

Home Computing WEEKLY

An Argus Specialist Publication

NO. 36
Nov 8-14, 1983

38p

FREE

24-page
computer
buyers' guide

Software
reviews for:
Spectrum, BBC,
Dragon,
Commodore 64,
Oric, Texas

Make your
VIC-20 make
music

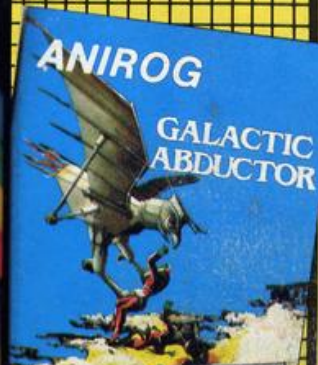
Turn your
Dragon into a
teacher

Making mazes
with the ZX81

Programs to
type in for:

Spectrum,
VIC-20, Dragon
ZX81, Atari...

AND:
your letters,
U.S. Scene,
software
charts...



Software STUDIOS
Games Designer



Author:
John Hollis

Mine's a Spectrum and tonic

What's yours? Now, whatever you are drinking, a 48K Spectrum can help serve you faster.

It should also help ensure that you get the right change. The man who dreamed up the idea is 35-year-old Les Mercer, a former consultant on business computers.

He has designed a computerised cash register. Inside a black steel box is a Spectrum, ZX Printer and a 12 volt car battery — in case the mains fail — for use by pub staff.

The complete deal, including a black and white TV and a cassette recorder, costs £650.

Mr Mercer said the idea came to him when he was thinking of

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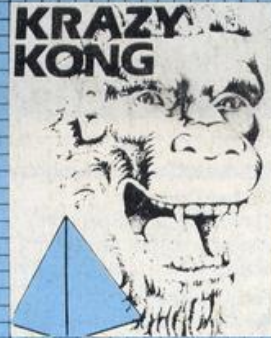
The Rabbit that roared

Software boss Alan Savage took a van to a firm of Mayfair solicitors — and dumped 4,000 computer game tapes.

It was all part of a dispute between Harrow-based Rabbit Software which had the UK franchise for eight games from Victory Software, of Pennsylvania.

Victory's solicitors, Offenbach and Co, say they began legal action because Rabbit had paid no royalties or given a statement of account.

continued on page 5



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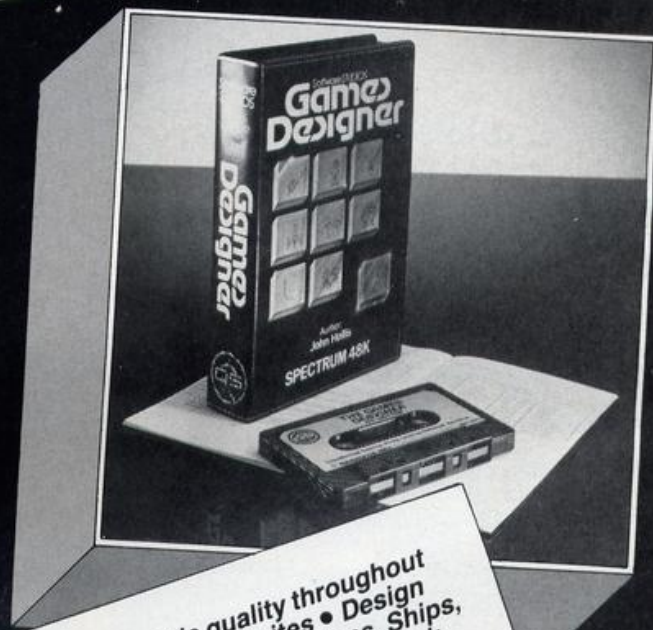
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Winning ways with words

Our readers are certainly good with words — the competition in issue No. 28 proves that.

We offered software prizes from A&F totalling £1,000 to entrants who made the most number of words out of the company's new titles, Chuckie Egg and Cylon Attack.

Several exceeded the 2,000 mark but many were not in the dictionary we specified, The Oxford Paperback Dictionary.

We said you could enter as many times as you wished — provided each entry was on the official coupon.

So Mr A.J. Wood, of Southampton, wins two prizes of £25-worth of software for his Spectrum. And two entries from the same address in Farnham, Surrey, means that J.A. and S.A. Flood each receive Spectrum software.

A&F Software is sending a 10 per cent discount voucher, redeemable by mail order only, to all entrants.

A&F is despatching the prizes and the vouchers to arrive within 28 days.

The complete list of winners: A.J. Wood (two prizes), of Southampton; J.A. and S.A. Flood, both of Farnham; Mrs A. Clarke, Carlisle; Les Gibbins, Plymouth; S.F. Rhodes, Auchleaven; Douglas Anderson, Glasgow; Brian Gray, Corby; M.J. Trumper, Harrow; Barry Crook, Blackburn; Stephen Chattaway, Belvedere;

D. Howard, Trowbridge; Indrajit Advani, Southgate; Raymond Terry, Shoburness; Sue Osborne, Romney Marsh; R. Howell, South Shields; Neil French, Dartford; Steven Truville, Birmingham; Anna Goodfellow, Newcastle upon Tyne; John Moss, Coventry;

David Meredith, Portsmouth; Sean Kilvington, Saltburn; Roger Smith, Portsmouth; M.J. Swallow, Lowdham; B.P.A. Andrews-Howe, Swindon; Nigel Lowe, Ashton-under-Lyne; Michael Silve, Stoke Newington;

Mark Munro, Edinburgh; Miss S. Stoneman, Dawlish; Maurice Rodgers, Ballyninch; Anthony McDermott, near Chorley; Graham Furniss, Chesterfield; Mark Ashley, Frome; B. Bates, Gateshead; Simon Wharton, Ashby-de-la-Zouch; Henry Shades, Glasgow; Russell Whittington, Wigan; Mrs E. Dadd, near Wadhurst; Mrs Lesley Buchanan, Isle of Wight.

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BUY THIS SPACE

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01-437 1002 NOW!



Your Dragon can help youngsters sharpen up their English and arithmetic. Just type in the program that starts on page 11.



Play something, simply, with Alan Blackham's program for the VIC-20. Turn to page 22.



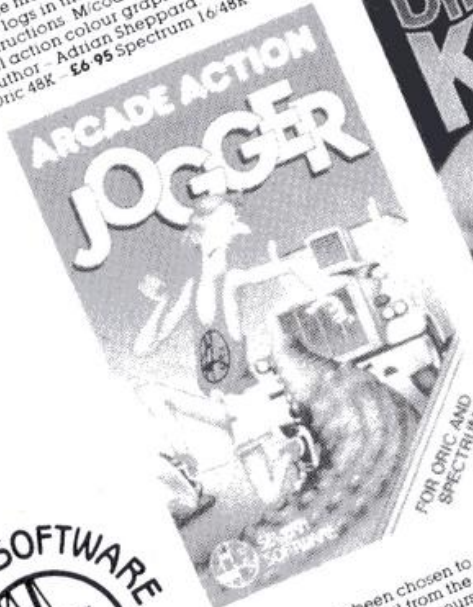
Mazes made easier on the ZX81. The program that does it begins on page 60.

In the centre of this week's Home Computing Weekly is a free 24-page guide to computers costing under £400. We plan to make your Christmas gift buying easier. Or you could leave it open around the house as a heavy hint...

The REAL Challenge!

For your ORIC or SPECTRUM

Jogger Guide your joggers across a 4-lane motorway and crocodile infested river to reach their safe haven through the gap in the fence. Each time a jogger is safely home the next one will have to encounter more lorries and cars on the motorway but fewer crocodiles and logs in the river. Full on-screen instructions. Miccode, sound effects and full action colour graphics.
Author - Adrian Sheppard
Oric 48K - £6.95 Spectrum 16/48K - £4.95.



Dinky Kong Attempt to rescue your lovely girlfriend who is held captive by the angry gorilla. As you climb the connecting ladders and move along the gangways, the gorilla will be throwing barrels and fireballs at you! The only way to reach her is to leap over these obstacles and progress to the top. Miccode action with sound effects, full colour action graphics, skill levels etc.
Author - Adrian Sheppard
Oric 48K - £6.95

Quincy A superb dice game for 2 to 6 players. 3 throws per go to try and score points by obtaining certain combinations, i.e. 3 of a kind, a run, pairs etc. 13 go's to complete a game. The highest score is the winner! It's a game that is easy to learn but can be won by skilful and thoughtful play. Full colour graphics, on-screen instructions, bonus scores, etc.
Author - Tony Churcher
Spectrum 48K - £4.95.



SEVERN SOFTWARE
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GLOUCESTER GL15 5TA

Grail You have been chosen to seek and recover the Holy Grail from the Castle Penitence. Throughout the course of your task you will have to use your skill, intelligence and logic (along with a little luck) as you encounter many foes. You will have the opportunity to gather weapons and armour to fight with, but if you are wounded your strength will drain away - many other features such as warp, jewels etc.
Author - Mike Howard
Oric 48K - £6.95.



Moria A challenging adventure game set in the mines of Moria. You'll have to try and survive encounters with the monsters of middle-earth while trying to locate Durin's Ring. The Wizard and the Trader may help or hinder you on your journey to find and open the hidden doors to freedom - a game that will really test your character and staying power.
Author - Mike Howard
Oric 48K - £6.95 Spectrum 16/48K - £4.95.



Oricade A combined assembler/disassembler and editor for the Oric. • Handles full 6502 Mnemonics • Features Save and Reload M.C. • Assembles and disassembles at any address • An essential tool for any serious programmer.
Author - Adrian Sheppard
Oric 48K - £8.50

Oric titles recommended by ORIC PRODUCTS INT. LTD.
All Spectrum Software is available on Micronet 800
TRADE ENQUIRIES WELCOME

All Oric titles available from Laskys.
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Pub Spectrum

From front page

how small shops could be helped by computers.

Business micros were out of the question because of the cost. And home computers had too little RAM memory for the thousands of products even smaller shops kept in stock, he said.

But pubs were ideal customers because most had 80 to 110 product lines, including items like crisps and sandwiches.

Mr Mercer said: "I did quite a bit of research from the customers' side of the bar. Whenever I was in a pub I started chatting to the landlord."

When you place an order at a pub equipped with a Spectrum cash till the barman/maid presses one or two keys and the drink and its price appears on the screen.

Big rounds can be catered for. In fact, one transaction can involve 20 different drinks, and 99 of each.

At the end of the day the landlord gets a sales and stock report from the printer. It can even tell him which staff sold most drinks.

It could show, for example, that the better-looking made more sales. He commented: "The landlord could then employ more bar staff that look like that. After all, he who pays the piper calls the tune."

The difficulty he faced was convincing publicans that his £650 system was as good as sophisticated purpose-made tills costing around £3,000.

He said: "It's a bit like standing on a street corner selling £5 notes for £2 each. It's the old story, no-one believes you. They say: 'Computers? I'm sure they won't fit in with my system'."

Landlord John McManus, of The Gloucester, West Croydon, has had one of the Spectrum tills



There's a Spectrum inside this new-style cash till for pubs

on test for a few weeks and — after staff training — was due to "go live" today.

He said: "It's tremendous and everyone will be able to adjust to it. I had to replace my three tills and they would have cost at least £1,000 each. This system for three bars will cost me a total of £1,600."

Mr Mercer and his wife Sue, co-directors of Mercer Computer Systems, have been marketing the Spectrum till since January. Mr Mercer reckons the 40½K BASIC program took him the equivalent of 1½ years to write.

The couple's daughter, Pamela, aged 3½, helped to test it. He said: "We handed it over to her for destruction testing and she hasn't been able to break it yet."

In fact, the unit has a clear plastic cover over the Spectrum keyboard to avoid that age-old pub problem — spilled drinks.

Mercer Computer Systems, 22 Baird Road, Farnborough, Hants GU14 8BP

Oric makes a quick recovery

Production of the Oric is nearly back to normal after the recent fire that destroyed nearly 7,500 machines. The fire was at Oric's main production plant at Kenure Plastics in Feltham.

But according to Oric's MD Barry Muncaster, production was up and running again by 2 o'clock on the day following the fire.

Mr Muncaster said: "The Oric used to be made in Kenure's main plant, but then we moved it to their new factory over the road, and that was the one affected by the fire."

"Fortunately, the moulds needed to make the cases were

still secure in the old building.

"We should be back on target by the second week in November, thanks to staff working overtime to make good the losses. People have been beaver away at weekends making new labels and stuff."

"Our main problem is not so much the fire — it's that orders have been coming in faster than we expected. From October to December we have orders for 130,000 units."

"The High Street shops wait until the last minute to place their orders rather than ordering well ahead — they don't have any comprehension of the problems of producing home computers."

"It isn't like making ordinary electrical goods — some components have a lead time of 26 weeks."

Games dispute

From front page

But then Rabbit stopped marketing the games and Rabbit director Mr Savage delivered the remaining 4,000.

Mr Savage said his company had distributed four VIC-20 games out of the eight and there were programming faults in three of them.

He said: "It's a very sore point with us. There were eight games and we could only get four working. They did not provide us with bug-free versions."

"We withheld the royalties as a lever. Now we are beginning an action for loss of profit."

"I did not think there was much we could do in the courts over there because of the cost. But we are very pleased that Offenbach has brought the action to this side of the Atlantic because we were going to let it go."

"I don't know what the solicitors are going to do with all those tapes. It's mildly amusing."

The four titles which Rabbit marketed were the arcade game Annihilator and three adventures, Grave Robbers and Ad-

venture Pack 1 and Adventure Pack 2.

Rabbit says that the three adventures had bugs, but only at the higher levels which meant they were not spotted until dealers began returning them. Rabbit replaced them with its own titles.

Victory's main action, still to be heard, claims royalties on sales, subject to Rabbit's accounts.

Meanwhile, the UK, European and Scandinavian rights to Annihilator have been acquired by newcomers Mogul Software which says it is planning to "rush-release" the game.

A US best seller, it will cost £5.99 for both the VIC-20 and the Commodore 64.

Coincidentally, one of the directors of Mogul is the general secretary of the Computer Trade Association, Nigel Backhurst.

Rabbit is bringing out a game called Protector, which Mr Savage described as an enhanced version of the Defender-style arcade games.

Rabbit Software, 380 Station Road, Harrow, Middx. HA1 2DE

Mogul Software, 90 Regent Street, London W1R 5PA

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TI: users hit out

Users of TI's home computer — which goes out of production this month — are blaming the company for a series of failings.

They say the TI-99/4A, first out here two years ago, should have been updated to fight off newer computers, marketing and advertising was not strong enough and that software companies, user groups and dealers had difficulty getting information out of TI.

Several, however, said it came as no surprise that Texas Instruments, in Dallas, announced that home computer production was

to end.

The company stressed that it would continue making higher-priced business computers.

It has pulled out of home computers because of growing losses. Third quarter figures show a loss of £66.8m after the £200.4m it will cost to close down the home computer side.

It will mean bargains for some computer buyers, for TI is cutting the price of remaining stocks to clear them off the shelves.

Author and ex-official of the old group, Pete Brooks, said: "TI didn't do themselves any favours. Information was always scarce. They refused to discuss any of the bugs — they refused to acknowledge that there were any. And it was 18 months before they responded to the market and brought the price down."

Stephen Shaw, head of TI specialists Stainless Software, said: "I've been expecting this ever since it came out — their marketing is so atrocious. I think it's a damn good computer; there's nothing to touch it. The processor is marvellous and can you think of any other computer that can sing?"

Vince Apps, of Apex Software, said: "I'm annoyed. I didn't think they would do it so suddenly. It was a bit of a shock. I thought they would hang on for about 18 months and bring out a new machine."

At the company's UK headquarters in Bedford, Richard Mann, for TI, denied claims that TI failed to help third party software companies, pointing to deals with Milton Bradley and Fox.

TI would continue servicing support, including warranty work, "indefinitely." The company was still servicing watches and they went out of production three to four years ago.

Texas Instruments, Manton lane, Bedford MK41 7PA

Cash on cartridge

Richard Shepherd, best known for his adventure tapes, is determined to be the first with a program designed for the new Spectrum Microdrive.

He is adding new features to a bank account program called Cash Controller, including an option to save both program and data onto the Microdrive's tiny cartridges.

Mr Shepherd, a certified accountant before starting Richard Shepherd Software with his wife Elaine, said that at present Cash Controller took 2½ minutes to load and a similar amount of time to load the data.

This would be cut to 10-20 seconds using a Microdrive.

Cash Controller, the company's only non-adventure program, costs £9.95 on cassette and would be priced at around £14.95 on cartridge.

The new version, now being worked on, will increase the number of budget headings from eight to take account of the extra storage.

