not been left out of this month's new releases with two new arcade style games.

Astroblaster is a multi-wave shoot 'em up with an assortment of tough aliens. Frenzy is a robot attack game in which you must fight it out with deadly droids. Both games run on 16k or 48k machines and are available from HQ at £4.95 each.

STOCKS AND SHARES ON THE MARKET

STOCK EXCHANGE

New software house A.S.L. are understandably bullish about their new game for the Oric.

The game is called Stock Exchange and enables you to dabble with stocks and shares for the afternoon without causing your bank manager to burst a blood vessel.

The game displays the continuously updated performances of nine companies. You must buy



and sell shares to make money. Borrowing is allowed but not always advisable.

On the B side of Stock Exchange is a bonus program called Etch-a-Sketch which features a movable cursor, shading in any colour which you can select from the list on offer.

Stock Market and Etch-a-Sketch are available from the Wrexham based firm at £4.

THEATRE OF DEATH AND DESTRUCTION

SHEVA

Budding Masterminds reading this will not need to be told that Sheva is the Hindu god of destruction.

The less well informed amongst you may also be interested to learn that Sheva is the name of the latest game from Red Shift Software which simulates the conflict involved in Europe during World War III.

The game features a scrolling map of Europe. The cities which you have chosen at the beginning of the game may be annihilated by nuclear warheads if you are not careful.

Sheva is the follow up to Red Shift's Timelords — a complex computer-cum-boardgame for the BBC model B, at £7.95.

Sheva runs on the 48k Spectrum and is available from the London based Red Shift at around the £7 mark.

TUNE IN TO THOSE NEW MICRO WAVES RADIO PROGRAMS

Home computer owners in the West Country can now tune into a free bank of software on their local commercial radio station — Radio West.

C&VG spoke to Zorte, real name Edwin Tozer, Radio West's computer program presenter. "The program goes out on Monday evenings between 7.30 and 8.00 pm. We cover computer news, run competitions, and broadcast short computer programs — usually no more than about fifteen seconds in length."

Subjects covered so far have been multiplication, morse code, and a graphics package for the ZX81 which was programmed to draw a picture of a face.

No games have been broadcast as yet but Zorte is working on a Breakout type game for the BBC machine, and soon Radio West will be ready to broadcast their first game.

As well as the short programs broadcast during the programme Radio West also broadcast longer programs after the station has finished normal transmission.

These longer programs have been mainly educational, with some business applications. Machines for which software has so far been broadcast are the Dragon, ZX81, BBC, Epsom, Newbrain, Atari and the Oric.

JACK JUMPS JUST LIKE A FROGGER!

JUMPIN' JACK

Jumpin' Jack Flash he's a gas, gas, gas. Well — more precisely, he's a brand new Frogger type game for the unexpanded Vic-20.

Hopping from log to log, and then on to turtles, you must jump your little green friend across a fast flowing river.

Jumpin' Jack is just one of a wide range of games which have just been released for the Vic-20 from Sumlock.

In this month's batch is a Galaxians-type game called Triad and a version of Scramble. All three games run on the unexpanded machine and are available at £7.95.

Also new from Sumlock this month for Vic owners is an adventure game requiring a 16k expansion.

Starship Escape challenges you to find the various bits of your spacecraft which have been hidden by aliens in their giant spaceship. Starship is available at £9.95.

THE BIRDS FLY HIGH WITH VIC

FIREBIRDS

Cosmic Firebirds — the arcade game with the spiralling aliens — has at last been converted for the Vic-20.

Firebirds is the latest offering from the new software house — Solar Software.

Other games in the range so far include tried and tested favourites — Galaxians, Scramble, Super Breakout, Gunfight, Asteroids and Munchman.

The games are available from Currys Micro C and direct from Solar Software at £5.95 for Gunfight, Asteroids, and Munchman, and £6.95 for Galaxians, Scramble and Super Breakout.

All of the games run on the unexpanded Vic except Cosmic Firebirds which runs on the Vic with an 8 or 16k expansion.

A feast for everyone interested in computers.

We're preparing a mouth-watering spread for our 4th International Computer Show at the Cunard Hotel, Hammersmith.

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(CVG 0683) Computer & Video Games June 1983

NEW PRODUCTS NEW PRODUCTS NEW PRODUCT GAMES NEWS

THE DRAGON SPREADS ITS WINGS!

FLIGHT SIMULATION

Up, up and away go Dragon owners with a flight simulation written by a professional pilot.

The game challenges you to safely take off and land a small plane. You have all normal flight controls including an instrument landing system and vertical speed indicator.

Flight Simulator runs on a Dragon in 16k and is available from Salamander Software of Brighton at £9.95.

DAMSELS IN DISTRESS NEED HELP!

WIZARD

Wizard takes you back to a fantasy land of spells, demons and beautiful maidens with flowing golden locks.

But if you think this is a fairy tale adventure game you would be wrong. Wizard is an arcade style game with a few original twists of its own.

The demons are attacking your planet — swooping down and abducting the maidens who are helpless against their superior strength.

Your job is to save them before they are brought back to the evil king who will put them to death in a ceremonial sacrifice.

Several waves of demons must be dealt with — together with cunning little bugs who come at you intent on destruction.

Wizard runs on the BBC model B in 32k and is the latest game from Quicksilva at £6.95.

Also new for BBC model B owners is a monster attack game called Protector. The monsters are attacking scientific installations in an isolated part of your planet. The game gets faster and faster as you drive your craft from base to base, blasting the invaders. Watch out also for the occasional monster which grows larger as the game progresses.

The third Beeb offering from Quicksilva this month is a boxed Music Processor which enables you to exploit the musical capabilities of the BBC A or B.

The Music Processor costs £14.95, you get a 30-page instruction manual included in the price.

Quicksilva's original customers — Britain's one million plus ZX81 owners have not been left out of this months new releases.

Four new games are on offer for the 16k machine. Ocean Trader is a seafaring simulation enabling you to play captain of the ship, Pioneer Trail takes you back to the wild west, and Black Star is 3D shoot 'em up. For arcade addicts there are also versions of Amidar, and Pacman.

WORDS OF WISDOM, AND GAMES!

TEXAS BOOK

Texas owners can look forward to 35 new games to enter into their software starved computer when a new book goes on sale later this month.

The Texas Program Book contains 35 listings which you can enter into your machine. The subjects covered include games, home accounts, and a filing system.

Games highlights are 3D-Maze, horse racing, tennis, and a novel game in which you help a penguin to save its eggs.

The book will be available from Phoenix Publishing Associates at £5.95.

THE GAMES CAPITAL OF THE U.K.?

LYVERSOFT

Liverpool is fast becoming the Silicon Valley of the UK for computer games anyway.

The city that gave you Bug Byte and Imagine can now boast a third specialist games software house called Lyversoft.

They have just launched

a range of games for the Vic-20. Apple Bug challenges you to gobble up the life saving apples before the bug catches you. Crazy Climber sets you the equally difficult task of climbing scaffolding and catch balloons floating past to score bonus points.

Space Assault is a Scramble-type game with a difference. Instead of bombing fuel-dumps to refuel as in the arcade game you must dock with the fuel-tankers.

Lunar Rescue puts you at the controls of a ship attempting to land on a planet bombarded by a meteor storm. Your task is to pick up the three marooned scientists and make your escape.

The games run on the 3 or 8k Vic-20 and are available from the Liverpool based firm at £5.95.

FIGHT THE FLAB, NOT MORE ALIENS!

DIETRON

Calling all overweight Spectrum owners. If you are becoming flabby and hollow-eyed due to many hours crouched over the keyboard then here is a computerised answer to the problem.

Dietron is a new program designed to enable you to plan your diet.

No, you don't stand on your Spectrum to make it speak your weight. Instead the program asks you a number of questions which "will establish a complete range of values and requirements that are personal to you".

Once your values have been calculated you can jot them down and proceed with your diet, or if you have a printer, make a print-out.

Key 1 to 4 on the Dietron show you the complete range of foods for which information is held. For example key 1 will display information 37 varieties of vegetables.

The values can be reset at any time for a second person to receive information. There is also a second program on the tape which is a data bank of nutritional information. Less chips for Spectrum owners from now on!

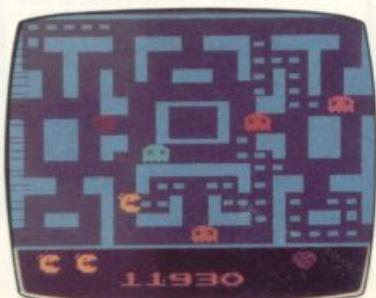
Dietron runs on a Spectrum in 48k and is available from W. H. Smith at £5.95.

Illustration: Jon Davis



If you think Pac-Man* is a tough act to follow, meet Ms. Pac-Man.*

Make no mistake, this little lady is a screen sensation. More dynamic, more talented than even Pac-Man himself (and he's the world's biggest selling video game ever). Ms. Pac-Man has just what it takes to be a video star. Graphics that are close to arcade quality. Four mazes to amaze you. She even hands out bonus points for audience participation. So visit your Atari® stockist and meet Ms. Pac-Man in person. She can't wait for you to give her a screen test.





THE EVOLUTION OF COMPUTER & VIDEO GAMES (PART 1)

BACK ISSUES



Most computer historians agree that the first known remains of Computer & Video Games date from November 1981. It was then that this magazine first emerged (a little unsteadily) into the primeval twilight of the early days of Sinclair Man.

Then huge computer dinosaurs roamed the Earth, thrusting keen young programmers into their wall-to-wall maws and the magazine looked a little out-of-place surviving on a diet of strange new features and listing material washed up from across the Atlantic.

Naturalists are only now beginning to draw conclusions about the close association between the Computer & Video Games story and a little yellow gobbling creature's own evolutionary niche ...

Let us take a closer look at some of the noteworthy steps in the evolution of both:-

November 1981

The strippling emerges into twilight with Tarot on the Tandy, Musical Hangman on the Sharp MZ-80K, Trench on the Atari, Nibblers on the Pet and Super Nim on the Apple. Keith Campbell kicked off his popular Adventure series, Garry Marshall kicked off graphics with a space invader. There were Pacman arcade tips and Max Bramer looked at the first chess machine, Von Kempelen's Turk.

December 1981

Growing up fast with Potshot on the Vic-20, Breakout on the Atom, 'Round the Horn' on the Tandy, Mini Golf on the Atari and Pet owners could tackle Rubik's Cube with more confidence. Keith Mott went trouble-shooting on the ZX81 in Kit Korner and Screaming Foul-up fell in love with Terry Wogan.

January 1982

A new year begins with Ted Ball on the trail of the Bugs in his Practical Programming column. Speed Race for the Texas, Treasure Hunt was a popular Apple adventure — much converted by owners of other machines, three 1K wonders for the ZX81 and Changing Hearts for Atari owners. We also saw a seamier side to gaming with a feature on Softporn Adventure!

February 1982

Science Fiction author David Langford brought a new look to space games with Space Blockade. Dr Livingstone set up a quest for Sharp owners and Grand Prix gave Tandy owners a racetrack to try out. David Annal POKEd some sounds out of the quieter

micros and Arcade Action announced two Pacman lookalikes.

March 1982

Robin Bradbeer reported from Las Vegas on a country going video crazy — how right he was. ZX81 owners got to grips with Reversi (Othello), there was Startrek III.4 for the Tandy and Octodraw had the Atari moving in eight directions at once.

April 1982

Spring came with Tim Metcalfe's feature on pinball, a revitalised sector of the arcades fighting back against Space Invaders. Engineer helped Atari owners rebuild the Golden Gate Bridge, Poker for the ZX81 and Ron Potkin's classic Tandy wargame Kriegspiel. Plus Pacman hit the home Video Screens at last.

May 1982

Computer Moderated Games were investigated by Terry Pratt (the first thoughts on Seventh Empire were voiced about here). Minotaur took the Vic-20 down into a maze and tried to lose it, Pacman arrived in a C&VG listing on a Pet, Minopoly for up to five Sharp businessmen, Meteorstorm took Apple owners by surprise and Earthport II won Tandy fans.

June 1982

The World Cup was upon us and we responded with World Cup Manager — written for the Sharp but without a PEEK or POKE and since converted to many a micro. Vic-20 owners were set afloat on a river torrent in Speedboat, there was Trolls Gold on the Apple and Dog Star Adventure on the Tandy.

It also included issue 1 of our BBC Micro publication, Owl.

July 1982

Do the arcades have anything to offer the fairer sex? America was wooing women with Ms Pacman and we featured this first lady of the arcades in July. Imhotep took the Apple owners back to ancient Egypt, Moon Shuttle sent the Vic into space and Z-Xtra gave 16 pages over to Sinclair fans.

August 1982

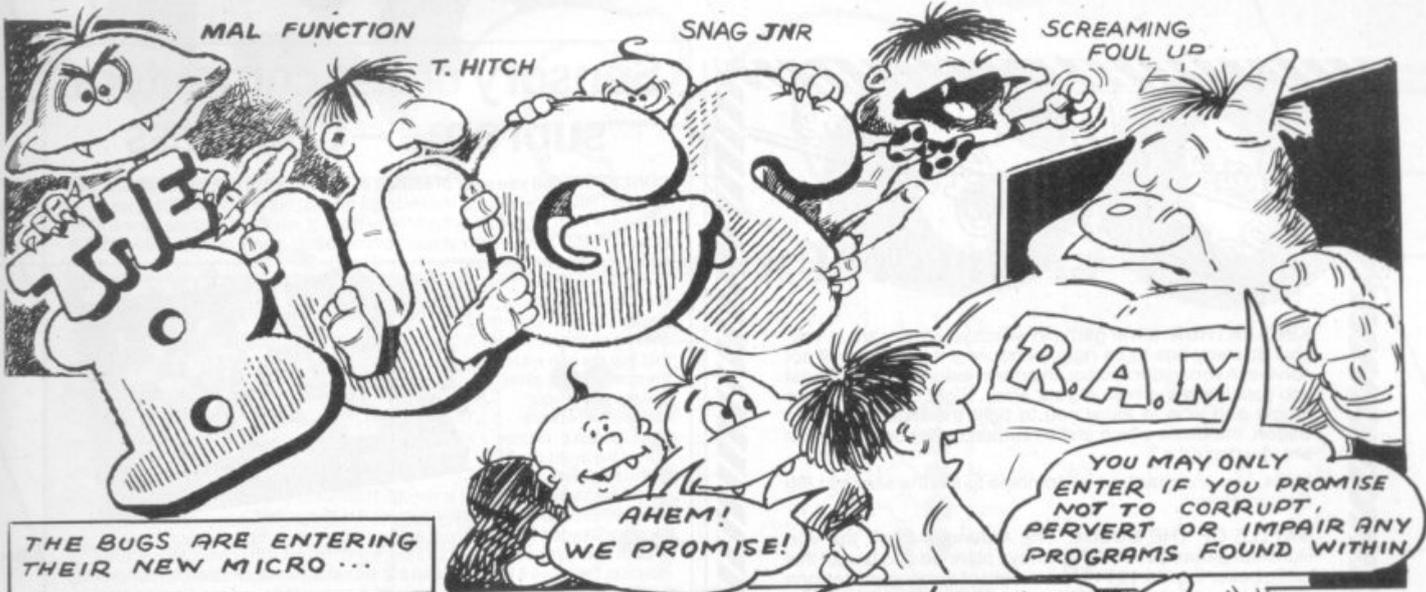
Haunted House gave Atoms a shudder, Space Hopper made Tandy's jump to it and Rocks made Vic owners roll over and beg for more. Imagic launched a range of cartridges for the Atari VCS. Hardcore was given over to a game-player's guide to the Atari and Sue Garden gave us all a giggle with a computer widow's tale.

September 1982

Tron: out of the arcades came Walt Disney's graphically stirring film about being trapped in a computer game. We featured it first. Pacman appeared on the Vic-20, there was Star Wars on the Atom and Colditz Adventure on the Tandy. Issue two of Owl gave BBC owners Speed Trial and X marks the Spot.

October 1982

C&VG saw out its first 12 issues with Space Watch on the Spectrum, asking you to befriend the aliens before it's too late! Sharp Defender, Galaxian Colony II on the Apple and the controversial Wild Strawberries on the Atari added to the action. And Pacman appeared in the Bugs cartoon!



MAL FUNCTION

SNAG JNR

SCREAMING FOUL UP

T. HITCH

THE BUGS ARE ENTERING THEIR NEW MICRO ...

AHEM!
WE PROMISE!

YOU MAY ONLY ENTER IF YOU PROMISE NOT TO CORRUPT, PERVERT OR IMPAIR ANY PROGRAMS FOUND WITHIN



BEING A USER FRIENDLY BUG IS HARD WORK. LOOK, THE POOR DEVIL IS TRYING TO WORK OUT IF HE CAN GO ON HOLIDAY THIS YEAR!



- 1 BOGNOR... 5 DAYS.
- 2 COMPUTER CLUB TRIP... SINCLAIR'S WEEKEND.
- 3 AUNT MAISIE 3 WEEKS
- 4 HANG GLIDING IN NEASDEN 2 DAYS.

OH NO! HIS AUNT MAISIE'S ON THE LIST AGAIN!

YES! IT WAS AN AWFUL PROGRAM, BUT WE KNOCKED IT INTO SHAPE FOR HIM. IT WORKS OUT TRAVEL COSTS, SUBSISTENCE, TOUR COSTS, TAKES INTO ACCOUNT HIS SALARY AND OF COURSE THE FUN FACTOR!



AUNT MAISIE'S IS AWFUL. HER VOICE, HER POLISHING AND DUSTING NEARLY ASPHYXIATED US!

SHE CAN'T BE THAT BAD. I'LL GET GRAPHIC MODE TO DRAW HER UP!

YUK! THAT'S HER. I REMEMBER SHE SPILT PORRIDGE ON US!

SOB! PLEASE ALTER THE PROGRAM. WE CAN'T GO BACK THERE!

YOU'VE GOT TO DO SOMETHING. THE PROGRAM IS BOUND TO COME UP WITH AUNT MAISIE'S... SHE'S SO CHEAP!

B.B. BUT- THAT WOULD BE TAMPERING!

A FEW MOMENTS LATER...

HANG GLIDING IN NEASDEN... GREAT! I NEVER THOUGHT I COULD AFFORD IT!

HEE! HEE!



I CAN'T IT'S DEAD AGAINST THE USER FRIENDLY CHARTER FOR BUGS! RULE 7. SECTION B.



CHEERS!

Chameleon Computer Games

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Maps, text and graphics all combine to set the scene in 6th Century Britain.

BATTLE OF THE BULGE: The Ardennes 1944, the Von Runstedt offensive. Could you have planned and fought this battle better than in 1944? Movement of armoured divisions and infantry can be a hazardous task in war conditions.

An option within the program allows the use of a ZX printer to produce hard copy maps of troop positions.

SEAWOLF: An unusual hunt and evade war game. The interior of the submarine contains all the dials and information you need to locate and sink enemy shipping. But you are prone to attack if you spend too much time close to the surface. Then you must dive to evade the chasing destroyers using your instruments and cunning to stay alive.

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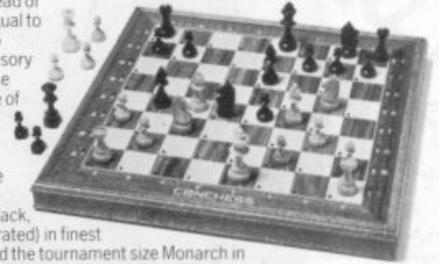
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C&V/G/6

BY ALLAN SCARFF

Go is far more popular in Japan than any comparable game is in the West. Apart from appearing on peak time television, Go is the subject of regular newspaper columns and the national press spend quite large sums of money on sponsoring professional Go tournaments.

In Japan, Tsume-Go takes the place of the daily newspaper crossword puzzle. This type of life and death Go problem can be extremely tricky to solve even though there may be very few moves to consider.

The example shown in figure 1 is about as simple as they come. Black's first move is almost certainly at A3, B3, A4 or B4, but which?

The object is to stop white forming two eyes. If, for instance, white manages to play both at A3 and B3, white's stones can never be reduced to a single liberty and therefore can never be captured.

Figure 2 shows black's most obvious approach which of course fails!

If you wish to get the full flavour of Tsume-Go try to solve the problem without looking at figures 4 and 5. Even though there are only a few possibilities you may soon find that it becomes increasingly difficult to remember which sequences of moves you have already considered and thus what possibilities are left.

This is one element of Go in which the computer can shine. Since the position is entirely isolated, there are no complex interactions to complicate matters. The simple technique of tree-searching will suffice.

Figure 3 shows a small part of the tree of possible sequences. After each move the white stones must be examined for one of three states:

- Dead — there are no longer two or more potential eyes

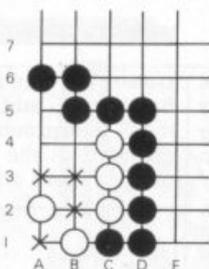


Figure 1: Black to play and kill white (crosses mark potential eyes)

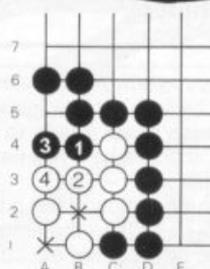


Figure 2: The obvious failure (two eyes are alive)

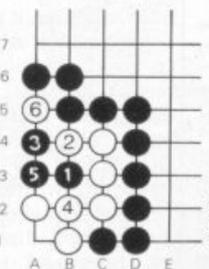


Figure 4: A less obvious failure. (The second eye is achieved after capture of three black stones).

⑦ at ③
⑧ at ⑤

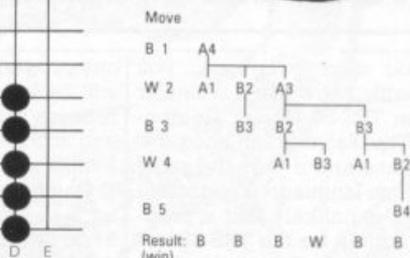


Figure 3: A small portion of the tree.

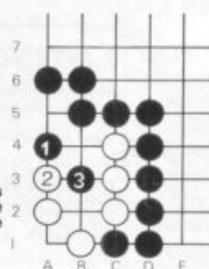


Figure 5: Success! (If white next plays at B4 black captures at B2).

- Alive — there are two or more completely formed eyes

- Maybe either — there are still potentially two eyes not yet fully formed.

In the last case the next move in the sequence must be tried. In the other two cases alternative moves must be examined.

The listing shown gives the main logic needed to search the tree.

We need only consider the intersections within the enclosing black stones. The x and y co-ordinates of these points must be placed in the tryx and tryy arrays prior to calling the tsume procedure. The routine finishes with the result, the first black move, available via the number 1 element of the branch array.

For a problem of this size the procedure will examine about 200 sequences averaging under 5 moves each. Since the status of the white stones must be examined after each move, the whole process will take many seconds if not minutes.

Larger, more typical problems can take much longer. It may be possible to speed the search up by eliminating some of the sillier moves, but too heavy pruning of the tree can mean rejecting a move that may look silly but is actually the only move that works!

Now if you've attempted the example (without the aid of a computer), you may appreciate the worth of a thorough Tsume-Go program even if you have to leave it running all night!

```

1000 REM BBC BASIC
1010 REM TSUME PROCEDURE
1020 REM tryx and try y must already hold coordinates
1030 REM branch array must already be defined
1040 REM Decision Table:
1050 REM          ; WHITE MOVE      ; BLACK MOVE
1060 REM-----;-----;-----
1070 REM          ; next selection ; up 1 branch
1080 REM dead    ; up 1 branch   ; not applicable
1090 REM alive   ; down 1 branch ; down 1 branch
1100 REM maybe   ; up 2 branches ; up 2 branches
1110 REM branch exhausted ; up 2 branches ; up 2 branches
1120 REM-----;-----;-----
1130 REM
1140 DEF PROCtsumelimit)
1150 move=1 : branch(1)=1 : REM initialise
1160 IF move > 0 select=branch(move) : PROCredomoves(move)

```

```

1170 IF move < 1 ENDPROC
1180 REPEAT
1190   legal=FUNCplaymove(tryx(select),tryy(select))
1200   select=select+1
1210 UNTIL legal OR select=limit
1220 IF NOT legal move=move-2 : GOTO 1160 : REM up 2 branches
1230 REM legal:-
1240   PROCtestlife
1250   IF maybe move=move+1 : select=1 : GOTO 1180 : REM down
1260   IF (dead) AND (moveMOD2=0) GOTO 1180 : REM across
1270 REM all other legal cases:-
1280   move=move-1 : GOTO 1160 : REM up 1 branch
1290 REM
1300 REM This routine is written for simplicity! For space saving
1310 REM use byte arrays accessed via indirection operators. For
1320 REM elegance use block structure (no GOTO's) with recursion
1340 REM (the routine calling itself).

```

There is still only a limited library of games software for the Dragon owner. And many have looked longingly at the wealth of Tandy Colour Computer software and wished the two machines were closer than the hair's breath which separates them.

Now they are. RON POTKIN has taken time off from his Warpath series to show Dragon owners how they can make use of Colour Computer software on their brand new machines.

If you own a Dragon, you probably know that it is similar to the TRS-80 Colour Computer. The Basic commands are the same and it uses the same machine language. Yet despite this, it is unlikely that a program written for the TRS-80 will run satisfactorily on the Dragon. In this article, I intend to give some help in converting the programs so that they will run.

Unfortunately the PLAY command still defies translation, but I never use it anyway.

Unfortunately, little can be done to ROM packs. The design is such that they cannot be easily be altered to run on the Dragon. We can however, adjust Basic programs. Machine language programs (those which are run using the EXEC command) can also be altered but this can be very difficult. More about this later.

First, let us examine the Basic Interpreter Program. You will know that when you switch on the computer, it wakes up and prints "OK" on the screen. In that fraction of a second an initialisation program, a part of the Basic Interpreter, has been automatically run in order that the computer may be ready to accept and carry out your commands.

This is similar to a calculator which is able to add, subtract, multiply and so on immediately you turn it on.

It is a complex program. There are routines to print on the screen, read the keys you press at the keyboard, draw a line, read the tape and many more. Many programmers when writing in machine lan-

TIME AND SPACE

guage will use these routines in their programs.

It saves time and space and avoids re-inventing the wheel, but it is one of the main reasons for our conversion problem. You must know where these routines lie in memory and the addresses may be different in the two machines.

The Basic Interpreter cannot be erased or changed. When you switch the computer off,

any program you have entered will be lost but the Interpreter remains intact, ready to spring into action when you next turn it on.

One function of the Interpreter is to reduce the length of a Basic line. Let me explain what this means. Assume I type in the following line:
10PMODE 4,1 : PCLS : SCREEN 1,0

LISTING GARBAGE

Ignoring the line number and spaces, this has 23 characters but to save space the commands PMODE, PCLS and SCREEN are converted to numbers (or tokens) so that instead of 23 characters only 11 are required to hold the line in memory.

These tokens are not the same in both machines. As a result, if you load a TRS-80 program in this compressed format into the Dragon, the instructions will be mis-read. When you list the program, you may believe that you are listing "garbage", but closer inspection will show that although the Basic commands are different the line numbers and variable are intact.

It is usual to save the program on tape in compressed format because it reduces loading time, but you do have the option of saving in ASCII format. The command is:
CSAVE "PROGRAM",A

Saved this way, the words PMODE, PCLS and SCREEN will be saved instead of the tokens. If you save a program on tape in the ASCII format using the TRS-80, you will be able to load it correctly into the Dragon. The Dragon will read the commands and translate them into its own tokens. Try this method if you have access to a TRS-80.

Although we can change the tokens, there is one instruction which may cause difficulties. This is the USR function which is used to access a machine language program from Basic. It is mentioned only very briefly in the Dragon manual.

If Basic passes a number to the program or the program

DRAGON FROM THE

passes a number back to Basic, two addresses within the Interpreter must be changed in the machine language. These addresses are:

	TRS-80		Dragon	
	Decimal	Hex	Decimal	Hex
Get argument from Basic	46061	B3ED	35632	8B30
Return result to Basic	46324	B4F4	35895	8C37

In addition, it may be necessary to check whether routines in the Interpreter have been used. This starts to get complicated and there are no easy rules. You will soon discover that trying to understand a program written in machine code is a challenge. If you are keen, get a disassembler and be prepared for some late nights!

The TRS-80's EDTASM has a good disassembler but you cannot use the tape commands. If you find this difficult

to follow, don't worry; your understanding will improve as you become more accustomed to your Dragon. Just remember that if you do not think you can

convert a TRS-80 program, don't waste your money! Now let's see how the program can help. It's purpose is to create a machine language program which will convert the TRS-80 Basic tokens to the equivalent for the Dragon. It will leave unchanged anything contained within strings, so that any machine language routines or graphics will be safe. The program syntax is not checked.

All lines within the TRS-80 program containing USR will

LOADER FOR DRAGON CONVERTER

```

10 CLEAR100,29999
30 DATA 80,81,82,83,84,85,86,87
,88,89,8A,8B,8C,8D,8E,8F,90
40 DATA 91,92,93,94,95,96,97,99
,9A,9B,9C,9D,9E,9F,A0,A1
50 DATA A2,A3,A4,A5,8B,8C,8D,8F
,C0,C1,C2,C3,C4,C5,C6,C7
60 DATA C8,C9,CA,CB,CC,AD,A7,A8
,A9,9B,8E,AA,AB,AC,AD,AE
70 DATA AF,B0,B1,B2,B3,B4,B5,B6
,B7,B8,B9,BA,BE,CD,80,81
80 DATA 82,A1,84,8B,8C,8D,8E,8F
,90,91,92,93,96,97,98,99
90 DATA 9A,9B,8B,89,8A,87,94,86
,83,85,95,9C,9D,9E,9F,A0
100 DATA 00,01,A4,8E,00,19,7F,7D
,70,10,AE,81,34,20,10,AE
110 DATA 81,10,BF,7D,71,A6,84,81
,22,26,0A,C6,01,F0,7D,70
120 DATA F7,7D,70,20,44,81,00,27
,44,F6,7D,70,C1,00,26,39
130 DATA 81,FF,26,27,30,01,E6,84
,C1,80,25,2D,C0,80,10,8E
140 DATA 7D,4E,E6,A5,E7,84,C1,A1
,26,1F,86,7D,ED,AD,9F,A0
150 DATA 02,8D,35,86,20,AD,9F,A0
,02,20,0E,81,80,25,0A,80
160 DATA 80,10,8E,7D,00,A6,A6,A7
,84,30,01,20,A8,30,01,A6
170 DATA 84,81,00,27,05,35,10,16
,FF,8C,35,10,39,55,27,10
180 DATA 03,E8,00,64,00,0A,00,01
,34,16,FC,7D,71,8E,7D,EE
190 DATA 8D,1D,8D,2A,30,02,8D,17
,8D,24,30,02,8D,11,8D,1E
200 DATA 30,02,8D,0B,8D,18,30,02
,8D,05,8D,12,35,16,39,10
210 DATA 8E,00,00,A3,84,25,04,31
,21,20,F8,E3,84,39,34,16
220 DATA 1F,20,1F,98,8B,30,AD,9F
,A0,02,35,16,39
230 DATA XX
290 U=32000
292 CT=0
300 READA$:IFA$="XX"THEN500
310 POKEU,VAL("&H"+A$)
315 CT=CT+VAL("&H"+A$)
320 U=U+1
330 GOTO300
500 IFCT<36454 OR U<32317 THEN
PRINT"ERROR- CHECK THE DATA!" :EN
D
510 PRINT"MACHINE CODE LOADED AT
32000"
520 PRINT"NOTOR IS ON":NOTORON
530 PRINT"READY RECORDER AND PRE
SS ENTER"
550 INPUTQ$:NOTOROFF
555 FORT=1T04
560 CSAVEN"DRAGON",32000,32316,3
2115
565 FORJ=1T02000:NEXTJ,I
570 PRINT"OK - EXECUTION ADDRESS
IS 32115"
580 END

```

NEW GAMES THE TANDY

be printed. If none is printed the converted program should run correctly. Otherwise, you will have to assess the difficulties bearing in mind the explanation above.

PREPARING THE PROGRAM

1. Type in the program below and save it on a new tape i.e. CSAVE "DRAGCONV"
2. Now type "RUN". The program will build up the machine language program.
3. There are two checks to ensure that the DATA has been entered correctly. If the number of items is not 316 or they do not sum to 36454, an error message will be printed. If this occurs inspect the DATA very carefully.
4. If the program passes the tests, you will be asked to get the cassette recorder ready. Put a second new tape into the recorder and press the RECORD and PLAY. Press ENTER when ready. Don't use the same tape — things can get very difficult if you want to erase one program and not the other.
5. The converter will save in machine format. The name of the program is "DRAGON". Four copies are saved.

OPERATION

1. Switch on the Dragon and type "CLEAR 200,31999". This will keep the routine safe.
2. Rewind the tape containing the machine program and load it i.e. CLOADM "DRAGON".
3. Now load the TRS-80 program written in Basic.
4. Type "EXEC 32115".
5. The program will print out line numbers of any USR's.
6. When conversion is complete, LIST the program. It should now make sense.
7. CSAVE the converted program on a new tape.
8. Do not RUN it if you have further programs to convert since programs using protected memory are liable to ruin the converter.
9. Check the programs and the USR's once all conversions are complete.