Richard Shepherd Software, Elm House, 23-25 Elmshott Lane, Cippenham, Slough, Berks

THE
Ω MEGA
RUN
... is coming

Computer dating a la modem

This week's leader amounts to nothing less than the announcement of the most off-beat computer bulletin board system (CBBS) that I have ever heard of.

Not that I am surprised at its existence; actually I am surprised that it took so long to be created. What I am talking about is nothing less than a computer bulletin board called (ready?) Dial-A-Match.

You guessed it. A CBBS for the lovelorn. Created by a gentleman named Gregg Collins, dialling the number in Los Angeles (where else?) can put you in touch with people in a similar predicament from all over the country — even from all over the world!

It's true. As documented by Mr Collins himself, affairs are being arranged, spouses are being cheated upon, gay lovers are being introduced to each other, and all via modem and CBBS. Amazing.

If you want (or need) more information, call (213) 840-8211, in beautiful downtown Burbank. No computer necessary to call for information.



When it rains it pours department. I mentioned in an earlier column that I had finally encountered a decent word processing program for the VIC. Well, this week I have found one that also comes highly recommended.

It is called Wordcraft 20 and comes from the makers of the already successful Wordcraft Ultra. Compared with its big brother, the junior version is no slouch. It comes with an extensive list of commands, is easy to use, versatile, and takes good advantage of the color capabilities of the VIC.

It is a screen based processor, which means that what you see on the screen is what will be printed by the printer. I feel this is the best type of processor. Especially for people like me who have trouble visualizing things.

The processor has two modes, one for the entering of text and the other for entering formatting commands. Either can be entered by a single keystroke.

Instead of cluttering up the screen with command lists and/or help screens, you must learn all the commands. This should not prove too difficult as the commands are mnemonic, and most of us tend to use the same commands frequently.

For assistance, the top three or so lines on the screen list where you are in the document, and what the processor thinks you are doing.

Since the VIC cannot display 80 columns, and the processor can handle up to 99 characters, the screen will automatically scroll horizontally as the 25th character is typed. Otherwise, the screen width can be set at 23 columns to prevent scrolling while entering text, then reset to full width prior to printing.

In addition to the regular version, an optional version is available with 8K of RAM built into the program cartridge. This extra memory is necessary if you plan on doing any serious writing, other than short letters. If you have already expanded your VIC above minimum memory, you will not need the optional version.

The manual is 31 pages long, well laid out, easy to read and understand, and includes a tutorial that should get you up and running within an hour or two. The program is written in assembly and is therefore a fast runner.

This may be more value for the money than Quick Brown Fox, but it also costs more. The regular version costs \$99.95 with the 8K RAM version costing \$100 more. In the UK contact: Audiogenic, 34-36 Crown Street, Reading, Berks (0734) 586334.

Guess what? Out of space again! See you next week.

Bud Izen

Fairfield, California.

Top Ten programs for the Spectrum

- | | | |
|----|-------------------|-----------------|
| 1 | Flight Simulation | Psion (3) |
| 2 | Lunar Jetman | Ultimate (-) |
| 3 | Kong | Ocean (8) |
| 4 | Zzoom | Imagine (1) |
| 5 | Ant Attack | Quicksilver (-) |
| 6 | Pool | CBS (-) |
| 7 | Trans-Am | Ultimate (7) |
| 8 | Zip-Zap | Imagine (7) |
| 9 | Bugaboo | Quicksilver (-) |
| 10 | Pssst | Ultimate (6) |

Compiled by W.H. Smith. Figures in brackets are last week's positions

Top Ten programs for the Commodore 64

- | | | |
|----|-----------------------------|---------------------|
| 1 | Hungry Horace | Melbourne House (-) |
| 2 | Matrix | Llamasoft (-) |
| 3 | Scramble | Interceptor (7) |
| 4 | SpriteMan | Interceptor (-) |
| 5 | Grand Master Chess | Audiogenic (9) |
| 6 | Hover Bovver | Llamasoft (1) |
| 7 | Attack of the Mutant Camels | Llamasoft (2) |
| 8 | Frogger | Interceptor (3) |
| 9 | Escape MCP | Rabbit (4) |
| 10 | Motor Mania | Audiogenic (5) |

Compiled by Boots. Figures in brackets are last week's positions

Top Ten programs for the VIC-20

- | | | |
|----|----------------|----------------|
| 1 | Gridrunner | Llamasoft (1) |
| 2 | Arcadia | Imagine (2) |
| 3 | Wacky Waiters | Imagine (4) |
| 4 | Catcha Snatcha | Imagine (3) |
| 5 | Laser Zone | Llamasoft (-) |
| 6 | Escape MCP | Rabbit (-) |
| 7 | Abductor | Llamasoft (-) |
| 8 | Paratroopers | Rabbit (-) |
| 9 | Frantic | Imagine (-) |
| 10 | Bonzo | Audiogenic (6) |

Compiled by Boots. Figures in brackets are last week's positions

Top Ten programs for the Dragon

- | | | |
|----|-------------------------|-----------------|
| 1 | Android Attack | Microdeal (3) |
| 2 | Mined Out | Quicksilver (9) |
| 3 | The King | Microdeal (-) |
| 4 | Cuthbert Goes Walkabout | Microdeal (4) |
| 5 | Frogger | Microdeal (-) |
| 6 | Ring of Darkness | Wintersoft (2) |
| 7 | Space War | Microdeal (5) |
| 8 | Wizard War | Salamander (-) |
| 9 | Katerpillar Attack | Microdeal (-) |
| 10 | Dragon Trek | Salamander (-) |

Compiled by Boots. Figures in brackets are last week's positions

BEST SELLERS

Top 30

- | | | | |
|----|-----------------|------------------|----------|
| 1 | Manic Miner | Bug Byte | Spectrum |
| 2 | Jet Pac | Ultimate | Spectrum |
| 3 | Trans-Am | Ultimate | Spectrum |
| 4 | Cookie | Ultimate | Spectrum |
| 5 | 3D Combat Zone | Artic | Spectrum |
| 6 | Zzoom | Imagine | Spectrum |
| 7 | Chuckie Egg | A & F | Spectrum |
| 8 | Johnny Reb | Lothlorien | Spectrum |
| 9 | Krazy Kong | Anirog | VIC-20 |
| 10 | Horace Goes | | |
| | Skiing | Psion | Spectrum |
| 11 | Pssst | Ultimate | Spectrum |
| 12 | Cuthbert in the | | |
| | Jungle | Microdeal | Dragon |
| 13 | Penetrator | Melbourne House | Spectrum |
| 14 | Frogger | Microdeal | Spectrum |
| 15 | Cuthbert Goes | | |
| | Walkabout | Microdeal | Dragon |
| 16 | Frogger | C-Tech | BBC |
| 17 | Space Shuttle | Microdeal | Dragon |
| 18 | Splat | Incentive | Spectrum |
| 19 | Gold Mine | dk'tronics | Spectrum |
| 20 | Labyrinth | Commodore | CBM 64 |
| 21 | Intergalactic | | |
| | Force | Microdeal | Dragon |
| 22 | Hall of the | | |
| | Things | Crystal | Spectrum |
| 23 | Horace and the | | |
| | Spiders | Psion | Spectrum |
| 24 | Redweed | Lothlorien | Spectrum |
| 25 | Jumpin' Jack | Imagine | Spectrum |
| 26 | Kong | Ocean | Spectrum |
| 27 | Hunchback | Superior | BBC |
| 28 | Devils of the | | |
| | Deep | Richard Shepherd | Spectrum |
| 29 | Sargon Chess | Commodore | VIC-20 |
| 30 | Dungeon Master | Crystal | Spectrum |

Compiled by PCS Distribution (0254 691211) and sanctioned by the Computer Trade Association. Chart is for retail sales in individual outlets in the UK and Northern Ireland for the fortnight ended October 22

Top Ten programs for the ZX81

- | | | |
|----|-------------------|-----------------|
| 1 | Football Manager | Addictive (1) |
| 2 | Flight Simulation | Sinclair (2) |
| 3 | Space Raiders | Sinclair (4) |
| 4 | Espionage Island | Sinclair (3) |
| 5 | Scramble | Quicksilver (5) |
| 6 | 1K Games | Sinclair (6) |
| 7 | Ship of Doom | Sinclair (8) |
| 8 | 1K Chess | Sinclair (7) |
| 9 | Fantasy Games | Sinclair (10) |
| 10 | Defender | Quicksilver (9) |

Compiled by Boots. Figures in brackets are last week's figures

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fantasy

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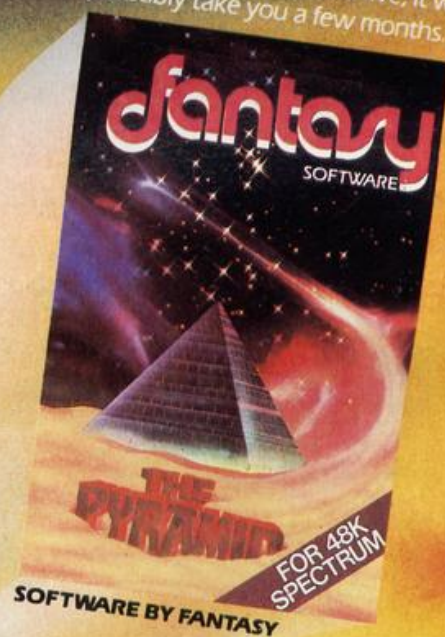
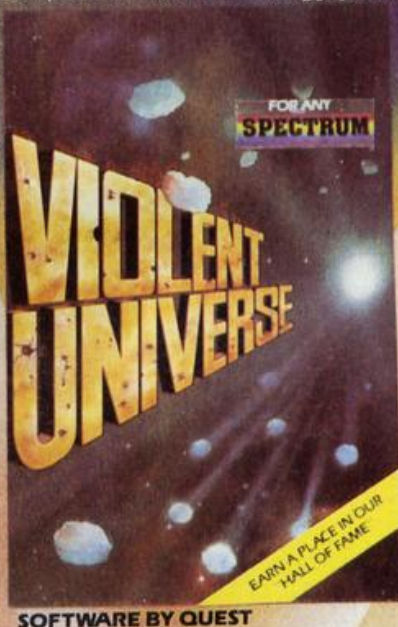
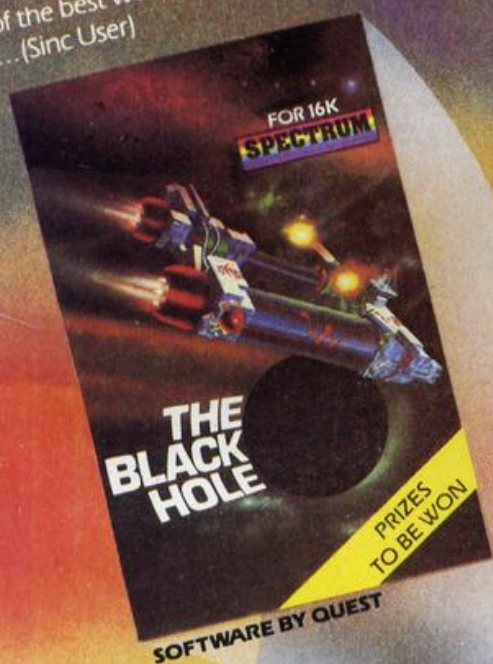
September is the last month to qualify for the Black Hole championship. However, from October the sender of the highest valid score each month will win software of their own choice to the value of £50.

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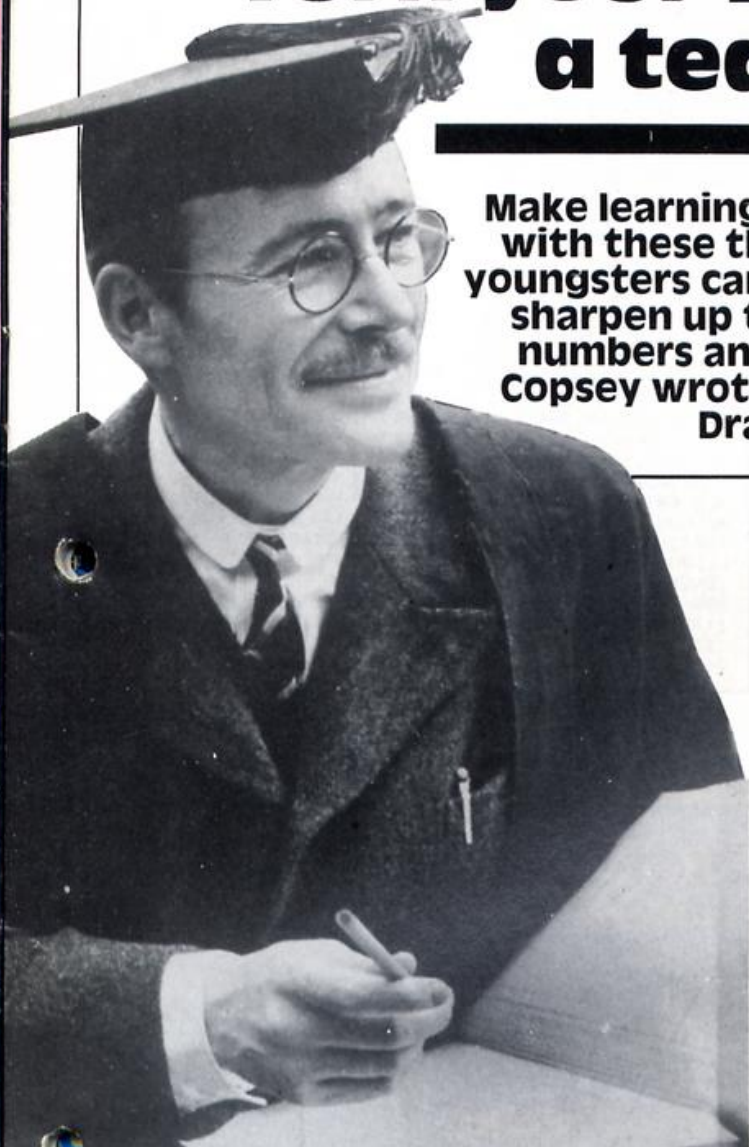
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Turn your Dragon into a teacher



Make learning less of a chore with these three programs youngsters can use at home to sharpen up their skill with numbers and English. Tim Copsey wrote them for the Dragon

Hints on conversion

The best way to convert this and all the other programs is to transport the idea to your particular micro. A considerable amount of the code could remain unchanged but the random number routine may have to be altered if your micro doesn't support such an extensive range of string handling commands.

Also, remember that the Dragon's PRINT@ is not of an (X,Y) co-ordinate nature but instead uses one number for the position of a screen location, 0 being the top left hand corner and 511 being the bottom right hand corner PRINT@ position.

a teacher the computer can fill the role of a test provider.

However, that does not mean that the tests can not be interesting and exploit the facilities of the computer. It is a well known fact that when education is conveyed in an interesting way, people learn more. Consequently my program has two modes of operation: Table Learning and Fun Test.

How it works

10 titles
30-90 data for the graphics in program
110-150 menu for choosing test or learning
160-220 display tables for learning
230-500 fun test, sum generation, ship/sub movement

Table Learning provides an opportunity for the pupil to list the times table of their choice between two and 12. When they have learned it they may then have "Fun Test" on a specific table or a mixture of them all.

The test takes the form of a game where the object is to get your ship from one side of the

screen to the other before the submarine does. A sum will be displayed and if answered correctly the ship advances. If however, the sum is answered incorrectly the submarine will advance and the correct answer will be displayed for a little while.

At the beginning the computer will provide an option for the Fun Test to be timed.

To start with you may find it advisable to not use the timer so that the child does not feel rushed or under pressure, but later as the child's ability improves the timer gives an extra challenge, thus extending the useful life of the program.

Now for the program that gives help to primary pupils with their English.

Variables

SS,WS,TIS,A input variables
N1,N2 random numbers
SC score correct
BS number of incorrect answers
DY,N loop counters
B,C flags
T time in seconds
S3,T3 ship, sub PRINT@ positions
A correct answer to sum

Alongside games, education was probably the main reason you bought your Dragon.

Education in the field of computing falls into two categories: computer literacy (increasing your knowledge of computers in general) and academic education. With this in mind I will cover some topics of the latter.

Although your Dragon can be used to aid the learning of a number of different subject areas it is particularly suited for mathematics, because the resident language BASIC contains a lot of mathematically related commands. One of particular importance is the pseudo random number generator, RND. It can be used to create a lot of data which is needed in educational maths programs.

A program aiding something such as English necessitates a person providing the bulk of the data.

So two of my programs are mathematics orientated. However, the Dragon's string handling facilities are not put to waste as the remaining program is to aid a young person's English.

My aim is to assist children of five to eight and 14 to 16. And programmers may pick up some techniques by studying the listings.

The first two programs are for the benefit of the younger age groups. The first, Tables, was written originally for my six year old sister, Gemma who was learning her times tables at school. It seems to have done the trick as she is getting 10 out of 10 in tests now.

Although a lot of contemporary educationalists disapprove of the computer being used to provide conventional drill type tests, the teachers I have spoken to still stand by them and feel that when pupils are at home without

```
10 CLS:PRINTTAB(6)"T. D. COPSEY PRESENTS":PRINTTAB(
13)"TABLES":PRINT
20 GOTO110
30 T3=385:S3=161
40 FORS=1 TO 8:READ S1:S1=S1+CHR$(S1):NEXT
50 FOR S=1 TO 4:READ S2:S2=S2+CHR$(S2):NEXT
60 FOR T=1 TO 8:READ T1:T1=T1+CHR$(T1):NEXT
70 FOR T=1 TO 4:READ T2:T2=T2+CHR$(T2):NEXT
80 DATA207,207,194,128,128,128,128,193,207,207,200
,196
90 DATA175,175,159,159,159,159,159,175,175,159
,159
100 RETURN
110 PRINT"1. LEARN TABLES"
120 PRINT"2. FUN TEST":PRINT
130 INPUT"SELECT YOUR CHOICE":C:IF C>2 THEN130
140 ON C GOTO 150,230
150 CLS:INPUT"WHICH SET OF TABLES WOULD YOU LIKE
DISPLAYED":T:IF T>12 OR T<2 THEN GOTO 150
160 CLS
170 PRINTTAB(6)"tables to be learnt"
180 FOR N=1 TO 12
190 PRINTTAB(9)N:PRINTTAB(13)"X*T"="N*T
```



```

200 NEXT
210 INPUT "WOULD YOU LIKE ANOTHER SET OF TABLES":
S$
220 IF LEFT$(S$,1)="Y" THEN GOTO150 ELSE GOTO10
230 CLEAR600:CLS:PRINTTAB(12)"fun test"
240 GOSUB30
250 INPUT "WOULD YOU LIKE A TEST ON A PARTICULAR
TABLE":W$
260 IF LEFT$(W$,1)="Y" THEN B=1 ELSE B=0
270 IF B=1 THEN INPUT "WHICH TABLE WOULD YOU LIKE":
V:IF V=12 OR V=2 THEN GOTO270
280 CLS:INPUT "WOULD YOU LIKE YOUR TEST TO BE TIME
D":T1$
290 IF LEFT$(T1$,1)="Y" THEN C=1
300 CLS3:PRINTSTRING$(192,207);
310 GOSUB420
320 IF C=1 THEN TIMER=0
330 T=INT(TIMER/60)
340 N1=INT(RND(11)+1):N1$=STR$(N1):IF INSTR(1,NA$,
N1$)() THEN 340 ELSE NA$=NA$+N1$
350 IF B=1 THEN N2=V ELSE N2=INT(RND(11)+1):N2$=ST
R$(N2):IF INSTR(1,NB$,N2$)() THEN GOTO 350 ELSE N
B$=NB$+N2$
360 PRINT@0,N1$:PRINTTAB(4)"X"N2$:PRINTTAB(10)"=":
:INPUTA
370 IF A=N2*N1 THEN PRINT@17,"CORRECT":SC=SC+1:S3=
S3+2ELSE PRINT@16,"WRONG":IT="N2*N1:T3=T3+2:BS=BS+
1
380 FOR DY=1 TO 750:NEXT
390 K=K+1:IF K=11 THENNA$="":N1$="":N2$="":NB$=""
400 GOSUB420
410 GOTO430
420 PRINT@T3,T1$:PRINT@T3-30,T2$:PRINT@S3,S1$:P
RINT@S3-30,S2$:RETURN
430 IF SC=10 OR BS=10 THEN GOTO 450 ELSE GOTO 440
440 PRINT@0,STRING$(31," "):GOTO330
450 IF SC=BS THEN M$="YOUR SHIP":P$="04T20L4DEDFDC
DBDADDEEAACDEAT10L2FACEECAFFFF" ELSE M$="THE SUBMA
RINE":P$="01L1T9FACAFCAACFFACCA"
460 FOR DY=1 TO 1200:NEXT:PRINT@0,"YOU GOT"SC"CORR
ECT OUT OF"K:IFC=1 THEN PRINT "IN "T"SECONDS"
470 PRINT@256,M$ "WON THE RACE!"
480 PLAY P$
490 INPUT "WOULD YOU LIKE ANOTHER TEST":Y$
500 ILEFT$(Y$,1)="Y" THEN GOTO230

```

Opposites tests a child's knowledge of words and the corresponding words that have an opposite meaning. The program works by getting the computer to choose a word at random from a list of words (that can be changed) given in DATA statements, and the child types in the appropriate word after a prompt from the computer.

If the child's word is correct, then a smiling face will be displayed accompanied by a cheerful tune. If however the word is incorrect then your Dragon will create the opposite effect. After 10 words the score is given.

How it works

10 clears string space
20 dimensions arrays
30 reads word data into arrays
40-70 provides opposites tests
80-160 prints face minus mouth
180-200 prints score and asks if another test is required
210-220 DATA containing words
230 prints appropriate mouth, i.e. smile/frown

```

10 CLEAR400
20 DIM A$(35),B$(35)
30 FOR A=1 TO 35:READA$(A),B$(A):NEXT
40 CLS:PRINT@11,"OPPOSITES":PRINT@43,"*****"
50 FOR T=1 TO 10
60 N=INT(RND(34)+1):IF INSTR(1,W$,A$(N))() THEN GO

```

Hints on conversion

Converting this should be a fairly simple process, as the characters used to create the smiling face can be found on nearly all micros. The rest of this program uses simple, although effective, string handling, the equivalent of which can be found on any machine. Also note what I said previously about the random number routine.

The final program should be of interest to people studying maths at 'O' or 'C.S.E.' level and to anyone who would like to see their computer perform some mathematics slightly different from the conventional.

Variables

AS,BS string arrays containing words and opposites
A,T,Y loop counters
SC score
SS,RS,QS word randomly chosen, corresponding opposite, input word

```

TO 60 ELSE W$=W$+A$(N):S$=A$(N):R$=B$(N):PRINT@108
,"WHAT IS THE":PRINT@140,"OPPOSITE OF":PRINT@172,S
$:INPUT O$
70 IF O$=R$ THEN SC=SC+1:PLAY"03T10C#E-F#B-F#B-F#"
:PRINT@416,"CORRECT" ELSE PRINT@416,"WRONG THE ANS
WER WAS "R$:PLAY"TS02EFFEDFEDFEED"
80 PRINT@100,"####";
90 PRINT@131,"#####";
100 PRINT@162,"#####";
110 PRINT@194,"# * * #";
120 PRINT@226,"( . . )";
130 PRINT@259,"":
140 PRINTTAB(3)":
150 PRINTTAB(4)":
160 PRINTTAB(4)"---"
170 GOSUB230
180 FOR Y=1 TO 1000:NEXT:PRINT@416,STRING$(32," ")
:PRINT@172,STRING$(18," "):NEXT T
190 PRINT@416,"YOU SCORED"SC", OUT OF 10"
200 PRINT@448,"":INPUT "WOULD YOU LIKE ANOTHER TES
T":Y$:IF LEFT$(Y$,1)="Y" THEN GOTO 10 ELSE PRINT@4
48,"BYE BYE FOR NOW!":END
210 DATADEEP,SHALLOW,TALL,SHORT,BIG,SMALL,HIGH,LOW
,STRONG,WEAK,WET,DRY,HOT,COLD,BLACK,WHITE,DARK,LIG
HT,GOOD,BAD,CLEAN,DIRTY,HAPPY,SAD,NEAR,FAR,UP,DOWN
,THROW,CATCH,STANDING,SITTING,RICH,POOR
220 DATA QUIET,LOUD,SOFT,HARD,FAST,SLOW,ABOVE,BELO
W,BLUNT,SHARP,ROUGH,SMOOTH,FOLLOW,LEAD,REMEMBER,FO
RGET,WAR,PEACE,GENTLE,VIOLENT,DESTROY,CONSTRUCT,PU
LL,PUSH,GIVE,RECEIVE,EXIT,ENTRANCE,INNOCENT,GUILTY
,ENERGETIC,LAZY,IN,OUT,BACK,FRONT
230 IF R$=O$ THEN PRINT@292,CHR$(134)" "CHR$(137)
:PRINT@325,CHR$(131)CHR$(131):ELSE PRINT@292,CHR$
(137)" "CHR$(134):PRINT@261,CHR$(140)CHR$(140):
240 RETURN

```

Number Systems provides an explanation of number systems and a conversion test. Very briefly, this topic deals with the fact that there are a number of different systems in mathematics such as our own, the decimal

How it works

10 clear string space and dimension array
20-70 menu
80-310 explanation of number systems
330-480 number system test

Variables

P,AN input variables
C2 loop counter
B1,N1 random numbers
C,A,J6,MS all used in line 420 as part of a formula for base conversion
SC score

Hints on conversion

Examine the formula I have used to change a number from one base to another, as this forms the heart of the program and perform the necessary changes to make it work on your micro. Once you have done this the remaining code is fairly standard.

Musical effects in any of the above use the PLAY command which has several parameters. It has octave, tempo, note length, volume and note name (B is the note B, B- is B flat). If apart from the note name is omitted then a default value is used. You will have to take this into account when converting to other micros.

system, and others such as binary, that computers use.

The program explains this fully and then gives a method of converting a number from one system to another. Finally it tests this principal.

```

10 CLEAR7000:DIMG(100)
20 CLS:PRINT@9,"NUMBER SYSTEMS"
30 PRINT@41,STRING$(14,171)
40 PRINT@64,"1. NUMBER SYSTEMS EXPLANATION"
50 PRINT@96,"2. TEST"
60 INPUT "SELECT AN OPTION":P:IF P=2 OR P=1 THEN 20
70 ON P GOTO 80,330
80 CLS:PRINT@3,"NUMBER SYSTEMS EXPLANATION":PRINT@
35,STRING$(26,131)
90 PRINT "THE NUMBER SYSTEM WE WORK IN IS KNOWN AS
THE DECIMAL SYSTEM AND IN THIS SYSTEM THE DIGITS F
ROM 0 TO 9 ARE USED. WHEN USING THIS SYSTEM Y
OU ARE SAID TO BE WORKING IN BASE 10. AN EXAMPLE
OF A NUMBER IN BASE 10 IS:"
100 PRINT"5632=(5X1000)+(6X100)+(3X10)+(2X1)
110 PRINT "IN ANOTHER BASE E.G. BASE 5, THIS NUMBER W
OULD BE DIFFERENT 140012=(1X3125)+(4X625)+(0
X125)+....E.T.C"
120 PRINTTAB(4)"press a key to continue":
130 IF INKEY$="" THEN 130

```


DRAGON PROGRAMS

```

140 CLS:PRINT"NUMBER SYSTEMS ARE OF PARTICULAR INTE
REST TO COMPUTERISTS BECAUSE A COMPUTER WORKS IN BI
NARY/BASE2 A NUMBER SYSTEM USING ONLY THE NUMBERS
0 AND 1."
150 PRINT:PRINT"THE TEST THE COMPUTER WILL PR
OVIDE FOR YOU TESTS YOUR ABILITY TO CONVERT N
UMBERS FROM ONE NUMBER SYSTEM/BASE TO ANOTHE
R. THE WAY YOU SOLVE A QUESTION OF THIS NATURE
IS TO USE A METHOD INVOLVING ":
160 PRINT"CONTINUOUS DIVISION WITH REMAINDERS."
170 PRINTTAB(2)"press a key for an example"
180 IF INKEY#="" THEN 180
190 CLS:PRINT@1,"AN EXAMPLE OF BASE CONVERSION":PR
INT@33,STRING$(29,131)
200 PRINT"234 BASE 10 TO BINARY"
210 PRINT"234/2=117 REMAINDER 0"
220 PRINT"117/2= 58 REMAINDER 1"
230 PRINT" 58/2= 29 REMAINDER 0"
240 PRINT" 29/2= 14 REMAINDER 1"
250 PRINT" 14/2= 7 REMAINDER 0"
260 PRINT" 7/2= 3 REMAINDER 1"
270 PRINT" 3/2= 1 REMAINDER 1"
280 PRINT" 1/2= 0 REMAINDER 1"
290 PRINT"HENCE 234 BASE 10=11101010 BASE2";
300 PRINT"THIS METHOD CAN BE USED TO CONVERT
A NUMBER IN BASE 10 TO ANY OTHER BASE JUST BY CHA
NGING THE DIVISOR. press a key";
310 IF INKEY#="" THEN 310
320 GOTO10
330 FOR C2=1 TO 10
340 CLS:PRINT@1,"NUMBER SYSTEM CONVERSION TEST":PR
INT@33,STRING$(29,131)
350 M#="" : C=0 : J6=0
360 B1=INT(RND(7)+2) : N1=INT(RND(2000)+40)
370 PRINT"CONVERT" N1 "BASE 10 TO BASE" B1 : INPUT AN

```

```

380 GOSUB410
390 NEXTC2
400 GOTO470
410 N=N1
420 C=C+1 : A=INT(N/B1) : R=N-(A*B1) : G(C)=R : R#=STR$(R)
: IF A=0 OR J6=0 THEN GOTO430 ELSE FOR H=C-1 TO 1 ST
EP-1 : M#=#+STR$(G(H)) : NEXT : PRINTN1="M# : IF VAL(M#)
=AN THEN GOTO 460 ELSE 450
430 IF A=0 THEN J6=1
440 PRINTN1/"B1"="A"REMAINDER"R# : N=A : GOTO420
450 PRINT@480,"YOU GOT IT WRONG":PLAY"TS01FADEDFC
BCFCDCECAAAA":RETURN
460 SC=SC+1:PRINT@480,"CORRECT ANSWER WELL DONE!
":PLAY"03T20FEDDEFBCACBCDEFBATSDDDDFFFFF":RETURN
470 CLS:PRINT"YOU SCORED"SC" OUT OF 10"
480 PRINT"press a key to return to menu"
490 IF INKEY#="" THEN GOTO 490 ELSE 10

```

A note for programmers: The random number routine used in this program as far as I know is unique. I invented it to solve the problems of the computer picking a random number that has already been used. I used my knowledge of strings to overcome the problem.

Basically, when a number is created I use STR\$ to convert it into the string equivalent. This

string is concatenated to the holding string if this random number string is not found in the holding string. If this seems a little complicated look at this general routine:

```

10 N=INT(RND(9)+1):
NS=STR$(N):IF IN-
STR$(NS,NS) 0 THEN 10
ELSE NAS=NAS+NS
20 C=C+1 : C=11 THEN END
ELSE PRINT VAL(NS):GOTO
10

```

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You're a snake — and those diamonds are lethal

Here's a game with lots of bytes... it's called Snake and runs on the unexpanded VIC-20.

You have to miss the diamonds and hit the stars. If you collide with a diamond you blow up and lose one of your five lives. This is accompanied by a tune and a change of colour.

You could change lines 70-90 so that you can fire and thrust instead of hitting targets.