By the way, the program does not work in reverse! You cannot convert a Dragon program back to the TRS-80.



Illustration: Dorian Cross



LEARN THE PHAROAH'S SECRETS

TIPS ON TUTANKHAM

Tutankham has a natural appeal to the watcher but it is a confusing game for the beginner as he struggles to find his way through the maze of tunnels to the legendary treasure of the tombs.

It's a maze game with a difference as you can't see the whole maze at once, just a collection of rushing bats, snakes and birds, the undead creatures of the pharaoh's tomb, whose touch is lethal.

These have to be shot, smart-bombed or dodged as you grab the treasures and keys necessary to progress.

You begin your expedition with two smart bombs and three men and one extra of each arrives

every 20,000 points. Smart bombs are shown as lanterns at the top of the screen and clear the whole area you are in at the time.

The first screen takes you up past the enemy's house where monsters issue forth and into a secret tunnel through to the second screen.

The tunnel is only opened by the key which must first be grabbed by the adventurer. 1,000 points are awarded for getting the key and there is a time bonus to be scored by getting it into the lock soon after the start of that screen.

If you run out of time then your fire power vanishes and you have to get to the lock before the enemy get to you.

The second — and all subsequent screens — need two keys for two locks, collected in the order: key, lock, key, lock.

Your fire ability is fast and stabs out both ahead and behind you at the same time. But it is limited, it can't be used in vertical passages. The monsters realise this and rush you in the vertical passages while lurking and waiting in the horizontal ones.

These adversaries often have their little dens situated on main highways through the maze and challenge you to get past.

The maze is set out as underground tunnels with large open spaces, supposedly giving the effect of the passages you might find beneath a pyramid.

The open spaces can be particularly dangerous when the creatures can attack from all sides.

For bonus points pick up the treasures, either a chest or a ring, that are dotted around the screen. The first of these is worth 500 points, the next 1,000, the next 1,500 and so on.

Smart bombs are often best saved for the rush to the last lock, when monster activity is at its height. If in doubt check the radar scanner at the top of the screen.

Getting past a den is a case of waiting until a spurt of monsters dies down and then rushing, guns blazing past.

The snakes and birds are predictable but bats are fast and erratic. If something closes its jaws around you as you approach your run-in to the final treasure, you can usually be sure its one of these.

Our thanks to Carl Warrington of Leicester for the tips.



POINTS FOR CRASHING

Burning Rubber is the first car race game which encourages you to slam into other road-users.

Simulating the stock car races where the aim is to crunch as many opponents as possible, Burning Rubber gives points for bumping into rivals and sending them spinning from the track.

The danger is that each contact will also send your own car screeching towards the track perimeter, so that you must leave yourself room to control the swerve before hitting the hedge boundary.

Burning Rubber is a racetrack which is looked down on from above, it travels in a straight line scrolling down from the top of the screen.

Unfortunately the course seems to be set in a river delta and the track is constantly being interrupted by stretches of water. These sometimes have narrow bridges across their depths, other times the track

BURNING RUBBER

continues on islands in the centre of the waterways.

Luckily a jump button will lift you out of trouble and actually help boost the score if you can successfully manage to land on an unsuspecting opponent.

The only restriction on jumping is that you must be up to a certain speed before you can take off. That speed is achieved quite easily and then there is nothing to stop you leapfrogging around the track, over opponents, rivers and intruding hedges.

Nothing, that is, except a tendency to slow down drastically when landing on an opponent and a certainty that a watery death awaits anyone landing in the drink.

Other hazards come mainly from your fellow road users. These vary from hole-digging trucks, to almost unmovable caterpillar tread trucks.

SEND YOUR BEST SHOT

Hurry up and send in a top score, if you want to enter our 1983 Video Games Championships.

The grand final takes place at the end of June and we'll need your top score in by June 23rd to make you eligible to win a place at the finals.

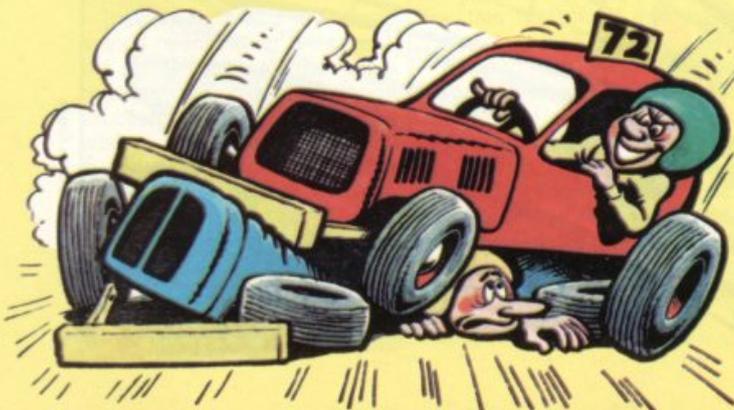
A form can be cut out of the magazine on page 11 and taken around to your local pub, club or arcade to fill in the best score you can on your favourite machine.

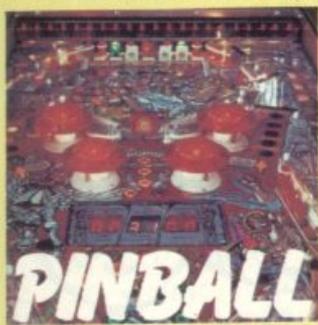
You can enter on up to three different machines. The prize is a brand new arcade game from

Taitel Electronics, one of their new summer releases which will be in the winner's home before it's in the arcades.

And if you make your top score while your magazine is still at home ask the arcade owner if he has an entry form. We are distributing forms to many arcade, pub and college sites.

If you have entered already there's nothing to stop you improving your score in the meantime and sending it in on this month's form but please ensure that every entry is witnessed by the pub, club or arcade owner.





So you think that all pinball machines look the same eh? Just a playfield and a sit-up-and-beg backslap. Well, have we got news for you! The word is that Williams are bringing out a pin that could revolutionise the image of the pin table forever. Well, until the next revolution anyway!

Based on the Williams video game called Joust — which features flying beasts and gallant knights — the company's new pin can be played by two players. So what's new about that, I hear you ask. But they play both at the same time — ever seen that before smarty!

Yes, Joust — the pinball, can be played by two players at opposite ends of the table one is the attacker, the other the defender. Roles reverse when the ball is lost.

Meanwhile back to the more conventional side of the pinball market and Zaccaria have a new pin called Time Machine.

The special feature on this machine goes into action when you get the ball into a saucer about two-thirds of the way up on the left hand side of the playfield. Then the three pop-bumpers disappear into the bowels of the machine and a flat surface takes its place. This takes you into the "past". When the bumpers are up it's the "future".

This feature makes Time Machine two games in one.

ALIENS TAKE A TUMBLE

For Scramble and Zaxxon fans who enjoy a good battle over scrolling scenery, Xevious holds new graphical and action thrills.

The story is set in Earth's future with the massive Xevious fleet gradually taking control of the world we humans know as home.

In true *Boys' Own* style, a hero is despatched to strike deep into the Xevions' home territory and destroy their mothership.

Xevious forces are to be found on the ground and in the air. Bombing and firing away as he did in Zaxxon, but this time from a different angle and viewpoint the player takes on one batch of Xevions after another. Each wave gets progressively difficult.



That legendary bird of fortune, the Roc, takes the place of Donkey Kong's starlet in a new game, Roc n' Rope.

The Roc is every bit as elusive to capture as Kong's starlet was to save and like her, it leaves hints to its whereabouts strewn around the vicinity in the shape of golden feathers.

Mario's place is taken by an intrepid explorer who is betting on new technology to take him past the horrors and dangers of the primeval labyrinth of caves, trees and terraces.

Whether or not his bet is well-founded, depends on you as you guide his progress to the Roc at the top of the screen. The first screen is laid out with rock ledges. You climb with the aid of a rocket gun which has a rope attached to its pointed tip. As it imbeds itself in the next level, you anchor the far end and begin your ascent. Cavemen and dinosaurs are out to stop you but you

XEVIOUS

A crosshair sight preceding his craft helps the player judge his range.

If it all sounds too familiar, the difference Xevious boasts is in a detailed and varied backdrop to the action and some marvellous effects from the opposing fleet as they roll, tumble or zoom in towards you.

My own favourites are the turning mirrors which spin slowly as you approach them.

The Mothership also puts up an almighty barrage to prevent you placing your ranging site over its vulnerable core.

Rivers, roads, forests and air-strips form the backdrop to the action. Operators are given a lot of leeway over how difficult Xevious can be for the beginner, so if you find it too hard or too easy have a word in the arcade owner's ear.

A LONG HAUL AFTER AN EXOTIC BIRD

ROC N' ROPE

are equipped with a flash which can be used to blind them.

Cavemen are quite capable of following you up a rope or shaking you down from it, but flash blindness renders both they and the dinosaurs helpless for a while.

The cave-dwellers can change levels by climbing up or down vines and are difficult to shake off your trail. Points are gained for picking up golden feathers and if the player finds a golden egg he will become super-powered and invincible for a while, destroying his enemies at a touch.

Rock stairways, fountains and a prehistoric revolving door type escalator, feature in the later screens but the dinosaurs and cavemen are to be found on every one.

Like most of the Kong-type games, the successful players will memorise a good route and follow it to the top again.



DON'T LET THEM BREAK YOUR CHAIN

DOMINO MAN

Remember lining up a snake of dominoes and sending it sprawling with a careless flick of your little finger at one end or another.

Well domino flicking is big business in the States at the moment with teams trying to produce new record flicks and ever more impressive displays.

The trend is recreated in Domino Man where you take the title role and set up dominoes in a chain behind the supermar.

Dominoes are set up merely by touching them but you have to do it before an old lady with a bag, a bully, or a little boy knocks part of your chain over. You can knock them out of the way. Then there's this bee which wanders around so slowly that you may feel tempted to go and find out what it's doing on screen — don't, it stings!

After conquering the supermarket you can move onto the golf course, where a small dog threatens domino destruction or onto the construction site.

You can trap certain of your enemies in the domino chain for extra points and other bonuses can be achieved by finishing your screen in a good time.

The dominoes are laid out in easy to assemble chain and tactics usually centre on whether you go for a whole chain at once or shorter chains which are easy to rebuild if knocked over.



Howdy partners. My name is Killer McGrew and this here's my gang, The Ringo Kid — he's the one with the ring through his nose — and Sid Lightning — so called because of the ragged scar on his cheek.

A couple of the nicest guys you're ever likely to come across in this here town. Unless of course they don't like the way you look. Then they can get quite nasty. That's why it's just as well to pack a mean six-shooter and be very quick on the draw!

This here game will give you a bit of practice, just in case you come up against an 'ornery old gunfighter in the street one fine day.

This program uses both hi-res pages on the Apple and is just under 6k in length. Therefore it is a very tight fit below hi-res page 1 and so there are no REM statements in the program and the line numbering is fairly crucial.



Illustrations: Terry Rogers

WANTED
IN 45 STATES



SID LIGHTNING	KILLER Mc GREW	THE RINGO KID
\$150	\$255	\$200

DEAD OR ALIVE



BY ROBERT PENROSE

QUICKDRAW

RUNS ON AN APPLE IN 6K

```

1 GOTO 47
2 FOR I = 40 TO 1 STEP - 1: POKE PIT,I: POKE DUR,5: CALL NOISE: CALL NOIS
E: NEXT : RETURN
3 FOR J = 1 TO 2000: NEXT : RETURN
4 HOME : VTAB 21: HTAB 1: RETURN
5 POKE 790,255:OP$ = "KILLER MCGREW": RETURN
6 POKE 790,200:OP$ = "THE RINGO KID": RETURN
7 POKE 790,150:OP$ = "SID LIGHTNING": RETURN
8 X = 200:Y = 130:SHOTS = 0:SC = 0
9 POKE - 16368,0: PRINT "WHEN YOU SEE THE GLASS - FIRE!!!": GOSUB 3: POKE
- 16302,0: GOSUB 3: GOSUB 4
10 IF PEEK ( - 16384) > 127 THEN GOSUB 2: POKE - 16301,0: PRINT "OUCH!!
YOU JUST SHOT YOUR FOOT!": GOSUB 3:SHOTS = SHOTS + 1: GOTO 19
11 POKE 230,32: SCALE= 1: ROT= 0: XDRAW 5 AT X,Y: CALL 791: CALL 791: XDRA
W 5 AT X,Y
12 IF PEEK ( - 16384) > 127 THEN GOTO 15
13 POKE - 16299,0: GOSUB 2: GOSUB 3: GOSUB 3: POKE - 16300,0: POKE - 16
301,0: GOSUB 4: IF PEEK ( - 16384) > 127 THEN PRINT "NOT QUICK ENOUGH!":S
HOTS = SHOTS + 1: GOSUB 3: GOTO 19
14 PRINT "COME ON! YOU ARE SUPPOSED TO SHOOT!": PRINT "I AM NOT PLAYING BY
MYSELF!": GOSUB 3: GOSUB 3: GOTO 19
15 POKE - 16299,0: GOSUB 2: POKE 230,64
16 POKE PIT,120: POKE DUR,100: CALL NOISE
17 FOR I = 0 TO 48 STEP 8: ROT= I: SCALE= I / 8 + 1: XDRAW 6 AT X,Y: FOR J
= 1 TO 10: NEXT : XDRAW 6 AT X,Y: NEXT : GOSUB 3
18 SHOTS = SHOTS + 1:SC = SC + 1: POKE - 16300,0: POKE - 16301,0
19 GOSUB 4: PRINT SC:" OUT OF ";SHOTS
20 IF SHOTS = 6 THEN POKE - 16368,0: GOTO 72
21 GOSUB 3: GOSUB 4: GOTO 9
22 FOR I = 791 TO 797: READ J: POKE I,J: NEXT
23 DATA 173,22,3,32,168,252,96
24 RETURN
25 HPLLOT 220,100 TO 75,100 TO 75,80 TO 200,80 TO 200,100: HPLLOT 150,65 TO
200,65: HPLLOT 0,141 TO 270,141
26 HPLLOT 100,50 TO 100,40 TO 105,30 TO 145,30 TO 150,40 TO 150,50 TO 145,6
0 TO 105,60 TO 100,50: HPLLOT 105,50 TO 105,40 TO 110,35 TO 140,35 TO 145,40
TO 145,50 TO 140,55 TO 110,55 TO 105,50
27 HPLLOT 95,68 TO 105,68: HPLLOT 99,66 TO 101,66 TO 102,68 TO 102,70 TO 101
,72 TO 99,72 TO 98,70 TO 98,68 TO 99,66: HPLLOT 99,69: HPLLOT 101,69: HPLLOT 9
9,71 TO 101,71
28 HPLLOT 93,80 TO 93,75 TO 96,72 TO 104,72 TO 107,75 TO 107,80: HPLLOT 106,
80 TO 106,76 TO 104,74 TO 104,80: HPLLOT 94,80 TO 94,76 TO 96,74 TO 96,80: H
PLOT 96,78 TO 97,78 TO 97,72: HPLLOT 98,72 TO 98,78 TO 102,78 TO 102,72: HPL
OT 103,72 TO 103,78 TO 104,78
29 RETURN
30 HPLLOT X,Y TO X,Y - 6 TO X + 2,Y - 8 TO X + 2,Y - 10 TO X + 3,Y - 10 TO
X + 3,Y - 8 TO X + 5,Y - 6 TO X + 5,Y TO X,Y: HPLLOT X,Y - 6 TO X + 5,Y - 6:
HPLLOT X,Y - 3 TO X + 5,Y - 3: RETURN
31 FOR I = 770 TO 789: READ J: POKE I,J: NEXT : REM SOUND
32 DATA 172,1,3,174,0,3,173,48,192,202,224,0,208,251,136,192,0,208,240,96
33 RETURN
34 FOR I = 24577 TO 24926: READ J: POKE I,J: NEXT
35 DATA 6,0,14,0,87,0,163,0,241,0,63 ,1, 88,1,118,115,94,187,118,115,115,115,1
15,107,107,107,115,115,123,99,123,123,115,115,118,115,118,115,115,107,107,1
07,227,103,99,99,99,99,107,67,99,99,99,227,99,99,99,107,115,115,115,107,99,
99,99,99,99,227
36 DATA 76,99,99,99,99,99,227,191,246,91,107,107,107,107,107,107,109,91,
88,0
37 DATA 118,243,78,171,118,115,115,115,123,123,123,115,115,107,99,107,107,
115,243,118,243,118,115,115,123,123,123, 99,101,99,99,99,99,123,67,99,99,99
, 99,97,99,99,123,115,115,115,123,99,99,99,99,99,99
38 DATA 92,99,99,99,99,99, 99,173,118,73,123,123,123,123,123,123,123,12
3,123,123,91,88,0
39 DATA 118,115,94,187,118,115,115,107,107,107,115,115,123,99,123,123,115
,115,118,115,118,115,115,107,107,107,227,103,99,99,99,99, 99,100,99,107,107
,67,107,67,107,120
40 DATA 123,187,87,123,99,123,123,67,107,107,99,99,227,76,99,99,99,99,99,

```

ANIROG

SOFTWARE

XENO II

An E-XPANDED-D screen presentation with superb action packed space thriller, written entirely in machine code with four action packed stages. To destroy the power source of Xeno II, you have to fight off waves of robot attack, plasma bombing by the legions of the outer sanctum and finally attack the power source protected by a force field, continuous bombardment by guardians and blockading by wild whirling suicidal space ships. Truly a game for all arcadians.

JS VIC 20 16K £7.90

CAVERN FIGHTER

All M/C version of SCRAMBLE. Lasers, bombs, continuous scoring and sound effects give all the thrills of arcade game. Pilot your space ship through the tortuous tunnels and caverns destroying enemy missile launchers, fuel dumps and airborne fire saucers. Four ships to complete mission. 10 skill levels.

KB/JS VIC 20 Unexp. £6

CRAWLER

All M/C version of Centipede. Homing spiders, mushroom laying fleas and multi-direction travel makes this game fast and furious, with 10 skill levels.

JS VIC 20 Unexp. £6

PHARAOH'S TOMB

Once you enter, the only way out is with the aid of a key which unlocks the mystery of the Pharaoh's tomb. Beware of the mantraps the ancient Egyptians so painstakingly built. One false move and you will meet the same fate as befell other tomb robbers over thousands of years. A multi-screen big graphical adventure with M/C movements.

KB VIC 20 16K £6.00

SEVEN PROGRAMS (VOL 1)

Hi-res games for the whole family. Board game Othello plus Bomber, Slalom, Bounce out, Lunar Docker, Memory and Snake.

KB VIC 20 Unexp. £6.00

SEVEN PROGRAMS (VOL 2)

Another Hi-res games pack for the family Graphical Adventure, Goblins Gold, plus Dare Devil, Ghosts, Grand Prix, Breakout, Cobra and Minefield.

KB VIC 20 Unexp. £6.00



DOTMAN

Ghosts chase you as you try to eat the dots and collect points. You can turn the tables on them by eating the pills. Don't forget the ghosts have been given intelligence and will try to corner you. This feature makes Dotman exciting and challenging. All M/C game complete with running and highest scores and tunnels.

JS/KB VIC 20 Unexp. £6.00

ZOK'S KINGDOM

Your starcruiser badly damaged in a meteor storm is forced to crash land on the planet ruled by ZOK, a time space generated image of Dracula. You are challenged to a battle of wits and endurance as the battle for survival starts in earnest in this big multi-screen graphical adventure in hi-res graphics and M/C movements.

KB/JS VIC 20 16K £6

KRAZY KONG

An E-XPANDED-D screen, large graphics, rolling barrels, hammer, fireballs, lifts, handbags and umbrellas as you try to rescue the damsel Kong has abducted. Spectacular collapse of Kong's lair in the fourth screen. Uses all 21K of your expanded Vic for this 100% M/C thriller. Complete with high score table.

KB/JS VIC 20 16K £7.90

GALACTIC ABDUCTORS

NEW

A stunning action packed game which uses all of your TV screen for the superb large animated graphics. Giant Space Hawks whirl and weave in intricate patterns as they drop their deadly homing mines which will destroy your base on contact. While you are busy defending yourself, the Hawks will feed on your helpless population returning only their skulls. All M/C game complete with high score table that will blow your mind with its graphics and sound effects.

JS VIC 20 16K £7.90

FROGRUN

NEW

Popular arcade game. All machine code with brilliant colour graphics and sound effect. Features include snakes, crocodiles, lady frogs, turtles, cars, lorries and logs.

KB/JS VIC 20 Unexp. £6
KB/JS SPECTRUM 16K/48K £6
KB/JS COMMODORE 64 £6

DRACULA

Count Dracula is asleep somewhere in his castle. He rises at midnight and you must find him and drive a stake through his heart before he rises. A multi-screen graphic adventure.

KB VIC 20 3K £6

TINY TOT'S SEVEN

Super games pack for younger children with bright colour graphics and sound effects. Everybody's favourite Simon plus Super Snap, O's and X's, Word Jumble, Bomber, Duck Shoot and Mad Drivers.

KB VIC 20 Unexp. £6.00

3D TIME TREK

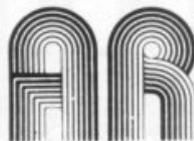
NEW

At last a 3D game for the VIC! Although badly wounded, you are determined to seek and destroy the marauding space pirates who have now dispersed around the galaxy in search of fresh prey. A brilliant Startrek game with a difference — spectacular 3D graphics and real arcade actions.

JS VIC 20 16K £6.00

SOFTWARE WRITERS

We are looking for top class writers to join our growing software team. If you have written a quality game for VIC 20, SPECTRUM, DRAGON 32, ORIC 1 or COMMODORE 64, then contact us. We pay top royalties for accepted programmes.



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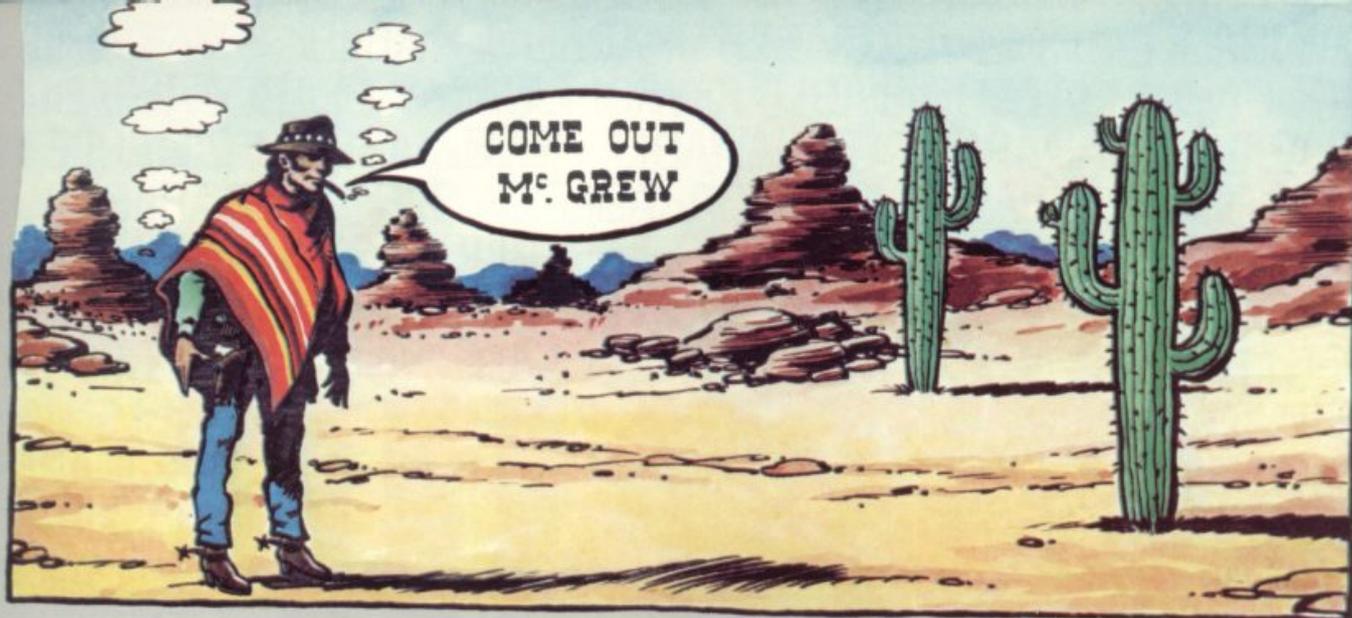
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PAYMENT BY CHEQUE, P.O., ACCESS/VISA
ANIROG SOFTWARE
26 BALCOMBE GARDENS
HORLEY, SURREY
ENQUIRIES: HORLEY (02934) 2007/6083

```

227,191,246,91,107,107,107,107,107,107,107,107,107,107,107,91,88,0
41 DATA 118,243,78,171,118,115,115,123,123,123,115,115,107,99,107,107,115,
243,118,243,118,115,115,123,123,123,99,101,99,99,99,99,227,100,99,123,123,6
7,123,67,251,104
42 DATA 107,171,85,107,99,107,107,67,123,123,99,99,99,92,99,99,99,99,99
,99,173,118,73,123,123,123,123,123,123,123,123,123,91,88,0
43 DATA 100,123,123,123,115,115,115,115,107,107,107,99,99,99,99,107,1
07,115,115,123,123,91,88,0
44 DATA 176,92,107,95,88,0
45 POKE 232,1: POKE 233,96
46 RETURN
47 N = 1:HC = 3:PIT = 768:DUR = 769:NOISE = 770: HGR : HGR2
48 TEXT : HOME : VTAB 10: HTAB 15: INVERSE : PRINT "QUICKDRAW": GOSUB 22:
GOSUB 31
49 POKE PIT,140: POKE DUR,50: CALL NOISE: FOR I = 40 TO 1 STEP - 1: POKE
PIT,I: POKE DUR,20: CALL NOISE: CALL NOISE: NEXT
50 VTAB 15: HTAB 8: PRINT "FASTEST GUN IN THE WEST": NORMAL
51 FOR I = 32 TO 64 STEP 32: POKE 230,I: HCOLOR= HC: GOSUB 25
52 Y = 65: FOR X = 155 TO 185 STEP 10: GOSUB 30: NEXT
53 NEXT
54 GOSUB 34
55 ROT= 0: SCALE= 1
56 POKE 230,32: XDRAW 1 AT 10,120: XDRAW 5 AT 112,76
57 POKE 230,64: XDRAW 3 AT 10,120: XDRAW 5 AT 112,76
58 VTAB 20: HTAB 11: PRINT "SPACE BAR TO FIRE": GOSUB 3
59 POKE - 16304,0: POKE - 16301,0: POKE - 16300,0
60 VTAB 21: PRINT "WHAT DO YOU CALL YOURSELF?"
61 VTAB 23: INPUT "";N$
62 GOSUB 4: PRINT "WELL ";N$: PRINT "LET'S PRACTICE YOUR DRAW"
63 GOSUB 3: POKE - 16302,0: GOSUB 3
64 FOR I = 1 TO 4: POKE - 16299,0: FOR J = 1 TO 1500: NEXT : POKE - 1630
0,0: FOR J = 1 TO 500: NEXT : NEXT
65 POKE - 16301,0
66 GOSUB 4: PRINT "THAT'S ENOUGH! ";N$: PRINT "WE DON'T WANT YOU TO STRAIN
SOMETHING!"
67 GOSUB 3: GOSUB 3: GOSUB 4
68 PRINT "LET'S SHOOT AT SOME GLASSES": PRINT "DON'T SHOOT TOO SOON": PRIN
T "OR YOU'LL BLOW YOUR FOOT OFF!!"
69 GOSUB 3
70 ON N GOSUB 5,6,7
71 GOSUB 3: GOSUB 4: GOTO 8
72 ROT= 0: SCALE= 1: GOSUB 3: GOSUB 4: IF SC > 2 THEN 76
73 PRINT "DREADFUL!": PRINT "WANT TO QUIT? (Y/N) ";: INPUT "";Z$: IF Z$ =
"N" THEN GOSUB 4: GOTO 8
74 GOSUB 4: PRINT "THAT MIGHT NOT BE POSSIBLE!": IF RND (1) > .5 THEN 78
75 GOSUB 3: TEXT : HOME : PRINT "O.K. QUIT WHILE THE GOING'S GOOD. BYE!":
END
76 IF SC > 4 THEN 78
77 PRINT "YOU WON'T SURVIVE AGAINST ";OP$: PRINT "GO BACK AND PRACTICE AGA
IN!": GOSUB 3: GOSUB 3: GOSUB 4: GOTO 8
78 PRINT "OH! OH! HERE COMES ";OP$
79 X1 = 260:X2 = 262:Y = 120: POKE 230,64: XDRAW 3 AT 10,120: XDRAW 1 AT 10
,120: XDRAW 2 AT X2,Y: GOSUB 3
80 POKE 230,32: XDRAW 2 AT X1,Y: POKE - 16302,0
81 POKE 230,64: XDRAW 2 AT X2,Y:X2 = X2 - 4: XDRAW 2 AT X2,Y: POKE - 1629
9,0
82 POKE 230,32: XDRAW 2 AT X1,Y:X1 = X1 - 4: XDRAW 2 AT X1,Y: POKE - 1630
0,0
83 IF X1 < > 200 THEN 81
84 POKE 230,64: XDRAW 1 AT 10,120: XDRAW 3 AT 10,120: XDRAW 2 AT 202,120:
XDRAW 4 AT 200,120
85 POKE - 16301,0: POKE 230,32
86 GOSUB 4: PRINT "WHEN THE GLASS SMASHES ON THE FLOOR": PRINT : PRINT "FI
RE!!"
87 GOSUB 3: FOR I = 64 TO 32 STEP - 32: POKE 230,I: XDRAW 5 AT 112,76: NE
XT
88 Y = 76: FOR I = 112 TO 208 STEP 3: XDRAW 5 AT I,Y: FOR J = 1 TO 50: NEXT

```

```

: XDRAW 5 AT I,Y: NEXT
89 X = I: FOR I = Y TO 96 STEP 3: XDRAW 5 AT X,I: FOR J = 1 TO 50: NEXT : X
DRAW 5 AT X,I: NEXT
90 POKE - 16368,0
91 POKE PIT,100: POKE DUR,50: CALL NOISE
92 CALL 791
93 IF PEEK ( - 16384) > 127 THEN 103
94 POKE - 16302,0: POKE - 16299,0: GOSUB 2
95 POKE 230,32: XDRAW 1 AT 10,120: ROT= 48: XDRAW 1 AT 10,138: ROT= 0: GOS
UB 4: POKE - 16300,0: POKE - 16301,0
96 PRINT "OH DEAR!": FOR J = 1 TO 1000: NEXT
97 FOR I = 0 TO 10: READ A,B,C: POKE PIT,A: POKE DUR,B: CALL NOISE: FOR J
= 1 TO C: NEXT : NEXT
98 DATA 250,255,200,250,255,200,250,80,100,250,255,200,220,255,200,250,80,
100,255,255,200,250,80,100,255,255,200,250,80,100,255,255,500
99 POKE - 16368,0
100 CALL - 912: PRINT "PLAY AGAIN ? ";; GET Z$
101 IF Z$ < > "Y" THEN TEXT : HOME : PRINT "BYE!": END
102 RESTORE : GOTO 47
103 POKE - 16368,0: POKE - 16302,0: POKE - 16299,0: GOSUB 2: GOSUB 3
104 POKE 230,32: XDRAW 2 AT 200,120: ROT= 16: XDRAW 2 AT 200,138: ROT= 0:
GOSUB 4: POKE - 16300,0
105 GOSUB 3: GOSUB 3
106 POKE 230,64: XDRAW 3 AT 10,120: XDRAW 1 AT 10,120: XDRAW 4 AT 200,120:
ROT= 16: XDRAW 2 AT 200,138: ROT= 0: XDRAW 2 AT 262,120
107 X1 = 260:X2 = 262:Y = 120: POKE 230,32: XDRAW 2 AT X1,Y
108 POKE 230,64: XDRAW 2 AT X2,Y:X2 = X2 - 4: XDRAW 2 AT X2,Y: POKE - 162
99,0
109 POKE 230,32: XDRAW 2 AT X1,Y:X1 = X1 - 4: XDRAW 2 AT X1,Y: POKE - 163
00,0
110 IF X1 < > 208 THEN 108
111 POKE 230,64: ROT= 16: XDRAW 2 AT 200,138: XDRAW 2 AT 202,138:Y1 = 138:
POKE - 16299,0
112 POKE 230,32: ROT= 0: XDRAW 2 AT X1,Y: ROT= 16: XDRAW 2 AT X1 - 8,Y1:X1
= X1 + 4: XDRAW 2 AT X1 - 8,Y1: ROT= 0: XDRAW 2 AT X1,Y: POKE - 16300,0
113 POKE 230,64: ROT= 0: XDRAW 2 AT X2,Y: ROT= 16: XDRAW 2 AT X2 - 8,Y1:X2
= X2 + 4: XDRAW 2 AT X2 - 8,Y1: ROT= 0: XDRAW 2 AT X2,Y: POKE - 16299,0
114 IF X2 < > 262 THEN 112
115 POKE 230,32: XDRAW 2 AT X1,Y: XDRAW 5 AT 112,76: ROT= 16: XDRAW 2 AT X
1 - 8,Y1: ROT= 0: POKE - 16300,0
116 POKE 230,64: XDRAW 1 AT 10,120: XDRAW 3 AT 10,120: XDRAW 2 AT X2,Y: XD
RAW 5 AT 112,76: ROT= 16: XDRAW 2 AT X2 - 8,Y1: ROT= 0
117 POKE - 16301,0: PRINT "YOU'RE STILL HERE!": PRINT "MORE PRACTICE NOW
YOUR FAMOUS!"
118 GOSUB 3: GOSUB 3
119 N = N + 1: IF N < > 4 THEN 70
120 GOSUB 4: PRINT "I'M AFRAID YOU'RE NOW TOO FAST!": PRINT "NO-ONE WILL C
HALLENGE YOU AGAIN!": PRINT "I'M OFF!": GOSUB 3: GOSUB 3: TEXT : HOME : PRI
NT "BYE!!"