Hit the stars but avoid the deadly diamonds in Maurice Robey's game for the unexpanded VIC-20

How it works

Includes explanation of control characters

- 1 POKE screen colour, title, CLS, cyan, yellow
- 2 asks name, then goes to instructions
- 10 home cursor, CLS
- 12-45 randomise stars and diamonds, time = score
- 50 POKES tail on snake
- 70-90 move snake
- 100 POKES head of snake
- 200 POKES "bang" when diamonds are hit
- 210-240 music when diamonds are hit
- 260-265 change colour of screen
- 300-400 score, 300 CLS, white; 380 CLS, home cursor, reverse field
- 432-515 instructions, 435 reverse, reverse off; 450 home cursor, CLS, reverse; 452 cursor right; 480 home cursor, CLS, reverse; 510 reverse; 515 home cursor, CLS



Variables

A = 7900 which is the sixth location down from top of screen
D = 8164 bottom location
POKE codes:
stars 43, tail 58, head 22, diamonds 90

Hints on conversion

All you have to do is change the A and D screen locations for the POKE locations on your computer and add randomise, 210-240, which play music, would have to be changed along with the screen colours in 1, 260 and 265.

```

1 POKE36879:8:PRINT"███"PRINTTAB(7):"SNAKE"PRINTTAB(7):"-----"
2 PRINT:PRINT:PRINT:PRINT:INPUT"TYPE YOUR NAME":M$GOTO500
4 Y$:"PRINTTAB(4):"V"
7 A=7900:B=11:D=8164
10 Z=0:C=0+3:IFC=0THENEND:PRINT"███"
12 D1=INT(RND(1)*1000)+1
13 FORJ=1TO1000:NEXT
14 T1$="000000"
15 F=0142
20 FORJ=1TO9:PRINT:NEXT
30 POKED+INT(32*RND(1))*96
45 POKED+INT(RND(1)*23)*43:FC=FC+1
50 POKER=B:DB
55 PRINT
60 GETA$
70 IF A$=""THEN100
80 IFB(1)AND A$="Q"THENB=B-1
90 IFB(2)AND A$="P"THENB=B+1
100 POKER=B:DB
105 IFPEEK(A+B+22)=90THENDOSUB200
110 GOTO30
200 POKE(A+6):2:POKE(A+7):1:POKE(A+8):14:POKE(A+9):7:POKE(A+10):33
210 POKE36877:220
220 FORL=15TO0STEP-9:POKE36876:L:FORM=1TO300:NEXTM:L
221 POKE36877:0:POKE36879:94
222 POKE36876:15
224 FORL=250TO200STEP-4:POKE36876:L
226 FORM=1TO50
227 NEXTM:NEXTL
230 FORL=205TO205STEP4:POKE36876:L
232 FORM=1TO50:NEXTM:NEXTL
236 POKE36876:0:POKE36878:0
240 POKE36878:0
250 Z=Z+1
260 IFZ=5THEN300
265 POKE36879:35
268 POKE36879:110
270 RETURN
300 S=0:T1=PRINT"YOUR SCORE IS":SC
310 IFSC:HSANDH=0THEHHS=SC:PRINT"
320 PRINT"HIGH SCORE(VF)":HS:PRINT"

```

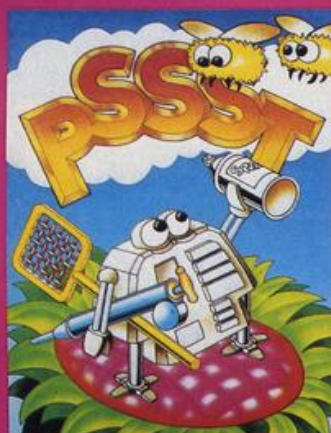
```

322 PRINT"YOU HIT"FC"STAR$"
325 FORT=1TO1000:NEXT
329 IFFC=600:CRHS=3000THEN500
330 IFFC=601TO100000CRHS=3000TO1000000THENGOTO610
375 END
380 PRINT"███"PRINTTAB(7):"SNAKE"PRINTTAB(7):"-----"
385 PRINT"
392 PRINT"
395 PRINT"YOU HAVE FIVE LIVES"
398 PRINT"
400 PRINT"IF YOU HIT THE DIAMOND-S(+)
402 PRINT"
410 PRINT"YOU WILL LOSE A LIFE."
412 PRINT"
420 PRINT"IF YOU HIT THE CROSSES"
421 PRINT"
422 PRINT"YOU WILL GAIN POINTS (<+)
423 PRINT"
430 PRINT"
432 PRINT"
435 PRINT"PRESS 'A' TO START":INPUT"(REMEMBER TO PRESS - RETURN)":A$
440 IF A$="A"THEN480
443 END
450 PRINT"███"PRINTTAB(7):"SNAKE"
451 PRINTTAB(7):"-----"
452 PRINT"HELLO!"M$
453 PRINT:PRINT"YOU CONTROL THIS CHARACTER"
454 PRINTTAB(10):"":PRINTTAB(10):"":PRINTTAB(10):"
455 PRINTTAB(10):"":PRINTTAB(10):"":PRINTTAB(10):"V"
458 PRINT"PRINT THE CONTROLS ARE:-"PRINT"
460 PRINT"PRINT'Q'-IS FOR THE LEFT"
462 PRINT"PRINT'P'-IS FOR THE RIGHT"
465 PRINT"
470 INPUT"PRESS 'A' TO CONTINUE":M$
476 IFA$="A"THEN380
480 PRINT"███"PRINTTAB(4):"WHERE THEY COME":GOTO7
485 END
500 PRINT:PRINT:PRINT"WOULD YOU LIKE THE INSTRUCTIONS:<V/
510 INPUT"Y/N":G$IFG$="Y"THEN450
515 IFG$="Y"THENPRINT"███"GOTO480

```


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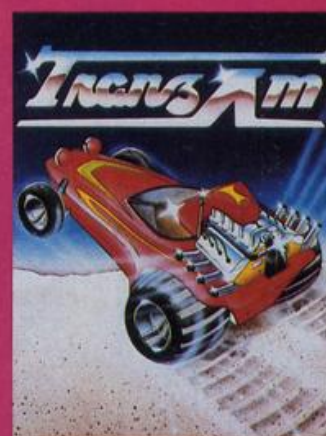
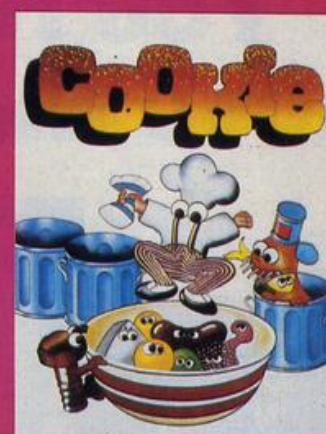
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Bring the arcade home

The question is: are they as good as the arcade versions? Our reviewers have the answer

Meteor Storm TI-99/4A (extended BASIC) £10

Intersoft, from Stainless Software, 10 Alstone Road, Stockport, Cheshire SK4 5AH

Your objective is to blast meteors as they move around the screen, manoeuvring your ship to avoid collision.

The ship may be rotated left or right through 360 degrees, with 45 degree stepwise turns, and accelerated. The latter feature makes the game exciting, as the faster you are travelling when a meteor is destroyed, the higher your score.

There are two modes of play, normal and advanced. In normal

play you are confronted with five showers of meteors, the game ending when either you've blasted through all of them or crash.

In advanced play there are an infinite number of meteors provided, the game ending only in the event of a collision. With a choice of 10 skill levels there is plenty of scope for expert and beginner alike.

Control of the ship is by keyboard or joystick. The instructions state there is an additional feature for younger children whereby an adult may manoeuvre the ship with joysticks while the child uses the spacebar to fire.

instructions	95%
playability	85%
graphics	70%
value for money	70%



Cosmic Guerilla Spectrum £5.50

Crystal Computing, 2 Ashton Way, East Herrington, Sunderland SR3 3RX

Yet another Invaders variant, but this one is a little different.

Your three laser cannons are presented vertically up the centre of the screen, protected on both sides by vertical force fields.

The invaders are also in two vertical columns on the left and right of the screen and they move horizontally to and fro, taking pieces of your force field away until the laser cannons are exposed.

The invaders can then capture your laser cannons and move these to the side of the screen,

thus destroying them. You are provided with a laser cannon that traverses the bottom of the screen and shoots vertically. In this way, you can pick off the aliens as they move horizontally to take away chunks of the force field.

There are four game options, including a training mode, and six levels of difficulty, plus a one or two player option and high score feature. So as your skill improves you can move on to a new challenge.

The graphics are good, but I feel that better use could have been made of sound.

instructions	80%
playability	80%
graphics	90%
value for money	90%



Frogger 32K BBC £7.95

Superior Software, 69 Leeds Road, Bramhope, Leeds

This is a faithful implementation of the arcade original which must now be becoming a bit old hat. However, it is certainly as good as any other Frogger I have seen for the Beeb.

The program loads in two parts with no problems and full instructions are contained within.

A good feature is the facility to use either the keyboard or joystick to operate the game. The choice of keys for keyboard operation is sensible, unlike some other games around.

If you are not familiar with Frogger the idea is to guide your

frogs to holes across the river within a time limit while avoiding cars, lorries and gaping-mouthed crocodiles.

Progress across the river is accomplished using the floating logs and turtles — but watch out for the turtles when they dive.

Landing on a fly scores extra points and the game increases in difficulty as you complete each screen.

The graphics are extremely detailed and impressive, although at times the screen does appear somewhat overcrowded.

D.H.

instructions	80%
playability	85%
graphics	95%
value for money	80%



Kong Commodore 64 plus Joystick £7.95

Anirol, 8 High Street, Horley, Surrey

This version of Donkey Kong really beats all others that I have seen on Commodore machines. The object of the game is to rescue the beautiful Fay Ray from that dreaded of beasts, Kong.

The game consists of four different screens.

In screen 1 you must get to the top of the screen, by climbing ladders, while Kong rolls barrels and fireballs chase you.

Screen 2 consists of a pie factory. There are moving conveyors, fireballs, a cooker and pies which can deter you from

getting up the ladders.

The third screen is quite complex. You must manipulate your way across large gaps using two lifts before you can get to the top.

Once you are on the ladders to get to the top of the screen, girders are thrown down at you. Split-second timing is required.

The last screen (which at the time of writing I have not yet reached) is Kong's lair. You must knock out all of the supports to make the lair collapse. Once you have done this you have rescued Fay Ray.

instructions	40%
playability	95%
graphics	90%
value for money	95%



Air Attack TI-99/4A £5.25

Microsonic, 85 Malmesbury Road, Cheshire Hume, Cheshire SK8 7QL

Air Attack is a variation of the game Bomber. But instead of bombing a city to enable you to land, here you have the task of defending the city by using missiles to destroy the falling bombs and attacking aircraft.

There are four cities, and missiles may be launched from any of these using the numbered keys one to four. If you destroy an aircraft you gain 1,000 points, and 100 points are awarded if a bomb is hit.

When a city is completely destroyed, missiles can no longer be launched from it. Each city also has a limited number of missiles available and this

amount varies according to the degree of difficulty chosen.

Full instructions are displayed on screen, if required, prior to the start of the game. The program loaded without trouble every time, although there appears to be a bug during the running of the game.

When a bomb hits a part of city number four, the program stops and a bad value in line message is displayed. As this appears to be a program error and not just a fault in my review copy, it would need to be ironed out before the tapes are retailed in any quantity.

D.B.

instructions	80%
playability	60%
graphics	70%
value for money	60%



SPECTRUM PROGRAM

```

1020 FOR F=0 TO 31: PRINT AT 9,F
: " *": AT 11,F: " *": BEEP .005,F+10
NEXT F
1030 LET K$="PRESS ANY KEY FOR A
NOTHER GAME "
1040 PRINT AT 10,0: " "
1050 FOR F=1 TO 31: PRINT AT 10,
: K$(F TO F): PAUSE 8: NEXT F: P
PRINT AT 0,0: INVERSE 1: "SCORE:"
1060 PAUSE 0: RUN
7000 BORDER 0: PAPER 7: INK 0: C
LS: PRINT AT 0,12: "SKI-RUN": OV
ER 1: AT 0,12: " "
7010 PRINT " YOU HAVE TO GUIDE
YOUR MAN (↓) DOWN THE SKI SLOPE
7020 PRINT " THERE ARE SOME
OBSTACLES "
1)....TREES (4)
2)....FLAGS (4)
7025 PRINT " SOMETIMES YOUR M
OMENTUM WILL CARRY YOU INTO
A FLAG, BUT SOMETIMES YOU CAN
BE LUCKY AND SURVIVE HITTING A F
LAG. "
7030 PRINT " AT THE END OF THE
SLOPE THERE WILL BE A COLOURFUL
RECEPTION (AND SOME MUSIC). "
7040 PRINT " FLASH 1: " PRESS A
NY KEY FOR MORE INFO. "
7050 PAUSE 0
7060 CLS
7070 PRINT AT 0,12: "SKI-RUN": OV
ER 1: AT 0,12: " "
7080 PRINT "CONTROLS: "
7090 LET W$="LEFT.....Z"
7100 PRINT " PRINT
7110 FOR F=1 TO 16: PRINT AT 5,F
: W$(F): PAUSE 8: NEXT F
7120 LET W$="RIGHT.....X"

```

```

7130 FOR F=1 TO 16: PRINT AT 7,F
: W$(F): PAUSE 8: NEXT F
7135 LET W$="M.STOPS THE GAME"
7136 FOR F=1 TO 16: PRINT AT 9,F
: W$(F): PAUSE 8: NEXT F
7140 PRINT " BEGIN SKI-ING DOWN 'MEHOTECH MOU
NTAIN' "
7150 LET W$="GOODBYE"
7160 FOR F=1 TO 7: PRINT AT 19,F
: W$(F): PAUSE 8: NEXT F: LET W
$=" "
7170 FOR F=1 TO 8: PRINT
AT 19,F+4: W$(F): PAUSE 10: NEX
T F: CLS: RETURN

```



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Similar facilities to the floating point version but has only integer arithmetic.
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Games of skill and chance

These programs will turn your micro into a fruit machine, pinball table, and more. Interested? See what our reviewers thought of them

Romik Cube Dragon £9.99

Romik Software, 272 Argyll Avenue, Slough, Berks

Everyone has heard of the infamous Rubik's Cube, that frustrating cube of plastic that became a national craze last year.

Well, Romik has brought out its own version for the Dragon.

The cube is well depicted on the screen and overcomes the Dragon's four-colour graphics cleverly. The program is in machine code and provides very fast 'twist' graphics in response to one of the long list of commands.

There are two other games on the cassette, if you find the standard cube too easy. The first one

is a timed cube which changes the side's colour if you do not complete it quickly. The harder game is the 4D cube, an infuriating brain twister which I have yet to solve.

The actual game is a good one, extremely well implemented on a computer not really suited for it.

However, who wants to fiddle with the cube nowadays? Its interest has seemed to pass and Romik's version for the Dragon with the long list of instructions seems of little extra interest.

The game is exorbitantly priced at ten quid, a price which makes it hardly worth considering.

instructions	60%
playability	35%
graphics	70%
value for money	10%



Flippit Spectrum £9.95

Sinclair Research, 25 Willis Road, Cambridge CB1 2AQ

This game, written for Sinclair, is a cross between Rubik's cube and a magic square.

The program responds very quickly to your commands as you should expect.

When loaded, you are shown a large square made up of nine smaller squares. Each of the smaller ones has a number between zero and three in the corners and it is your task to move, rotate or flip over these tiles so that each row and column plus the two diagonals add up to nine.

This is not as simple as it sounds — there are supposed to be millions of combinations.

The graphic display, while being easy to read, is not very exciting, but it is hard to see what else could be done to make it so.

A record of moves is kept and, if playing competitively, your opponent's target is displayed and the tiles are set back to their original positions.

When, or if, you solve the puzzle, the pieces turn red and a musical trill sounds. If you manage to beat your opponent, the border flashes too. I haven't managed to test this yet!

The tape comes attractively boxed with a user manual, but I feel that it would have been better to do away with the packaging for a lower price.

instructions	100%
playability	85%
graphics	70%
value for money	70%



Challenge Spectrum £5.95

Temptation Software, 27 Cinque Ports Street, Rye, Sussex

Challenge brings you two well known games. Mastercode deluxe is simply Mastermind (no, not the one with Magnus Magnusson).

For the cave-dwellers amongst you, one must use logic to guess the colours and sequence of four pegs. The computer indicates which pegs were right at each guess, so you go on to deduce the correct code.

Of course, you can also enter a code for your silicon chum to guess. There are two skill levels.

The screen display is effective but the game suffers from being

written in BASIC — if you mark the computer's answer wrongly, there will be a lengthy pause!

Higher and Lower is a game from a TV show compered by Bruce Forsight. You are given a card and you have to say whether the next card is higher or lower.

Guess wrongly and you lose money, but guess correctly four times and you collect a golden payoff. You can also gamble your winnings in the chance of a bigger jackpot.

It's colourful, and the graphics are realistic, but somehow it lacks real excitement.

instructions	100%
playability	70%
graphics	70%
value for money	60%



Pinball Arcade 32K BBC £10.35

Kansas City Systems, Unit 3, Sutton Springs Wood, Chesterfield

If you are a real pinball wizard, then this program will certainly help tune-up those flipper fingers. Not only can you play a mean game but you can actually design the table yourself.

The instructions look rather shoddy but they are quite adequate.

Setting up a new table involves picking up various shapes, representing the bumpers and buzzers, and placing them anywhere on the table. The selection of shapes is impressive.

The score for each bumper and the tilt of the table can be selected together with the strength of the flippers.

Control of the program, except the actual play, is achieved with the cursor keys and the space bar — absolute child's play.

The play itself uses two keys for the flippers and the space bar to compress the spring — the longer the space bar is held, the stronger the spring. The action is fast and furious with very realistic sound effects and good graphics.

Naturally, the highest score is retained, and the whole table can be SAVED though the score is then lost. Unfortunately, you cannot choose the name of the SAVED datafile.

instructions	J.P.
playability	70%
graphics	90%
value for money	90%



Las Vegas Spectrum £5.95

Temptation Software, 27 Cinque Ports Street, Rye, Sussex

For addicts of the one-armed bandit, this will prove an enjoyable tape featuring, as the insert states, "a full feature pub fruit machine". And so it is, complete with holds, nudges and gamble.

The machine is well laid out and easy to understand, and the symbols spin extremely well, making good use of the Spectrum's graphics. With £10 to gamble away at 10p a go, you can gamble away to your heart's content.

Also on the tape is another old favourite, Blackjack. Although the cards are dealt in a strange way, this is a good representation

of the game which plays according to Hoyle — although I did have my doubts about the dealer with some of his turn-ups.

I don't know the rules governing this sort of thing but it struck me that it may be a good side show for school fetes to raise funds.

My only criticism is that when you finish playing Fruit Machine, there is no routine to let you load Blackjack without BREAKING the program, and there are no instructions to tell you how to load the second game without going through the first.

instructions	80%
playability	90%
graphics	95%
value for money	90%



VIC-20 PROGRAM

In the bad old days, writing music on the VIC-20 was slow and boring. But now those days have gone, thanks to my Music Aid program.

The program starts by displaying a musical staff with letters indicating the positions of the notes. You find the note you want and enter the appropriate letter.

When you have entered all the notes you want, you then press the back arrow on the top left of the keyboard, and go on to enter the spacing and timing by pressing the space bar. If you go wrong, just press the back arrow and you can start again.

After all that, you can listen to your creation, and if it's what you want you can list the data for the tune.

How it works

20-80 print some instructions
100-195 prints the notes available
200-295 enter the notes
300-460 input the timing
500-595 let you hear the tune
600-660 enter your option
700-930 list the data
1000-9000 is the end of the program
9000-9070 wait for key to be pressed
9100-9160 invalid input and
4000-40040 data for the notes

Hints on conversion

This program would be quite hard to convert to another micro because it uses a lot of commands and POKEs only the VIC has.

POKE 36879 screen colour
POKE 36874 — 36877 sound channels
POKE 198,0 clear keyboard buffer
SYS 64802 erase program
TIS real time clock
TI timer updated every 60th of a second

Play something, simply

This Music Aid program by Alan Blackham takes the blood, sweat and tears out of making music on your VIC-20

```

10 POKE 36879,29:POKE 808,127
15 DIM N(100),D(100),I(100)
17 X=0
20 REM
22 REM 东南东南南 INSTRUCTIONS 东南东南南南
30 PRINT"使用说明"
35 PRINT"说明"
40 PRINT"说明"
45 PRINT"说明"
50 PRINT"X=FIRST ENTER THE NOTES"
55 PRINT"X=FOR YOUR TUNE."
60 PRINT"X=ENTER THEM BY THE"
65 PRINT"X=LETTER UNDER THE NOTE"
70 PRINT"X=YOU NEED."
75 PRINT"说明"
80 OOSUB 9000
100 REM
103 REM 东南东南南南 PRINT LINES 东南东南南南
107 PRINT"说明"
110 PRINT"THE NOTES AVAILABLE:"
115 PRINT"说明"
117 PRINT"说明"
120 PRINT"说明"
125 PRINT"说明"
130 PRINT"说明"
135 PRINT"说明"
140 PRINT"说明"
145 PRINT"说明"
150 PRINT"说明"

```

```

155 PRINT"          █G██";
160 PRINT"          █FI█";
165 PRINT"          █EI█";
170 PRINT"          █DI█";
174 PRINT"          █C█";
176 PRINT"██  █BI█";
178 PRINT"    █A█";
185 PRINT"███  ████";
190 PRINT"███ PLEASE ENTER NOTES"
195 PRINT"██ (ENTER ^← TO END)"
200 REM
203 REM ***** ENTER NOTES *****
205 REM
210 POKE 198,0:X=X+1:N$=""
220 PRINT"XXXXXXXXXXXXXXXXXXXXXXXX██"
230 PRINT"██NOTE "X;
232 INPUT"██";N$
235 IF LEN(N$)>1 THEN GOSUB 9100:X=X-1:GOTO 100
236 IF N$="^←" THEN 300
237 N=ASC(N$)
238 IF N<65 OR N>79 THEN GOSUB 9100:X=X-1:GOTO 100
250 RESTORE
255 READ A$,A:IF A$<>N$ THEN 255

```

```

256 N(X)=A
260 PRINT"  _____  ";
265 POKE 36876,220
266 FOR R=1 TO 50:NEXT R
267 POKE 36876,0
270 IF X<100 THEN 100
275 PRINT"XXXXXXXXX OUT OF MEMORY !XXX"
280 FOR I=128 TO 245
285 POKE 36877,I:NEXT I
290 POKE 36877,0
295 GOSUB 9000
300 REM
303 REM ***** INPUT DURATION *****
305 REM
310 PRINT"  _____  ";
320 PRINT"  GET TIMING CORRECT"
330 PRINT"  _____  "
335 PRINT"EXPRESS THE SPACE BAR"
340 PRINT"XFOR EACH NOTE TO SET"
345 PRINT"XTHE DURATION ."
350 PRINT"XEXPRESS '<' TO RE-START"
355 PRINT"X_____  "
360 PRINT"X_____  THERE AREM";X-1;"XNOTES"

```

You'll notice some special Commodore control characters in the listing. The functions of these are as follows:

30 clear screen, set black, move cursor down 35 cursor down, set blue 40 cursor down, set green, reversed text, normal text 45 set reversed text, normal text 50 cursor down, set red 60 cursor down, set green 65,70 cursor down 75 cursor down twice 107 clear screen, set green, reversed text, normal text 110 set black 115 set reversed text, green, normal text 117-170 set black, green 174 set black 176 set green, black, green 178 set black 185 set green, reversed text, normal text 190,195 set black 220 cursor home, cursor down 20 times 230 set blue 232 set black 260 set reversed text, green, normal text 275 clear screen, cursor down five times, set red, cursor down twice 310 clear screen, set green, reversed text, normal text 320 set black 330 set reversed text, green, normal text 335 cursor down, set red 340,345 cursor down 350 set black, cursor down 355 cursor down, set green, reversed text, normal text 360 cursor down twice, set black, set red, set black 507 clear screen 515 set green, reversed text, normal text 518 reversed text, green, normal text 520-525 set black 530 set green, reversed text, normal text 607 set black, clear screen, cursor down four times 610 set black 620 cursor down, set red 622-625 cursor down 630 cursor down twice, set blue 635 set red 710 clear screen, set black 715 cursor down, set red 770 cursor down twice, set black 840,865 set black 900 set red 930 clear screen 1010 clear screen, cursor down three times, set red 1020 cursor down 1030 cursor down, set blue 9020 set black, reversed text, normal text 9110,9150 cursor home, cursor down 11 times, set red

VIC-20 PROGRAM

```

400 FOR I=1 TO X-1
410 POKE 198,0:TI$="000000"
420 GET A$:IF A$="" THEN 420
425 I(I)=TI
430 IF A$="+" THEN 300
435 TI$="000000"
440 POKE 36876,N(I)
450 IF PEEK(197)>64 THEN 440
460 D(I)=TI:POKE 36876,0:NEXT I
500 REM
503 REM ***** HEAR TUNE *****
505 REM
507 PRINT "J";
510 FOR J=1 TO 154
515 PRINT "J";:NEXT J
518 PRINT "J";
520 PRINT "J"; PRESS ANY KEY TO "
525 PRINT "J"; HEAR THE TUNE ! "
530 PRINT "J";
535 POKE 198,0
540 GET A$:IF A$="" THEN 540
550 FOR I=1 TO X-1
560 POKE 36876,N(I)
570 TI$="000000"
580 IF TI<D(I) THEN 580
590 POKE 36876,0
591 TI$="000000"
593 IF TI<I(I) THEN 593
595 NEXT I
600 REM
603 REM ***** ENTER OPTION *****
605 REM
607 PRINT "J";
610 PRINT "J";DO YOU WANT TO : "
620 PRINT "J"; 1..LIST DATA"
622 PRINT "J"; 2..RE-ENTER NOTES"
625 PRINT "J"; 3..RE-ENTER TIMING"
630 PRINT "J";PLEASE ENTER 1,2 OR 3."
635 PRINT "J";
640 POKE 198,0
650 GET A$:IF A$<"1"AND A$<"2"AND A$<"3" THEN 650
660 ON VAL(A$) GOTO 700,17,300
700 REM
703 REM ***** LIST DATA *****
705 REM
710 PRINT "J";THE PROGRAM TO USE"
712 PRINT "J";THE DATA SHOULD BE"
715 PRINT "J";LIKE THIS :J";
720 PRINT "J"; 10 READ N,D,I"
725 PRINT "J"; 20 IF N=-1 THEN END"
730 PRINT "J"; 30 POKE 36876,N"
735 PRINT "J"; 40 TI$='000000'"
740 PRINT "J"; 50 IF TI<D THEN 50"
745 PRINT "J"; 60 POKE 36876,0"
750 PRINT "J"; 70 TI$='000000'"
755 PRINT "J"; 80 IF TI<I THEN 80"
760 PRINT "J"; 90 GOTO 10"
770 PRINT "J";PRESS ANY KEY TO SEE THE DATA : "
775 POKE 198,0
780 GET A$:IF A$="" THEN 780
800 NL=0:N=0:PRINT "J";
810 FOR I=1 TO X-1
820 N=N+1:NL=N+1
830 IF N=19 THEN N=0:GOSUB 900
840 PRINT "J";DATA "N(I)", "D(I)", "I(I)"
860 NEXT I
865 PRINT "J";DATA -1 , -1 , -1"
870 GOSUB 900:GOTO 1000
900 PRINT "J"; PRESS ANY KEY"
910 POKE 198,0
920 GET A$:IF A$="" THEN 920
930 PRINT "J";:RETURN
1000 REM
1003 REM ***** END OF PROGRAM *****
1005 REM
1010 PRINT "J";DO YOU WANT TO DO"

```

```

1020 PRINT "J";ANOTHER TUNE"
1030 PRINT "J"; (Y OR N)?"
1040 POKE 198,0
1050 GET A$:IF A$<"Y"AND A$<"N" THEN 1050
1060 IF A$="Y" THEN RUN
1070 SYS 64802
9000 REM
9003 REM ***** PRESS ANY KEY *****
9005 REM
9010 POKE 198,0:POKE 36876,15
9020 PRINT "J"; PRESS ANY KEY "J";
9030 GET A$:IF A$="" THEN 9030
9040 POKE 36876,220
9050 FOR I=1 TO 100:NEXT I
9060 POKE 36876,0
9070 RETURN
9100 REM
9103 REM ***** INVALID INPUT *****
9105 REM
9107 FOR J=1 TO 5
9110 PRINT "J";INVALID INPUT!";
9120 FOR I=225 TO 245
9130 POKE 36877,I
9140 NEXT I:POKE 36877,0
9150 PRINT "J";
9155 FOR R=1 TO 50:NEXT R,J
9160 RETURN
40000 REM
40003 REM ***** DATA FOR NOTES *****
40005 REM
40010 DATA A,191,B,195,C,201,D,207
40020 DATA E,209,F,215,G,219,H,223
40030 DATA I,225,J,228,K,231,L,232
40040 DATA M,235,N,237,O,239

```

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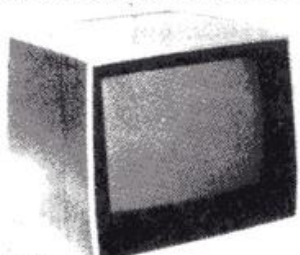
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EPSON FX80: 80 column, 160 CPS, normal, italic and elite characters, 256 user definable characters, superscript, subscript, 11 x 9 matrix, bi-directional logic seeking, hi-res bit image printing (960 x 8 dots/line), friction and pinfeed, 9 international character sets, Centronic parallel interface.

FX80 PRICE: £349 + VAT - £401.35

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GP-250X PRICE: £219 + VAT - £251.85

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STAR DP510 10" carriage 80 columns.

SPECIAL PRICE: £219 + VAT - £251.85

STAR DP515 15" carriage 136 columns.

SPECIAL PRICE: £279 + VAT - £320.85

RS232 INTERFACE FOR ABOVE: £50 + VAT - £57.50

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* CASIO PB-100 Basic language pocket computer, 544 program steps, Qwerty keyboard, 12 char display. £34.75 + VAT - £39.95

* CASIO FX-700P Basic language, scientific functions, 1568 program steps, Qwerty keyboard, 12 char display. £43.44 + VAT - £49.95

* CASIO PB-300 Basic language computer, scientific functions, 1568 program steps, built-in mini printer, Qwerty keyboard, rechargeable batteries and charger, 12 char display. £78.22 + VAT - £89.95

* CASIO FA-3 Cassette adaptor for PB100, PB300, FX700. £17.35 + VAT - £19.95

* CASIO FP-12 Printer for BB100 and FX700. £39.09 + VAT - £44.95

* SHARP PC-1211 Basic language computer, scientific functions, 1424 program steps, 24 char display, Qwerty keyboard. £60.83 + VAT - £69.95

* SHARP PC-1251 Basic language computer, 4K RAM, 24K system ROM, 24 char display, Qwerty keyboard, user defined key, numeric pad. £69.52 + VAT - £79.95

* SHARP CE-125 Cassette recorder and mini printer for use with PC-1251, incl. built-in printer. £86.91 + VAT - £99.95

* SPECIAL PRICE PC-1251 - CE-125. £146.95 + VAT - £169.00

TEXAS INSTRUMENTS TI 99/4A



This microcomputer is based on TMS9900 16-bit microprocessor. It includes 16K RAM, 16 colour high resolution graphics (192 x 256). The screen display is 32 characters, 24 lines TI-BASIC. Full-size keyboard. For Software there are about 1000 programs to choose from. There are a lot of peripherals available, e.g. Disk Drives, Disk Interface, Speech Synthesiser, Extra RAM, Additional Language (PASCAL, TI-LOGO, ASSEMBLER).

TI HOME COMPUTER HARDWARE

Title	Description	Price inc. VAT
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When used with selected modules will reduce electronic speech.

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This unit takes all card peripherals and on internal disk drive.

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92K formatted drive, mounts internally in peripheral expansion system.

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Matrix Printer

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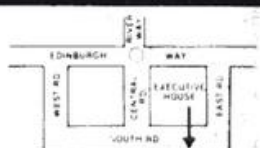
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Your complete guide to home micros

All the facts you need
to know about home
computers are packed
into the next pages.
Mike Roberts covers
popular computers
costing under £400.

Atari 800XL Lynx 96K Genie II 16K Atari 800 Genie I 16K Genie II
BBC model B
Aquarius ZX81 Laser 200
Genie I 16K
Spectrum
Genie
Oric
Elect
Tandy
Atari 400
Oric 16K TI-9
Lynx 48K
Spectrum 16
Sord M5
Jupiter Ace
BBC model
Genie I 48K
Laser 200 Aquarius
Colour Genie Dragon Electron Lynx 48K
Lynx 96K Sharp MZ700 Tandy Colour
VIC-20 Sord M5 Atari 400 Atari 600XL
Genie I 16K Spectrum 48K Oric 48K
TI-99/4A Tandy MC-10 Spectrum 48K Oric 48K
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How to use the guide

Price: This is the recommended price. It is often possible to find a lower price by shopping around. The guide is in price order. Memory is given next. First is the total random access memory, followed by the amount you can actually use for your programs after the computer has taken what it needs. Then there is the size of the read-only memory which can be used but not changed. The size is a fair indication of the complexity of the built-in language.

Keyboard: If you are a typist you may feel you need a typewriter style keyboard which puts up the price of the computer. Many of the popular computers have button-like keys each of which performs several duties.

Screen: The number of columns or characters per line and number of lines of text on the screen, followed by high-resolution modes in which images can be designed by programming. Colours and other screen features are also given.

Sound: the more the better, particularly for arcade-style games.

Languages: most micros have BASIC built in, and others available at extra cost. Microsoft BASIC is the most popular and if you know this you can switch fairly easily to another computer using it. But this does not mean programs will run unchanged on different computers. Except in rare cases they will not.

Processor: One of the most important things in a computer. The most popular are 6502/6520 and the Z80 and Z80A. The 6502 is probably the best and fastest, although this depends on the application.

Operating system: Used by the computer as a common core to control itself and what your software asks of it. Most are machine-specific. Similar operating systems make it easy for experts to convert software.

I/O stands for input/output — the sockets through which the computer communicates with the outside world. All computers can interface to cassette recorders, so this is not mentioned. Sockets for domestic TVs are not given for the same reason. RS-232 and Centronics are the industry-standard interfaces for a wide range of printers.

Number sold in UK is an estimate from the maker.

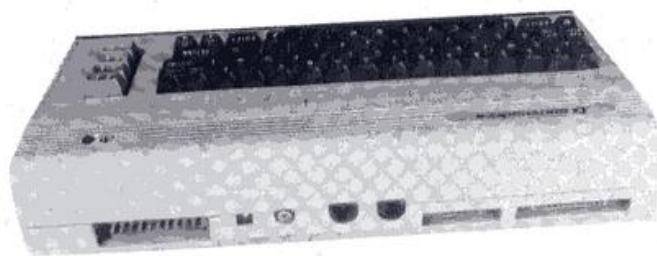
Speed: a general indication only.