```

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```

5000 X,GM=1 :: SD=SD-20
5010 GOTO 380
5020 REM *CHARGE HIT BOTTOM*
5030 CALL POSITION(#3,Y,X) :: CALL
5040 DELSPRITE(#3)
5050 CALL SPRITE(#4,110,12,183,X)
5060 FOR A=1 TO 2
5070 CALL PATTERN(#4,114) :: CALL
5080 COLOR(#4,RND*12+3)
5090 CALL PATTERN(#4,115) :: CALL
5100 COLOR(#4,RND*12+3)
5110 CALL PATTERN(#4,119) :: CALL
5120 COLOR(#4,RND*12+3)
5130 CALL PATTERN(#4,46) :: CALL C
5140 COLOR(#4,RND*12+3)
5150 CALL SOUND(-500,-5,0)
5160 NEXT A
5170 G=G-6 :: CALL POSITION(#2,A,
5180 B) :: CALL LOCATE(#2,G,B)
5190 CALL POSITION(#2,Y,X)

540 IF Y<100 THEN 860
550 GM,X,S=0 :: SD=2000
560 GOTO 380
570 REM **HIT SUBMARINE**
580 CALL DELSPRITE(#3)
590 IF U=2 THEN CALL MOTION(#2,5
600 -10) ELSE CALL MOTION(#2,5,10)
700 CALL SOUND(-200,-6,0) :: CALL
710 COLOR(#2,10)
720 CALL POSITION(#2,A,B) :: IF A
730 >183 THEN 720 ELSE 710
740 CALL PATTERN(#2,113) :: CALL
750 COLOR(#2,12)
760 CALL SOUND(-1000,-4,0)
770 CALL SOUND(-1000,-6,0)
780 CALL MOTION(#2,0,0)
790 CALL POSITION(#2,Y,X) :: CALL
800 DELSPRITE(#2)
810 FOR B=5 TO 10
820 CALL SPRITE(#5,46,RND*2+9,Y,
830 X,-10,SGN(RND-.5)*20)
840 NEXT B
850 FOR D=5 TO 10
860 FOR DEL=1 TO 20 :: NEXT DEL
870 CALL DELSPRITE(#D)
880 NEXT D
890 SCORE=SCORE+1 :: DISPLAY AT (
900 1,1) : "SCORE",SCORE
910 SPEED=SPEED+3
920 GM,X,S=0 :: SD=9000
930 GOTO 340
940 REM **BOAT HIT**
950 CALL MOTION(#1,0,0)

```

```

960 CALL POSITION(#1,C,D)
970 CALL POSITION(#2,A,B)
980 CALL SPRITE(#5,46,16,A,B)
990 U=C-A :: V=D-B :: D1X=SGN(U)
1000 D1Y=SGN(V) :: D2X=D1Y :: D2Y=0
1010 M=ABS(U) :: N=ABS(V)
1020 IF M>N THEN 970
1030 D2X=0 :: D2Y=SGN(V) :: M=ABS(
1040 U) :: N=ABS(V)
1050 S=INT(M/2)
1060 FOR I=0 TO M
1070 CALL LOCATE(#5,A,B)
1080 S=S+N :: IF S<M THEN 1020
1090 S=S-M :: A=D1X :: B=B+D1Y ::
1100 GOTO 1030
1110 A=A+D2X :: B=B+D2Y
1120 NEXT I
1130 FOR AS=1 TO 10
1140 CALL SOUND(200,-4,0,110,15,
1150 210,15,310,15)
1160 CALL PATTERN(#1,115)
1170 CALL COLOR(#1,RND*12+3)
1180 CALL SCREEN(RND*12+3)
1190 CALL COLOR(#1,RND*12+3)
1200 CALL PATTERN(#1,113) :: CALL
1210 COLOR(#1,RND*12+3)
1220 NEXT AS
1230 CALL SOUND(-1000,-5,0)
1240 CALL SCREEN(16)
1250 CALL POSITION(#1,Y,X) :: CAL
1260 DELSPRITE(#1,#5)
1270 FOR DEL=1 TO 500 :: NEXT DE
1280 CALL PATTERN(#1,97)
1290 CALL COLOR(#1,15)
1300 DISPLAY AT(10,7) : "PLAY AGAI
1310 N? (Y/N)"
1320 CALL DELSPRITE(ALL)
1330 CALL KEY(0,K,S) :: IF S=0 TH
1340 EN 1200
1350 IF K=69 OR K=121 THEN 1250
1360 IF K=76 OR K=110 THEN CALL
1370 CLEAR :: CALL DELSPRITE(ALL) :: S
1380
1390 CALL SOUND(10,110,0)
1400 GOTO 1200
1410 X=0 :: GM=0 :: SCORE=0 :: S
1420 SPEED=7 :: SD=2000
1430 DISPLAY AT(1,1) : "SCORE",SCO
1440 RE
1450 CALL NCHAR(10,5,S2,22)
1460 GOTO 320
1470 END

```

The June Top Ten in Spectrum software at W.H. Smith.

The range of software available for the Sinclair Spectrum is to say the least, extensive.

So every month at W. H. Smith, we review the range with particular reference to presentation, challenge, excitement and value for money. And because we're quite severe it's a difficult job finally to arrive at a Top Ten. But as you can see, not impossible.

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Flight Simulation
Sinclair 48K £7.95

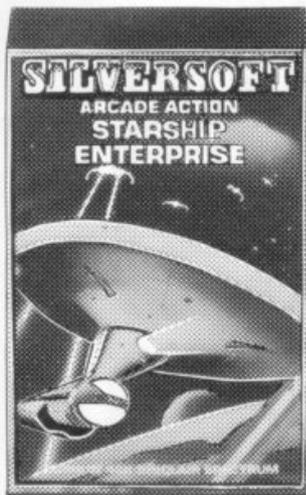


Penetrator
Melbourne House 48K £6.95

Title	Producer	K RAM	Price
Arcade Games			
Meteor Storm	Quicksilva	16	£4.95
Space Intruders	Quicksilva	16	£4.95
Time Gate	Quicksilva	48	£6.95
Gulpman	Campbell	16	£4.95
Spectral Invaders	Bug-Byte	16	£5.00
Meteoroids	Softek	16	£4.95
Planetoids	Sinclair	16	£4.95
Hungry Horace	Sinclair	16	£5.95
Space Raiders	Sinclair	16	£4.95
Mazeman	Abersoft	16	£4.95
Nightflight	Hewson	48	£5.95
Ground Force Zero	Titan	16	£5.00
Caterpillar	CDS	16	£5.95
Leapfrog	CDS	16	£5.95
Gobble-A-Ghost	CDS	16	£5.95
Centi-Bug	DK Tronics	16	£4.95
3D Tanx	DK Tronics	16	£4.95
Cruising	Sunshine	16	£4.95
Blind Alley	Sunshine	16	£4.95
Derby Day	Computer Rentals	48	£5.95
Jackpot	Computer Rentals	48	£4.95
Escape	New Generation	16	£4.95
3D Tunnel	New Generation	16	£5.95
Gobbleman	Artic	16	£4.95
Galaxians	Artic	16	£4.95
Invasion Force	Artic	16	£4.95
Sentinal	Abacus	16	£4.95



Chess
Sinclair
48K **£7.95**



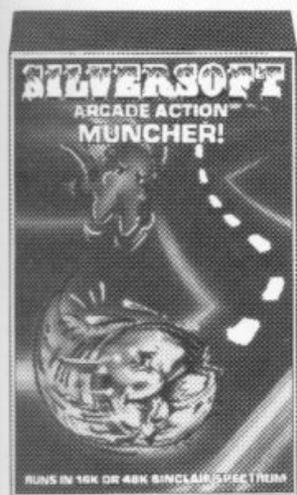
Starship Enterprise
Silversoft
48K **£5.95**



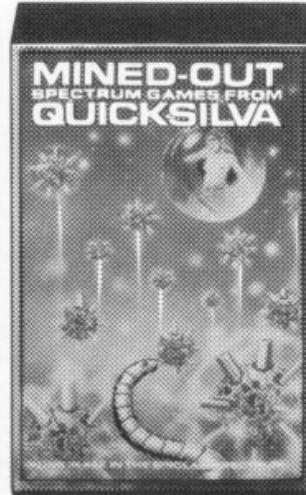
Horace Goes Skiing
Sinclair
16K **£5.95**



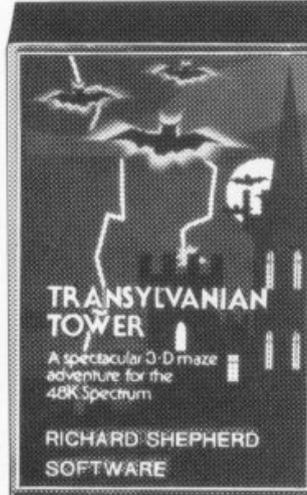
Schizoids
Imagine
16K **£5.50**



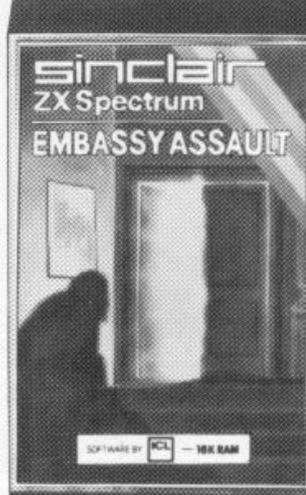
Muncher
Silversoft
16K **£5.95**



Mined-Out
Quicksilva
48K **£4.95**



Transylvanian Tower
Shepherd
48K **£6.50**



Embassy Assault
Sinclair
48K **£4.95**

Title	Producer	K RAM	Price
Avenger	Abacus	16	£4.95
Cyber Rats	Silversoft	16	£5.95
Arcadia	Imagine	16	£5.50
Ground Attack	Silversoft	16	£5.95
Orbiter	Silversoft	16	£5.95
Slippery Sid	Silversoft	16	£5.95
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Battle of Britain	Microgame	48	£5.95
Novotnik Puzzle	Phipps	16	£4.95
Chess	Artic	48	£9.45
Voice Chess	Artic	48	£9.95
Superchess II	C P Software	48	£7.95
Football Manager	Addictive	48	£6.95
Chess-The Turk	Oxford	48	£8.95
Dictator	DK Tronics	48	£4.95
Everest Ascent	Shepherd	48	£6.50
Dallas	CCS	48	£5.95
Adventure			
Labyrinth	Axis	16	£5.95

Title	Producer	K RAM	Price
Planet of Death	Sinclair	16	£6.95
Inca Curse	Sinclair	48	£6.95
The Hobbit	Sinclair	48	£14.95
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Reversi	Sinclair	16	£7.95
Othello	CDS	16	£5.95
Golf	R and R	16	£3.75
Conflict	Martech	48	£11.95
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Title	Producer	K RAM	Price
Backgammon	C P Software	48	£5.95
Draughts	C P Software	48	£6.95
Practical			
Vu-Calc	Sinclair	16	£8.95
Vu-File	Sinclair	16	£8.95
Vu-3D	Sinclair	48	£9.95
Collectors Pack	Sinclair	48	£9.95
Club Record Controller	Sinclair	48	£9.95
Address Manager	Oxford	16	£8.95
Finance Manager	Oxford	16	£8.95
Dietron	Custom Data	16	£4.75
Program Collections			
Shiva Special I	Shiva	16	£5.95
Over The Spectrum 1	Melbourne House	16	£5.95
Over The Spectrum 2	Melbourne House	16	£5.95
Over The Spectrum 3	Melbourne House	16	£5.95

WHSMITH



Prices correct at time of going to press. Subject to availability. At selected branches only.

```

10 REM BALLTRAP
20 REM S.HEAP
30 MODE5:SZ=1000
40 PRINT "'DO YOU WANT SOUND"
50 INPUT"Y OR N",B$
60 IF B$="Y" N=-10 ELSE N=0
70 VDU30,9
80 UZ=20+RND(800):AZ=20+RND(1000):DUZ=1:DAZ=2:BZ=3
90XZ=500+RND(500):YZ=400+RND(400):DXZ=-8:DYZ=-4:TIME=0
100 VDU19,2,7,0,0,0
110 VDU19,3,2,0,0,0
120 GCOL0,131:CLG
130 PROC_BOX
140 PROC_BALL
150 PROC_LINE
160 IF BZ=1 WZ=WZ+1 ELSE WZ=0
170 IF WZ=100 PROC_WIN:GOTO 190
180 IF ADVAL(0)=1 GOTO 70 ELSE GOTO 140
190 IF ADVAL(0)=1 GOTO 70 ELSE GOTO 190
200 DEFPROC_BOX
210 GCOL0,0
220 MOVE16,16:DRAW1264,16
230 DRAW1264,1004:DRAW16,1004
240 DRAW16,900:DRAW160,900
250 MOVE16,900:DRAW16,800
260 DRAW160,800:MOVE16,800
270 DRAW16,16
280 GCOL0,1:MOVE24,896
290 MOVE160,896:PLOT85,160,804
300 MOVE24,804:PLOT85,24,896
310 ENDPROC
320 DEFPROC_LINE
330 GCOL0,0
340 MOVE AZ,UZ
350 IF ADVAL1>50000 IF AZ>20 THEN AZ=AZ-DAZ:GOTO 390
360 IF ADVAL1<10000 IF AZ<1260 THEN AZ=AZ+DAZ:GOTO390
370 IF ADVAL2>50000 IF UZ<1000 THEN UZ=UZ+DUZ:GOTO390
380 IF ADVAL2<10000 IF UZ>20 THEN UZ=UZ-DUZ
390 DRAW AZ,UZ
400 ENDPROC
410 DEFPROC_WIN
420 VDU28,1,19,18,15:COLOUR1:COLOUR131:CLS
430 PRINT"YOU HAVE WON"
440 TZ=TIME/100:IF TZ<SZ SZ=TZ
450 PRINT"IN ";TZ;" SECS"
460 IF TZ<30 A$="CHAMP!!":GOTO500
470 IF TZ<50 A$="GOOD!":GOTO500
480 IF TZ<80 A$="NOT BAD":GOTO500
490 A$="RUBBISH-GIVE UP!!"
500 PRINT A$
510 PRINT"BEST IS ";SZ;" SECS"
520 ENDPROC
530 DEFPROC_BALL
540 IF POINT(XZ+DXZ,YZ+DYZ)<>0 GOTO580
550 IF POINT(XZ+DXZ,YZ)=0 DXZ=-DXZ
560 IF POINT(XZ,YZ+DYZ)=0 DYZ=-DYZ
570 SOUND 2,N,130,1
580 GCOL0,BZ
590 PLOT 69,XZ,YZ
600 XZ=XZ+DXZ:YZ=YZ+DYZ
610 IF POINT(XZ,YZ)=1 BZ=1 ELSE BZ=3
620 GCOL0,2
630 PLOT69,XZ,YZ
640 ENDPROC

```



BAT AND BALL

RUNS ON A BBC MODEL A OR B IN 16K

BY STEVE HEAP

This is an interesting variation of those very early bat and ball type video games which heralded the arcade boom all those years ago. It was written primarily for the BBC Model B but can easily be converted to work on the A or B from the keyboard.

The object of the game is to trap a bouncing ball in a coloured rectangle in the top corner of the screen. To do this a continuous line is drawn using the joystick (or keyboard controls) which slowly confines the ball in a smaller and smaller area until it is finally trapped. But beware — the ball has a nasty habit of escaping through the smallest gap in your defences!

If you are successful and manage to catch the bouncing ball the time you take will be displayed — together with the best time so far. The fire button on the joystick sets up a new game at any time.

The game can be converted to work from the keyboard by changing/adding the following lines:

```

25 ON ERROR GOTO 650
62 *FX12, 1
64 *FX11, 1
66 *FX15, 0
180 IF INKEY$(0)="N" GOTO 66 ELSE GOTO 140
190 IF INKEY$(0)="N" GOTO 66 ELSE GOTO 190
345 A$=INKEY$(0)
350 IF A$="Z" IF AZ>20 THEN AZ=AZ-DAZ:GOTO 390
360 IF A$="X" IF AZ<1260 THEN AZ=AZ+DAZ:GOTO 390
370 IF A$=":" IF UZ<1000 THEN UZ=UZ+DUZ:GOTO 390
380 IF A$="/" IF UZ>20 THEN UZ=UZ-DUZ
395 *FX15, 0
650 *FX15, 0
660 *FX12, 0
670 MODE7:END

```

For the best hardware, the best software.

The BBC Microcomputer system is generally regarded to be the best micro in its price range you can lay your hands on. So, if you're thinking of buying one or already own one, you'll want to know about the software that's been specially designed for it.

Not surprisingly, it's made by Acornsoft, the software division of Acorn Computers Ltd., who designed and built the BBC Microcomputer. So naturally you can expect the highest quality software with the built-in ingenuity to fully exploit the BBC Micro's potential.

Further education for everyone.

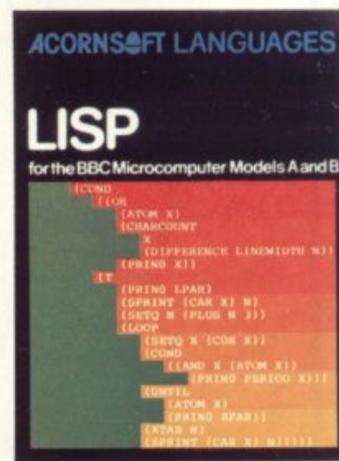
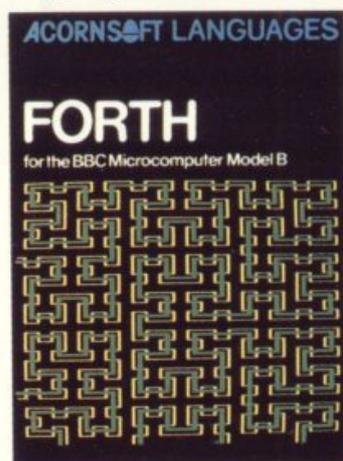
Number Balance (price £11.90) contains two programs on cassette for practising simple mathematical operations from numbers 1 to 20. The object of the exercise is to make a balance level by inputting the correct missing number into one side of a simple equation. Incorrect answers will tilt the balance in the appropriate direction; after three incorrect attempts the program responds with the correct answer.

Chemical Analysis (price £13.80) contains three Chemistry programs on cassette and a booklet. 'Elements' presents a series of mystery elements which the student is asked to identify. 'Inorganic' presents a series of inorganic substances to be

identified by performing tests selected from a menu of standard tests. 'Organic' is a program dealing with organic compounds.

Learn more languages.

LISP (price £24.35) is the fundamental language of artificial intelligence research.



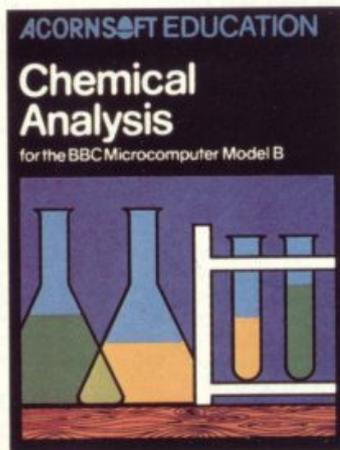
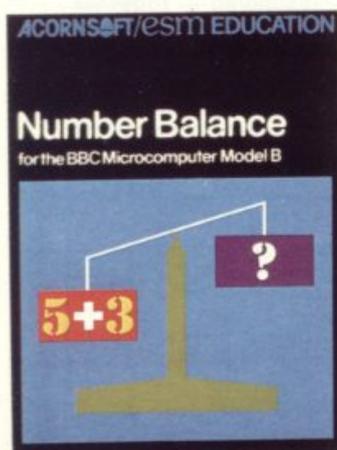
It is easy to learn, and is widely used for writing substantial and sophisticated programs, with practical applications including design of education systems and medical research.

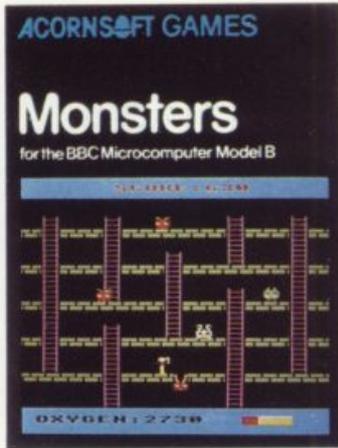
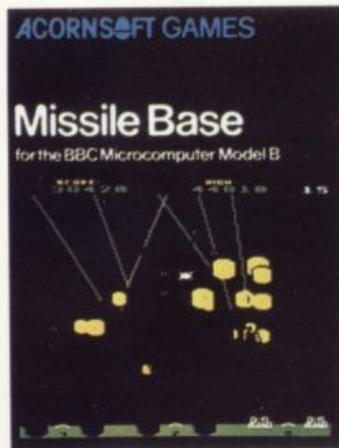
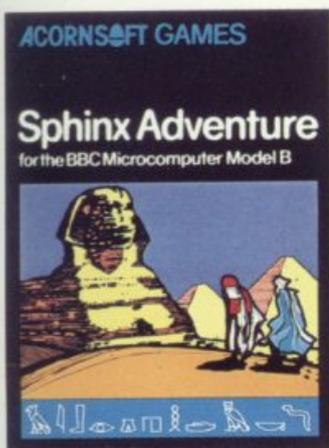
It comes complete with a book that introduces you to programming in LISP, as well as some fascinating applications.

FORTH (price £24.35) is a complete implementation of the FORTH language to the 1979 standard specification for the BBC Microcomputer Model B. This much acclaimed programming language is also accompanied by a specially written book explaining all you need to know.

Mind-boggling games.

Sphinx Adventure (price £9.95) is a full-sized classic adventure game in which you move through caves, fight with trolls, collect treasure and finally make your way to the sphinx





How to get Acornsoft programs.

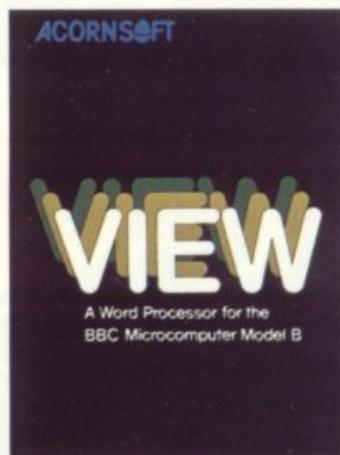
If you're a credit card holder and would like to buy cassettes of the programs shown in this advertisement, or if you would like to know the address of your nearest stockist, just phone 01-200 0200.

Alternatively, you can buy the cassettes directly by sending off the order form below to: Acornsoft, c/o Vector Marketing, Denington Estate, Wellingborough, Northants NN8 2RL.

Also use this form if you would like to receive the current free Acornsoft catalogue.

Please allow 28 days for delivery.

 Credit Card Holders. Ring 01-200 0200.



to collect your reward.

Missile Base (price £9.95) sees you as Moon Base Commander, and you must ward off the salvos of deadly neutron missiles falling from space onto your base. As the game progresses, intelligent missiles arrive on the scene. They must be destroyed with cunning. Comes complete with satellites and planes and includes a table of high scores.

Monsters (price £9.95) is a game where your man is pursued by monsters who chase him up and down ladders and along walls. The only hope of survival is to dig holes in the walls and trap the monsters by filling them in. Complete with sound effects and high score.

Increase your business acumen.

VIEW (price £59.80) is a program that enables your machine, together with a printer, to operate as a fully operational word processor. For convenience the program is in ROM so that it can become a permanent feature of your machine. (It can easily be fitted by your local dealer.) You'll find out more by going to your dealer or by sending for the free catalogue.

To Acornsoft, c/o Vector Marketing, Denington Estate, Wellingborough, Northants NN8 2RL.

Please send me the following:-

PROGRAM	PRICE	QUANTITY	TOTAL	(Code Acornsoft use only)
Number Balance	£11.90			SBE08
Chemical Analysis	£13.80			SBE12
Lisp	£24.35			SBL02/SBD04
Forth	£24.35			SBL01/SBD03
Sphinx Adventure	£9.95			SBG07
Missile Base	£9.95			SBG18
Monsters	£9.95			SBG03
			TOTAL	

I enclose PO/cheque payable to Acornsoft Ltd. Or charge my credit card.

Card Number _____
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Please send me the VIEW catalogue

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Signature _____ CVG6
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ACORNSOFT



PROTECTOR

BY L. BRAINE

RUNS ON A VIC-20 IN 3.5K

Space piracy is ruining the economy of your sector of the galaxy and Star Fleet Command have ordered you, the skipper of an interstellar customs cruiser, to wipe out the pirates at any cost. Their plundering means that galactic taxes may have to put up — and there's an interplanetary election coming up!

Blasting off from your HQ after picking up your orders you soon pick up the space pirates fleet on your scanners. They are approaching you in force and closing fast. The odds are six to one. Your only chance is to quickly switch to hex-drive, which will give you two minutes of super-power and enable you to out manoeuvre the pirate ships and blast them out of the sky. Can you end the pirates reign of terror?

Your score will be shown at the top of the screen, and also the time you have left to complete your task. The high score is also shown.

The program is listed in two parts. First the user-defined graphics and second is the main program.

Program notes:

100-160: main loop. 400-460: ground movement routine. 500-565: joystick and your movement routine. 600-710: space pirates movement routine. 800-980: laser guns routine. 1000-1050: end of program routine.

```

5 POKE52,28:POKE56,28
10 DATA 255,255,255,255,255,255,255,255
20 DATA 0,0,0,0,0,0,0,255
30 DATA 0,0,0,0,0,0,255,255
40 DATA 0,0,0,0,255,255,255,255
50 DATA 0,0,0,255,255,255,255,255
60 DATA 0,0,255,255,255,255,255,255
70 DATA 0,255,255,255,255,255,255,255
80 DATA 0,255,255,189,189,36,66,36
90 DATA 126,90,255,189,36,66,36
100 DATA 0,0,0,63,255,31,0
110 DATA 0,12,126,255,255,254,254,0
120 DATA 0,40,126,255,255,127,127,0
130 DATA 0,0,0,252,255,248,0
140 DATA 73,42,0,99,0,42,73,0
150 DATA 1,3,7,15,31,63,127,255
160 DATA 128,192,224,240,248,252,254,255
190 FORI=7168+32*8TO7168+32*8+7:POKEI,0:NEXT
200 FORI=7168TO7295:READJ:POKEI,J:NEXT
210 PRINT"LOAD"
230 POKE198,3:POKE632,19:POKE633,13:POKE634,13
READY.
  
```


ORIC

SOFTWARE

from TANSOFT

ORIC CHESS



A superb chess game written in Basic with a Machine Code Move Search Routine. Features high resolution colour graphics, record of moves, allows Castling and En-Passant, 5 levels of play and computer can play black or white.

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A 36K adventure game that will test your intelligence and patience for hours. Find the 12 hidden signs of the Zodiac to discover incredible treasures. Can you ward off the angry Yeti? What is the meaning of the radio that plays the 'Archers' over and over again (through your loudspeaker!)?

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Can you fly your new 787 jet on to the runway without crashing, stalling or running out of fuel? Full digital instrument readout plus cockpit view of final runway approach. Superb graphics and sound.

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Zodiac at £9.99		
Oric-Flight at £7.95		
TOTAL		

Postage per cassette is 40p

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All cheques payable to
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3 CLUB MEWS
ELY
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Tansoft is the software division of
Tangerine Computers.