Add-ons: a guide to the devices you can plug into the computer, from extra memory to sophisticated printers. The computer magazines are packed with advertisements from makers of add-ons. Study them if you want to use the computer for a particular job.

Software, after price and memory, is probably the major factor in choosing a computer. The difficulty is that the newer, more sophisticated computers generally have less software available. After all, independent software houses are inclined to produce programs for micros which have sold in their thousands. In many cases, however, micro makers commission software for new launches.

Opinion is mine alone. Do decide why you want a computer before going into the shop and then ensure you get a demonstration. Members of your local computer club (details at libraries) will also be glad to help.

• This guide will appear again. Any amendments should be sent as soon as possible to **Micro Guide, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE**



The computers in alphabetical order

Atari 800XL	£239.99
Atari 800	£299.99
Atari 600XL	£160
Atari 400	£149.99
Aquarius	£59.95
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Dragon	£175
Dragon 64	£225
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Genie II 48K	£341.55
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BLACK CRYSTAL

The Classic, six program adventure game for the 48K Spectrum and 16K ZX81 computers. No software collection is complete without it. **Black Crystal** is an excellent graphics adventure and a well thought out package. *Sinclair User*, April '83 **Black Crystal** has impressed me by its sheer quantity and generally high quality of presentation. I am afraid I have become an addict. *Home Computing Weekly*, April '83 **Spectrum 48K** 180K of program in six parts only £7.50 **ZX81 16K** over 100K of program in seven parts only £7.50 **WHY PAY MORE FOR LESS OF AN ADVENTURE?**

THE CRYPT by Stephen Renton

Prepare yourself for the many challenges that shall confront you when you dare to enter **THE CRYPT**. You will battle with giant scorpions, Hell spawn, Craners, Pos - Negs and if you are unlucky enough — the Dark Cyclops in this arcade style adventure.

Available now for the 48K Spectrum at £4.95



THE ADVENTURES OF ST. BERNARD

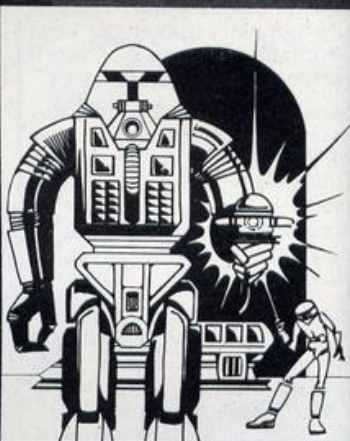
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ZX COMPENDIUM



ZX81 COMPENDIUM

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The ideal software package for all 16K ZX81 owners. Six major programmes on two cassettes for only £6.50

Alien Intruder/Hieroglyphics — Both programs make good use of graphics and words to make a very entertaining package. *Sinclair User* Aug 82 **Alien/Hieroglyphics/Wumpus/Movie Mogul** — A varied mix from Carnell, all featuring imaginative responses and graphics and all of them good games for all ages (Hieroglyphics is particularly good for children). *Popular Computing Weekly* Aug 82

THE DEVIL RIDES IN

I uttered the last incantations as the clock struck thirteen. All fell silent except for a faint rustling in the corner. From out of the shadows they came, all Hell's fury against me but I was not defenseless until the Angel of Death, astride a winged horse, joined the battle. Avoiding his bolts of hell fire, I took careful aim. My chances were slim, but if my luck held...

(Fast moving, machine code, all action, Arcade game)

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BUYERS' GUIDE

ZX81

£39.95

1K RAM (0.3K useable) 8K ROM

Keyboard: flat membrane-type, 40 keys, no space bar or special function keys or dedicated cursor control keys, five functions per key.

Screen: 32 columns by 22 rows, only 20 rows useable. Black and white display, no hi-res or colour but 64 by 40 plotting of points is supported. Display is reverse of most, i.e. letters are black on white.

Sound: none.

Languages: BASIC, very simple and very non-standard. **Processor:** Z80A. **Operating system:** Sinclair. **I/O:** none included but can be added via an expansion port. ZX Printer requires no interface. **Number sold in UK:** 500,000.

Add-ons: A 16K RAM pack is available at £29.95. A printer that works by electrostatic printing on unretained paper 4½ in wide costs £39.95, but this is only really useful as a cheap means of listing a program.

Add-ons: Interfaces are available for almost every application, due to the large amount of users. This also applies to other add-ons, such as better keyboards, RAM packs and joysticks. **Software:** likewise available in great quantity and for the same reasons although little is produced now because the ZX81 has been overtaken for most purposes by the new generation of colour computers. A starter pack of ZX81, 16K RAM pack and games tape costs £45.

Opinion: An old design at a low price. The keyboard is very hard to use and soon wears out, although extension keyboards can be added. Screen display quality is poor and tiring to look at for any length of time. Editing is very minimal. All inputs, whatever they are, must be on the bottom line. Key words must be entered with assigned keys. The ZX81 is useful as an introduction to computing and even then it is hard to move on as the BASIC is so non-standard. It is compatible with a small sub-set of the Spectrum's more basic features. The ZX81 has two speeds of operation: very slow and slower still.

Sinclair Research: Stanhope Road, Camberley, Surrey GU15 3BR

Camberley (0276) 685511

Laser 200

£69.95

4K RAM 16K ROM

Keyboard: 45 Spectrum-like rubber keys, but more widely spaced. Up to four functions per key.

Screen: 32 columns by 16 rows or 128 by 64 in graphics mode, 96 characters. Eight foreground colours in text mode, four colours for graphics.

Sound: single channel.

Languages: BASIC, with optional single key entry, built in and more promised. **Processor:** Z80A. **Operating system:** custom. **I/O:** Centronics port for printers etc and expansion slot. **Number sold in UK:** no figure available — computer was launched in July.

Software: 15 titles available from distributors with more promised. Distributor says three software houses are writing for the Laser.

Add-ons: 16K RAM pack available now. To follow soon: 64K RAM pack, joysticks, light pen, RS232 interface, four-colour printer/plotter.

Opinion: Aimed squarely at first-timers, the Laser 200 is easy to use for beginners. However, the 16K RAM pack costs about £30, taking it into the hotly-contested Spectrum/Oric bracket. Screen resolution is limited and so is the colour display. Stylish appearance. The Laser 200 is made in Hong Kong and known in the US as the VZ200.

Computers for All, Southfields Industrial Park, 30 Hornsby Square, Laindon, Essex.
Basildon (0268) 418414

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Christmas gifts. Or you could
leave it open as a hint to the
rest of the family . . .**

Aquarius

£59.95

4K RAM (2K useable) 8K ROM

Keyboard: hard rubber mat type similar to but slightly better than the Spectrum's. 49 keys, no user definable keys, no dedicated cursor control keys, no space bar.

Screen: 40 columns by 24 rows text with 16 colours. No hi-res graphics or definable characters, but hi-res is claimed with expansion although no details of this are available.

Sound: single channel sound generator.

Languages: Microsoft BASIC included. LOGO and Extended BASIC planned. **Processor:** Z80A. **Operating System:** custom. **I/O:** none included except cartridge port and expansion bus. **Number sold in UK:** new machine so no figures yet available. **Speed:** medium.

Add-ons: mini expansion box gives two extra channels for sound generation, two cartridge slots. Joy pads are available which are similar to Mattel's Intellivision joy pads. A cassette recorder is an option but a normal cassette recorder can be used although Mattel say there have been problems and recommend their own recorder. A 40-column thermal printer can be attached without extra interfaces. A modem and a maxi-expander are planned. Since this is a fairly new computer there is nothing forthcoming from independent suppliers.

Software: available from Mattel. About 15 cartridges. None known from independents.

Opinion: this computer appears to be a sort of colour ZX81 but it has quite a lot of other capabilities. The big problem is its lack of memory. Even so a lot can be done with this amount and it does have the advantage of a cartridge slot, sound of a sort, colour graphics, and the keyboard is slightly better than a Sinclair effort.

Mattel, North End Road, Wembley, Middx HA9 0AB
01-900 0311

Jupiter Ace

£89.95

19K RAM (17K useable) 8K ROM

Keyboard: rubber mat similar to Spectrum, 40 keys, no space bar or special function keys or dedicated cursor control keys, three functions per key.

Screen: 32 columns by 24 rows, black and white display, all characters are user definable, no hi-res or colour but block graphics are included.

Sound: internal beeper.

Languages: Forth is standard. **Processor:** Z80A. **Operating system:** custom. **I/O:** none included but can be added via expansion port.

Add-ons: 48K RAM pack is £79.95 although this price is currently under revision. Printer interfaces etc. are available from independent manufacturers. One enables Sinclair's ZX Printer to be used. BASIC and disc drives are under development although nothing is known about these except that the discs are of the three inch real disc type (none of your continuous loop tapes here) and a full disc system will cost around £300. **Number sold in UK:** 5,000. **Speed:** fast.

Software: available in limited quantity.

Opinion: a good computer that suffers by having a language that differs from most others. The manual is clear and concise and will explain most of the oddities of Forth. The program editor is unusual because it is orientated towards the editing of Forth words, which is good for this kind of application but may confuse some people. Fast speed is mainly due to the language the computer uses. The Ace would be useful for people who want an introduction to Forth, a fast computer or simply want to be different.

Jupiter Cantab, 22 Foxhollow, Bar Hill, Cambridge CB3 8EP
Cambridge (0223) 313479

Spectrum 16K

£99.95

16K RAM (7.5K useable) 16K ROM

Keyboard: rubber mat type, 40 keys, no space bar, definable function keys or dedicated cursor control keys, five or six functions per key.

Screen: 32 columns by 24 rows, but only 22 rows are available to the user. 256 by 192 high-resolution graphics supported by BASIC, two colours from a palette of eight are available in 704 areas on the screen. Foreground and background colours for each of these areas can be selected as well as whether the contents of the area are flashing or not. Two levels of intensity are also supported. 21 user defined characters are available.

Sound: internal beeper.

Languages: Sinclair BASIC. This version is an extended form of the type used in the ZX81. The extensions do not cover structured programming or aid functions and only deal with the graphics and file handling. This BASIC is very non-standard. **Processor:** Z80A. **Operating System:** Sinclair. **I/O:** none included but the ZX printer can be added without an interface. **Number sold in UK:** 400,000. **Speed:** medium.

Add-Ons: ZX Printer (see ZX81 for description). Microdrives, fast continuous loop tape recorders costing £49.95, need the ZX Interface to be attached. This costs £29.95 when purchased with a Microdrive or £49.95 when bought separately. The interface also provides a printer interface and a networking system. ZX Interface gives two Atari-type joystick ports and a slot for ROM games cartridges. This costs £19.95 with 10 cartridges at present available at £14.95 each. Many other add-ons are available from independent suppliers.

Software: a lot of software is available for almost all applications, particularly games. Despite the business software available, the Spectrum cannot realistically be considered as a business machine.

Opinion: when the Spectrum first appeared it was quite an innovation as the lowest priced colour computer. But newer designs have arrived recently with better technical specifications and more useable memory at similar prices. The colour display is not good and a colour display cannot be produced on a few colour TVs. For editing and the method of keyword entry see ZX81. With the Spectrum there are more keywords to be fitted on the same size of keyboard. Sound is though a beeper only. The range of software available is enormous. See also Spectrum 48K.

Sinclair Research, Stanhope Road, Camberley, Surrey GU15 3PS
Camberley (0276) 685311



Oric 16K

£99.95

16K RAM (14K useable in text mode, 7.5K in graphics mode) 16K ROM

Keyboard: raised key, similar to calculator type but better, 57 keys, space bar, dedicated cursor control keys, no definable function keys, two functions per key.

Screen: 40 columns by 28 rows Teletext compatible text display, two user definable character sets, eight foreground and eight background colours, double height, flashing, and inverted attributes available for each character. Graphics screen gives 240 by 200 resolution, colours and attributes are definable on a grid of 40 by 200. In each of these areas the foreground and background can be defined in eight colours, flashing and inverted output is also supported. In graphics mode three lines at the bottom of the screen also appear, and these are the same as the text mode lines.

Sound: sound generator with three channels and noise generator. There is a certain amount of envelope control. Pre-programmed sounds produce pings and zaps etc. Sound is produced through an internal speaker although hi-fi output is available through a DIN socket.

Languages: Extended Microsoft BASIC built in. Forth available, BBC-like BASIC planned. **Processor:** 6502A.

Operating System: custom. **I/O:** Centronics parallel printer port, user port, monitor port, expansion connector. **Number sold in UK:** 200,000. **Speed:** fast.

Add-Ons: from Oric, a four colour printer/plotter using 4½ in paper to give very good quality output up to 80 columns. A communications modem and three-inch disc drives are to be available soon. Joystick interfaces and other such items are available from independent suppliers.

Software: quite a lot, more appearing every day.

Opinion: This computer has always been compared to the Spectrum, and this is justified as they are outwardly similar and prices are the same. Looking at the two computers though, the Oric wins. The Basic is easier and is a structured form of the de-facto standard Microsoft BASIC. The keyboard is better, the graphics are better, it has real sound which is lacking in the Sinclair machine. Interfaces are built in that would normally cost extra. The edge that the Spectrum has is more software. See also 48K Oric.

Oric Products International, Coworth Park, London Road, Ascot, Berks SL5 7SE
Ascot (0990) 27686



BUYERS' GUIDE

TI-99/4A

£99.95

16K RAM (14.5K useable) 26K ROM

Keyboard: typewriter style, 48 keys, including row of function keys (not user-definable), space bar. Two functions per key. **Screen:** 32 columns by 24 rows text, 128 characters, all user-definable, 16 colours each for foreground and background. The way colour is handled is rather odd — a colour is assigned to a particular group of characters. There are 16 groups of eight characters, so a particular colour can be assigned, for example, to the letter A but will also affect B to H. High-resolution graphics only available with TI plug-in cartridges. **Sound:** three channels of five octaves with noise channel.

Languages: TI BASIC is included, but cannot use machine code, so arcade quality programs cannot be written or bought on cassette for the standard model. To write or use machine code programs, TI's Mini Memory or Editor Assembler cartridges are needed. Machine code can also be used with Extended BASIC, provided 32K is added. LOGO, the teaching language, is also available. **Processor:** TMS 9900. **Operating system:** custom. **I/O:** joystick and cartridge ports. **Number sold in UK:** TI would not comment, our estimate: 50,000. **Speed:** slow.

Add-ons: Apart from joysticks and speech synthesiser, all need a peripheral expansion box. Available: disc drives, 32K RAM card, RS232 serial port for printers. TI's own cassette recorder includes a cable, your own will need a special cable. There are very few independent add-ons.

Software: More software is becoming available — including US imports — but you may be forced to buy through mail order. TI sells a range of sophisticated cartridge software which is more expensive.

Opinion: an interesting computer which is now quite good value at its new low price. And it looks like a real machine with its good keyboard. Its drawback is that machine code cannot be used with the standard model so there is not much arcade-type cassette software, although this is slowly increasing. However, if all the games that interest you are from TI and you are willing to pay cartridge prices, then this is a good machine. For programmers it has a line editor which, although one of the better versions, is awkward to use. The BASIC is slow but easy to use and comprehensive. Its worst features are that there can be just one statement per line and spaces are essential. Maths functions are good but string functions leave something to be desired. The computer is very well built and looks attractive.

Texas Instruments, Manton Lane, Bedford MK41 7PA
Bedford (0234) 67466

Tandy MC-10

£99.95

4K RAM 8K ROM

Keyboard: 47 hard plastic keys in Spectrum-style layout, includes 16 graphics keys, space bar. Single key keyword entry. **Screen:** 32 columns by 16 lines text, 64 by 32 graphics. Eight colours.

Sound: single channel, five octaves controlled from BASIC. **Languages:** Microsoft BASIC. **Processor:** 6803. **Operating system:** Microsoft. **I/O:** RS-232. **Number sold in UK:** no comment from Tandy, but small because computer launched recently. **Speed:** medium to fast.

Add-ons: 16K RAM pack. Also compatible with Tandy printers.

Software: a small range, but growing.

Opinion: Tandy is selling this computer through 220 of its stores, rising to around 300, so support is excellent. It has been on sale in the US since May, so imported software from independents is likely. No UK independent software is known. You may feel the relatively high price is partly offset by Tandy's reputation for service and advice.

Tandy, Tameway Tower, Bridge Street, Walsall, West Midlands WS1 1LA
0922 648181



Spectrum 48K

£129.95

48K RAM (39.5K useable) 16K ROM

Identical to 16K version in every respect except price and memory and the fact that more software is available due to increased memory size.

Sinclair Research, Camberley, Surrey GU15 3BR
Camberley (0276) 685311

Oric 48K

£139.95

48K RAM (46K useable in text mode, 39.5K free in graphics mode) 16K ROM

Identical to the 16K version except for the memory differences and certain control lines on the expansion port to allow the ROM to be switched out and more memory used.