```

560 PRINTLEFT$(A#,G)SPC(18)B$(F)
565 RETURN
570 PRINTLEFT$(A#,G)"||| "SPC(14)" "
575 IFF=1THENF=2:GOTO560
580 F=1:GOTO555
600 Z=21:K=RND(1)
610 IFK.66THENZ=-1:GOTO630
620 IFK.33THENZ=-23
630 IFB(X)+Z<77670RB(X)+Z>8097THENZ=0:POKEB(X),32:B(X)=7789+22*INT(RND(0)*9):GO
T0650
640 POKEB(X),32:B(X)=B(X)+Z
650 POKEB(X),8:POKEB(X)+30720,2:RETURN
660 Z=23:K=RND(1)
670 IFK.66THENZ=1:GOTO690
680 IFK.33THENZ=-21
690 IFB(X)+Z<77670RB(X)+Z>8097THENZ=0:POKEB(X),32:B(X)=7789+22*INT(RND(0)*9):GO
T0710
700 POKEB(X),32:B(X)=B(X)+Z
710 POKEB(X),8:POKEB(X)+30720,2:RETURN
800 TB=250:POKESO,0:I3=0:IFF=2THEN900
810 FORI1=7684+22*(G-1)T07696+22*(G-1):TB=TB-1
820 POKEI1,198:POKEI1+30720,6:POKESO,TB
830 IFPEEK(I1+1)=8THENI2=I1-1:I1=7684+22*(G-1):I3=1:GOTO850
840 NEXT:POKESO,0
845 I2=7696+22*(G-1)
850 FORI4=7684+22*(G-1)T0I2:POKEI4,32:NEXT
860 IFI3=0THENRETURN
870 FORI5=1T04:IFPEEK(B(I5)-1)=198THENI6=I5
875 NEXTI5

```

```

880 POKEB(I6),13:POKESO,250:FORZ=1T099:NEXT
890 POKEB(I6),32:POKESO,0:POKEB(I6)-1,32
892 SC=SC+10:PRINT"|||||SC:IFSC>HCTHENPRINT"|||||SPC(16)SC:P=1
895 B(I6)=7789+22*INT(RND(0)*9):RETURN
900 FORI1=7697+22*(G-1)T07685+22*(G-1)STEP-1:TB=TB-1
910 POKEI1,198:POKEI1+30720,6:POKESO,TB
920 IFPEEK(I1-1)=8THENI2=I1+1:I1=7685+22*(G-1):I3=1:GOTO940
925 NEXT
930 I2=7685+22*(G-1)
940 FORI4=7697+22*(G-1)T0I2STEP-1:POKEI4,32:NEXT
950 IFI3=0THENRETURN
960 FORI5=1T04:IFPEEK(B(I5)+1)=198THENI6=I5
965 NEXTI5
970 POKEB(I6),13:POKESO,250:FORZ=1T099:NEXT
972 SC=SC+10:PRINT"|||||SC:IFSC>HCTHENPRINT"|||||SPC(16)SC:P=1
980 POKEB(I6),32:POKESO,0:POKEB(I6)+1,32
985 B(I6)=7789+22*INT(RND(0)*9):RETURN
1000 PRINT"|||||";:FORB=1T0330:PRINT" ";:POKESO,INT(RND(0)*120)+131:NEXT:POKESO
0
1010 IFSC<HCTHENPRINT"|||||GAME OVER."":GOTO90
1020 HC=SC

```

```

1025 PRINT"|||||NEW HIGH SCORE"
1030 FORZ=1T05
1040 FORZ=131T0254:POKESO,Z:NEXT
1045 FORZ=254T0131STEP-1:POKESO,Z:NEXT
1050 NEXTY:POKESO,0:GOTO90

```



THE MEN WHO INVENTED ME WERE
 CLEVER ENOUGH TO MAKE ME THINK
 IN 'FORTH' (IT'S 10 TIMES FASTER
 AND 4 TIMES MORE COMPACT THAN
 'BASIC').
 YET THEY'RE DUMB ENOUGH TO SELL
 ME FOR £89.95!

Richard Altwasser and Steven Vickers are the men who invented the Jupiter Ace.

After years of designing micro-computers that use BASIC (both men played a major role in creating the ZX Spectrum), they abandoned it in favour of FORTH.

FORTH is just as easy to learn as BASIC. Yet it's a faster, more compact and more structured language that educationalists and professional programmers alike prefer.

So the Jupiter Ace is the only micro-computer you can buy that is designed around FORTH.

Using it, there's little fear of accidentally 'crashing' programs halfway through and having to start all over again (a common fault with BASIC). The Jupiter Ace's comprehensive error checking sees to that.

The Jupiter Ace has a full-size keyboard, high resolution graphics, sound, floating point arithmetic, a fast, reliable cassette interface, 3K of RAM and a full 12 month warranty.

You get all that for £89.95. Plus a mains adaptor, all the leads needed to connect most cassette recorders and TV's, a software catalogue (35 cassettes available, soon to be 50), the Jupiter Ace manual and a free demonstration cassette of 5 programs.

The Jupiter Ace manual is a complete introduction to personal computing and a simple-to-follow course in FORTH, from first principles to confident programming.

Plug-on 16K and 48K memory expansions are also available, at very competitive prices. (There'll be a plug-on printer interface available soon, too.)

It'll take you no time at all to realise how clever Richard and Steven were to design the Jupiter Ace around FORTH. And even less time to realise what a silly price £89.95 is to charge for it.



Technical Information

Hardware
 Z80A, 8K ROM; 3K RAM.

Keyboard
 40 moving keys; auto repeat; Caps Lock.

Screen
 Memory mapped 32 col x 24 line flicker-free display upper and lower case ascii characters.

Graphics
 High resolution 256 x 192 pixel user defined characters.

Sound
 Internal loudspeaker may be programmed for entire audio spectrum.

Cassette

Programs and data in compact dictionary format may be saved, verified, loaded and merged. All tape files are named. Running at 1500 baud.

Expansion Port

Contains D.C. power rails and full Z80 Address, data and control signals. Can connect extra memory peripherals.

Editor

Allows complete editing and listing of compiled programs.

Please send cheque/postal order to:
 Jupiter Cantab Ltd., North Wing, Freemasons Hall,
 Bateman Street, Cambridge CB2 1LZ

Jupiter ACE

Please send me _____ Jupiter Ace microcomputers @ £89.95 (+ £3.95 p. & p.)
 Tick here if you require VAT receipt

Name _____

Address _____

007 02 83

Available for immediate delivery. Allow 14 days for p. & p. U.K. price only (export price on request).

Snakes

You can't escape the coils of this snake as it writhes around your Oric and charms even the most worldly games player. If you've played the arcade game Centipede or some similar game you'll know just what this is all about.

If not this is what you'll see. Your slippery Oric snake has to be steered around the screen with the cursor keys, gobbling up numbers which appear at random. Each time you hit a number the length of the snake increases in proportion to the size of that number — say if you eat a 5 you'll get five extra coils, and so on.

Unfortunately your snake exists in a very confined space and the more he eats the bigger he gets and the less space there is to move around — and if he crosses his own path or bites his tail then the game is all over! Oh yes, just to make things a little more interesting the screen border is definitely no place for a snake to stray. If you hit it you are dead!

This is an addictive little game which you'll be playing again and again just to get the elusive high score.

RUNS ON AN ORIC IN 16K

BY PAT NORRIS AND RICHARD JONES



```

~ ~ ~
1 REM "SNAKE" WRITTEN FOR C.& V.G..1983 R.S.JONES/P.W.NORRIS
5 LORES 0: PAPER 1: INK 7
15 FORZ=2T022:PLOT0,Z,4:NEXT
20 GOSUB 300
30 PLOT 5,10, "00000~": LET L=5 : LET L$="8888": LET D$="8"
40 LET S=L: LET T=S+S:: LET X=9: LET Y=T: LET N=0
50 LET G=INT(RND(1)*36)+1:LET H=INT(RND(1)*21)+2
60 IF SCRN(G,H)<>16ANDSCRN(G,H)<>32THEN50
110 PLOTG,H,CHR$(INT(RND(1)*9)+1+48):FORC=1T015+INT(RND(1)*2*L)
120 IFN<1THENPLOTS,T," ":T=T+(LEFT$(L$,1)="7")-(LEFT$(L$,1)="6")
125 IFN<1THENS=S-(LEFT$(L$,1)="8")+ (LEFT$(L$,1)="5"):L$=MID$(L$,2)
130 LET Y=Y+(D$="7")-(D$="6"):LET X=X-(D$="8")+(D$="5")
132 LET Q=SCRN(X,Y): LET A$=CHR$(Q)
140 PLOT X,Y,"0":LET L$=L$+D$:IF A$>"0" AND A$<"A" THEN LET N=N+VAL(A$)+1
145 IFA$>"0"ANDA$<"A"THENL=L+VAL(A$):C=15+2*L:PLOT24,0,STR$(L):ZAP:GOTO160
150 IFA$<>CHR$(16)ANDA$<>CHR$(32)THEN200
~60 LET A$=KEY$: IF A$>"4" AND A$<"9" THEN LET D$=A$
165 IFN>0THENN=N-1
170 NEXTC:PLOTG,H,CHR$(32-47*(G=XANDH=Y)):GOTO50
200 EXPLODE
201 PLOT S,T," ": LET T=T+(LEFT$(L$,1)="7")-(LEFT$(L$,1)="6")
205 LET S=S-(LEFT$(L$,1)="8")+ (LEFT$(L$,1)="5")
210 L$=RIGHT$(L$,LEN(L$)-1):IFL$<>" "THEN201
215 PLOT 8,8,"PRESS 'R' FOR ANOTHER"
216 PLOT 8,10,"PRESS 'S' TO STOP"
220 IF KEY$="R" THEN RUN
230 IF KEY$<>"S" THEN GOTO 220
240 TEXT:CLS:LIST
300 REM BORDER
310 LORES 0
320 PLOT 1,0,"Snake          Score :- 5          "
330 PLOT 0,1,"*****"
340 FOR I=1 TO 22: PLOT 0,I,"*": PLOT 37,I,"*": NEXT I
350 PLOT 0,23,"*****"
360 RETURN
  
```

Holy Moses! God has sure given me a tough task this time. I was sitting minding my own business, thinking holy thoughts, when there was this great clap of thunder, a flash of lightning, and this voice that filled my head until I thought it was going to burst!

The voice said, "I God, instruct you Moses to lead the Israelites away from Egypt to the Promised Land. But beware as the Pharaoh will pursue you with his armies and attempt to make you slaves again. Take the road towards the Red Sea and freedom.

I will help you provided no more than 2000 Israelites die on the journey. I have one miracle that I can use to aid your escape — but you must reach the Red Sea first. The Promised Land lies on the other side of this sea which you must cross.

Then you must take the Israelites to the place of the tablets, on which are engraved the Ten Commandments. Here you will be safe from the Egyptians and any other dangers."

So that's why we are trudging across these parched lands towards our Promised Land — with the Egyptian Pharaoh's armies hot on our heels.



THE TEN COMMANDMENTS

```

7 GRAPHICS 1:SETCOLOR 2,0,0
8 POSITION 0,10: ? #6;"the ten commandments"
9 FOR E=-10 TO 10
10 SOUND 0,200,4,10-ABS(E)
11 SOUND 1,255,4,10-ABS(E)
12 SOUND 2,225,4,10-ABS(E)
13 SOUND 3,150,4,10-ABS(E)
14 FOR K=1 TO 200:NEXT K:NEXT E:SOUND 0,0,0,0:SOUND 1,0,0,0:SOUND 2,0,0,0:SOUND 3,0,0,0
15 DIM A$(30)
17 GOTO 100
18 FOR F=1 TO INT(19*RND(0))+1:READ A$:NEXT F:RETURN
20 C=SQR(Q)*5
21 IF Q=1 THEN C=INT((Q*Q)-(INT(10*RND(0))))
22 IF Q>1 AND Q<=2 THEN C=INT((Q*Q)-(INT(10*RND(0))))
23 IF Q>2 AND Q<=3 THEN C=INT((Q*Q)-(INT(10*RND(0))))
24 IF Q>3 AND Q<=4 THEN C=INT((50*RND(0))+Q*2)
25 IF Q>4 AND Q<=5 THEN C=INT((65*RND(0))+Q*2)
26 IF Q>5 THEN C=INT((99*RND(0))+Q*2)
27 RETURN
30 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0,0:FOR E=1 TO 8:PRINT :NEXT E:PRINT " Thou has failed me Moses...I saideth"

```

RUNS ON AN ATARI 400/800 IN 5K

BY MARK BELL

```

31 PRINT " to You not more than 2000 people ":PRINT " should die...":D+L:" people have died."
32 FOR E=1 TO 1550:NEXT E:PRINT " ...and so shall You.":FOR E=1 TO 999:NEXT E:GOTO 830
33 GRAPHICS 0:SETCOLOR 2,0,0:POKE 752,1:FOR E=1 TO 10:PRINT :NEXT E:PRINT " Would thou care to try again ?"
34 PRINT " (Yay or Nay)":POKE 764,255
35 IF PEEK(764)=255 THEN 35
36 IF PEEK(764)=35 THEN PRINT :PRINT " THANKS FOR THE GAME.":POKE 764,255
5:POKE 752,0:END
37 POKE 764,255:RUN
90 PRINT " The people are unhappy because they ":PRINT "are hungry and fear death or sickness.":RETURN
98 D=(D+L):IF D+L>2000 THEN 30
99 RETURN
100 I=INT(34000*RND(1))+9000
101 G=INT(9000*RND(1))+2000

```

```

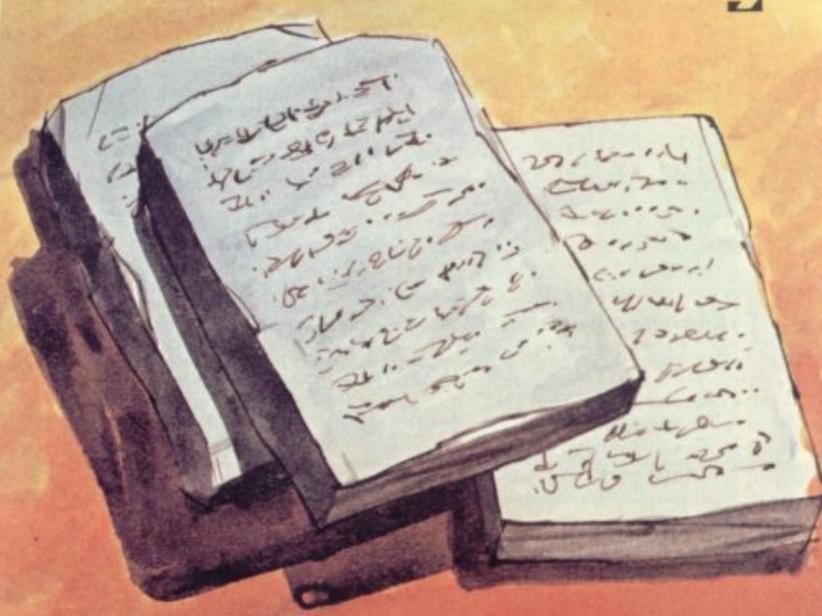
102 D=INT(400*RND(1))+50
103 S=INT(420*RND(1))+20
104 Q=INT(10*RND(1))+5
105 M=INT(500*RND(1))+100
106 L=0:T=0
107 GRAPHICS 0:SETCOLOR 2,0,0:POKE 752,1
109 PRINT :PRINT :PRINT
110 PRINT " I God, instructeth You Moses
to lead":PRINT " the Israelites away fr
om Egypt to"
112 PRINT " safety. Beware as Pharoah p
ursueth":PRINT " after You with his armi
es."
115 PRINT " If thou wouldest to take t
he road":PRINT " to the Red Sea, I would
lendeth my "
117 PRINT " help provided not more than
2000 ":PRINT "Israelites are killed. I
have but one"
118 PRINT " miracle that You are free t
o use ":PRINT " when You reach the Red
Sea. On the"
119 PRINT " other side of the sea is th
e ":PRINT " Promised Land."
120 PRINT "Take thou Israelites to the p
lace of ":PRINT " the Ten Tablets with
the Eternal "
122 PRINT " Commandments enscribed on th
em. ":PRINT " Here thou will be saf
e."
125 PRINT :PRINT :PRINT " PRESS [SPA
CE BAR] TO CONT.":POKE 764,255
126 IF PEEK(764)=255 THEN 126
127 IF PEEK(764)=12 THEN 128
128 POKE 764,255
160 IF Q<=0 THEN GOSUB 13000
162 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0,0
:PRINT :PRINT :GOSUB 18
165 RESTORE
170 PRINT "There are ";I;" Israelites wi
th You.":PRINT :PRINT "You are passing t
he city of ";A$;". "
175 PRINT "The Egyptians are ";Q;:IF Q<=
1 THEN PRINT " day behind You";
176 IF Q>1 THEN PRINT " days behind You.
"
178 Q=Q-1
180 IF (D+S)>230 THEN GOSUB 90
182 IF D+L>=2000 THEN 30
185 GOSUB 20
190 PRINT " You're chance of succession
is ";INT(C);"% "
200 PRINT :PRINT " You have ";G;" tons o
f grain. How ":PRINT " much do You wish
to share amongst "
201 PRINT " the Israelites ";:INPUT Z
202 G=G-Z
203 IF G<=0 THEN GOSUB 830
204 IF Z<INT(G/(Q+1)) THEN GOSUB 800
205 FOR E=1 TO 6:PRINT :NEXT E:PRINT "
PRESS [SPACE BAR] TO CONT.":POKE 764,2
55

```

```

206 IF PEEK(764)=255 THEN 206
207 IF PEEK(764)=12 THEN 208
208 POKE 764,255
210 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0,0
:GOSUB 18:PRINT :PRINT :PRINT "You are p
assing the town of ";A$;". "
211 RESTORE :IF M>=2500 THEN GOTO 11000
212 A=INT(250*RND(0))+100:W=INT(290*RND(
0))+50:IF Q<=0 THEN GOSUB 13000
213 PRINT :PRINT " The Egyptians are ";Q
;:IF Q<=1 THEN PRINT " day behind You.";
214 IF Q>1 THEN PRINT " days behind You.
"
215 T=INT(220*RND(0))+100
216 Q=Q-1:M=(M+T):I=I-(D+W)
217 PRINT :PRINT " You have travelled ";
M;" miles so far.":IF M>2500 THEN GOTO 1
1000
219 PRINT :PRINT " There are ";I;" Israe
lites with You.":PRINT :PRINT " You have
";G;" tons of grain."
220 PRINT :PRINT " ";(W)+D;" Israelites
have died.":PRINT :PRINT " ";(S)+A;" Isr
aelites are sick."
221 D=(D+W):S=(S+A):GOSUB 98
222 GOSUB 20:PRINT :PRINT " Your chance
of succession is ";INT(C);"% "
223 FOR E=1 TO 4:PRINT :NEXT E:PRINT "
PRESS [SPACE BAR] TO CONT.":POKE 764,2
55
224 IF PEEK(764)=255 THEN 224
225 IF PEEK(764)=12 THEN 226
226 POKE 764,255
227 IF C<50 AND D<=200 AND S<=200 AND M>
=1500 THEN GOTO 11000
228 IF M>=2500 THEN GOTO 11000
229 IF M<400 OR M<400 AND D>50 AND S>90
THEN GOSUB 12000
235 GOTO 160
800 PRINT :PRINT " The Israelites are re

```



```
volting!!":PRINT :PRINT " They need more food."
```

```
810 GOSUB 20:GOTO 190
```

```
830 FOR E=1 TO 8:PRINT :NEXT E:PRINT " There is no more grain left. ":PRINT " The Israelites will starve - You "
```

```
835 PRINT " have failed me Moses!":PRINT :PRINT " You must suffer the consequences."
```

```
840 FOR E=1 TO INT(990*RND(1))+500 STEP 10
```

```
842 SETCOLOR 2,E,E
```

```
843 SETCOLOR 2,10,E
```

```
844 SOUND 1,255,E,6
```

```
845 SOUND 2,E,8,5
```

```
846 NEXT E
```

```
847 SOUND 1,0,0,0:SOUND 2,0,0,0:SETCOLOR 2,0,0
```

```
848 FOR E=1 TO 1000:NEXT E:GOTO 33
```

```
9050 DATA Damascus
```

```
9051 DATA Beersheba
```

```
9052 DATA JUDAEA
```

```
9053 DATA Bethlehem
```

```
9054 DATA Sidon
```

```
9055 DATA Nazareth
```

```
9056 DATA Cana
```

```
9057 DATA Jericho
```

```
9058 DATA SAMARIA
```

```
9059 DATA Jordan
```

```
9060 DATA GALILEE
```

```
9061 DATA Capernaum
```

```
9062 DATA Tyre
```

```
9063 DATA Joppa
```

```
9064 DATA Tiberias
```

```
9065 DATA Bethany
```

```
9066 DATA Gadara
```

```
9067 DATA JERUSALEM
```

```
9068 DATA Caesarea
```

```
9069 DATA Lama
```

```
11000 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0,0:FOR E=1 TO 8:PRINT :NEXT E
```

```
11010 PRINT " Thou has done well Moses in reaching":PRINT " the Red Sea so soon. ..I will reward "
```

```
11020 PRINT "thee by parting the ocean before You ":PRINT " so You can pass through unharmed."
```

```
11021 FOR L=1 TO P
```

```
11022 FOR J=0 TO 45 STEP 2
```

```
11023 SOUND 0,J,8,4
```

```
11024 FOR K=1 TO 20+RND(0)*10:NEXT K
```

```
11025 NEXT J
```

```
11026 FOR J=45 TO 0 STEP -2
```

```
11027 SOUND 0,J,8,4
```

```
11028 FOR K=1 TO 50+RND(0)*30:NEXT K
```

```
11029 NEXT J:FOR K=1 TO 300+RND(0)*300:NEXT K:NEXT L
```

```
11030 SOUND 0,0,0,0:GOTO 14000
```

```
12000 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0,0:FOR E=1 TO 8:PRINT :NEXT E
```

```
12010 PRINT " Thou better buck their idea as up if ":PRINT " thou wanteth to finish!!"
```

```
12020 FOR E=1 TO 520:NEXT E:RETURN
```

```
13000 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0,0:FOR E=1 TO 8:PRINT :NEXT E
```

```
13010 PRINT " Moses the Egyptians are upon You!!":PRINT " Thou has failed me for the last time"
```

```
13020 PRINT " ...I shall leave thee to the mercy ":PRINT " of the Egyptians."
```

```
13025 FOR E=1 TO 1200:NEXT E
```

```
13030 GOSUB 840:GOTO 33
```

```
14000 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0,0:FOR E=1 TO 6:PRINT :NEXT E
```



```
14005 V=INT(8*RND(0))+1
```

```
14010 IF Q=1 THEN PRINT " Thou must hurry as the Egyptians ":PRINT " are less than a day away."
```

```
14015 IF D<=1400 THEN PRINT " Thou have crossed the sea with only ";V;" deaths. ":I=I-V
```

```
14020 IF D>1600 THEN PRINT " The Egyptians are upon thee. Thou ":PRINT " has failed me...You will ";
```

```
14025 IF D>1600 THEN PRINT "drown with the rest of your followers.":GOSUB 840:GOTO 33
```

```
14032 PRINT " Thou is now in the Promised Land."
```

```
14034 PRINT " ";I;" followers have crossed safely":PRINT " with thee and await for the final ":PRINT " journey."
```

```
14036 IF D>1400 AND D<=1600 THEN PRINT " Thou is not out of danger yet as ":PRINT " most of the Egyptian";
```

```
14038 IF D>1400 AND D<=1600 THEN PRINT " army got through and are following thee once again."
```

```
14039 IF V<4 THEN POKE 752,1
```

```
14040 IF V<4 THEN PRINT " The Egyptians are here!!...There is"
```

```
14042 IF V<4 THEN PRINT " nothing we can do...They have us!":GOSUB 840:GOTO 33
```

```
14050 IF V>=4 THEN POKE 752,1
```

```
14052 PRINT " Thou has only ";INT(V^2);" miles to go.":PRINT " ";V*2;" people have died since crossing."
```

```
14053 GOSUB 14090
```

```
14054 IF V>=4 THEN I=I-INT(V*2):D=D+(V*2):GOSUB 98
```

```
14055 IF D<=1982 AND V<25 THEN PRINT :POSITION 16,19:PRINT " MOSES!!"
```

```
14056 IF D<1982 AND V<25 THEN PRINT " MOSES!!...Thou has made it to the ":PRINT " place of the TEN COMMANDMENTS."
```

```
14057 X=INT(((I*6)+(Q*V)-(D*5))/100000)
```

```
14060 PRINT :PRINT :PRINT " Thou scored ";X;" points."
```

```
14070 PRINT :PRINT " PRESS [SPACE BAR] TO RET.":POKE 764,255
```

```
14072 IF PEEK(764)=255 THEN 14072
```

```
14074 IF PEEK(764)=12 THEN 14076
```

```
14076 POKE 764,255:GOTO 33
```

```
14090 FOR Y=0 TO 30:FOR P=1 TO 3 STEP 2
```

```
14091 NEXT P
```

```
14092 FOR P1=1 TO 5
```

```
14093 IF P1=2 THEN GOSUB 9000
```

```
14094 FOR DF=1 TO 15:NEXT DF
```

```
14095 NEXT P1
```

```
14096 NEXT Y
```

```
14099 RETURN
```



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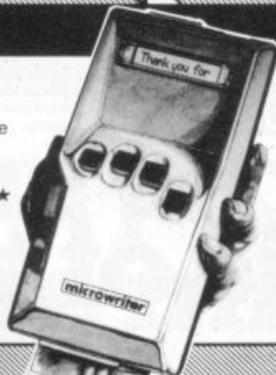
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Limited stock of games available at certain stores.

BY A. R. HEAD

RUNS ON A SHARP

MZ80K IN 2.5K

```
530 FORN=1TORU
540 J=RND(1):IFJ<HA(N)THEN570
550 G(N)=G(N)+1:T=PEEK(G(N)):IFT>0THEN600
560 POKEG(N),120:POKEG(N)-1,0
570 NEXTN
580 GOTO530
600 MUSIC"BB"BB"
610 POKEG(N),120:POKEG(N)-1,0
620 PRINT"#####THE WINNER WAS No.":N;" AT":A(N,1);"/":A(N,2)
630 POKE4466,20
640 IFE<>NTHENPRINT"HARD LUCK":GOTO680
650 W=INT(A(N,1)*F/A(N,2))
660 PRINT"YOU HAVE WON £":W
670 S=S+W+F
680 PRINT
690 PRINT"PRESS C TO CONTINUE"
700 GETC$:IFC$="C"THEN710
705 GOTO700
```

```
710 IFS=0THENB30
720 NEXTR
730 PRINT"@"
740 PRINT"AT THE END OF THIS AFTERN00NS RACING YOU HAVE £":S
750 PRINT
760 PRINT"I WISH YOU LUCK NEXT TIME"
770 PRINT
780 FORN=1TO2000:NEXTN
790 PRINT"ANOTHER GO Y/N"
800 GETC$:IFC$=""THENB00
810 IFC$="N"THENB80
820 GOTO120
830 PRINT"@"
840 PRINT"YOU HAVE NO MONEY LEFT- TIME TO GO HOME"
850 PRINT
860 PRINT"BETTER LUCK NEXT TIME"
870 GOTO770
880 END
890 DATA1.30pm,2.00pm,2.30pm,3.00pm,3.30pm,4.00pm
```

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Program notes:

Line 150 decides how many runners in the race and resets Z to the screen address of the starting position of the first runner.

Line 210 selects the odds.

Lines 220, 230 reduce the odds to the lowest denominator.

Line 250 handicaps the horse according to its odds.

530-580, the race is run between these lines. The Peek in 550

checks if a horse has finished.

POKE 4466, X — print X lines down.

POKE 4465, Y—print Y columns in.



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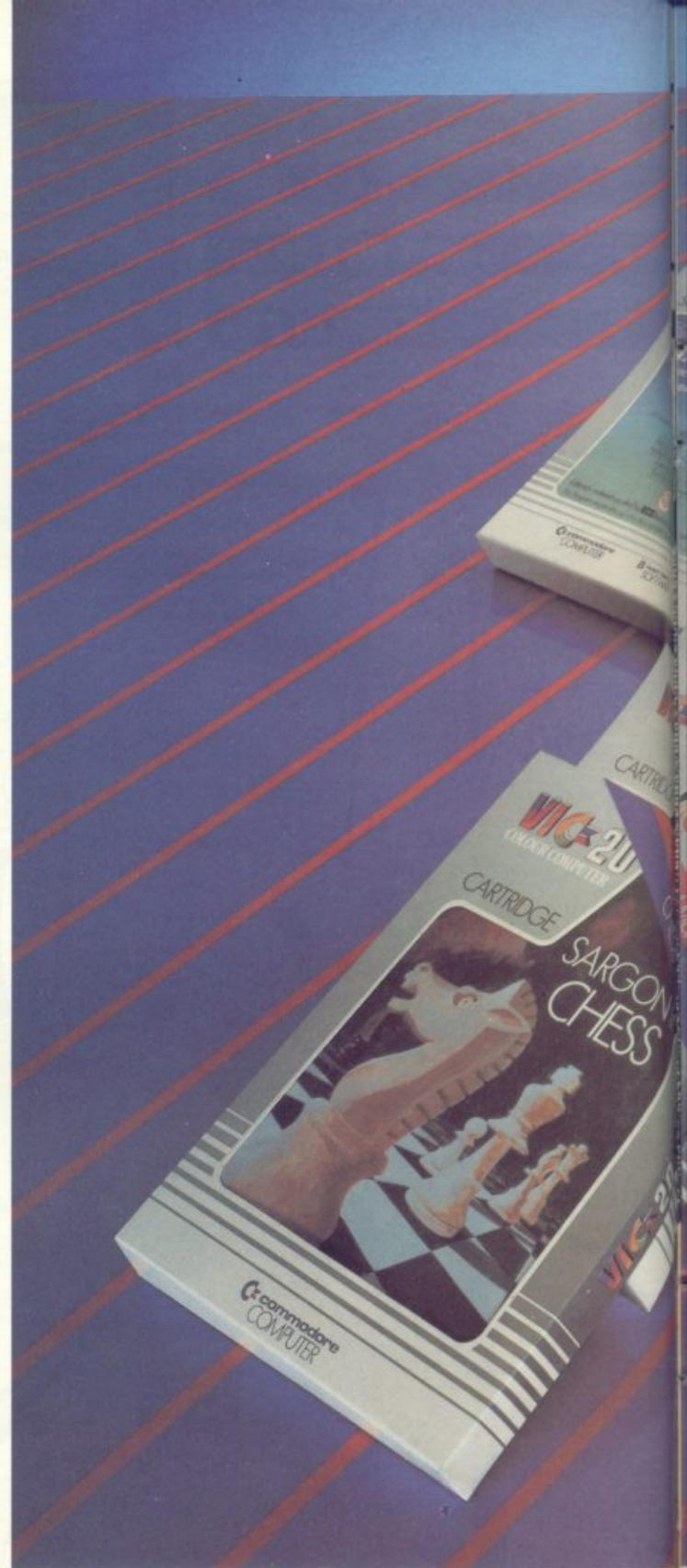
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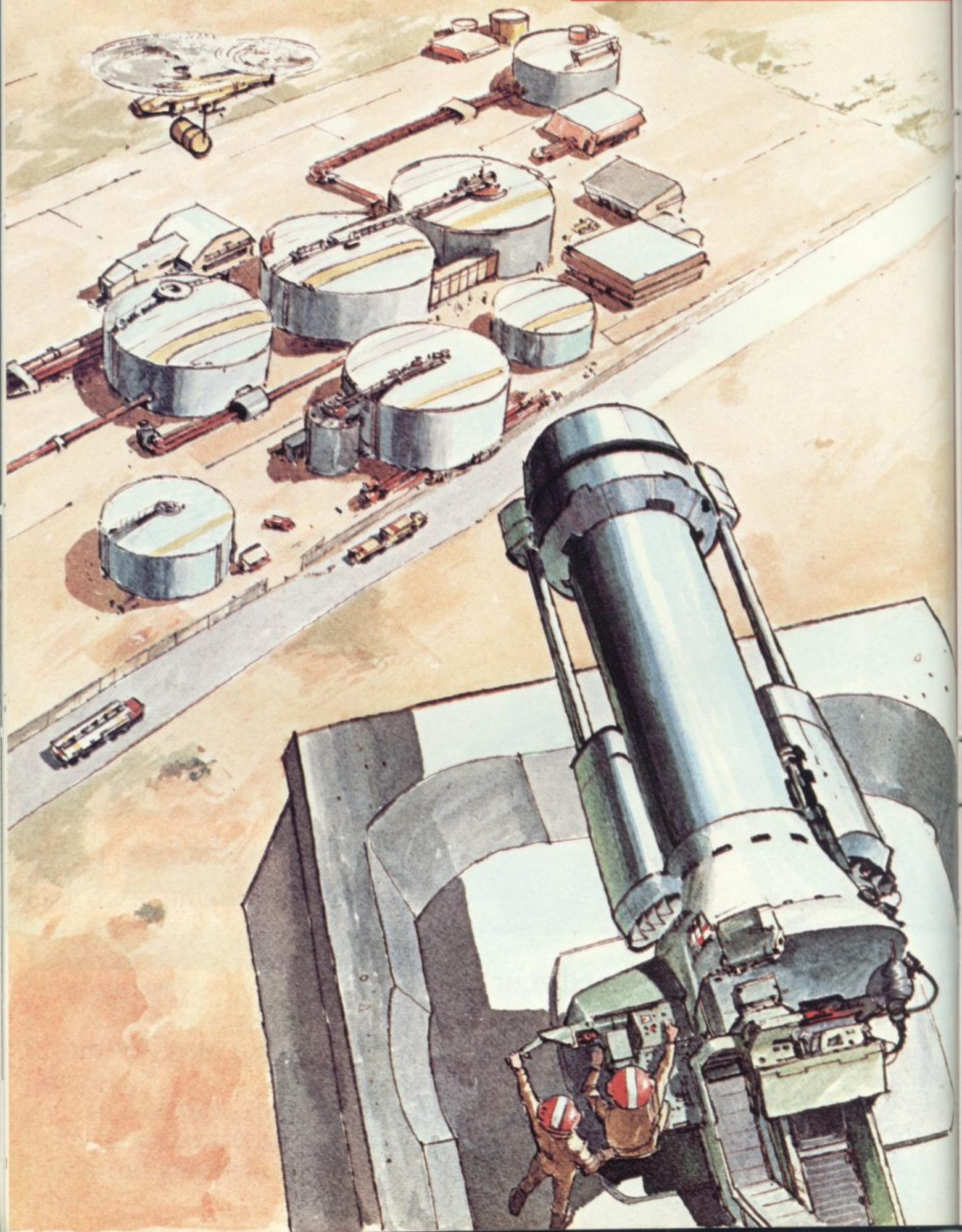


to add to your understanding and enjoyment of computers and computing.

There's even a special 'VicSoft' Club for VIC 20 enthusiasts, with many advantages including special offers to club members.

RUNS ON A ZX81 IN 16K

BY MICHAEL NADEN



CANNON MASTER

You perch like some sinister bird high atop a tall and graceful battle-tower waiting for the next attack — which you know will come all too soon. The enemy is determined to destroy your fuel supplies and only you — and commander of two battle-towers which defend a blasted plateau which serves as a fuel-supply depot for your armed forces — can protect the valuable stockpile. Will you be able to beat off the alien attack? Or will the invaders destroy you and your planet?

Once you have programmed in this life and death struggle you will see two towers appear on the screen. The '+' signs at the bottom of the screen mark the locations of the fuel supplies which you have to protect.

There are three cannons in each of the towers which remain hidden until fired at the advancing aliens. The laser blast from each cannon will reach halfway across the screen. To make the game harder you have limited power for your cannons. If you find they do not fire you must wait a few seconds for them to recharge.

Also the aliens can destroy your weapons — but will not be harmed themselves. They can only be destroyed by a direct hit or a collision with one of the towers.

Once two fuel-dumps are destroyed by the invaders the game is over.

The controls:

Keys 1, 2, 3, 4, or 5 fire top left cannon. Keys Q, W, E, R or T fire middle left cannon. Keys A, S, D, F or G fire bottom left cannon.

Keys 6, 7, 8, 9 or 0 fire top right cannon. Keys Y, U, I, O or P fire middle right cannon. Keys H, J, K, L or N/L fire bottom right cannon.

```

10 LET U=0
20 POKE 16418,0
30 SLOW
40 LET C=16514
50 LET S=0
60 PRINT AT 0,0;
70 FOR A=1 TO 24
80 PRINT "
90 NEXT A
100 LET P=50
110 LET J=6
120 FOR A=1 TO 15
130 PRINT AT A,4;"
140 NEXT A
150 FOR A=1 TO 4
160 PRINT TAB 4;"
170 NEXT A
180 LET Z=1+PEEK 16396+256*PEEK
16397
190 LET A=Z+INT (RND*13)+8
200 LET B=Z+INT (RND*13)+8
210 PRINT AT 16,12;"
220 POKE A,128

```

Illustration: Jon Davis

```

230 LET P=P+2.5
240 LET A=A+INT (RND*3)+32
250 IF PEEK A=8 THEN GOSUB 540
260 IF PEEK A=149 THEN GOSUB 68
0
270 POKE A,151
280 IF PEEK 16421<>255 THEN GOS
UB 360
290 POKE B,128
300 LET B=B+INT (RND*3)+32
310 IF PEEK B=8 THEN GOSUB 540
320 IF PEEK B=149 THEN GOSUB 68
0
330 POKE B,151
340 IF PEEK 16421<>255 THEN GOS
UB 360
350 GOTO 220
360 LET Q=PEEK 16421
370 PRINT AT 22,1;"
380 IF P<0 THEN PRINT AT 22,1;"
NO POWER"
390 IF P<0 THEN RETURN
400 LET P=P-10
410 LET C=Z+139*(Q=247)+238*(Q=
251)+337*(Q=253)+220*(Q=239)+319
*(Q=223)+418*(Q=191)
420 LET D=(Q=247 AND Q<=253)-(
Q=191 AND Q<=239)
430 IF PEEK C=128 THEN RETURN
440 LET N=C
450 POKE C,(146*(D=1)+147*(D=-1
))
460 FOR C=N+D TO N+(7*D) STEP D
470 IF PEEK C=151 THEN GOTO 540
480 POKE C,150
490 NEXT C
500 FOR X=N+D TO C STEP D
510 POKE X,128
520 NEXT X
530 RETURN
540 IF PEEK C=151 THEN LET H=C
550 IF PEEK C=151 THEN LET S=S+
10
560 IF PEEK A=8 THEN LET H=A
570 IF PEEK B=8 THEN LET H=B
580 FOR I=1 TO 5
590 POKE H,23
600 FOR F=1 TO 1000
610 POKE H,151
620 NEXT I
630 POKE H,128
640 IF H=A THEN LET A=Z+INT (RN
D*14)+9
650 IF H=B THEN LET B=Z+INT (RN
D*14)+9
660 IF H=C THEN GOTO 500
670 RETURN
680 LET I=155
690 IF PEEK A=149 THEN LET H=A
700 IF PEEK B=149 THEN LET H=B
710 POKE H,I
720 POKE H-32,I
730 POKE H-34,I
740 POKE H-63,I
750 POKE H-69,I
760 POKE H-29,I
770 POKE H-37,I
780 IF I=128 AND J=4 THEN GOTO
830
790 IF I=128 THEN GOTO 640
800 LET I=128
810 LET J=J-1
820 GOTO 710
830 PRINT AT 21,1;"YOU SCORED"
840 LET S$=STR$ S
850 FOR L=1 TO LEN S$
860 PRINT CHR$ (CODE S$(L)+128)
870 NEXT L
880 PRINT "POINTS"
890 IF S$=STR$ U THEN GOTO 940
900 IF S>U THEN LET U=S
910 PRINT AT 22,1;"HIGH SCORE I
S"
920 LET S$=STR$ U
930 GOTO 850
940 IF INKEY$<>" THEN GOTO 940
950 PRINT AT 9,9;"HIT ANY KEY"
960 FOR F=1 TO 100000
970 PRINT AT 9,9;"HIT ANY KEY"
980 IF INKEY$="" THEN GOTO 950
990 GOTO 20

```



An Exciting range for 16K ZX81
from SOFTWARE FARM



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YOUR MISSION

To penetrate the witches defences, enter her cavern and destroy her wicked heart.

THE WITCHES DEFENCES

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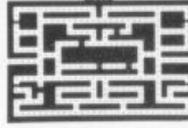
Volcanoes - to get past alive - if you can!
Vampire Bats - that cling to your ship and make controls sluggish

Cave-ins - should you hit the side of the cave with your Laser Cannon or Bomb, part of the roof will cave in on you



- Written entirely in machine code
- Hall of Fame
- 1 or 2 players
- Mystery score positions to bomb
- 5 skill levels

GOBBLERS Mk 2



Beat that high score!
Gobble those dots before those meanies gobble you!
Your only aids are four 'Power Pills' which make the meanies edible. But not for long!

- Machine coded for fast action
- Extra 'Gobbler' for 10,000 points
- On screen scoring
- High score with enter name facility
- Up to 4 players

Improved Mk 2 version!

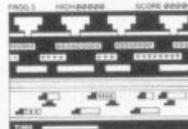
ASTEROIDS

Stay alive as long as possible in open space filled with flying rocks. Score by shooting them - which also causes them to break into lots of little bits and makes life even worse!

- Machine coded for fast action
- On screen scoring
- High score with enter name facility
- Up to 4 players
- Extra ship for 1,000 points (not as easy as it sounds!)
- Ship moves just like arcade version
- Rotate left/rotate right/thrust
- Fires in all 8 directions
- Increasing number of asteroids
- Three asteroid sizes
- alien spaceship (fires back!)

**All games
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- 50 Skill levels!
- Played against the clock - froggie only has a short while to live!

Jump your frog over the lanes in the road - preferably without being turned into jam by the approaching traffic! Then cross the river by hitching a few rides on some passing logs and finally into the safety of your hole on the opposite bank. Once all 'Frog Holes' have been filled you start again with a different pattern and a bonus frog.

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SCORE.

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KEYS OR JOYSTICK,
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"It has great graphics, sound effects, and music. The action is very fast"
U.S. Compute Mag. Feb. 83 **£6.99**



3-D MAN VIC + 3k, + 8k, + 16k Joystick

Brilliant! You are like Pacman, down in the maze in three dimensions. Race down the corridors dodging the ghosts and gobbling up the energy dots. Radar screen also provided to guide you around.

"The graphics are extremely fast and superbly done"
U.S. Compute Magazine. Feb. 83 **£9.95**



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Race against the clock. Fly your starship through the maze of Tri, an abandoned space station. You must rescue some scientists before the station hits the sun. Activate your shields and conserve your fuel through 4 screen levels.

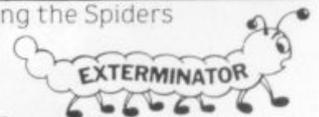
"This game is exceptionally well done. The graphics are great. The action is fast. The sound effects are good."
U.S. Compute Magazine. Feb. 83 **£9.95**

Programs Available From
VISION STORE 3 Eden Walk Precinct,
Kingston-on-Thames
Surrey. Tel: 01-546 8974

EXTERMINATOR STD 5k VIC. Key or Joystick

Blast the centipede while dodging the Spiders amongst the toadstools. The Vic version of the famous arcade game. Machine Code.

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All machine code, accelerate towards the oncoming traffic while dodging from lane to lane. Joystick steers and accelerates. Program keeps five highest scores. Excellent use of graphics. **£9.95**

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CVG6/83

C & VG SOFTWARE FORM

Have you written a games program which you feel is just right for C&VG? If so we have come up with a form to ensure that we can test it out and give you our views on it, as quickly as possible.

We would prefer a tape and listing but can work from just a tape and will return it to you if it doesn't find its way into the magazine. We will also need an additional sheet explaining the game and its theme. And any documentation like lists of variables or how certain routines are working, would be of great help to beginners. Please make sure that your name, address and the program name is on everything

you send us, including the cassette itself.

This form will merely help us to keep a check on your game as it goes through our testing process and make sure we have all the information we need to present it properly in the magazine.

If you don't want to cut up the magazine, we will accept photocopies or close copies of this page. This form will be appearing regularly in C&VG issues from now on.

Remember we pay £10 for each listing published and you could win our Programmer of the Year Contest where we will try to turn the winner into a best-selling games author.

Program name:

Machine make: Model

Other models it should run on: Number of K needed to run it:

Other equipment (joysticks, Extended Basic, add ons, etc.) needed to run it:

Author's name: Christian name: Sur-name:

Address:

Tel: Date:

Type of game: (If original please say so)

Loading instructions:

Game instructions: (If not included in the listing)

Office use only

Date received:

Evaluator's comments

Acknowledgement sent:

Good enough to publish

Name of evaluator:

Needs some tidying up

Date sent out:

Not worth publishing

Date due back:

Same game already published on this micro

Needs to be returned to author for alterations: Date sent:

Wouldn't load

Due to be published in issue of magazine.

LOOK FOR THE ULTIMATE SIGN FOR THE ULTIMATE GAMES



PSSST for 16 or 48K SPECTRUM

Little vermin, leave my plant alone, Oyl sucking the life from my Thyrogodian Megga Chrisanthoddi, making her shrink, will and die. I'll soon put a stop to their little game, quick Spray-O-Mustn't die, mustn't die. Take that and that. I'll said on the packet, "Take between two and five minutes to grow". It can't be much longer, won't be long now. Why! you little, little... Quickly, get the super slug spray, and then the leech laser. Hurry! ... Arrggg! ...

PSSST ... The ULTIMATE Challenge. sound effects, amazing 100% machine code, incredible graphics, and that totally new additive concept and ULTIMATE GAME people. Now you know why 'ULTIMATE PLAY THE GAME' ... Go grow yourself a REAL game. Design: 'ULTIMATE PLAY THE GAME'

JET PAC for 16 or 48K SPECTRUM

The Acme Interstellar Transport Company is delivering Spaceship kits to various Planets throughout the Galaxy, and as chief test pilot, all you have to do is assemble the Rocket and thrust on to your next destination. Bull as you don't often get the chance to get rich! You might just space travel is, oh so expensive, now's your chance to get rich! You might just as well stop off on several planets on your journey, collect the odd sack of precious gems, elements or gold, and take them back with you. Upon landing, you will find yourself equipped with the very latest Hydrovac Phasers, to blast any nasty mean, life aliens who might object to your visit. And my do those aliens get upset when you collect all of their valuables, and sneak off, without so much as a by-your-leave.

JET PAC Arcade standard, 100% machine code, incredible sound effects, amazing smooth high resolution visual graphics, the totally new additive concept and all those extra features you expect from the ULTIMATE GAME. Now you know why 'ULTIMATE PLAY THE GAME'.

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Post this coupon now, to **ULTIMATE PLAY THE GAME, The Green, Ashby de la Zouch, Leicestershire LE6 5JU**

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KEMPSTON joystick information

I enclose PO/cheque for £.....

Name.....

Address.....

ULTIMATE PLAY THE GAME is made by W. H. Smith, John Menzies & Co. Ltd.

9 REM

MINI-EMULATED BOX

```

10 DIM v(5): DIM w(5): DIM x(5)
11 DIM y(5)
20 POKE 23609,5
30 GO TO 2800
39 REM absorption noise
40 FOR b=0 TO 12
50 BEEP .01,12
60 NEXT b
70 LET p$="absorbed"
80 INVERSE 1
90 GO TO 1200
99 REM deflection noise
100 FOR b=12 TO 14 STEP .2
110 BEEP .01,b
120 NEXT b
130 FOR b=24 TO 26 STEP .2
140 BEEP .01,b
150 NEXT b
160 LET p$="deflected"
170 GO TO 1240
179 REM reflection noise
180 FOR b=0 TO 12
190 BEEP .01,b
200 NEXT b
210 FOR b=11 TO 0 STEP -1
220 BEEP .01,b
230 NEXT b
240 LET p$="reflected"
250 GO TO 1200
259 REM straight noise
260 FOR b=24 TO 28 STEP .2
270 BEEP .01,b
280 NEXT b
290 LET p$="straight"
300 GO TO 1240
309 REM clear ray description
310 FOR r=7 TO 11
320 PRINT AT r,0;"
330 NEXT r
340 RETURN
349 REM

```

initialise for new game

```

350 LET paper=0: LET ink=2
360 LET currow=10: LET curcol=1
370 LET peg=0: LET right=0
379 REM input and check number
380 INPUT TAB (5); "How many peg
389 IF LEN (i$)>1 THEN GO TO 38
390 IF CODE (i$)<52 OR CODE (i$)
400 THEN GO TO 380
410 LET nopeg=VAL (i$)
420 IF ATTR (0,0)=120 THEN GO S
429 REM randomly position pegs
and check that all are
in different positions
430 RANDOMIZE
440 FOR n=1 TO nopeg
450 LET v(n)=INT (RAND*0+1)
460 LET w(n)=INT (RAND*0+9)
470 FOR d=0-1 TO 1 STEP -1
480 IF v(n)=v(d) AND w(n)=w(d)
490 THEN LET n=n-1: GO TO 500
500 NEXT d
510 NEXT n
520 FOR n=1 TO nopeg
530 LET x(n)=v(n)+10
540 LET y(n)=w(n)+10
549 REM

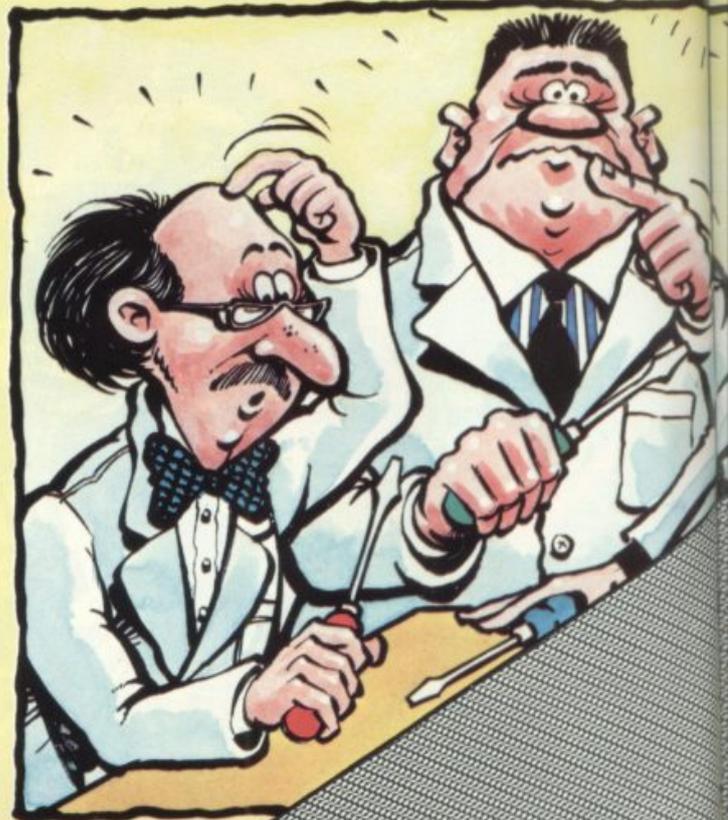
```

Normal mode

```

550 LET deflec=0
559 REM input and check guess
560 INPUT TAB (6); "Your guess (0
569 IF LEN (i$)>1 THEN GO TO 550
570 IF CODE (i$)<45 OR CODE (i$)
580 THEN GO TO 550
590 IF VAL (i$)<0 OR VAL (i$)>3
600 THEN GO TO 550
610 IF VAL (i$)=0 THEN GO TO 15
620

```



THE BLACK BOX

```

600 PAPER 7: INK 2
610 GO SUB 310
620 LET entry=VAL (i$)
630 GO SUB 1400
640 IF ATTR (erow,ecol)=71 THEN
649 REM display warning if
entry square already used
650 PRINT AT 7,3-(LEN (i$)-1);e
ntry; " "
660 PRINT AT 9,1;"already"
670 PRINT AT 11,2;"used"
680 FOR b=1 TO 5
690 BEEP .05,35
700 NEXT b
710 GO TO 550
719 REM tell player that ray
path being plotted
720 PRINT AT 7,0;"plotting"
730 PRINT AT 9,0;"course of"
740 PRINT AT 11,0;"ray now..."

```

Illustration: Terry Rogers



RUNS ON A

SPECTRUM IN 48K

BY JEREMY HEPPELL

Dare you delve into the Black Box and decipher its hidden secrets? This is a challenging game of deduction in the Mastermind mode.

Your Spectrum will create a code which you have to crack. The code takes the shape of four pegs hidden in an eight by eight grid — the "black box".

You have to attempt to crack the code by sending in "rays" from the edges of the box. These rays always travel in a straight line — unless they hit a peg. When this happens you'll get a clue to the whereabouts of the hidden pegs.

The rays behave in a completely logical fashion. When they strike a peg the ray will either be absorbed, deflected at right angles or reflected back the way it came. From the actions of the rays you will be able to deduce the positions of the pegs. But beware some rays will follow long and tortuous routes which can be baffling!

When the game begins you are in normal mode, where you fire rays in from the outside edges of the box. When you think you know the location of any, or all, the pegs, type 0 and you will enter cursor mode. Using the controls listed on the screen you plot the pegs which you think you have found. When you reckon that you know the positions of all the pegs type in 9 (in cursor mode) and the computer will mark your final guess.

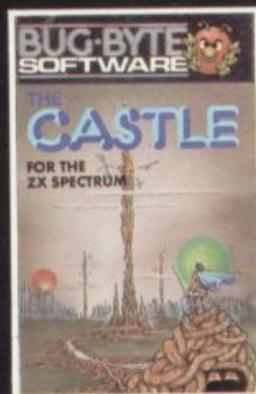
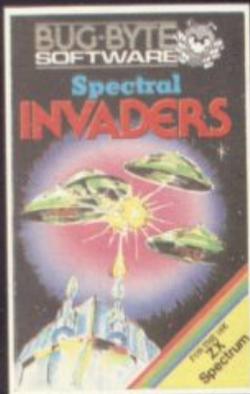
Because of the limitations of Basic the computer will sometimes take several seconds to work out a ray path.

For those of you with stiff programming fingers the title pages at the end of the listing can be left out. You must however, leave in the lines which read the user-defined graphic characters. Remember that when typing in these user-defined graphic characters will simply be letters in graphics mode — I used A, B, C, and D.

```

750 PRINT PAPER 0, INK 7; FLASH
1: AT row, ecol; "A"
759 REM set variables used in
plotting ray path
760 LET direct=entry
770 IF direct<=8 THEN LET start
=9: GO TO 810
780 IF direct<=16 THEN LET star
t=17: GO TO 810
790 IF direct<=24 THEN LET star
t=32: GO TO 810
800 LET start=8
810 IF start<=8 THEN LET end=1:
GO TO 850
820 IF start<=16 THEN LET end=1
6: GO TO 850
830 IF start<=24 THEN LET end=2
4: GO TO 850
840 LET end=25
849 REM check for peg in path
of ray
850 LET diff=1: IF start>end TH
EN LET diff=-1
860 FOR p=start TO end STEP dif
869 REM check for absorption
870 FOR n=1 TO nopeg
880 IF v(n)=direct AND w(n)=p T
HEN GO TO 40
890 IF s(n)=direct AND x(n)=p T
HEN GO TO 40
900 IF x(n)=direct AND y(n)=p T
HEN GO TO 40
910 IF y(n)=direct AND v(n)=p T
HEN GO TO 40
920 NEXT n
930 REM check for deflection
940 FOR n=1 TO nopeg
950 IF v(n)=direct+1 AND w(n)=p
THEN GO TO 1120
960 IF w(n)=direct+1 AND x(n)=p
THEN GO TO 1080
970 IF x(n)=direct+1 AND y(n)=p
THEN GO TO 1080
980 IF y(n)=direct+1 AND v(n)=p
THEN GO TO 1120
990 IF v(n)=direct-1 AND w(n)=p
THEN GO TO 1080
1000 IF w(n)=direct-1 AND x(n)=p
THEN GO TO 1120
1010 IF x(n)=direct-1 AND y(n)=p
THEN GO TO 1080
1020 IF y(n)=direct-1 AND v(n)=p
THEN GO TO 1080
1030 NEXT n
1039 REM check type of ray path
for rays which have emerged
from the box
1040 LET exit=direct+16: IF dire
ct>16 THEN LET exit=direct-16
1050 IF exit=entry THEN GO TO 16
0
1060 IF deflec=0 THEN GO TO 260
1070 GO TO 100
1079 REM reset variables used in
plotting ray path if ray
deflected
1080 IF p=9 OR p=17 OR p=32 OR p
=8 THEN GO TO 180
1090 LET start=direct-16: IF p>8
AND p<=24 THEN LET start=direct
+16
1100 LET direct=p+1: IF p>8 AND
p<=24 THEN LET direct=p-1
1110 GO TO 1180
1120 IF p=9 OR p=17 OR p=32 OR p
=8 THEN GO TO 180
1130 LET start=direct
1140 IF p<=8 THEN LET direct=p+1
7: GO TO 1180
1150 IF p<=16 THEN LET direct=p+
15: GO TO 1180
1160 IF p<=24 THEN LET direct=p-
17: GO TO 1180
1170 LET direct=p-15
1180 LET deflec=1
1190 GO TO 810
1199 REM set variables used in
ray path description
1199 REM absorption or
deflection
1200 LET posrow=1
1210 PAPER 7: INK 0
1220 GO SUB 1340
1230 GO TO 550
1239 REM deflection or straight
1240 LET posrow=0

```



SPECTACULAR!

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```

1100 PAPER paper: INK ink
1101 GO SUB 1340
1102 LET guess=guess-1
1103 LET entry=exit
1104 PAPER paper: INK ink
1105 GO SUB 1390
1106 LET ink=ink+1
1107 IF ink=7 THEN LET ink=paper
1108 LET paper=ABS (paper-7)
1109 GO TO 550
1110 REM ray path description
1111 REM ray path display
1112 GO SUB 310
1113 PRINT AT 7+posrow,3-(LEN (S
TR$ (entry))-1);entry; "-"
1114 PRINT AT 9+posrow,0;p#
1115 IF posrow=1 THEN GO TO 1390
1116 PRINT AT 11,2;"to ";exit
1117 GO SUB 1480
1118 PRINT AT erow,ecol;"A"
1119 REM update number of
guesses and score
1120 PAPER 7: INK 2: INVERSE 0
1121 LET guess=guess+1
1122 PRINT AT 16,4-(LEN (STR$ (g
uess))-1);guess
1123 LET score=score-1
1124 IF score=9 THEN PRINT AT 20
,3;"
1125 PRINT AT 20,4-(LEN (STR$ (s
core))-1);score
1126 RETURN
1127 REM find position of ray
entry (or exit) square on screen
1128 IF entry<=6 THEN LET erow=2
0: LET ecol=11+entry#2: RETURN
1129 IF entry<=16 THEN LET erow=
20-(entry-6)#2: LET ecol=11: RET
URN
1130 IF entry<=24 THEN LET erow=
2: LET ecol=11+(entry-16)#2: RET
URN
1131 LET erow=20-(entry-24)#2: L
ET ecol=29: RETURN
1132 REM

```

Cursor mode

```

1133 REM display cursor controls
1134 PAPER 7: INK 2
1135 PRINT AT 5,0;"0 -normal"
1136 PRINT AT 6,0;"1 - plot"
1137 PRINT AT 7,0;"2 - erase"
1138 PRINT AT 8,0;"3 - left"
1139 PRINT AT 9,0;"4 - down"
1140 PRINT AT 10,0;"5 - up"
1141 PRINT AT 11,0;"6 - right"
1142 PRINT AT 12,0;"7 - final"
1143 PRINT AT 13,0;"8 - guess"
1144 PAPER 0
1145 INK 6: IF ATTR (currow,curc
ol)=66 THEN INK 2
1146 PRINT FLASH 1;AT currow,cur
col;"A"
1147 REM check cursor input
1148 LET i$=INKEY$
1149 IF i$="0" OR i$="9" THEN GO
TO 1920
1150 IF i$<"3" OR i$>"8" THEN GO
TO 1650
1151 IF i$="3" THEN GO TO 1820
1152 IF i$="4" THEN GO TO 1870
1153 REM move cursor
1154 IF i$="5" THEN LET newrow=c
urrow: LET newcol=curcol-2: GO T
O 1740
1155 IF i$="6" THEN LET newrow=c
urrow+2: LET newcol=curcol: GO T
O 1740
1156 IF i$="7" THEN LET newrow=c
urrow-2: LET newcol=curcol: GO T
O 1740
1157 LET newrow=currow: LET newc
ol=curcol+2
1158 IF newrow<4 OR newrow>18 OR
newcol<13 OR newcol>27 THEN GO
TO 1650
1159 BEEP .05,12
1160 INK 7: IF ATTR (currow,curc
ol)=194 THEN INK 2
1161 PRINT FLASH 0;AT currow,cur
col;"A"
1162 INK 6: IF ATTR (newrow,newc
ol)=66 THEN INK 2
1163 PRINT FLASH 1;AT newrow,new
col;"A"
1164 LET currow=newrow: LET curc
ol=newcol

```

```

1810 GO TO 1650
1811 REM plot peg
1812 IF ATTR (currow,curcol)=194
THEN GO TO 1650
1813 BEEP .05,0
1814 PRINT INK 2; FLASH 1;AT cur
row,curcol;"A"
1815 LET peg=peg+1
1816 GO TO 1650
1817 REM erase peg
1818 IF ATTR (currow,curcol)=194
THEN GO TO 1650
1819 BEEP .05,0
1820 PRINT INK 6; FLASH 1;AT cur
row,curcol;"A"
1821 LET peg=peg-1
1822 GO TO 1650
1823 REM save cursor mode
1824 INK 7: IF ATTR (currow,curc
ol)=194 THEN INK 2
1825 PRINT FLASH 0;AT currow,cur
col;"A"
1826 FOR r=5 TO 13
1827 PRINT AT r,0;"
"
1828 NEXT r
1829 IF i$="0" THEN GO TO 550
1830 IF peg=nopeg THEN GO TO 209
0
1831 REM display warning if
number of pegs plotted
1832 PAPER 7: INK 2
1833 GO SUB 310
1834 PRINT AT 7,1;nopeg;" pegs"
1835 PRINT AT 9,1;"must be"
1836 PRINT AT 11,1;"plotted"
1837 FOR b=1 TO 5
1838 BEEP .05,36
1839 NEXT b
1840 PAUSE 0: PAUSE 100
1841 GO TO 1520
1842 REM

```

Final guess

```

1843 REM check each guess
1844 FOR n=1 TO nopeg
1845 IF ATTR (ABS (w(n)-s)#2-20,
v(n)#2+11)=71 THEN GO SUB 2200:
GO TO 2120
1846 GO SUB 2140
1847 NEXT n
1848 GO TO 2290
1849 REM peg correctly located
1850 PRINT PAPER 2; INK 6; FLASH
1;AT ABS (w(n)-s)#2-20,v(n)#2+1
;"A"
1851 LET right=right+1
1852 FOR b=1 TO 5
1853 BEEP .05,24
1854 NEXT b
1855 RETURN
1856 REM peg incorrectly located
1857 PRINT PAPER 0; INK 6; FLASH
1;AT ABS (w(n)-s)#2-20,v(n)#2+1
;"A"
1858 PAPER 7: INK 2: FLASH 0
1859 FOR b=1 TO 5
1860 LET score=score-1
1861 LET poscol=3: IF score>=0 FI
ND score<=9 THEN LET poscol=4: F
PRINT AT 20,3;"
"
1862 PRINT AT 20,poscol;score
1863 BEEP .05,12
1864 NEXT b
1865 RETURN
1866 REM display number of pegs
correctly located
1867 PAPER 7: INK 2
1868 GO SUB 310
1869 PRINT AT 7,2;right;" peg":
IF right=0 OR right>1 THEN PRINT
AT 7,7;"s"
1870 PRINT AT 9,0;"correctly"
1871 PRINT AT 11,1;"located"
1872 PAUSE 0: PAUSE 200
1873 REM display player's
success rating
1874 GO SUB 310
1875 PRINT AT 7,2;"Your"
1876 PRINT AT 9,0;"score is"
1877 IF score>=25 THEN PRINT AT
11,0;"very good": GO TO 2440
1878 IF score>=20 THEN PRINT AT
11,1;"good": GO TO 2440
1879 IF score>=15 THEN PRINT AT
11,1;"not bad": GO TO 2440
1880 IF score>=10 THEN PRINT AT
11,2;"poor": GO TO 2440

```



```

2420 IF score >= 0 THEN PRINT AT 1
1,0;"very poor": GO TO 2440
2430 PRINT AT 11,1;"abysmal"
2430 REM input and check whether
to play again
2440 INPUT TAB (4);"play game ag
ain(y/n)?" ;i$
2450 IF i$="y" THEN PAPER 0: GO
TO 310: GO SUB 2490: GO TO 350
2460 IF i$<"n" THEN GO TO 2440
2470 BORDER 7: PAPER 7: INK 0: B
RIGHT 0: CLS
2480 STOP
480 REM

Draw BOX
2480 REM refresh BOX after game
PAPER 7
2490 PRINT AT 16,3;" "
2500 PRINT AT 20,3;" "
2510 LET score=33: LET guess=-1
2520 GO SUB 1410
2530 PAPER 0: INK 7:
2540 PRINT AT 2,13;" "
2550
2560 FOR r=4 TO 18 STEP 2
2570 PRINT AT r,11;"STEP 2"
2580 FOR c=13 TO 27 STEP 2
2590 PRINT AT r,c;"A"
2600 NEXT c
2610 PRINT AT r,29;" "
2620 NEXT r
2630 PRINT AT 20,13;" "
2640 RETURN

Draw BOX outlines at
start of run
2650 PAPER 0: INK 7: CLS
2660 PRINT AT 0,0;" M I N I"
2670 PRINT AT 2,0;" B L A C K"
2680 PRINT AT 4,0;" B O X"
2690 PRINT AT 14,0;" Guesses "
2700 PRINT AT 18,0;" Scores "
2710 PRINT AT 0,13;" 1 1 1 2 2 2"
2720 PRINT AT 1,13;" 7 8 9 0 1 2"
2730
2740 FOR r=8 TO 1 STEP -1
2750 PRINT AT ABS (r*2-19),12;"E"
2760 CBCBCBCBCBCBCB"
2770 PRINT AT ABS (r*2-20),9;r+6
TAB 11;" D D D D D D D D";r+
4
2780 NEXT r
2790 PRINT AT 19,12;"CBCBCBCBCBCE"
2800 CBCBCB"
2810 PRINT AT 21,13;"1 2 3 4 5 E"
2820
2830 RETURN
2840 REM

Title pages
2850 REM introduction
2860 BORDER 0: PAPER 0: INK 5: F
0: BRIGHT 1: OVER 0: INVERS
0:
2870 CLS
2880 FOR r=0 TO 21
2890 IF r=12 THEN INK 0
2900 IF r=13 THEN INK 0
2910 BEEP .01,24: BEEP .01,r
2920 PRINT AT r,0;"BLACK BOX"

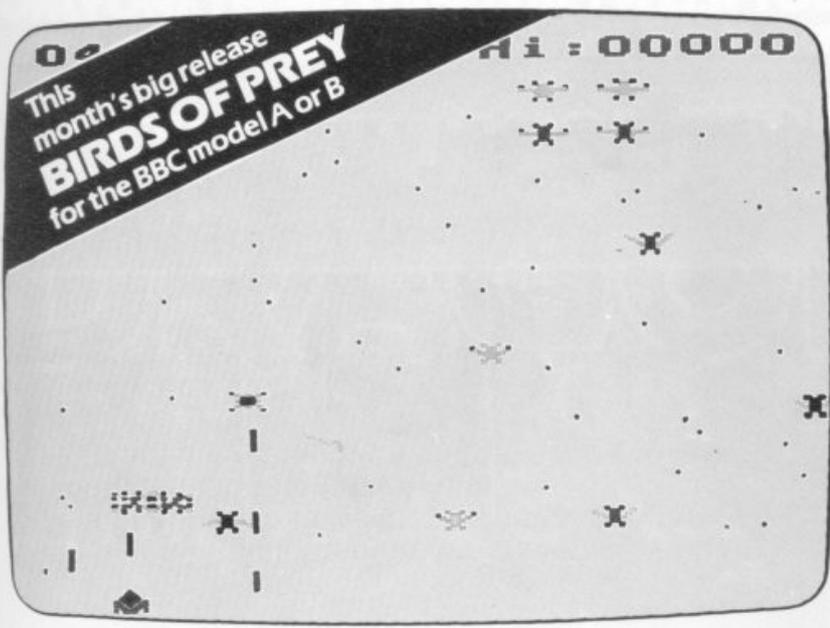
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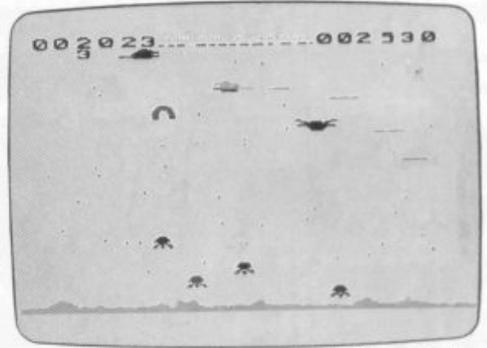
2930 PRINT AT ABS (r-21),14;"MIN
I"
2940 PRINT AT r,22;"BLACK BOX"
2950 NEXT r
2960 INK 0
2970 FOR r=21 TO 0 STEP -1
2980 IF r=12 THEN INK 2
2990 IF r=11 THEN INK 0
3000 PRINT AT r,0;"BLACK BOX"
3010 PRINT AT ABS (r-21),14;"MIN
I"
3020
3030 PRINT AT r,22;"BLACK BOX"
3040 BEEP .01,24: BEEP .01,r
3050 NEXT r
3060 INK 2
3070 PRINT AT 12,14;" "
3080 FOR c=0 TO 10
3090 PRINT AT 12,c;" "
3100 PRINT AT 12,ABS (c-22);" "
3110
3120 PRINT AT 12,c+1;"BLACK BOX"
3130
3140 PRINT AT 12,ABS (c-21);"BLA
CK BOX"
3150 BEEP .01,24
3160 NEXT c
3170 FOR b=24 TO 0 STEP -1
3180 BEEP .01,b
3190 NEXT b
3200 FOR b=1 TO 24
3210 BEEP .01,b
3220 NEXT b
3230 INK 7
3240 PRINT AT 6,10;"Waddington's"
3250
3260 PRINT AT 9,14;"MINI"
3270 PRINT AT 12,11;"BLACK BOX"
3280 REM read data for user-
defined graphics characters
3290 FOR g=1 TO 4
3300 READ g$
3310 FOR l=0 TO 7
3320 READ line
3330 POKE USR g$+l,line
3340 NEXT l
3350 NEXT g
3360 PRINT AT 21,3;"Press any ke
y to
play game"
3370 IF INKEY$="" THEN GO TO 325

display controls
3380 CLS
3390 PRINT PAPER 7; INK 2;"Conti-
nue"
3400 PRINT AT 3,0;"Normal mode"
3410 PRINT "(for guesses)"
3420 PRINT : PRINT "0" -
go into cursor mode"
3430 PRINT "1-32" -
your guesses"
3440 PRINT AT 10,0;"Cursor mode"
3450 PRINT "(for plotting pegs)"
3460 PRINT : PRINT "0" -
return to normal mode"
3470 PRINT "3" -
plot a peg"
3480 PRINT "4" -
erase a peg"
3490 PRINT "5" - cursor left
one square"
3500 PRINT "6" - cursor down
one square"
3510 PRINT "7" - cursor up
one square"
3520 PRINT "8" - cursor right
one square"
3530 PRINT "9" - for your
final guess"
3540 GO TO 350
3550 REM data for user-defined
graphics characters
3560 DATA "A",BIN 00000000,BIN 0
0111100,BIN 01111110,BIN 01111111
0,BIN 01111110,BIN 01111110,BIN
00111100,BIN 00000000
3570 DATA "B",BIN 00011000,BIN 0
0011000,BIN 00011000,BIN 1111111
1,BIN 11111111,BIN 00011000,BIN
00011000,BIN 00011000
3580 DATA "C",BIN 00000000,BIN 0
0000000,BIN 00000000,BIN 1111111
1,BIN 11111111,BIN 00000000,BIN
00000000,BIN 00000000
3590 DATA "D",BIN 00011000,BIN 0
0011000,BIN 00011000,BIN 0001100
0,BIN 00011000,BIN 00011000,BIN
00011000,BIN 00011000

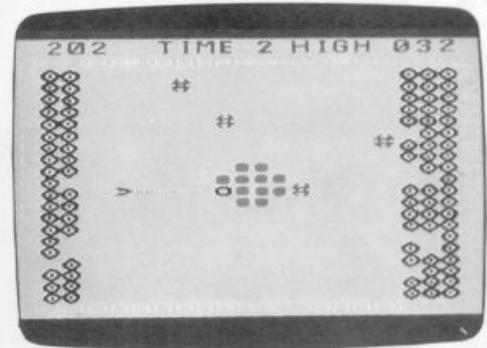
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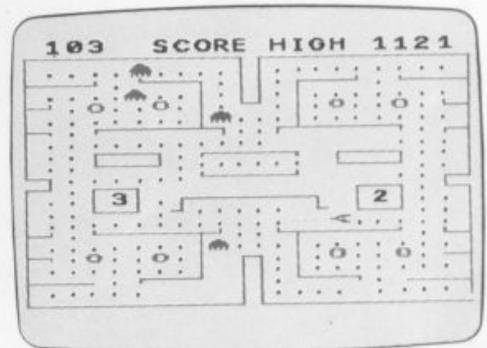
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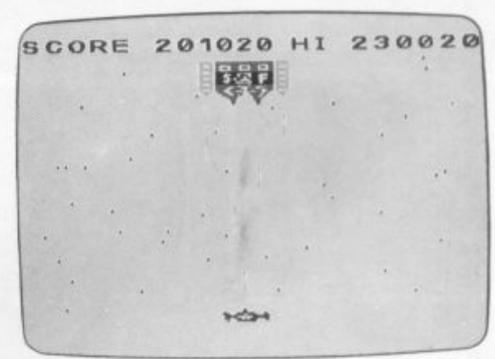
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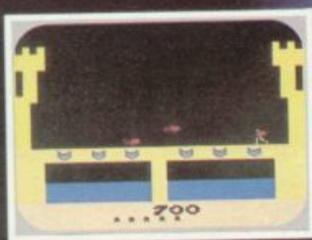
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You must shoot down all your attackers too — if you simply dodge one he'll be back to blast you out of the skies when you least expect it.

So stand by for action — and watch out for the Imperial fleet!