Oric Products International, Coworth Park, London Road, Ascot, Berks SL5 7SE
Ascot (0990) 27686

VIC-20

£139.95

6K RAM (3.5K useable) 20K ROM

Keyboard: typewriter quality, 67 keys, space bar, dedicated cursor controls, four user definable function keys.

Screen: 22 columns by 23 lines, eight colours for text, 16 for background and border and graphics. All characters user definable, lower case, inverted output, two character sets. High-resolution possible with expansion cartridge or with extra programming but BASIC does not support this. Two modes, 160 by 128 in eight colours and 80 by 128 in 16 colours. **Sound:** three channels and one noise channel covering nine octaves through TV speaker.

Language: Commodore BASIC supplied, compatible with PET and Commodore 64, Extended BASIC, at extra cost gives access to the hi-res, sound, and user definable function keys. Forth, Comal and Pilot are available. **Processor:** 6502A. **Operating System:** Commodore Kernal. **I/O:** IEEE 488 serial bus, RS232, user port, cartridge port, joystick port, two paddle port (two analogue to digital converters). **Number sold in UK:** 500,000.

Speed: medium to fast.

Add-ons: lots available due to its immense popularity. From Commodore alone there are printers, plotters, disk drives, modems and, via an IEEE 488 parallel cartridge, access to Commodore, Hewlett Packard and laboratory instruments. Disc drives up to a hard disk Winchester holding 32 Megabytes. The computer is sold as a package including the Commodore cassette recorder which is needed to record programs on tape. Memory expansion up to 24K is available.

Software: Many cassette tapes and cartridges from independents and Commodore.

Opinion: this is a nice machine to get started on and it comes as a package containing a computer, a cassette recorder, a beginners guide to BASIC and a games tape. So the initial high price for a 3.5K machine is somewhat offset. The BASIC is very easy to learn and is Microsoft compatible. This type of BASIC was first used by Commodore on the first widely available micro in 1977 so there is a lot of compatible software around.

Commodore Business Machines, 675 Ajax Avenue, Slough, Berks SL1 4BG
Slough (75) 79292/74111

BUYERS' GUIDE

Atari 600XL

£160

16K RAM (amount useable varies with graphics mode used) 26K ROM

Keyboard: Full typewriter style keyboard, 58 keys, four function keys, space bar but no dedicated cursor control keys.

Screen: 16 screen modes comprising five text modes and 11 graphics modes. Text is 40 columns by 24 lines in up to 256 colours. The graphics have a maximum resolution of 320 by 192 in the maximum hi-res mode. All characters are user definable and come in predefined shapes to start with. Player-missile graphics — like sprites — are also available.

Sound: four channel sound generator with full software support.

Languages: Atari BASIC included and these are available: Forth, Pilot, Logo, WSSM, Pascal, Microsoft BASIC. Two types of assembler editor are also available. **Processor:** 6502A.

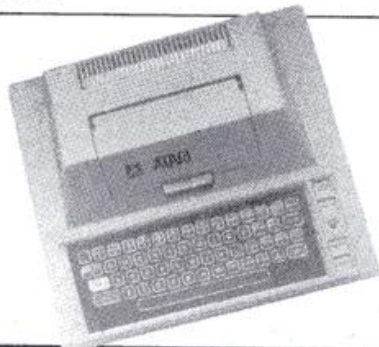
Operating System: Atari OS. **I/O:** serial input/output port, along with two connectors for two joysticks or four paddles. Other interfaces may be added via interface bus. Slot for ROM cartridges. Cassette port will only allow connection of Atari cassette recorder at £49.99, so this must be taken into account when considering costs. **Number sold in UK:** Atari would not comment. **Speed:** medium to fast.

Software: the XL series is software compatible with older models so a lot of software is on sale both from Atari — which has a library of 500 titles — and from independents, including US imports.

Add-Ons: Atari's essential cassette recorder uses one track for computer data and the other for audio that can be made to play under program control for purposes such as language tuition. Joysticks, paddles, and light pens are available from Atari. A disc system using a custom DOS. A CP/M cartridge, a printer plotter, a printer with a typeface like a daisy wheel but using a new system and a graphics tablet are due soon.

Opinion: The best of both worlds — a new design which can run the software for the older range. Excellent graphics and much of the software uses this to the full. Can be used by small businesses and the software for this is available. Writing your own programs is made easier by the full screen editor with all insert, delete and other functions easily accessible. Second only to the Commodore system for this. See also Atari 400, 800 and 800XL.

Atari, Railway Terrace, Slough, Berks SL2 5BZ
Slough (75) 33344



Atari 400

£149.99

16K RAM (amount useable depends on graphics mode) 16K ROM

Similar to Atari 800 except that memory cannot officially be expanded above 16K. "Sculptured" membrane keyboard and only one cartridge slot, usually occupied by the BASIC cartridge.

Opinion: keyboard is better than the ZX81 type of flat membrane, because the surface is contoured to form a ridge around each key area on the keyboard and a beep sounds every time you press a key to reassure you that the keypress has been accepted.

See also Atari 800, 600XL, and 800XL

Atari, Railway Terrace, Slough, Berks SL2 5BZ
Slough (75) 33344

Sord M5

£149.95

24k RAM (4K useable) 8K ROM

Keyboard: hard rubber mat, 65 keys, no space bar, no dedicated cursor control keys or user definable keys. Optional single key word entry from keyboard.

Screen: BASIC I — 32 columns by 24 rows in 16 colours. BASIC G adds sprites and 64 by 48 medium resolution 16 colour graphics. There are a number of graphics modes but these are mainly to do with different ways of handling the sprites.

Sound: three channel sound generator with one noise generator. Sound covers eight octaves.

Languages: BASIC I, included, is non-standard and has integer only arithmetic and not much in the way of graphics commands. BASIC G, available at extra cost, makes use of graphics described above, but also has integer-only arithmetic. BASIC F allows floating point maths and is designed for mathematical and scientific programming. **Processor:** Z80A.

Operating system: custom. **I/O:** Centronics parallel printer port, two joystick ports, cartridge slot. Cartridge slot cannot be used at the same time as BASIC because the BASIC is on a cartridge and thus occupies the port. **Number sold in UK:** no figures available — this is a new release.

Add-Ons: 32K RAM, printers, joy pads, cartridges and an expansion box with three cartridge slots are available from Sord. As this is a new machine there is not a lot from independent suppliers.

Software: A lot of cartridges from Sord, including a Visi-Calc lookalike and the other BASICs described above. None available from independent suppliers.

Opinion: overpriced and with an inadequate BASIC. Otherwise a fairly standard machine with nothing to shout about except for its lack of memory for user programs, and bad BASIC. Sprites fairly good. There are much better machines at better prices.

Sord Computer Systems, Samuel House, 6 St Albans Street, Haymarket, London SW1Y 4SQ
01-930 4214

Colour Genie

£168

32K RAM (30K text mode, 26K hi-res mode useable) 16K ROM

Keyboard: typewriter style, 63 keys, space bar, dedicated cursor control keys, four user definable function keys, full BASIC support for eight with shifts.

Screen: text mode — 40 columns by 25 rows of text with 16 colours, 128 characters user definable. Graphics mode — 160 by 102 hi-res in four colours with one background colour. The BASIC supports the graphics with commands to do almost anything and is very comprehensive.

Sound: three channels, each capable of noise production, eight octaves, no envelope control.

Languages: Microsoft Extended BASIC included, Forth available. **Processor:** Z80. **Operating system:** custom. **I/O:** two parallel ports, RS232 serial port, cartridge port, joystick port. **Number sold in UK:** not available. Not that many but number growing all the time. **Speed:** slow to medium.

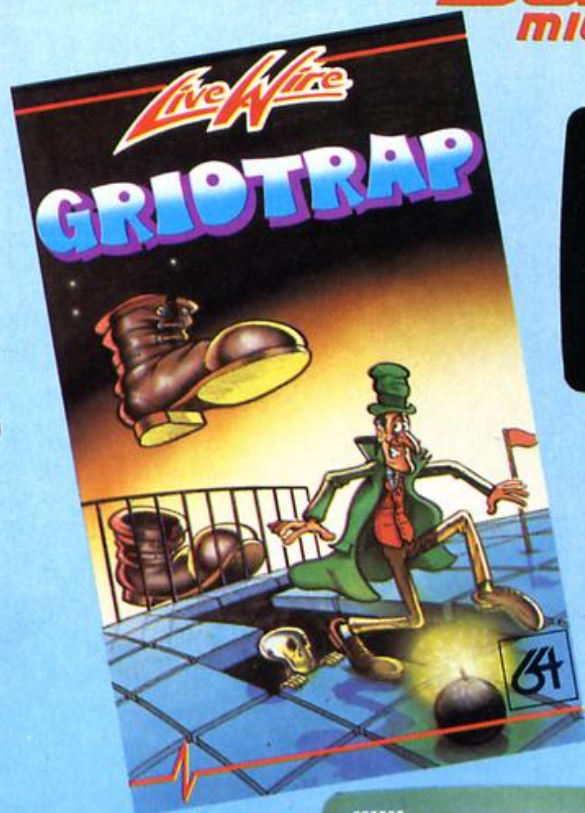
Add-Ons: from Lowe Computers — Centronics parallel printer interface, joysticks, printers, modem, disc drives. Not a lot from independent suppliers.

Software: About 60. Some converted from compatible TRS-80 and Genie 1.

Opinion: at first the Colour Genie suffered from too high a price and too small a memory. But now memory has been increased and the price cut looks like taking off. The BASIC is a good implementation and has all the necessary things plus some nice additions. Interest is now growing steadily, although whether it will be able to stop the assault by new machines such as the Electron is questionable as it does not have the backing of lots of independent software to keep it afloat. A shame, as this is a good computer worthy of more attention.

Lowe Computers, Chesterfield Road, Matlock, Derbyshire DE4 5LE
Matlock (0629) 4057/4995

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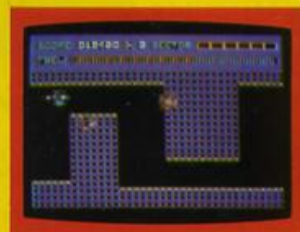
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GALACTIC ABDUCTORS



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XENO II



MINI KONG



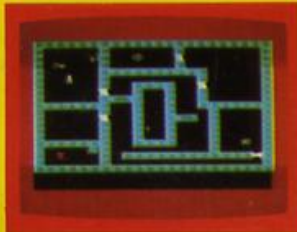
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A brilliant Star Trek game with a difference. Spectacular 3D graphics, real arcade action plus a game of strategy against marauding space pirates.

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This all m/c game is for true arcadians with super-fast reactions and nerves of steel under pressure. The fourth screen will test you to the limit as the power source guardians bombard you while your shots are blocked by whirling suicide space ships.

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Dragon 32

£175

32K RAM (30K to 24K RAM useable depending upon graphics mode used) 16K ROM

Keyboard: 52 key typewriter style, space bar, no user definable function keys or dedicated cursor control keys. Keyboard quality could be improved.

Screen: text mode 32 columns by 24 rows, text in one colour, no lower case or user definable graphics or colour, but there is an inverted output option. Text mode does have block graphics in colour though. **Graphics mode:** ranges from 256 by 192 in one colour to 128 by 192 in four colours. Text is not supported in this mode.

Sound: one channel music generator covering five octaves, good software control.

Languages: Microsoft Extended Colour BASIC included. Identical to Tandy colour computer BASIC. Other languages from independents. **Processor:** 6809E. **Operating System:** Microsoft's own, modified by Dragon, compatible with the Tandy. OS/09 is to become available when Dragon release discs. **I/O:** User port, Centronics parallel printer port, two joystick ports, cartridge port. **Number sold in UK:** 100,000.

Add-Ons: joysticks and disc drives from Dragon. Lots available from independents, ranging from printers to disc drives. Most Tandy suppliers have peripherals that will fit Dragon, likewise Tandy software. But software has only a certain amount of compatibility and it is wise to check.

Software: quite a lot available from Dragon and independents and (but check) Tandy.

Opinion: this micro is limited by its very basic sound system and its horrible text mode with very limiting formats. The BASIC is very good at manipulating screen graphics although it does not allow structuring. An altogether much better buy than the Tandy computer to which it is so similar because it already has much of the expansion that comes at extra cost for the Tandy machine and at a price that is lower than the basic initial price of the Tandy machine.

Dragon Data, Kenfig Industrial Estate, Margam, Port Talbot, West Glamorgan SA13 2PE
Kenfig Hill (0656) 744700

Spectravideo SV 318 £198.95

32K RAM (16K useable) 32K ROM

Keyboard: 72 rubber keys in typewriter layout, plus built-in joystick.

Screen: 80 columns by 24 rows text and 256 by 192 in hi-res mode, 16 colours and 32 sprites

Sound: three channels, eight octaves, through external speaker, including TV, only

Languages: The first computer in the UK to use MSX BASIC which is being promoted by several major manufacturers as a standard. Plus Extended Microsoft BASIC. **Operating system:** custom. **Processor:** Z80. **I/O:** two joystick ports, Centronics interface, expansion port. **Number sold in UK:** computer just launched, supplies limited.

Add-Ons: all the following available now, says importer — joysticks, single and multi expansion units, adaptor for Coleco and Atari cartridges, 16K and 64K RAMpacks (to maximum of 144K), RS-232 interface, disc drive cartridge which also adds the CP/M business operating system, twin 5¼in disc drives, dot matrix printer (made by Seikosha), graphics tablet. Cassette unit, at £39, is essential?

Software: five cartridges (£16 each) and 15 cassettes (at £5.90) available now. Importer is talking to UK software companies. **Opinion:** An interesting new computer from an experienced Hong Kong manufacturer. Lots of add-ons, a rarity for a new micro, the first opportunity to try MSX BASIC and, a nice touch, a built-in joystick. Will all this outweigh the rubber keys and the fact that, like Commodore, the company's own £39 cassette recorder is essential. But then, look how many micros Commodore has sold. See also Spectravideo SV 328 priced at £274.85

CK Computers, 6 Devon House, High Street, Worle, Weston-super-Mare, Avon BS22 0JR
(0934) 516246

Electron

£199

32K RAM (9K to 21K useable depending on graphics mode used) 32K ROM

Keyboard: typewriter style, 56 keys, space bar, no dedicated cursor control keys, no dedicated user definable keys though the numeric keys double with the use of a function key.

Screen: identical to BBC micro, except for lack of Teletext mode, although this is available as an option.

Sound: one channel through internal speaker, otherwise as BBC.

Languages: BBC BASIC is built in and FORTH and LISP are available. **Processor:** 6502A. **Operating system:** BBC. This makes Electron very compatible to the BBC and will run most of its software. **I/O:** none on basic machine though there is an expansion slot into which an expansion board can be plugged to give the same sort of interfacing options as the BBC but at extra cost. **Number sold:** no figures yet — this is a new machine. **Speed:** medium.

Add-Ons: with forthcoming expansion board the Electron should be able to use most of the add-ons that the BBC can accommodate. Some independent suppliers are producing items, but as this is a new computer only time will tell.

Software: a growing range as software houses convert BBC programs.

Opinion: as this computer is almost wholly BBC compatible with only some minor differences most of what I say for the BBC is true here except for the references to price. At this current low price this computer is good value for money.

Acorn Computers, 4 Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN
Cambridge (0223) 210111

Lynx 48K

£225

48K RAM (13.75K free) 16K ROM

Keyboard: good quality typewriter keyboard, 57 keys, space bar, optional single key keyword entry, no dedicated cursor controls or user definable function keys.

Screen: 40 character by 24 lines text, and 248 by 256 high resolution display in eight colours, user defined characters and lower case. There are one or two peculiarities: the screen cannot scroll and works on a plane system of colour generation and the characters are based on an unusual six by 10 matrix. The upshot is that any access to the screen is very slow. It can be speeded up slightly by only using one of the primary colours.

Sound: six-bit digital to analogue converter giving one sound channel covering five octaves driven through internal speaker, output available to external amplifier.

Languages: Lynx BASIC (included) is an excellent implementation, well structured, good access to machine code with a machine code monitor. Procedures are catered for as well as other structured programming functions. However it does leave something to be desired with some of the more basic functions of BASIC (sorry). For example, arrays can be only one dimensional. Tape recorder control by the computer is also lacking. **Processor:** Z80A. **Operating System:** custom, although CP/M is promised when Lynx is given disc drives.

I/O: Cartridge port, serial printer port. Parallel printer port extra, joystick interface extra. **Number sold in UK:** not available but not many, though number growing. **Speed:** fast when not accessing screen but slow when printing or plotting.