```

10 R=10
11 W=0
12 R1=5
13 F1=0:F2=0:F3=0:F4=0
19 GOTO 30
20 HS=0
30 SC=0
40 CLS3
50 GOTO 220
60 PLAY"125505004050":IF PPOINT(X+10,Y)=4 THEN GOTO 70 ELSE GOTO180
70 IF S=1 THEN GOTO 100
80 IF R2=R1+5 THEN GOTO 180
90 IF Z>105 THEN R2=R1 R1=R1+5:S=1:RES=R1:GOTO 170
100 IF F=1 THEN SC=SC+100
110 IF F=2 THEN SC=SC+75
120 IF F=3 THEN SC=SC+50
130 IF F=4 THEN SC=SC+25
140 F=1:PUT(C1,B1)-(C1+26,B1+14):F3:B=120:R=R-1
150 PLAY"01T25AGAGAGAGAGA"
160 GOTO 180
170 PLAY"03T255CCEDDEEFFEGGERREB04C"
180 REM
190 LINE(70,192)-(X+10,Y),PSET:LINE(185,192)-(X+10,Y),PSET
200 RETURN
    
```


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```

1070 IF AA=2 THEN C=C
1080 IF AA=3 THEN C=C-10
1090 B=120:C=128
1100 PUT(C,B)-(C+20,B+10),F1,PSET
1110 C1=C:B1=B
1120 B=B+5
1130 IF W<=4 THEN GOTO 180
1130 IF RND(2)=2 THEN LINE(C1+10,B1+10)-(128,192),PSET:RES=RES-1:PLAY"T25505C04G"
05C04G05C"
1140 RETURN
1150 AA=RND(3)
1160 IF AA=1 THEN C=C+10
1170 IF AA=2 THEN C=C
1180 IF AA=3 THEN C=C-10
1190 PUT(C,B)-(C+22,B+12),F2,PSET
1195 C1=C:B1=B
1200 IF W<=3 THEN GOTO 1220
1210 IF RND(2)=2 THEN LINE(C1+11,B1+12)-(128,192),PSET:RES=RES-1:PLAY"T25505C04G"
05C04G05C"
1220 B=B+5
1230 RETURN
1240 AA=RND(3)
1250 IF AA=1 THEN C=C+10
1260 IF AA=2 THEN C=C
1270 IF AA=3 THEN C=C-10
1280 PUT(C,B)-(C+26,B+14),F3,PSET
1285 C1=C:B1=B
1290 IF W<=2 THEN GOTO 1310
1300 IF RND(2)=2 THEN LINE(C1+13,B1+14)-(128,192),PSET:RES=RES-1:PLAY"T25505C04G"
05C04G05C"
1310 B=B+5
1320 RETURN
1330 AA=RND(3)
1340 IF AA=1 THEN C=C+10
1350 IF AA=2 THEN C=C
1360 IF AA=3 THEN C=C-10
1370 PUT(C,B)-(C+32,B+20),F4,PSET
1375 C1=C:B1=B
1380 IF W<=1 THEN GOTO 1400
1390 IF RND(2)=2 THEN LINE(C1+16,B1+20)-(128,192),PSET:RES=RES-1:PLAY"T25505C04G"
05C04G05C04G"
1400 B=B+5
1410 IF B>150 THEN B=120
1430 RETURN
1440 END
1450 DIST=256
1460 RES=R1
1470 A=A+5
1480 R1=A
1490 Z=100
1500 D=0
1510 LINE(0,8)-(RES,B),PRESET
1520 IF R1>120 THEN R1=128
1530 S=0
1540 RETURN
1550 CLS3
1555 HS=PEEK(12289)*100
1560 IF SC>HS THEN HS=SC

```



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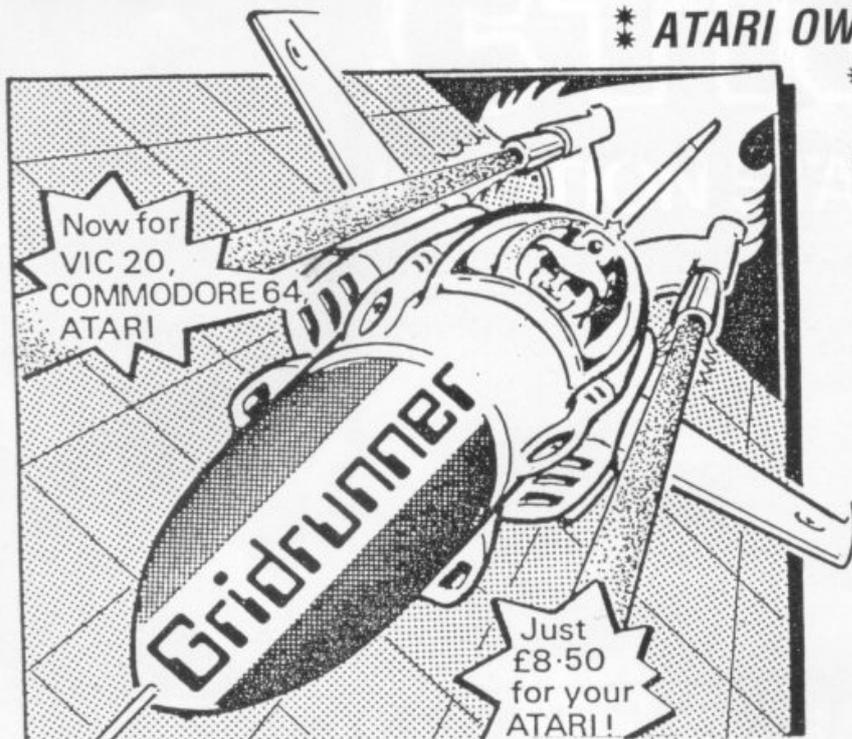
1570 PRINT@32,"YOUR SHIELD WAS DESTROYED BY CANNON FIRE";
1580 GOTO 1610
1590 CLS3:PRINT@32,"YOU WERE SHOT DOWN BY A T.I.E FIGHTER WHICH YOU HAD NOT
DESTROYED ON THE WAY TO THE HOLE";
1595 HS=PEEK(12289)*100
1600 IF SC>HS THEN HS=SC
1610 PRINT@325,"SCORE";SC;
1615 SC=0:A=10
1616 R1=5
1620 PRINT@357,"HIGH SCORE=";HS;
1624 HS=HS/100
1625 POKE(12289),HS
1630 PRINT@448,"ANOTHER GO?<Y/N>";
1640 Q#=#INKEY#:IF LEFT$(Q#,1)="Y" OR LEFT$(Q#,1)="R" THEN GOTO 1670
1650 IF LEFT$(Q#,1)="N" THEN END
1660 GOTO 1640
1670 PRINT"INSTRUCTIONS<Y/N>";
1680 Q#=#INKEY#:IF LEFT$(Q#,1)="N" THEN W=0:GOTO 2000
1690 IF LEFT$(Q#,1)="Y" THEN RUN
1700 GOTO 1680
1710 END
1720 IF X>=100 AND A>0 THEN GOTO 1550
1730 PRINT(130,Z),4,3
1740 Z=Z+10
1750 COLOR4,2
1760 IF Z>=185 THEN Z=100:DIST=256:LINE(0,5)-(DIST,5),PRESET:W1=W+W+1:S=0
1770 RETURN
1780 END
1790 PMODE1,1:PCLS
1800 A#="BM100,100,C4;BR2H2U4E2G2D2R6U2E2F2L3D4F2E2L3R3U2R6U2H2F2D4G2"
1810 DIMF1(20,10)
1820 DRAWA#
1830 GET(100,90)-(120,100),F1,G
1840 PCLS
1850 DIMF2(22,12)
1860 B#="BM130,100,C4;BR4H3U3E3G3D2R4E5D2G3R2D2R4U2L4R4H3U2F4D2R6G3E3U3H3
1870 DRAWB#
1880 GET(130,88)-(152,100),F2,G
1890 PCLS
1900 C#="BM100,150,C4;BR4H3U5E3G3D3R3E4R3U2D2R3L4G4R2U2D3L2F3R7L2E3L7R7U3H4F4R2H
4F4D3U1R5U3H3F3D5G3
1910 DIMF3(26,14)
1920 DRAWC#
1930 GET(100,136)-(126,150),F3,G
1940 PCLS
1950 D#="BM150,150,C4;BR6H6U6E6G6D3R6E6R6D2L5G4R2D2F4R4E4G2L8U2R9U3R2H5R2F6R5U3H
6F6D6G6"
1960 DRAWD#
1970 DIMF4(32,20)
1980 GET(150,130)-(182,150),F4,G
1990 RETURN
2000 CLS3:PRINT@485,"PRESS SPACE TO LAUNCH";:FOR P=1 TO 500:NEXT
2010 Q#=#INKEY#:IF Q#="" THEN GOTO 2050
2020 PRINT@485," ";
2030 FOR P=1 TO 500:NEXT
2040 GOTO 2000
2050 CLS3:FOR L=1 TO 800:NEXTL:GOTO 700

```

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Your spacecraft must attack the descending aliens and frustrate their evil intent. Fly your Ramjet fighter over the Andes mountain range and protect your llamas from kidnap by hostile UFOS. Features 5 kinds of UFO, controls include up, down, reverse, fire, thrust and smart bomb. Entirely in machine code. Requires 8K expansion and joystick. £8.00 + 50p P & P

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Rox is a challenging game involving the defence of your lunar base from a deadly meteor shower. Rox-64 includes amazing sprite graphics displays and spacy sound

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The ORIGINAL game from the ORIGINAL author. This is the identical program to that being sold by other companies for three times our price. The game has received ecstatic reviews in the computing press. Program has 30 speed levels and ever increasing Centipede hordes. Tables top 10 scores and names. Why wait to pay more? Only £1.95 + 50p P & P.



PLEASE ADD 50p TO ALL ORDERS

effects, and an awesome 'mother'ship' display if you win the game. Top 10 scores are tabled along with their names. This program shows just what can be achieved using only Commodore-64 basic. Study the listing and learn how to use sprites and sound on this outstanding machine. £4.95 + 50p P & P.

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MIND OVER MATTER...

Now that my series of programming tips has been concluded, I shall be devoting a corner to hints on solving some of the more difficult problems that are stumping Adventure-playing readers.

These will be printed upside down, so as not to catch the eyes of those wishing to battle on!

Readers often write to me requesting help but unfortunately, although I have played many Adventures, I have not solved them all! So help me to help fellow Adventurers by writing to me with tips.

At the moment David Coverley and Anthony Sanford are languishing in Artic's 'Ship of Doom', unable to set the key from under the glass.

Steven Milligan, meanwhile, hasn't cracked the secret of Artic's 'Espionage Island'. Can you help me help them, and save them from otherwise certain insanity?

What's in a package? How much are you tempted by a large attractive box in a plastic bubble, covered with a design suggesting fantasy and excitement within?

Do you ever suspect that you may have had to pay a few pounds less had that same cassette been more plainly wrapped? The ultimate test, of course, is in the invisible magnetic impressions on that cassette.

Here we have two games. One is lavishly packaged in a beautifully illustrated box, and quite expensive; the other supplied on a proprietary cassette with a duplicated instruction sheet, and at the low end of the price spectrum. No pun intended!

Transylvanian Tower is billed as a 'spine-chilling new Adventure' for the 48k Spectrum. Unfortunately it is not.

There are five levels in the tower, and the player's objective is to reach the top, kill Count Dracula, and raid his treasure trove. Each level consists of a maze, and each has different characteristics.

A floor plan of the level can be called up, with increasing difficulty as one nears the top.

Objects, many of which have magical properties, may be picked up if seen by typing "P", but only three may be carried simultaneously.

The same is screened graphically in colour and bats, which are a hazard, can be seen flapping around. Sufficient must be killed to enable you to move up a level. How do you kill the bats to get to Dracula? Would you believe with a laser gun?

This might be a reasonable maze game, but good Adventure it is not. From Richard Shepherd Software, this is disappointing after *Shaken not Stirred*.

For £6.50 you will get the game on a TDK cassette, and a fairly comprehensive two-page description of how to load and play the game.

*"I am Overmind;
Ruler of mortals, destroyer of worlds!
Know me, obey me, and despair!"*

With terror in your heart, you wish Overmind dead. But Overmind is omniscient, knowing even your innermost thoughts, and inflicts upon you the pain of a thousand lashes.

Before you start playing *Empire of the Overmind* it is almost essential to read the Rhyme of the Overmind, supplied with the game.

On starting, you find yourself among mountains and brooks, where tracks and trails abound, and ever present in the sky is a large red planet.

A mysterious stone tower appears to hold no secrets other than an animated skeleton who clobbers you as soon as you take the key which hopefully will unlock an iron door. Unconscious, your body is moved. You will more than likely end up in a very dark place. I did many times, and despaired.

But the game imparts such a feeling of intense hatred toward Overmind, that I was determined not to be beaten.

Thus, I came to a place where there was a large blue planet in the sky. I haven't yet defeated Overmind but I shall return to fight again!

At first the game appears insoluble due to the difficulty of getting out of the "very dark place". However, and this may help the disheartened player, when "clobbered" unconscious, you don't always end up in "a very dark place". I'll say no more than that!

Another problem is that it appears a held object cannot be used (although it may be dropped) unless it heads the inventory list.

Whether or not this feature is deliberate is hard to say, but it involves the rather tedious task of dropping every

object that precedes the required one in the inventory list, using it, and then picking up the discarded ones.

This task isn't aided by the rather slow response time. Whilst the reply is screened quickly enough, the prompt sometimes takes a long time to appear, and a fast player can easily lose all or part of his next command without realising it.

A large colourful box, complete with internal plastic moulding, housed *Empire of the Overmind*. Also included was a double page of detailed, well printed instructions on how to load and save the game on a 48k Apple, 48k TRS-80, and 40k Atari 800.

This was quite important, as the methods although simple were not obvious. Also in the package was 'Rhyme of the Overmind', a long and rather well-written poem printed in script on pale blue parchment-like paper.

This covered a number of pages held together with a silken cord embellished with — yes! — a tassel!

Oh, I nearly forgot! The box also contained a cassette containing all three versions of the game.

It is available from Avalon Hill Games of 650 High Road, North Finchley, London N12 0N1L for £17.95 on cassette, £20.95 on disc.

ADVENTURE TIPS

Howdy! The stage arrived last week bringing cries of help from a number of would-be cowboys in Ghost Town.

There they are, standing next to a pesky horse, and quite unable to get the darned critter movin'. Now then folks, don't go getting no fancy ideas that I'm gonna give away all my ol' pal Scott's secrets. Leastwise, not unless you take me down to that there saloon and fetch me something a mite stronger than what's in your Golden Derringer.

Nope — just a few hints to chew over until you get right inspired, that's all you'll get out of me!

WARNING:

Turning this page upside-down may damage your Adventure!

The key to shoeing the horse is in the stall. The key to the stall is in the stable. The solution is magnetic. When the horse is shod, mount him and say the right words. If this problem sends you round and round you may get giddy.

BY KEITH CAMPBELL

CHESS



THE DUCHESS AND KAISSA

I left you with a celebrated position (figure 1) from the first round game between Duchess and Kaissa, at that time the reigning world champion program, at the second world computer chess championship in Toronto in 1977.

In the diagrammed position, Duchess (White) had just played 34. Q-R8ch, a check which can be parried by a King move to N2.

However, Kaissa's next move astounded the entire audience, which included former world (human) champion Mikhail Botvinnik and other strong masters, plus the team of expert commentators.

It played 34. . . . R-K1, placing the Rook *en prise*. After Duchess' 35. QxRch, Kaissa lost quickly. The task for Kaissa's programmers before the next round was to find out what caused the program to commit such a gross blunder and correct the fault.

Only later was it realized that Kaissa's 34th move was not a blunder at all. If instead Black had played 34. . . . K-N2, White could give checkmate by the Queen sacrifice 35. Q-B8ch! followed, after 35. . . . KxQ by 36. B-R6ch.

Whether Black now were to play 36. . . . B-N2 or 36. . . . K-N1, 37. R-B8ch would be checkmate (apart from irrelevant sacrifices by Black to delay the end by a move or two).

Kaissa's evaluation function clearly ranked losing a Rook as preferable to being checkmated, which solves the mystery. However, the question remains: is 34. . . . R-K1 a blunder or a brilliancy?

ROOK DILEMMA

It is surprisingly difficult to answer this with confidence. Objectively, losing a Rook must be preferable, but it could be argued that losing the Rook is only slightly less fatal, does not postpone checkmate very long, and moreover even the humblest beginner would capture the Rook, whereas even quite a good player might just conceivably

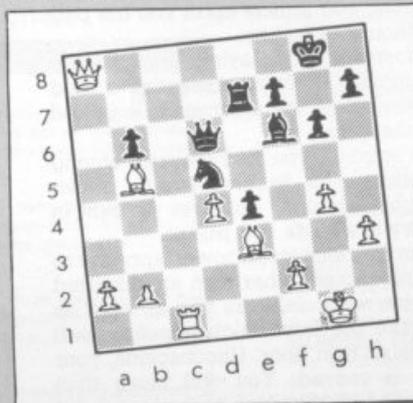
overlook the checkmate.

Against an opponent who played 34. Q-R8ch in full knowledge of all the variations that could follow, it makes little difference what Black plays, the best course of action probably being to resign, but what if White had played the check in ignorance, simply as an "irritant" to Black?

What if White were a weak player and Black a Grandmaster (an unlikely event admittedly, but quite possible in a simultaneous tournament or in a material odds game?)

STAYING ALIVE

Would it be better to move the King and rely on White not following up properly (as well as the checkmate there is the strong reply 35. R-B8, of course) or to give up the Rook to guarantee staying "alive"



and then hope somehow to win even though a Rook behind in material?

The problem becomes more difficult if the details are changed a little: what if Black were already a Bishop ahead or if the checkmate were 10 moves (each side) deep, or both?

Considerations of this kind are far from irrelevant in computer play, where programs can often vary considerably in analytic powers, and where a program will frequently be "blind" to a strong move which human experts perceive easily.

It would be completely wrong to assume that all computer chess programs are deep or infallible analysts (although some are extremely good).

In particular it would be a mistake for the best analyst (BELLE at present) to assume all its opponents were equally good.

There is a well-known joke about an ultra-intelligent chess-playing program considering its first move in a game, as White.

After hours of analysis it decides that the opening position is, after all, a forced win for Black in every variation.

Rather than waste any more time defending a hopeless position, it immediately resigns without playing a move!

The flaw in the argument is, of course, that chess is a contest where the opponent's fallibility plays a crucial part.

So, how would Kaissa have made its decision? From a competitive viewpoint, it should have taken the strength of its opponent into account.

No doubt Duchess was strong enough to win when a Rook ahead, but would its analysis algorithm have caused it to consider the Queen sacrifice?

If it did, would it have been able to look far enough ahead to discover the checkmate?

In more subtle ways, judgements about the skill level of the opponent are an important part of human play. Grandmasters prepare specially for their major opponents by studying their games and playing style, and looking for weaknesses.

It is interesting to speculate whether chess-playing programs of the future will include representations of their main rivals' algorithms in a similar way.

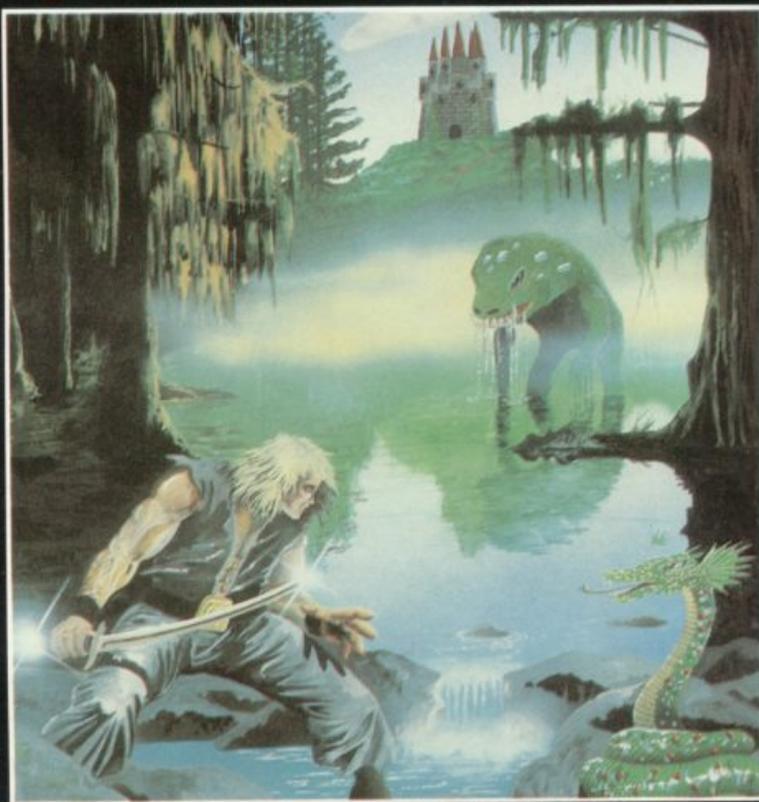


BY MAX BRAMER

KAYDE

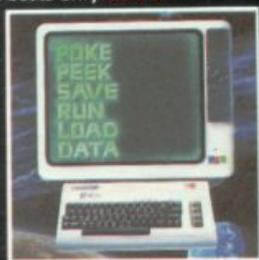
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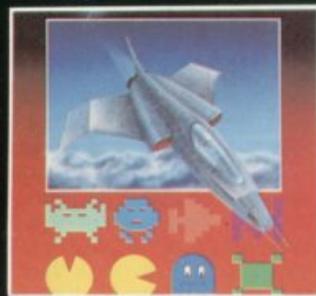
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FIND THE ENEMY

```

0000      00100      ORG      0
          00101 ;X$(16) - RANGE
          00102 ;=====
          00103 ;FINDS ENEMY
          00104 ;=====
          00105 ;

688A      00116 NA      EQU      27530D
6AD0      00117 TB      EQU      27344D
7F6E      00120 INIT    EQU      07F6EH
7F72      00121 SAVE    EQU      07F72H
7F76      00122 ADD     EQU      07F76H
7F7A      00123 SUB     EQU      07F7AH
7F7E      00124 TEST    EQU      07F7EH
7F8A      00126 JL00KA  EQU      7F8AH

0000 DD21D06A 00200      LD      IX,TB
0004 0601      00300      LD      B,1
0006 05        00400      DEC     B
0007 0E06      00500      LD      C,6
          00550 ;-----

0009 1E01      00600 LOOKA  LD      E,1
000B 1D        00700      DEC     E
000C 53        00800      LD      D,E
000D 05        00900      PUSH   DE
000E CD6E7F    01000      CALL  INIT;
0011 CD7E7F    01100      CALL  TEST
0014 3A8A68    01200      LD      A,(NA)
0017 B7        01300      OR      A
0018 2812      01400      JR      Z,LOOKB
001A FE02      01500      CP      2
001C 280A      01600      JR      Z,ABLDLDR
001E 303E      01700      JR      NC,LOOKD
0020 3E01      01800      LD      A,1
0022 CD727F    01900      CALL  SAVE
0025 B7        02000      OR      A
0026 1804      02100      JR      LOOKB
0028 D1        02200 ABLDR  POP     DE
0029 1601      02300      LD      D,1
002B 05        02400      PUSH  DE
          02450 ;-----

002C CD7E7F    02500 LOOKB  CALL  TEST
002F 3A8A68    02600      LD      A,(NA)
0032 B7        02700      OR      A
0033 2811      02800      JR      Z,LOOKC
0035 FE02      02900      CP      2
0037 2809      03000      JR      Z,BBLDR
0039 3023      03100      JR      NC,LOOKD
003B 3E02      03200      LD      A,2
003D CD727F    03300      CALL  SAVE
0040 1804      03400      JR      LOOKC
0042 D1        03500 BBLDR  POP     DE
0043 1E01      03600      LD      E,1
0045 05        03700      PUSH  DE
          03750 ;-----

0046 79        03800 LOOKC  LD      A,C
0047 FE06      03900      CP      6
0049 2813      04000      JR      Z,LOOKD
004B FE03      04100      CP      3
004D 280F      04200      JR      Z,LOOKD
004F CD7E7F    04300      CALL  TEST
0052 3A8A68    04400      LD      A,(NA)
0055 FE01      04500      CP      1
0057 2005      04600      JR      NZ,LOOKD
0059 3E03      04700      LD      A,3
005B CD727F    04800      CALL  SAVE
          04850 ;-----

005E CD6E7F    04900 LOOKD  CALL  INIT;
0061 D1        05000      POP     DE
0062 1E01      05100      LD      E,1
0064 1D        05200      DEC     E
0065 05        05300      PUSH  DE
0066 CD7E7F    05400      CALL  TEST
0069 CD767F    05500      CALL  ADD
006C CD7E7F    05600      CALL  TEST
006F CD7A7F    05700      CALL  SUB
0072 3A8A68    05800      LD      A,(NA)

```



```

0075 B7        05900      OR      A
0076 2811      06000      JR      Z,LOOKE
0078 FE02      06100      CP      2
007A 2809      06200      JR      Z,DEBLDR
007C 304A      06300      JR      NC,EDGE
007E 3E02      06400      LD      A,2
0080 CD727F    06500      CALL  SAVE
0083 1804      06600      JR      LOOKE
0085 D1        06700 DEBLDR POP     DE
0086 1E01      06800      LD      E,1
0088 05        06900      PUSH  DE
          06950 ;-----

0089 79        07000 LOOKE  LD      A,C
008A FE06      07100      CP      6
008C 2812      07200      JR      Z,LOOKF
008E FE03      07300      CP      3
0090 280E      07400      JR      Z,LOOKF
0092 CD7E7F    07500      CALL  TEST
0095 3A8A68    07600      LD      A,(NA)
0098 BF        07700      CP      A
0099 2005      07800      JR      NZ,LOOKF
009B 3E03      07900      LD      A,3
009D CD727F    08000      CALL  SAVE
          08050 ;-----

00A0 79        08100 LOOKF  LD      A,C
00A1 FE02      08200      CP      2
00A3 2823      08300      JR      Z,EDGE
00A5 B7        08400      OR      A
00A6 FE05      08500      CP      5
00A8 281E      08600      JR      Z,EDGE
00AA CD6E7F    08700      CALL  INIT;
00AD CD7E7F    08800      CALL  TEST
00B0 CD767F    08900      CALL  ADD
00B3 CD7E7F    09000      CALL  TEST
00B6 CD7E7F    09100      CALL  TEST
00B9 CD7A7F    09200      CALL  SUB
00BC 3A8A68    09300      LD      A,(NA)
00BF FE01      09400      CP      1
00C1 2005      09500      JR      NZ,EDGE
00C3 3E03      09600      LD      A,3
00C5 CD727F    09700      CALL  SAVE
          09750 ;-----

09752 ;CHECK FOR FINISH
09754 ;IF SO, SEVEN TIMES
09756 ;NO. OF RECORDS GOES
09760 ;INTO TB(0)
09762 ;-----

00C8 D1        09800 EDGE  POP     DE
00C9 0D        09900      DEC     C
00CA C28A7F    10000     JP      NZ,JL00KA
00CD D0E5      10100     PUSH  IX
00CF E1        10200     POP     HL
00D0 11D06A    10300     LD      DE,TB
00D3 AF        10400     XOR     A
00D4 ED52      10500     SBC    HL,DE
00D6 7D        10600     LD      A,L
00D7 32D06A    10700     LD      (TB),A
00DA C9        10800     RET
00E0          12300     END
0000          TOTAL ERRORS
33217 TEXT AREA BYTES LEFT

```

COMBAT SEQUENCE

Once all movement is complete, a check will be made for possible attacks. Different parts of the screen are flashed on the screen as the search is made. When a piece is found that has opponents within range, a letter will be placed to the right of each defender. There are two types of combat:

1. ATTACKING AT ONE HEX RANGE
This is compulsory. If there is only one defender the attack takes place automatically. If there is more than one, the piece will flicker "WHO", to which you must reply with one of the letters appearing on the screen. The result of the attack will appear at the bottom of the screen. Tomahawks may only attack at one hex range.

2. ATTACKING AT TWO OR THREE HEX RANGE
This is optional. If you do not wish to attack, press "ENTER"

DEFENCE
A defender is permitted to return the fire once during the attack sequence. This is compulsory at one hex, but at two or more the piece will flicker "RTN". If you wish to return the fire, press "Y" or else press any other key. Having replied, there will be no defence in further attacks.

ADD REGISTER

```

0000      00010      ORG      0
          00011 ;X$(12) - ADD
          00012 ;=====
          00013 ;ADD 1 TO REGISTER C.
          00014 ;MOD 6
          00015 ;=====
          00018 ;

0000 0C        00020      INC     C
0001 79        00030      LD      A,C
0002 FE07      00040      CP      7
0004 3802      00050      JR      C,SEVEN
0006 0E01      00060      LD      C,1
0008 C9        00070 SEVEN  RET
0000          00080      END
00000 TOTAL ERRORS
34884 TEXT AREA BYTES LEFT

```

SUBTRACT

```

0000      00010      ORG      0
          00011 ;X$(13) - SUB
          00012 ;=====
          00013 ;SUBTRACT 1 FROM C
          00014 ;MOD 6
          00015 ;=====
          00016 ;

0000 0D        00020      DEC     C
0001 3E01      00030      LD      A,1
0003 3D        00040      DEC     A
0004 E9        00050      CP      C
0005 2002      00060      JR      NZ,ZERO
0007 0E06      00070      LD      C,6
0009 C9        00080 ZERO  RET
0000          00120      END
00000 TOTAL ERRORS
34884 TEXT AREA BYTES LEFT

```

The movement routine is complete. Now we must approach the much more difficult part of the program which takes care of the combat. This occurs immediately the player has completed all moves. This article is devoted entirely to machine language routines. Next we will develop and complete the Basic portion so that you will see how they fit together.

The combat sequence involves examining up to 30 hex around each man looking for opponents. A diagram of this area is shown in figure 1. You will see that I have divided it up into 6 segments and labelled the hex in each A, B, C, D, E and F.

There are, of course, really 36 hex but because the hex is elongated due to the shape of the video pixel, one finds that a distance of three hex North or South is unrealistically far, so the top and bottom hex are ignored. If you want to have them, the adjustment is easy.

At this point, we must get into some heavy machine code. In order to make an attack, we need to know several facts about the opponent i.e.

1. His position on the screen. (2 bytes)
2. The position of boulders which provide cover. (2 bytes)
3. The distance between the two pieces.
4. The index of the defender.
5. The direction of the attack.

When we come out of the X\$(16) routine we will have this information in a table called TB. The first byte in this will



Illustration: John Davis

WARPATH

No wargame is complete without a good battle. In part six of his Warpath game, Ron Potkin tackles the combat routines as the cavalry and the braves move to adjacent hexes.

contain the length which we divide by seven to obtain the number of defenders.

The code in X\$(16) calls five sub-routines held in X\$(10) through to X\$(14). Some of these are very simple and I could have repeated the coding in the X\$(16), but the length would have exceeded the maximum which can be held in one string.

Incidentally, this routine was first written and tested in Basic and then translated. For example:

```
X$(12)... C = C + 1
          IF C = 7 THEN C = 1
          RETURN
```

```
X$(13)... C = C - 1
          IF C = 0 THEN C = 6
          RETURN
```

I prefer this method. The idea is that I can get the logic correct in Basic so that, when writing the machine code, I need only concentrate on the syntax. It looks complicated because machine code re-

quires that you work at a much greater level of detail. Let me outline what happens:

1. Register BC counts the number of segments i.e. 6 (see lines 300-500 of RANGE). This is also the direction indicator. Assume that BC equals 1.
2. Register D contains 1 if we are checking a near boulder hex (A). Register E contains 1 if it is a far hex (B or D). These will be stored in the table if a boulder is found.
3. The routine TEST uses BC to obtain the offset. This gets us to A. It calculates the IBOARD and VIDEO positions as it proceeds. If there is a defender here, we need to look no further because the attack is compulsory.
4. Now we continue up to hex B and C using the same offset. Any defenders are saved in TB. We now go back to the start (using INIT). We call TEST which takes us to A and then increment C and call TEST again which takes us to D. Similar methods are used to reach E and F.

Just one point: the routines use the same names as the Basic program. This was necessary in order to stop my head going in circles! Do not confuse the two.

The six subroutines are in this month's listing. As usual, load the tape containing Parts 1 to 5 before you start. Sorry: there are several lines of numbers — so take it easy. Type in a few lines at a time and save at regular intervals. You will see that I have adjusted lines 4000 to 4020 which will check that the DATA is correct. Make sure that the X\$ strings are the following lengths:

X\$(10	11	12	13	14	16
Length	17	46	9	10	128	220

Once you have RUN this program, delete lines 791, 1085/6 and all lines from 2000 upwards. The only code remaining should be up to 1690 in multiples of 10. Now save this as well. You will be pleased to know that this completes all machine code — the remainder is now in Basic.

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CONTENTS AND UPDATE

```

0000      00010      ORG      0
00020 ;X*(14) TEST
00030 ;=====
00040 ;FIND CONTENTS OF HEX DEFINED BY
00050 ;BL AND DIRECTION GIVEN BY REG. C
00060 ;RETURNS NA: EDGE = 3, BOULDER = 2
00070 ;      OPPONENT = 1, OTHER = 0
00080 ;ALSO UPDATES BL AND PR TO HEX POSITION
00090 ;=====
6888      00092 PR      EQU      275280
6884      00093 BL      EQU      275240
6898      00094 RW      EQU      275440
688A      00095 NA      EQU      275380
6881      00096 NX      EQU      275210
7885      00097 BD      EQU      316690
6888      00098 SK      EQU      275310
688C      00099 VID      EQU      275320
00100 ;
00110 ;CALCULATE NEW PR FROM OFFSETS
00120 ;SEE RW IN BASIC - LINE990
00130 ;SIMILAR TO ROUTINE IN LINE 500
00140 ;=====
0000 218C68      00150      LD      HL,VID
0003 2B      00160      DEC      HL
0004 2B      00170      DEC      HL
0005 09      00180      ADD      HL,BC
0006 09      00190      ADD      HL,BC
0007 5E      00200      LD      E,(HL)
0008 23      00210      INC      HL
0009 56      00220      LD      D,(HL)
000A 2A8868      00230      LD      HL,(PR)
000D 19      00240      ADD      HL,DE
000E EB      00250      EX      DE,HL
000F ED538868      00260      LD      (PR),DE
0013 EB      00270      EX      DE,HL
00271 ;=====
00272 ;CALCULATE HEX
00273 ;SIMILAR TO ROUTINE IN X*(4)
00274 ;=====
0014 2A8468      00280      LD      HL,(BL)
0017 1601      00290      LD      D,1
0019 15      00300      DEC      D
001A 1E18      00310      LD      E,240
001C AF      00320      XOR      A
001D ED52      00330 SUBT      SBC      HL,DE
001F 3903      00340      JR      C,ROW
0021 3C      00350      INC      A
0022 18F9      00360      JR      SUBT
0024 E601      00370 ROW      AND      1
0026 219868      00380      LD      HL,RW
0029 2803      00390      JR      Z,EVEN
002B 1E0C      00400      LD      E,120
002D 19      00410      ADD      HL,DE
002E 09      00420 EVEN      ADD      HL,BC
002F 09      00430      ADD      HL,BC
0030 2B      00440      DEC      HL
0031 2B      00450      DEC      HL
00455 ;=====
00456 ;ASSUME HEX IS
00457 ;VACANT
0032 3E01      00460      LD      A,1
0034 3D      00470      DEC      A
0035 328A68      00480      LD      (NA),A
00482 ;=====
00484 ;UPDATE BL
00486 ;=====
0038 5E      00490      LD      E,(HL)
0039 23      00500      INC      HL
003A 56      00510      LD      D,(HL)
003B EB      00520      EX      DE,HL
003C ED588468      00530      LD      DE,(BL)
0040 19      00540      ADD      HL,DE
0041 EB      00550      EX      DE,HL
0042 ED538468      00560      LD      (BL),DE
0046 EB      00570      EX      DE,HL
0047 AF      00580      XOR      A
0048 11B578      00590      LD      DE,BD
004B 19      00600      ADD      HL,DE
00602 ;=====
00604 ;GOT IT !
00606 ;=====
004C 7E      00610      LD      A,(HL)
004D 328168      00620      LD      (NX),A
0050 FE63      00630      CP      99D
0052 2824      00640      JR      Z,EDGE
0054 FE3C      00650      CP      60D
0056 2824      00660      JR      Z,BLDR
0058 FE33      00670      CP      51D
005A 3018      00680      JR      NC,OTHER
00682 ;=====
00684 ;WE HAVE A MAN.
00686 ;FRIEND OR FOE?
00688 ;=====
005C 11FFFF      00690      LD      DE,OFFFHH
005F FE1A      00700      CP      26D
0061 3802      00710      JR      C,LESS1
0063 1E01      00720      LD      E,1
0065 3A8868      00730 LESS1      LD      A,(SK)
0068 FE1A      00740      CP      26D
006A 3802      00750      JR      C,LESS2
006C 1601      00760      LD      D,1
006E 7A      00770 LESS2      LD      A,D
006F EB      00780      CP      E
0070 2805      00790      JR      Z,OTHER ;FRIEND

```

POSITION OF ENEMY

```

0000      00010      ORG      0
00011 ;X*(11) - SAVE
00015 ;=====
00020 ;ADDS DETAILS ON POSITION
00025 ;OF ENEMY TO TABLE
00027 ;=====
00030 ;
00040 PR      EQU      275280
00050 NX      EQU      275210
00060          EQU      HL,(PR)
00070          EQU      (IX+01H),H ;VIDEO
00080          EQU      (IX+02H),L ;POSITION
00090          EQU      HL ;GET RETURN ADDRESS
00100          EQU      DE ;GET BLDR FLAG
00110          EQU      DE ;SAVE ADDRESS
00120          EQU      HL ;DISTANCE 1,2,3
00130          EQU      (IX+06H),A
0010 3A8168      00140      LD      A,(NX)
0013 D07705      00150      LD      (IX+05H),A
0016 D07203      00160      LD      (IX+03H),D
0019 D07304      00170      LD      (IX+04H),E
001C D07107      00180      LD      (IX+07H),C
001F D023      00190      INC      IX
0021 D023      00200      INC      IX
0023 D023      00210      INC      IX
0025 D023      00220      INC      IX
0027 D023      00230      INC      IX
0029 D023      00240      INC      IX
002B D023      00250      RET
002D C9      00260      END
0000          00290
00000 TOTAL ERRORS
34459 TEXT AREA BYTES LEFT

```



TEMPORARY VARIABLES

```

0000      00010      ORG      0
00020 ;X*(10) - INIT.
00025 ;=====
00030 ;SB IS SP, SS IS BL
00035 ;SEE BASIC LINE 1230
00040 ;THIS SETS UP THE
00045 ;TEMPORARY VARIABLES
00050 ;PR & BL
00055 ;=====
00060 ;
00070 SB      EQU      275220
00080 BL      EQU      275240
00090 SS      EQU      275260
00100 PR      EQU      275280
0000 ED588268      00110      LD      DE,(SB)
0004 ED538468      00120      LD      (BL),DE
0008 ED588468      00130      LD      (PR),DE
000C ED538868      00140      RET
0010 C9      00150      END
0000          00160
00000 TOTAL ERRORS
34741 TEXT AREA BYTES LEFT
0072 3E01      00800      LD      A,1 ;FOE
0074 328A68      00810 PUTNA      LD      (NA),A
0077 C9      00820 OTHER      RET
0078 3E03      00830 EDGE      LD      A,3
007A 18F8      00840          JR      PUTNA
007C 3E02      00850 BLDR      LD      A,2
007E 18F4      00860          JR      PUTNA
0000          01030      END
00000 TOTAL ERRORS
0070 33191 TEXT AREA BYTES LEFT

```




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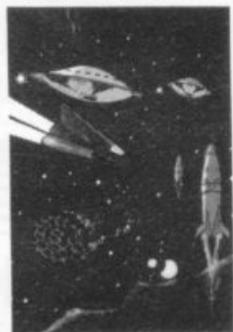


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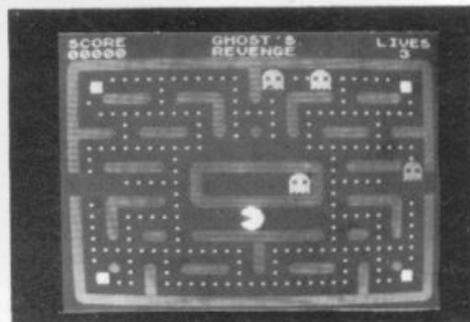


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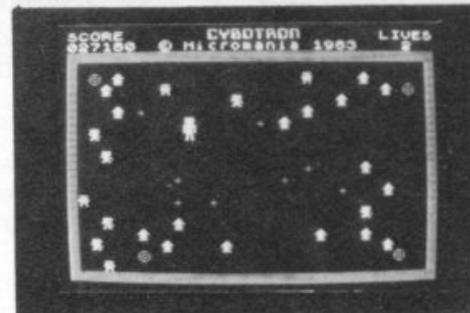


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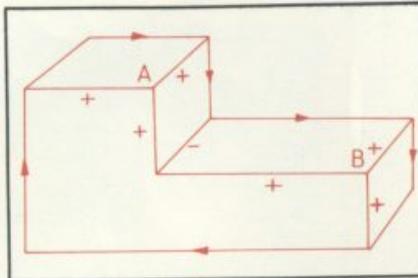


FIG 1: LABELLINGS

The labelling can then be done by a program, and once the labelling is done, the shape of the object can be understood.

The key to doing the labelling automatically is in the way that the corners where edges meet can be labelled. The corners marked A and B in figure 1, for example, both show three converging edges all of which are labelled with '+', so that they are projecting outwards to form a corner of the kind possessed by a cube.

In fact, there are 18 permitted ways for labelled edges to converge at a corner. They are all illustrated in figure 2. All other possible corner labellings correspond to situations that are physically impossible.

With the aid of this list of valid corner labellings, we can give a method for the automatic labelling of a line drawing. It is:

1. Label the perimeter of the drawing with arrows forming a clockwise ring.
2. Complete the corners on the outside with corner labellings selected from figure 2.
3. Work inwards to label the remaining corners with valid labellings until the labelling is complete.

These three phases are illustrated in figure 3. Step 3 required two passes in

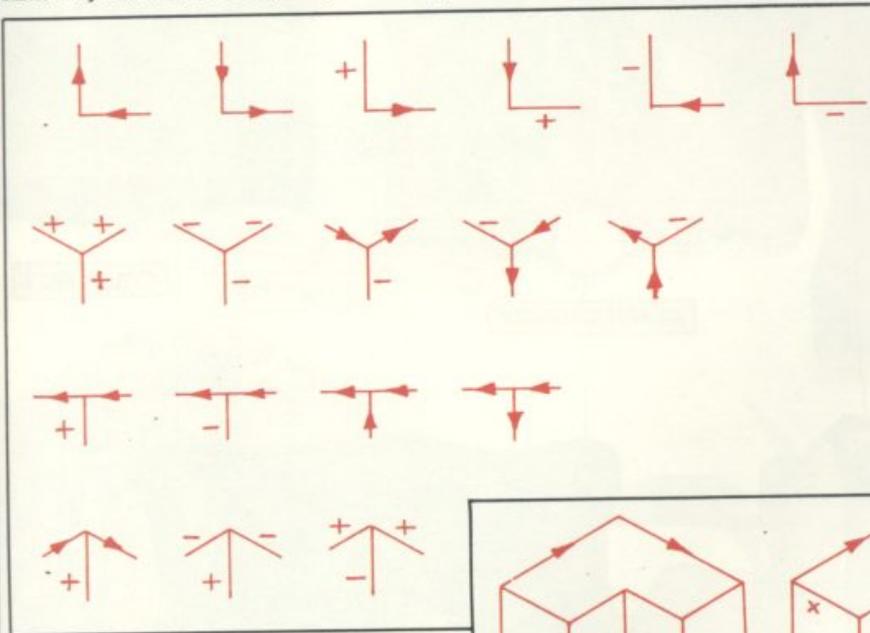


FIG 2: CORNER LABELLINGS

by running a program. In this case it must be presented in some way with an image of what it is seeing and run a program which can tell it what this image means.

The image can be presented by a video camera. However, it is a task beyond the current state of the art to interpret raw video pictures directly.

If such pictures are first processed to reduce them to line drawings, then it is a quite straightforward matter to interpret them.

In this article I'll explain how line drawings of three-dimensional objects can be interpreted so that a computer can be programmed to know what it is seeing. Next I will examine how ordinary pictures of an object can be reduced to line drawings.

In a line drawing of a three-dimensional object, each line can represent one of the following

- (a) An edge projecting *outwards* at the join of two surfaces. Such lines are indicated by labelling them with a '+'.
(B) An edge projecting *inwards* at the

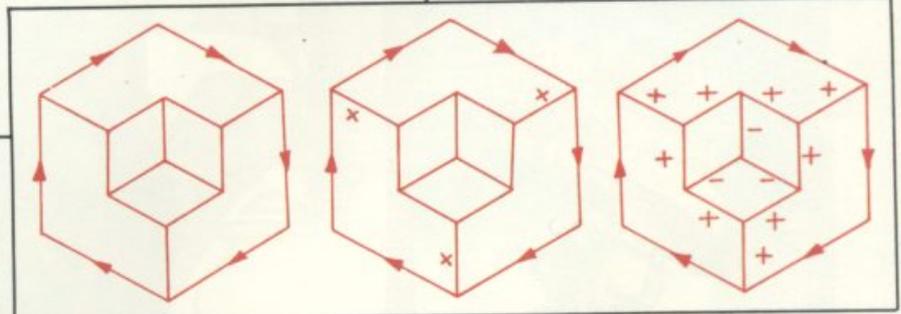


FIG 3: THE THREE PHASES

join of two surfaces. Such lines are indicated by representing them with a '-'.

(c) An edge at which one of the surfaces hides another. Such lines are labelled with an arrow. The direction of the arrow is such that when walking along the edge the surface which hides the other is always to the right.

These labellings are illustrated in figure 1. A brief examination of the diagram will show that the shape which you automatically assign to the object that is represented in the figure is confirmed by the labelling of the lines.

Having seen that the labelling corresponds with the way that we see an object, what is needed now is a procedure for automatically labelling any line drawing of a three-dimensional object.

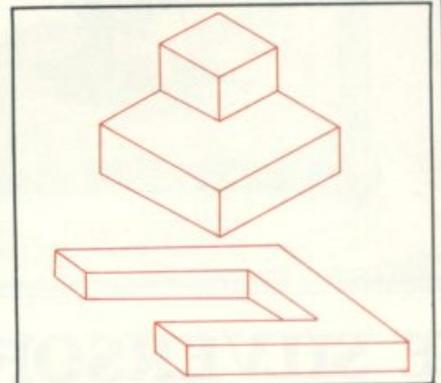
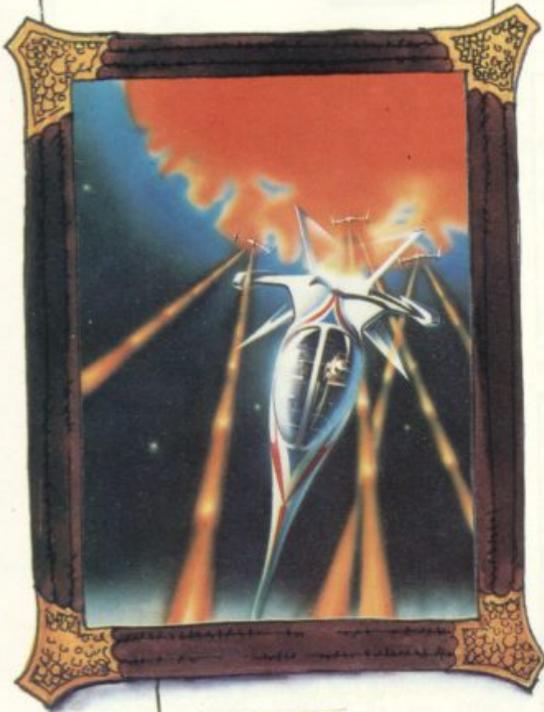


FIG 4: EXAMPLES

the figure illustrated.

You might care to try your hand at the examples in figure 4, and to test the results by comparing them with the way that you see the objects.

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MACHINE CODE

We have not yet covered all the different types of machine code instruction, but we have looked at enough instructions to be able to write some useful routines.

Instead of looking at new instructions this month we will look at how to use the routines built in to the computer's ROM in conjunction with the instructions we already know.

ROUTINES AND HARDWARE

All computers have built in routines to handle such basic operations as printing a character, reading the keyboard, tape input and output, etc.

The details of these routines depend on the hardware of the particular computer, and they are usually quite complicated.

For example, the routine to print a character on the screen has to produce the actual dot pattern for the character, keep track of the cursor position, provide automatic carriage return/line feed at the end of each line, provide automatic scrolling at the end of the screen, and also has to handle various non-printing control codes.

Before you can use these routines in your own programs you need to find their memory addresses and how to pass values between these ROM routines and your program.

The manual for the BBC micro gives details of how to use several ROM routines, but with most small computers you have to rely on what users have found out for themselves and published in magazines or books.

PRINTING THE MESSAGES...

In the example programs printed here I will assume that to print a character on the screen you have to get the ASCII code for the character into the accumulator and call a subroutine called OUTCH, and I will also be assuming that OUTCH does not alter any of the registers. Most computers do have a routine that works like this.

Suppose we have a message stored in the computer's memory, and we want to print the message on the screen.

BY TED BALL

We need to know the address where the message starts, which we will call MESSGE (abbreviated because assemblers normally allow only six characters), and where the message ends.

There are several methods you can use to indicate the end of a message, for example, put zero after the last character, or add 128 to the code for the last character (this will not usually cause any confusion as the codes for the normal printing characters are less than 128).

The examples here mostly assume that you know the actual length of the message and the routines count the number of characters printed. The form of the routines is:

Initialise pointers

Repeat

Read character

Print character

Advance pointer

Until end of message

We can now look at the routines in detail.

LET'S GO FOR A LOOP!

6502

Routine (a) is quite simple: we use the X register as a pointer and load the character to be printed into the accumulator using absolute indexed addressing.

The character is printed by calling the ROM subroutine OUTCH, and we then increment the X register to point to the next character and compare the value in the X register with the length of the message.

If the value in the X register is not equal to the length of the message we loop back to process the next character.

Routine (a) can only be used when the message is less than 256 characters long, as the registers in the 6502 are only 8-bits long.

If the message is more than 256 characters we can use routine (b), which is more complicated as we have to handle 16-bit numbers in two 8-bit sections. The characters of the message are read into the accumulator using indirect indexed addressing (or post-indexing).

This requires the base address to be stored in two consecutive page zero locations, which are called MESSAD and MESSAD+1 in the routine.

The first few lines in routine (b) calculate some constants which are used later. A standard 6502 assembler will allow calculations of this type, and will

also allow the calculations to be performed in operands.

The numbers involved in the arithmetic must be between 0 and 65535, and division always returns an integer result, any fractional part being discarded.

Thus, if MESSGE were \$1234, the first two lines of routine (b) would give MESSHI as \$12 and MESSLO as \$34, separating the address into its high and low bytes.

After the initial calculations routine (b) puts the low and high bytes of MESSGE into the page zero locations MESSAD and MESSAD+1, and sets the Y register to zero.

After a character has been printed the pointer is advanced by incrementing the contents of memory location MESSAD (the low byte) and if the low byte becomes zero the high byte also has to be incremented.

The test for the end of the message also has to be done in two parts. The high byte of the current address is compared with the high byte of the address of the end of the message (which was calculated at the beginning); if they are not equal the routine loops back to process the next character; if they are equal the low bytes have to be tested.

DEFICIENCIES OF THE Z80 SET

Z80

Routine (c) uses the HL register pair as a pointer to the current character and the B register as a counter for the number of characters. Note that, as the compare instruction CP performs a comparison with the accumulator, the contents of the B register are copied into the accumulator in order to perform the comparison.

The B register is 8-bits long, so routine (c) can only be used if the message is less than 256 characters.

Routine (d) will handle messages with more than 256 characters. The BC register pair is initially loaded with the address of the end of the message and after a character has been printed and the HL pointer incremented the routine tests to see if the contents of HL are equal to the contents of BC.

The test is a little complicated because of deficiencies in the Z80 instruction set.

The Z80 has no 16-bit compare instruction. However, you will remember that a compare instruction works by performing a subtraction, and keeps the

ROUTINE (a) — 6502

```

NEXTCH  LDX #0
        LDA MESSAGE,X      ; Get character
        JSR OUTCH          ; Print it
        INX                ; Advance pointer
        CPX #LENGTH       ; Test for end of message
        BNE NEXTCH
    
```

ROUTINE (b) — 6502

```

MESSHI = MESSAGE/256
MESSLO = MESSAGE — 256*MESSHI
MEND = MESSAGE + LENGTH
MENDHI = MEND/256
MENDLO = MEND — 256*MENDHI
LDA #MESSLO                ; Initialise Pointer
STA MESSAD
LDA #MESSHI
STA MESSAD+1
LDY #0
NEXTCH  LDA (MESSAD,Y)      ; Get character
        JSR OUTCH          ; Print it
        INC MESSAD         ; Advance pointer
        BNE TEST
        INC MESSAD + 1
TEST    LDA #MENDHI        ; Test for end of message
        CMP MESSAD + 1
        BNE NEXTCH
        LDA #MENDLO
        CMP MESSAD
        BNE NEXTCH
    
```

flags but not the actual result of the subtraction. Thus, a 16-bit comparison can be performed with a subtraction.

The Z80 has 16-bit Subtract With Carry operations but no 16-bit Subtract, without carry.

Thus routine (d) uses the instruction AND A to clear the carry flag, and SBC HL,BC to compare the contents of HL and BC. If the contents of HL and BC are equal we have reached the end of the message and jump to the end of the routine.

If we have not reached the end of the message we must remember that SBC HL,BC has altered to contents of HL, so we must restore the value of HL with the instruction ADD HL,BC before looping back for the next character.

INDIRECT AND DIRECT...

6809

Routine (e) will print a message of any length, and uses auto-increment addressing, which allows us to read a character and advance the pointer in one instruction.

After printing a character the routine tests for the end of the message by comparing the contents of the X register with (MESSAGE+LENGTH), the address of the end of the message.

The auto-increment and auto-decrement instructions are very useful in handling messages and tables of all kinds.

The operand forms are ,R+ ,R++ ,—R, —R[R, R+][, —R] where R may be any one of the 16-bit registers X, Y, S, U. ,R+ takes the contents of the memory location pointed to by register R and then increments R; ,R++ takes the contents of the memory location pointed to by R and the next higher memory location, and increments R twice. ,—R and ,—R work similarly but register R is decremented *before* the memory reference takes place.

The indirect forms [,R++] and [, —R] use the memory location pointed to by the contents of the memory locations pointed to by R.

Indirect auto-increment and auto-decrement only increment or decrement twice because the indirection requires a two-byte operand.

CONTINUED NEXT MONTH

ROUTINE (c) — Z80

```

LD HL, MESSAGE
LD B, 0
NEXTCH  LD A, (HL)          ; Get character
        CALL OUTCH        ; Print it
        INC HL            ; Advance pointer
        INC B
        LD A, B            ; Test for end of message
        CP LENGTH
        JR NZ, NEXTCH
    
```

ROUTINE (d) — Z80

```

LD HL, MESSAGE
LD BC, MESSAGE+LENGTH
NEXTCH  LD A, (HL)          ; Get character
        CALL OUTCH        ; Print it
        INC HL            ; Advance pointer
        AND A              ; Clear Carry Flag
        SBC HL, BC         ; Test for end of message
        JR Z, DONE
        ADD HL, BC
        JR NEXTCH
DONE    ...
    
```

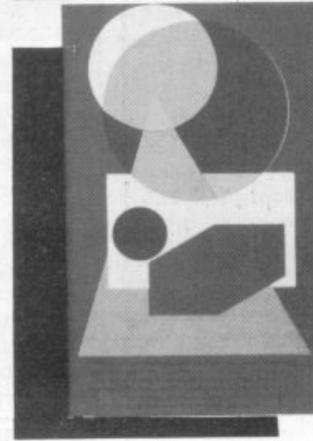
ROUTINE (e) — 6809

```

NEXTCH  LDX #MESSAGE
        LDA ,X+            Get char & advance pointer
        JSR OUTCH          Print character
        CMPX #(MESSAGE+LENGTH) Test for end of message
        BNE NEXTCH
    
```

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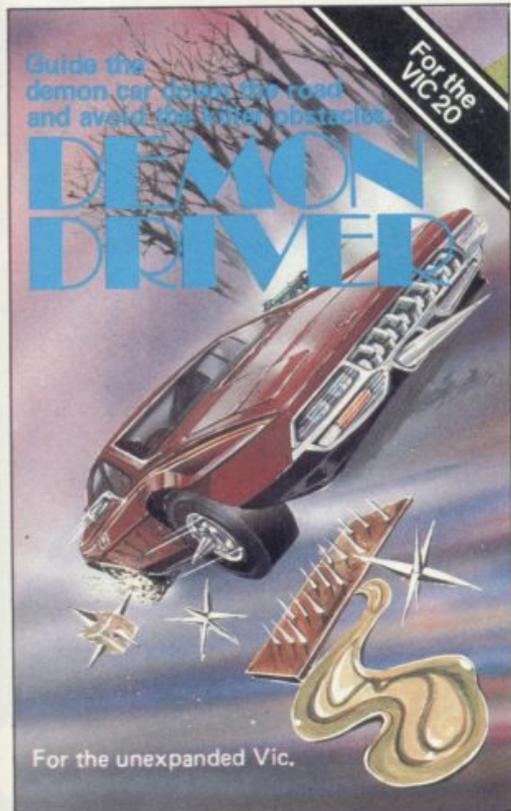
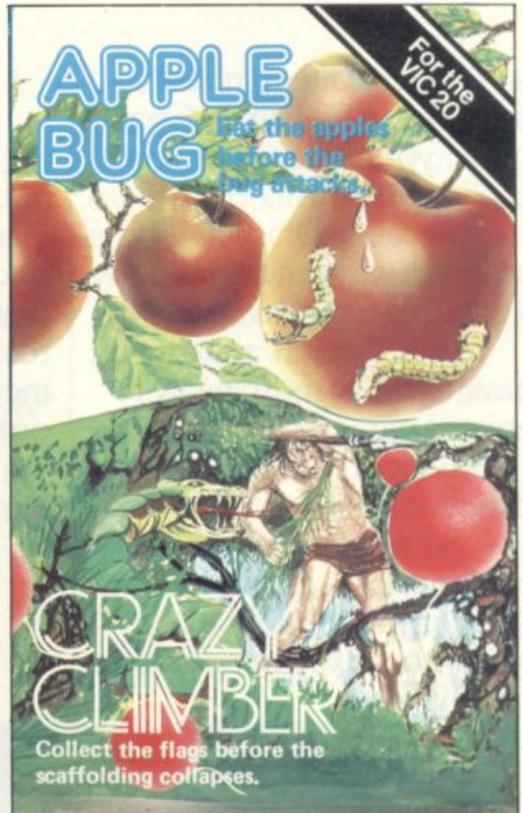
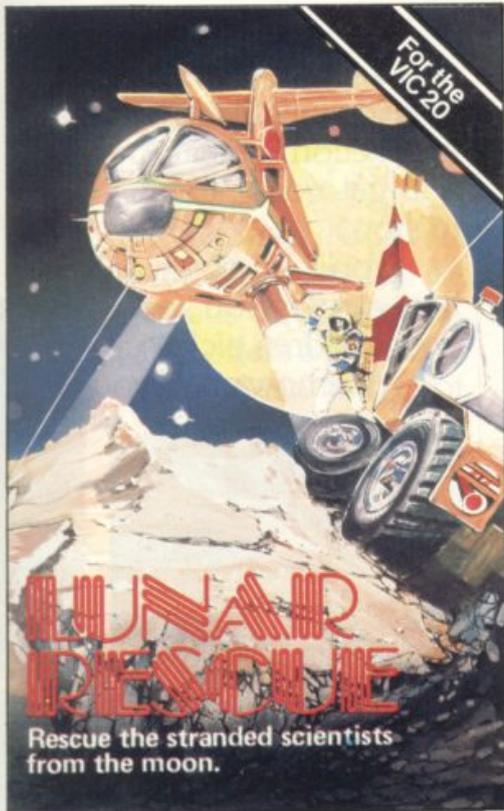
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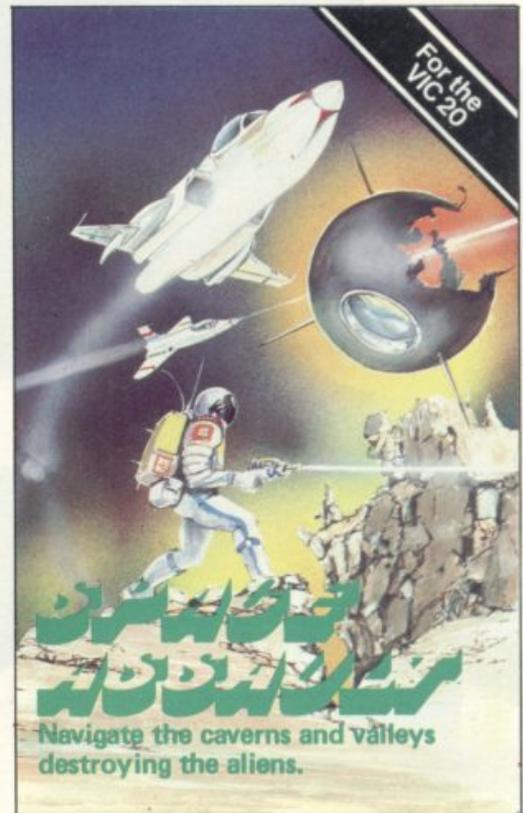


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WARE SOFTWARE SOFTWARE SOFT REVIEWS

MORE EMPIRES TO CONQUER

ROMAN EMPIRE

Roman Empire is the latest period war game from M. C. Lothlorien.

This Cheshire-based company have become specialists in computerised war gaming with other titles in the range such as Peloponnesian War, Tyrant of Athens, Samurai Warrior, and Japanese Challenge.

Roman Empire is a strategy war game requiring thought and application.

Graphics are therefore not as crucial to the game as they are in other games. Even allowing for this the graphics in Roman Empire are very unimpressive.

All you get are columns of figures with a list of menu options around which the game is based.

A few more illustrations would have made the various columns of figures far more accessible. The odd map would have been very much appreciated as well.

The game has now been converted for the Dragon and Atari computers and some of the above suggested improvements have now been incorporated in these new versions. Why it is not possible to upgrade the Spectrum version is anyone's guess.

The idea of the game is to conquer the six countries that are hostile to you. In order to do this you must wipe out your enemies troops. You must build up your legions and launch campaigns in the regions you are attempting to annex.

A constant check has to be kept on your legions morale, fighting efficiency, energy level and status.

The only graphic display Roman Empire does give you is when you press the "next period" button — which totals your victories and defeats. What the display was supposed to be, however, I couldn't tell you. My girlfriend thought it looked like a screen full of ants. Any suggestions?

Confirmed war gamers may get something out of this one. For the uninitiated though — it would have to have greatly improved on-screen instructions and

graphics before I would reach for my wallet.

- Getting started 4
- Value 4
- Playability 4

CLASSIC ALIENS BEGIN A BRAND NEW INVASION

SPACE INVADERS

The latest release from Buy-Byte for the BBC micro is a version of that granddaddy of all video games — Space Invaders.

You would not normally expect a software house to launch a copy of this classic game when several other adequate versions already exist unless it was a particularly good version. This version does not fall into that category.

Bug-Byte has not made the most of the BBC's colour and sound potential.

The machine is easily capable of producing a truly de-luxe version of Space Invaders though this cassette is sadly unworthy of that description.

The mystery saucers did not appear at the correct times and lacked the sound and movement of the arcade original.

In the games favour: it was fast and the aliens exploded cleanly when hit.

Despite this I couldn't help thinking that for £7.50 I was entitled to something more than the same old format. For an extra couple of pounds practically any game from the Acornsoft range is better value for money.

- Getting started 9
- Value 4
- Playability 3



BEWARE THE DEADLY BUG-TRAIN!

STAR MAZE

If you fancy trying your hand at blasting a weird assortment of aliens and getting lost in the graphics of a maze then Star Maze is the game for you.

The idea of the game is to pilot your space shuttle through an enormous scrolling space maze — mining the jewels that appear every so often and taking them back to your mother ship.

The screen is divided into two sections. The left two-thirds of the screen displays the maze and your ship and the remaining third displays all relevant game information — score, high score, amount of fuel left, number of bullets left, ships, and various types of aliens drowned.

Various aliens are attempting to thwart your mission in the shape of asteroids, cruisers, and toughest of all — bug trains.

There is only one effective way to deal with the bug trains and that is to use one of your three smart bombs on them. A single bullet will only cause the bug train to split letting out a Pandora's box of nasty aliens.

You are armed with a sophisticated laser capable of single fire and also rapid fire. This enables you to use your limited supply of ammunition most effectively. You begin the game with three smart bombs but can earn an extra one each time you clear one level.

There are sixteen levels in all though you will need to be a pretty skilled space ace to get that far. After weeks of play I'm still stuck on the sixth.

Ship control is the most difficult part of Star Maze and it took me quite some time to master the technique. You could really do with a third, or even fourth hand there are that many controls to keep a spare finger on.

You have short and long distance thrust, rotate left and right, single fire, rapid fire, hyperspace, smart bomb, and even a freeze button which enables you to pause the game to answer the phone or plan your strategy for an imminent alien onslaught. Sound and graphics are not outstanding.

I was hooked on Star Maze from the very first session. Once I'd mastered the controls the game became more and more fascinating and I can confidently recommend it as one of the best games now on sale for the Apple.

Manufactured by Sirtech for TSR the game is sold by SBD of London at £21.00.

- Getting started 8
- Value 9
- Playability 10



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Futura Software's Powerboat Race gives you the chance to pit your wits against the world's top powerboat racers on the BBC model B.

The program loaded first time and presented a detailed title page with full playing instructions. You are invited to enter the World Powerboat Championships. You can also choose the one or two player game and name your drivers before the computer chooses your opponent.

You'll need joysticks and 32k to play the game and I found it difficult to control the boat at first — although this was due more to the joystick than the program.

Making life more difficult on the high seas as you race along are two bobbing yellow buoys which must be negotiated to clock up those all important laps.

Each race consists of three heats of 15 laps and points are scored according to your position at the end of the race; 400 for first place, 300 for second and 200 for third. The driver scoring the most points over the three heats wins.

Screen presentation was quite good with your score and number of laps completed displayed at the bottom of the screen during each race.

The game was more frustrating than addictive because of the poor control afforded by the joysticks.

- Getting started 7
- Value 6
- Playability 5

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E SOFTWARE SOFTWARE SOFTWARE
REVIEWS

DEFENDER BY ANOTHER NAME

REPTON
 Repton is an all action scrolling shoot-out
 for the Atari 800 and will provide hot
 competition for Atari's new Defender car-
 tridge.

The game has many similarities with
 Defender. Just like the Williams arcade
 game you can scroll backwards and for-
 wards — keeping a sharp eye on the radar.
 The radar display is very impressive.
 Sharp graphics, and an accurate repre-
 sentation of what is actually going to take
 place on your screen a few seconds
 hence.

I know all radar is supposed to do this —
 but believe me, this is a considerable
 achievement for computer games radar.

The idea of the game is to stop the aliens
 building a home base on Repton. Their
 colonisation of the planet is already almost
 complete having installed ground to air
 missiles and layed the foundations of their
 home base.

Like Defender there are a variety of
 aliens each with specific functions. The
 cruisers protect the base which is half
 constructed.

The Quarriors are systematically taking
 your building to bits — block by block and
 building up the home base.

As well as Cruisers there are Nova
 Cruisers that track you with greater speed
 and the deadly Dyne-Beam Shooters can
 trap you in a single blast of lazerfire that
 spans the entire screen.

You will also have to watch out for the
 Draynes who are stealing Repton's last
 supplies of fuel — shoot the snaking fuel
 pipes to return the fuel. Despite the aliens
 formidable strength your Armageddon craft
 has a speed advantage and very heavy fire
 power.

Repton is a first class piece of software.
 The graphics knock spots off Atari's own
 Defender cartridge. All the aliens are more
 colourful and construction of the base is a
 great graphical improvement on the basic
 plot.

The unfortunate thing about Repton is
 that many UK Atari owners won't be able to

enjoy the game unless they've got an 800
 with 48k, plus disc drive. If you are lucky
 enough to have both Repton is a must.

The game is imported into the UK by
 Centresoft of Birmingham and is available
 from your local Atari dealer now at £29.95.

- Getting started 9
- Value 5
- Playability 8

**NEVER BECOME A
 PLATE CAPTAIN —
 OR ELSE!**

WACKY WAITERS

Don't ever become a waiter. That much is
 clear from playing Imagine Software's
 Wacky Waiters on the Vic-20.

The idea of the game is to guide a waiter
 across the screen through a series of lifts
 to a waiting customer.

You then have to rush back across the
 lifts to the left side of the screen where the
 wine is kept. You collect the appropriate
 glass of wine and take it back to the
 customer. Your score is the tip that the
 customer gives you and it decreases de-
 pending on the time taken to collect and
 return the drink.

If you fail to jump into a lift you fall down
 a lift shaft and lose one of your three lives.

When all three lives are lost the game is
 over.

The game instructions were particularly
 unhelpful and it took me several hours to
 work out what I was supposed to be doing.

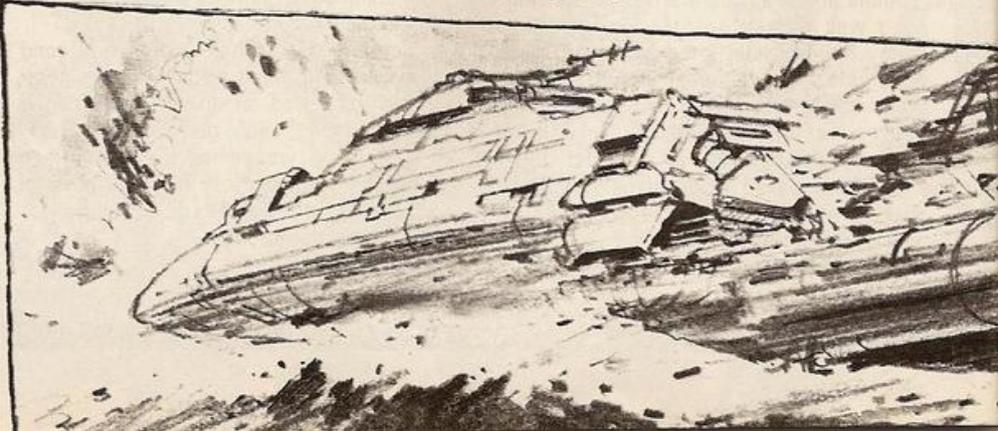
You can choose which keys you want to
 use to play the game which is a good idea
 as you can select a combination of com-
 fortable keys.

The game loaded first time and pre-
 sented five lifts moving up and down con-
 nected by a series of platforms.

The sound effects could have been vast-
 ly improved and the use of colour was at
 best average.

The game is available from Imagine
 Software of Liverpool at £5.50 inclusive.

- Getting started 6
- Value 4
- Playability 4



SOFTWARE SOFTWARE SOFTWARE REVIEWS

FUN FILLED LITTLE BOXES

Remember the pure joy of scribbling? Before you were old enough to be expected to produce forms representing vases or bowls of fruit? When you were allowed to spread colour over an endless supply of pure white paper in the nursery school?

Some of that infantile anarchy is let loose in Atari's latest arcade conversion for the 400/800 home computers. The game is called Qix and will already be well known to arcade-goers.

For those of you with strict parents who turn purple when you mention your local arcade the game is simple to learn but difficult to master.

You control a marker which you must move around the screen drawing boxes. When a box is complete the computer will colour it in either red or blue — depending on the speed at which the box was drawn.

A red box is worth more points and is drawn more slowly therefore putting you at greater risk from the Qix.

This is a shape with four prongs — like the head of a fork — which bounces around the screen at random. If it careers into your marker when a box is incomplete you lose a life.

When you have boxed in 75% of the

NOT THE GAME OF THE FUTURE

Blind Alley is a snake chase type game where you have to avoid your own tail and attempt to make two pursuing snakes crash into it.

Despite this, the cassette inlay depicts a space scene and gives some blurb about Blind Alley being the sport of the future. New software house — Sunshine — are not alone in producing misleading cassette inlays. Some of the worst offenders are the established software houses.

The idea of the game is to hem in the snakes before they can do the same to you. You score a hundred points for each snake successfully crashed.

You begin with two fairly slow snakes and then progress to two quicker ones, then four snakes and so on. Trouble is its all rather slow. The snakes are difficult to control with the keyboard and, if you accidentally press the wrong key they have the annoying habit of disappearing.

QIX

screen the Qix has insufficient room to manoeuvre and you then move on to a fresh screen.

Two other nasties who track you more systematically than the Qix are the Sparx. You start off with just two of these but their numbers multiply each time the red marker line at the top of the screen shrinks to zero.

Watch out for these electronic adversaries running up the lines of your boxes.

Also out to get you is the Fuse which will ignite if you stop drawing without having completed a box.

Just to make things even tougher the Qix increase in numbers as you move up through the screens.

Qix is for one or two players, retains a high score, and is in your local Atari stockists now at £29.99.

For pure originality this game shines out amongst a universe of aliens. It will not grab you from the first play — it takes time to appreciate its subtleties — but it is one very good game.

- Getting started 9
- Value 4
- Playability 8

BLIND ALLEY

The graphics were not the most colourful I have seen on the Spectrum to say the least. I also felt that the game would have been much better if you had something, or things, to gobble up as you guided your snake around the screen.

It is not possible in Blind Alley to rectify a mistaken move by steering yourself out of trouble — instead you must start all over again from the beginning.

About the only good feature of Blind Alley was the high score board which enabled you to write your name in full, congratulated you on a high score, and kept a 'Hall of Fame.'

Blind Alley is available from Sunshine Software at £4.95 and runs on the Sinclair Spectrum in 16 or 48K.

- Getting Started 8
- Value 3
- Playability 3

supermarket ...

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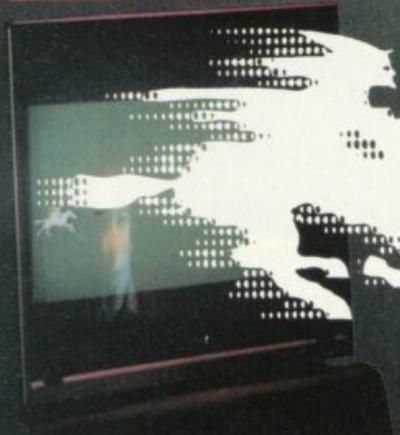


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Luke says - "It's 7-riffic. The better you do, the bigger the challenge." 2130 to beat! Do you have the lightning-fast eye to beat Luke at his favourite game?*

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Luke's comment: "Better than Pacman. It's a really fun game! 12570 eggs to gobble if you want to beat my best. Get it?"*

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Luke says - "Bet you can't keep the Gloom's away as long as I did?" 4360 to beat! That's difficult.*



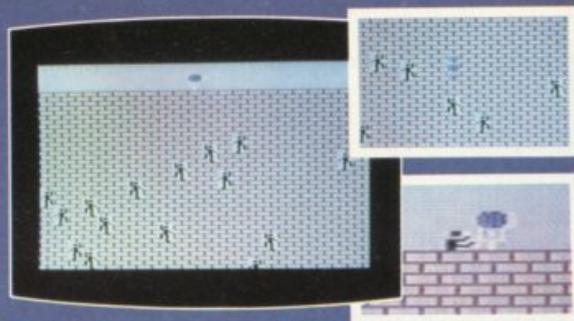
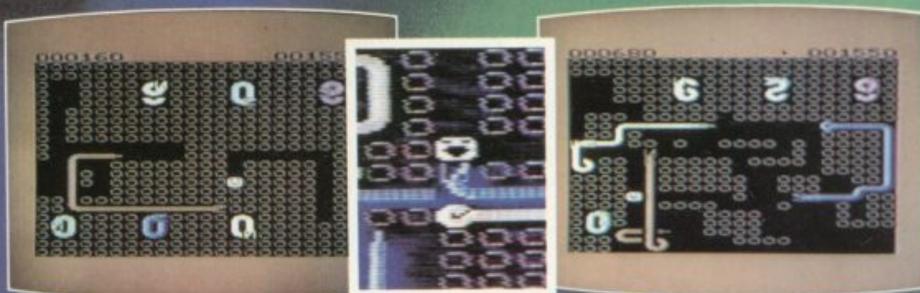
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*The scores quoted were achieved on a Spectrum computer - Different computers give different score potential.

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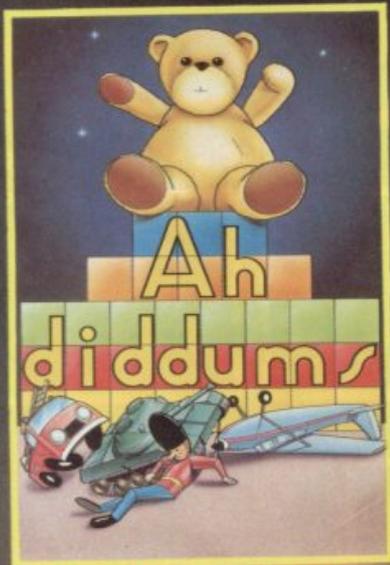
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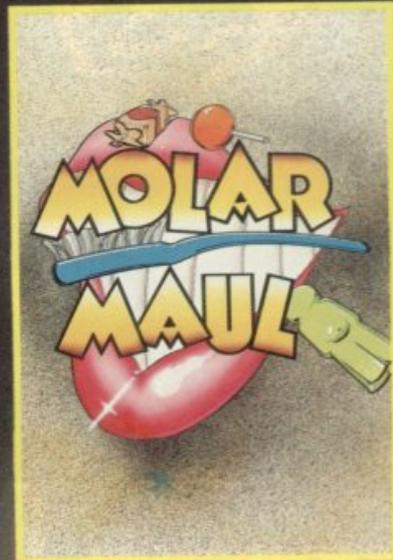
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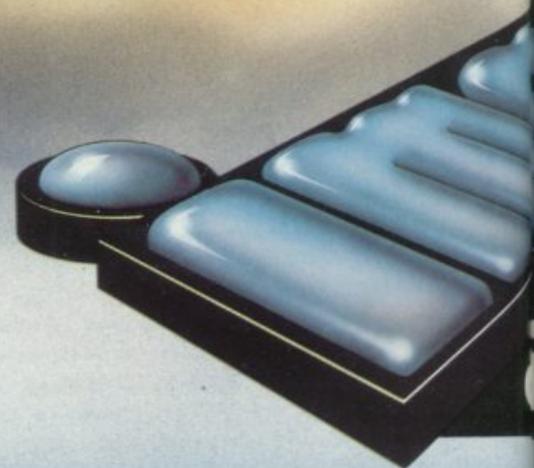
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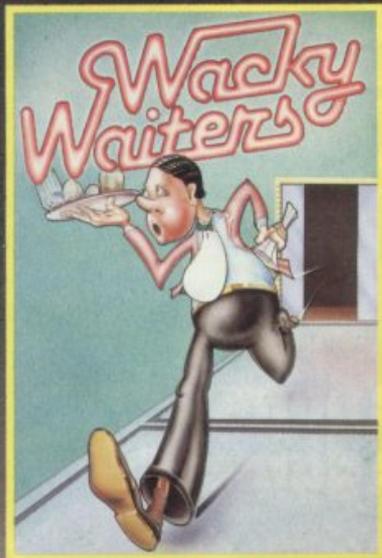


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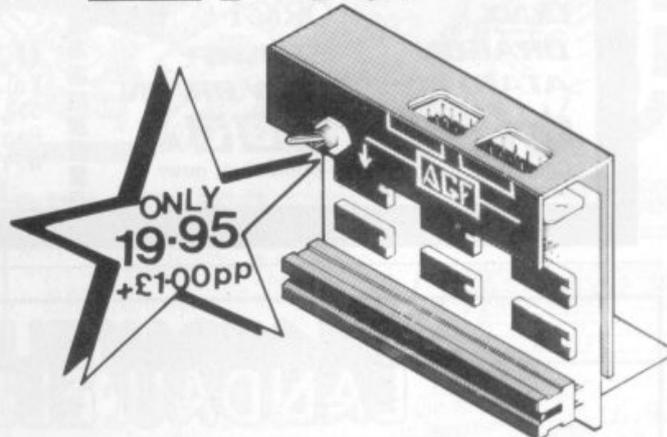
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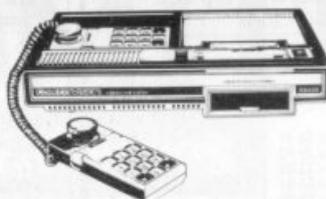
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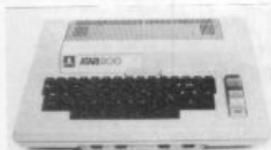
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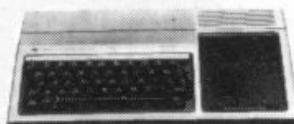
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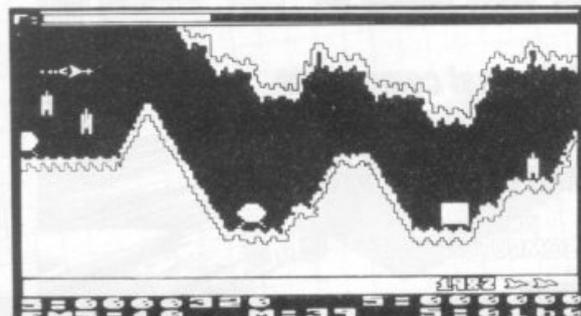
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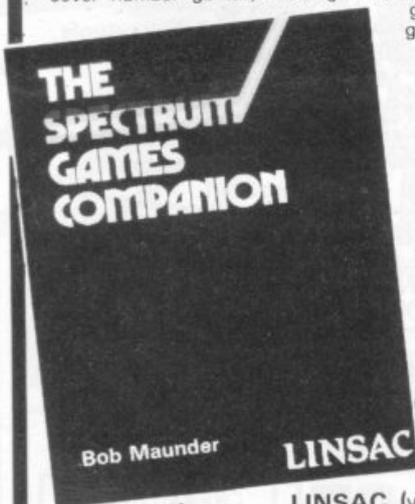
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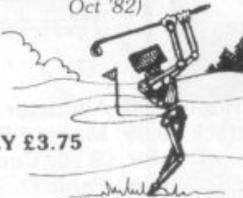
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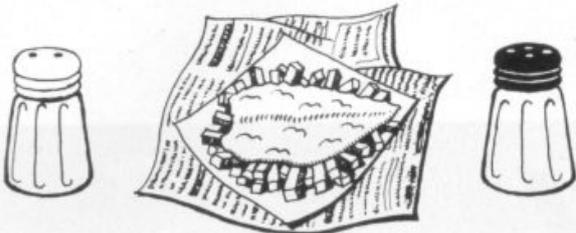
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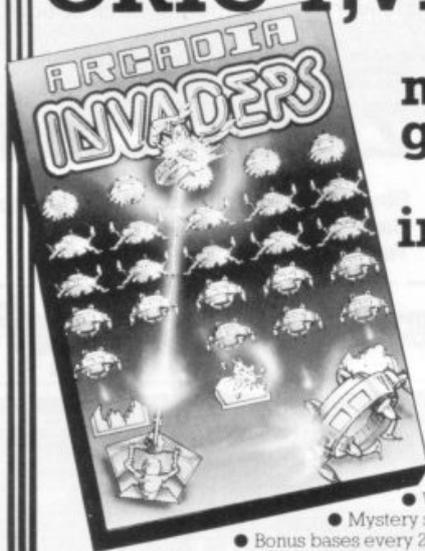
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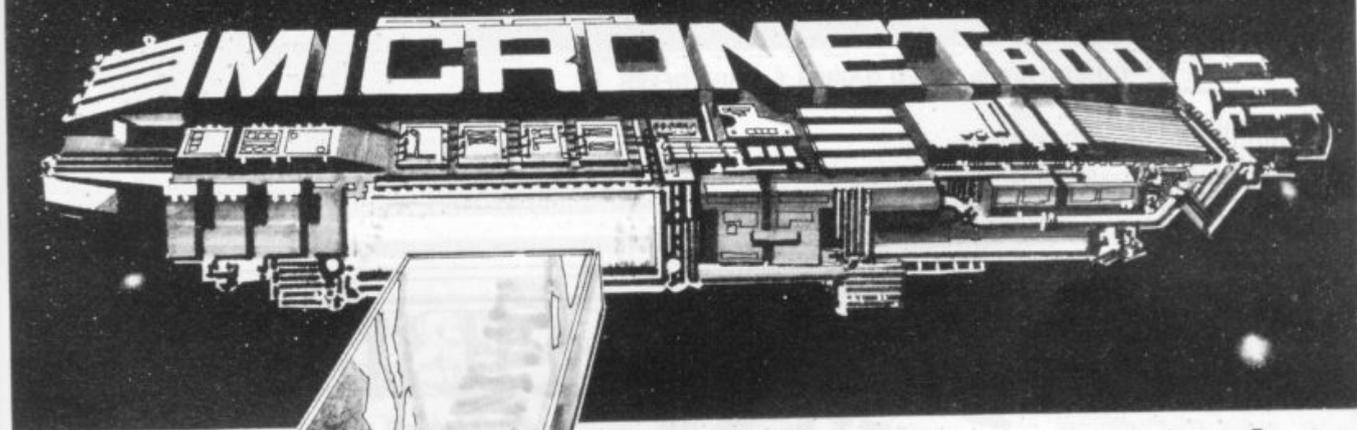
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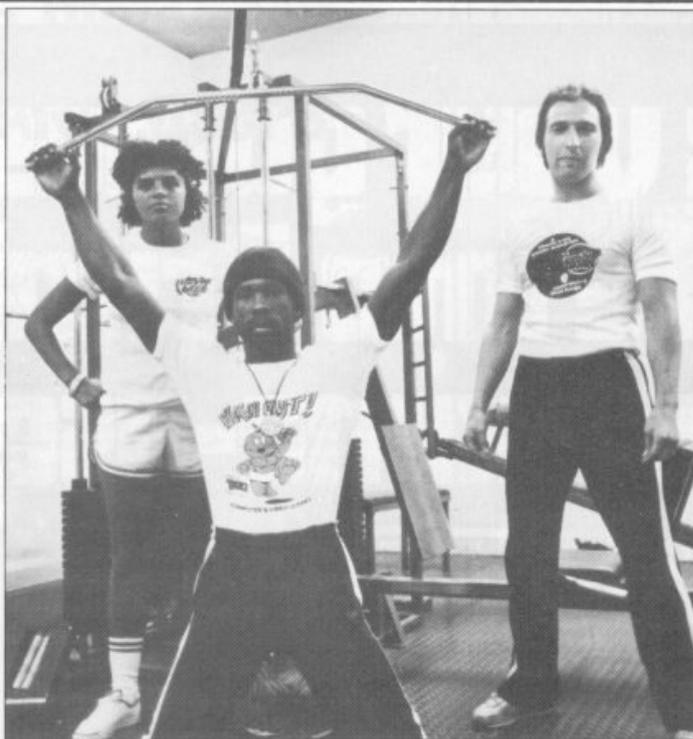


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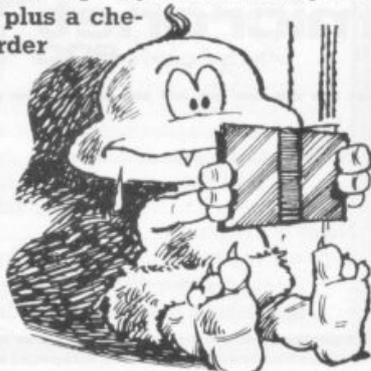


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Acornsoft	46/47	Lyversoft	101
Acorn User	26	Maplin	57
A.G.F. Hardware	113	M C Lothlorien	92
Anirog Computers	34	Melbourne House Publishers	116
Apex Trading	120	Micro-Antics	67
Arcadia Software	124	Micromania	92
Ashby Computers & Graphics	69	Micronet 800	125
ASP Exhibitions	66	Mikro-gen	91
Atari	22/23, 96/97	Milton Bradley	80
Bamby	124	Nicholson, J	121
Blaby Computers	121	Postern	109
Boots	6	Ram Electronics	119
Bug Byte	72	Reed Exhibitions	117
Chamelion Software	26	Romik	75
Chromasonic Electronics	115	R&R Software	120
Comchess	26	RSC Software	121
Commodore	4, 19, 62/63	Silica Shop	20
Dragon Data	102/103	Silversoft	94/95
Dragon Dungeon	121	Sinclair Research	122/123
E&E Enterprises	120	Smiths, W.H. & Son	42/43
Efficient Chips	124	Solar Software	91
Electronic Leisure Products	100	Softek	88
English Software	118	Software Express	36
Gemini Electronics	119	Software Farm	66
Imagic	77	Spectrum Games	2
Imagine	OBC, 110/111, 112	Spectrum Group	12/13/14/15
Interface	108	Startech	130
Interceptor Micros	129	Tansoft	50
Jupiter Ace	52	Trojan Products	127
Kayde	85	U.T.S.	114
Kempston	113	Video Palace	108
Landau Electronics	114	Vision Store	67
Lasky's	58/59	Wiley, John	76
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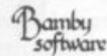
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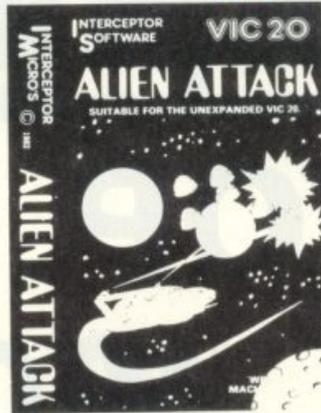
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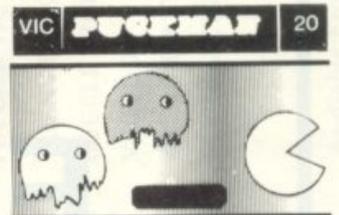
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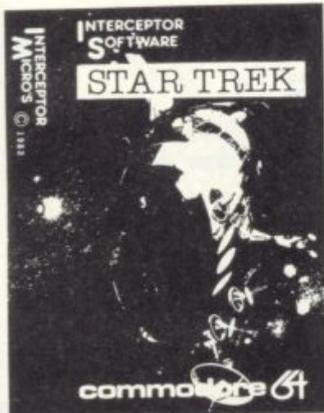


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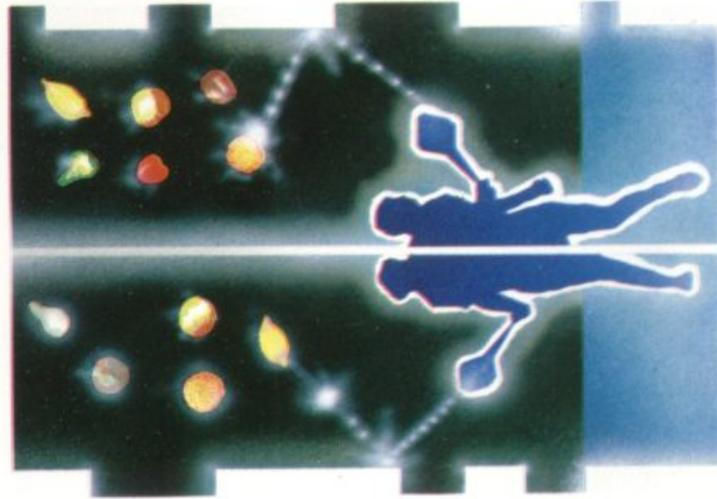
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(VIC-20)

This appealing game enables two players or one player versus VIC to enter a high speed world where reactions and judgement are paramount to survival. Players must deflect their ball into fruit-like objects that appear despite "Schizophrenic Spike" who roams the play area. The game would be simple but for the growing walls and court boundaries and . . .

!! Be thankful this is only a game !!

- ★ Unexpanded VIC
- ★ High speed machine code action
- ★ 1 or 2 players
- ★ Numerous options of play
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- ★ Life display



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(VIC-20)

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Hunt the alien moving around your sector at the speed of light. Destroy the alien's drones as he lays them in your path, whilst avoiding rogue asteroids. Watch out! Your fuel is diminishing and the pace is accelerating. Your chances of survival are slim.

- ★ High speed machine code action
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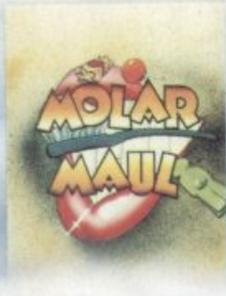
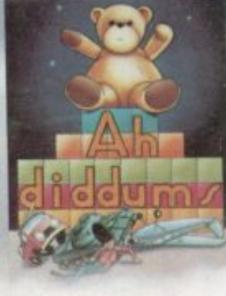
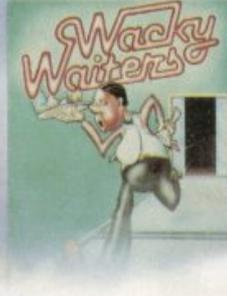
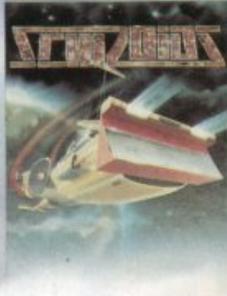
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