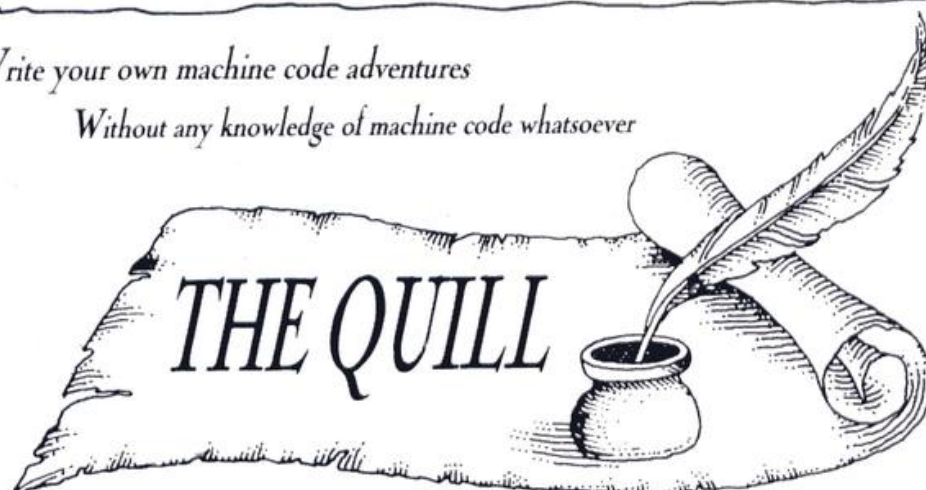
Add-Ons: Joystick interface, parallel printer interface, printer lead, disc drives promised with CP/M, all available from Computers. Nothing much from independent suppliers.

Software: Little available, but increasing.

Opinion: a much underrated machine suffering from having a funny BASIC and odd screen handling. A very nice machine on its own merits, it is expandable to 128K or 96K. The 128K machine has an 80 column display and has CP/M, opening up the opportunity to use a vast range of business software using this operating system. The 48K and 96K Lynxes run Lynx DOS.

Computers, 33A Bridge Street, Cambridge CB2 1UW
Lang Communications, 01-582 5128

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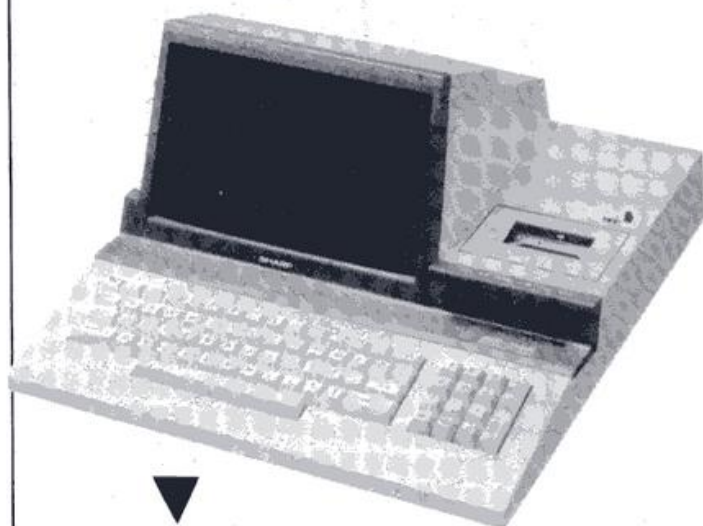
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Four clearly presented revision/tutorial programs. The subject matter has been carefully structured to cover the most important aspects of: • Elements, compounds and mixtures • Structure, bonding and properties • Redox, electrolysis and the activity series • Acids, bases and salts. 48K Spectrum and 16K ZX81 versions of the cassette are available. Please specify which you require. Our software is available by direct mail from:-

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108 Hermitage Woods Crescent, St Johns, Woking, Surrey GU21 1UF.
For further details please telephone: 048 67 2584. We have a demonstration cassette available for retailers or schools.

BUYERS' GUIDE



Sharp MZ700

£249.95

64K RAM 8K ROM

Keyboard: 69 typewriter-style keys including five function keys, four cursor keys, space bar.

Screen: 40 columns by 25 rows text, 80 by 40 graphics. Eight colours.

Sound: single channel, three octaves.

Languages: Extended BASIC cassette included in price. Also available: Pascal, Fortran, three versions of Pascal, two assemblers. **Processor:** Z80A. **Operating system:** custom. **I/O:** two joystick ports, video, RGB, port for Sharp printer/plotter and other printers. **Number sold in UK:** a new computer which Sharp says has sold 20,000 in first month. **Speed:** fast.

Add-ons: four-colour printer plotter, Sharp cassette recorder (although most domestic recorders will work), joysticks, other Sharp printers. Coming in January: I/O box for RS-232C, floppy discs etc.

Software: Sharp says 200 titles on cassette are available now starting at an inexpensive £3.95. Ten games are supplied with the computer. Four software houses are said to be writing for the MZ700. Software for the Sharp MZ-80K is totally compatible, although not in colour. And software for the MZ-80A and B needs little modification to work on the new computer.

Opinion: The MZ700 is a stylish design and the printer/plotter and Sharp cassette recorder slot into the main unit to give a smart appearance with no trailing wires. It is what has been dubbed a "clean" machine — the language must be added before programming can begin. It means that machine code programs can use nearly all of the 64K of RAM. It does mean, however, that you must wait for the BASIC to be loaded from cassette. One 4K ROM handles 512 characters and another deals with the monitor. However, the MZ700 faces stiff competition from the likes of the Commodore 64, which is cheaper.

Sharp, Thorpe Road, Newton Heath, Manchester 10
061-205 2333

Spectravideo SV 328

£274.95

80K RAM (64K approx useable) 48K ROM

Similar to the SV 318 model (£198.95), but with memory — expandable to 256K — and with a typewriter style keyboard. Aimed to appeal to small businesses, all peripherals for the cheaper model work on this version.

CK Computers, 6 Devonia House, High Street, Worle, Weston-Super-Mare
(0934) 516246

Memotech MTX500

£275

32K RAM (30K useable) 32K ROM

Keyboard: 58-key typewriter-style keyboard, plus 12-key numeric/cursor keypad and eight function keys. Set in black extruded aluminium casing.

Screen: 40 rows by 24 columns text, 256 by 192 pixels hi-res, 16 colours.

Sound: three channels plus noise, eight octaves.

Languages: Three languages are built in. MTX BASIC is similar to Microsoft's with extensions, mainly for graphics. Logo is the easy-to-use language used mainly in schools. Noddy is Memotech's interactive language. Built-in ROM routines include an assembler/disassembler. **Operating system:** custom. **Processor:** Z80A. **I/O:** RGB for a monitor, hi-fi sound, two joystick ports, Centronics interface. **Number sold in UK:** computer only recently launched. **Speed:** medium to fast.

Add-ons: available now — RS-232 board, 8K EPROM cartridge, 64K of plug-in RAM. Promised soon — Pascal on cartridge, 80-column board, "Silicon Disc" with ½ megabyte of RAM, floppy and hard discs running under CP/M, the operating system used for thousands of business programs. **Software:** six cassettes available now and Memotech says dozens more will be available soon, on tape and cartridge. Two programs are free with each computer.

Opinion: An all-British designed and manufactured computer from the people best known for their ZX81 and Spectrum add-ons. Many of the ideas in the MTX computers came from a business micro which an associate company was developing. Robust with a lot of features as standard and aimed at the top end of the home computer market, also occupied by the likes of the BBC micro.

Memotech, Station Lane, Witney, Oxon OX8 6BX
(0993) 2977

Lynx 96K

£299

96K RAM (37.5K useable) 20K ROM

Similar to the 48K Lynx except for increase in user RAM and the BASIC has extensions to drive a printer and increased ability to handle sound. The 48K Lynx can be upgraded for £89.95.

Computers, 33A Bridge St, Cambridge CB2 1UW
Lang Communications, 01-582 5128

Genie II 16K

£299.99

16K RAM (15K useable) 16K ROM

Keyboard: typewriter style, 71 keys, space bar, dedicated cursor control keys, four user definable function keys.

Apart from improved keyboard and lack of internal cassette deck, identical to Genie I.

Lowe Computers, Chesterfield Road, Matlock, Derbyshire DE4 5LE
Matlock (0629) 4057/4995

Atari 800

£299.99

48K RAM (amount useable depends on graphics mode in use) 16K ROM

Similar to 800XL and 600XL machines. The differences are: the screen has only 11 modes instead of 16, it has two more joystick ports than the 600XL and the 800XL, the amount of memory, and the sound is handled slightly differently.

See also Atari 400, 600XL and 800XL

Atari, Railway Terrace, Slough, Berks SL2 5BZ
Slough (75) 33344

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48K SPECTRUM

"Day of the Match" £5.00

Fascinating and realistic simulation of an entire football season. Name your own teams if you wish (English league provided on cassette). Rate each team from one to nine in various success categories such as attack, defence, manager, etc. Watch the season unfold. Includes knock-out cup option.

"Ball by Ball" £5.00

Simulates a test match series or one day international series. Set up your own teams and pool of players (England v Australia provided). Rate each player's capabilities as batsman and bowler on a one to nine scale for qualities such as talent, effort, etc. Pick your teams and play the match. Electronic scoreboard shows progress of a match. Full supporting score card and series averages.

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16K SPECTRUM

"Superdraw" £5.00

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16K ZX81

Here is a selection of titles still available for ZX81. Send sae for illustrated catalogue. These are the ZX81 equivalents of the Spectrum programs described above. Although similar in concept the specifications fall short of the descriptions given for the Spectrum.

"FOOTBALL-LEAGUE"	Forerunner of "Day of the Match"	£4.00
"TEST-MATCH"	Forerunner of "Ball by Ball"	£4.00
"VIDEO-PLAN"	Forerunner of "Superplan"	£7.00
"VIDEO-AD"	Forerunner of "Superview"	£7.00
"VIDEO-SKETCH"	Forerunner of "Superdraw"	£7.00

Many independent computer shops now stock our products but we continue to supply by mail order on an off-the-shelf, immediate delivery basis. Prices include VAT, post and packing in UK. Add a bit for postage if you live in Outer Mongolia. (Note: "Day of the Match" not available until late October 1983.)

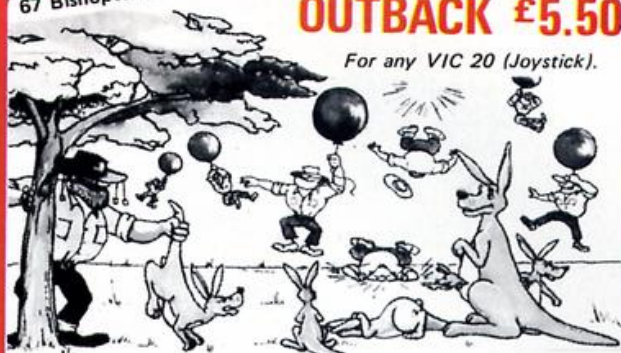
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When questioned about this epidemic, a representative of DIGITAL FANTASIA, a company who are actively involved in research and development work on Mysterious Adventures said, "There is probably no cure for TIS other than main failure, faulty RAM chips etc. which can be at best only a Temporary solution". "In the absence of a more permanent cure, I would advise TIS sufferers to submit to the Syndrome and obtain Mysterious Adventures from any source available to them". "TIS is highly contagious and in view of the current Worldwide Epidemic, I would say enjoy it while you can, resistance is futile".

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- 7) FEASIBILITY EXPERIMENT

- 8) THE WIZARD AKYRZ
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- 10) TEN LITTLE INDIANS

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D.F. MENTAL HEALTH WARNINGS. MYSTERIOUS ADVENTURES CAN SERIOUSLY DAMAGE YOUR SENSE OF REALITY.

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Dragon 32 order from:-



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51 FISHERGATE, PRESTON
LANCASHIRE, ENGLAND. TEL. (0772) 53051

Mysterious Adventures

WHAT ARE MYSTERIOUS ADVENTURES?

MYSTERIOUS: (Adjective):- "Baffling, full of mystery, strange or unaccountable".

ADVENTURE: (Noun):- "An enterprise full of risk or danger, an experience of unforeseen events endangering the participants life, a gamble on failure or success".

To start play on a MYSTERIOUS ADVENTURE is to take a step out of the world of reality and into the world of dreams. Your computer is your guide on these fantastic journeys in time and space where danger is ever present and solutions to problems seldom come easy.

By typing in simple commands in plain English you can "talk" to your computerised guide and tell it what your next actions are to be.

MYSTERIOUS ADVENTURES bring a frightening reality to the surreal situations in which you will find yourself. You will become involved in these strange worlds of the imagination, you will feel anger when things seem to be moving against you, you will feel elated when you overcome obstacles that are set in your way. Eventually you will feel overjoyed as you reach the climax of your mission and success is yours.

Any MYSTERIOUS ADVENTURE is not a mission to be taken lightly, success will never be instant - just as Rome was not built in a day, so each Adventure can rarely be completed in one session. To this end a "SAVE GAME" feature has been incorporated in each of the Adventures. This means that at any given time during play of an Adventure, you can store on tape your precise whereabouts, your equipment carried, and any other pertinent details about your present status.

NEW DEVELOPMENTS ON MYSTERIOUS ADVENTURES

Over the past few years, Adventure programs on Computers have almost always been presented in the classic "Text only" mode. For most Adventure players this has indeed been the way they prefer to play Adventures. The mental imagery generated by such an approach is limited only by the player's own imagination. One of the main reasons for the "Text only" approach has been the lack of hardware capabilities with regard to Graphics resolution - Pictorial Adventures could at best be only very limited in scope.

This situation is changing now however, and Brian Howarth, author of the MYSTERIOUS ADVENTURES series, has spent many hours incorporating Graphics into the Adventures. By working in close conjunction with Jon Blacow, a professional Artist, Brian has produced a series of extremely vivid and imaginative Adventures. Each MYSTERIOUS ADVENTURE now features, in addition to the Text description, pictorial "views" of your current location and surroundings. As you enter each new location, a high resolution, colour picture is rapidly drawn. The effect of this is to bring much more reality to the Scenario, you can actually see the situation you are faced with and act accordingly. It must be stressed that each picture has been designed so that it will enhance, rather than conflict with your mental imagery. At the single stroke of a key, you can erase the picture and carry on with your Adventure in text only if this is your preference. We are confident that no other Adventure programs can boast such breathtaking realism and imagination combined with the flexibility and ease of play that have made MYSTERIOUS ADVENTURES such a phenomenal worldwide success.

In addition, the Adventures now features full sentence decoding as standard. These mean that you are no longer restricted to inputting single or two-word commands. You can now type in whole sentences in more or less plain English. Your computer will quickly analyse the sentence and perform a whole string of your commands. Just another feature designed to maximise your enjoyment of these world beating games!



The "New style" MYSTERIOUS ADVENTURES are currently available for the 48K SPECTRUM, COMMODORE 64. More releases are planned this year which will include DRAGON 32, ORIC-1, APPLE II & IIfx, ATARI, LYNX, MATTEL AQUARIUS, IBM PC etc. Please write or phone for availability.

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All programs are sold subject to the condition that they may not, by way of trade or otherwise, be lent, hired out, resold or otherwise circulated without the written permission of Richard Shepherd.

BUYERS' GUIDE

Dragon 64

£225

64K RAM (up to 64K useable) 16K ROM

Dragon's new model offers three modes of operation: an emulation of the Dragon 32, Extended BASIC with 48K of useable RAM or as what the company calls a "soft machine." In this mode the BASIC is switched out for machine code programs or to add languages like Pascal. An RS-232 interface is standard and the OS/9 multi-user operating system can be added. A small amount of disc-based software, including business applications, is available at present.

Dragon Data, Kenfig Industrial Estate, Port Talbot, West Glamorgan SA13 2PE
(0656) 744700



Commodore 64

£229

64K RAM (40K useable) 20K ROM

Keyboard: typewriter quality, 67 keys, space bar, dedicated cursor controls, four user definable function keys although full use of them can only be had through an expansion program.

Screen: 40 columns by 25 rows, 16 colours, all characters user definable, lower case, inverted output, two character sets. There are four different text modes but the format is the same for all, the only difference is in the handling of the colour. There are two graphics modes giving 320 by 200 and 160 by 200 resolutions in 16 colours. The difference is to do with the colour: one mode uses the attribute system, similar to the Spectrum, the other uses a palette system where each dot is its own individual colour, similar to the BBC or Dragon computers. Unfortunately the BASIC does not support the graphics so you must write your own routines or buy a BASIC extension. Modes may also be mixed. Eight sprites are available and although the BASIC does not support these directly instructions are given in the manual on how to achieve them.

Sound: three channel music and noise channel music synthesizer. Full envelope control and waveform selection. BASIC does not support sound directly although, like the sprites, instruction is given in the manual on how to use sound.

Languages: Commodore BASIC supplied. Simons BASIC, Forth, Pilot, LOGO, Pascal available from Commodore along with BASIC compiler. **Processor:** 6510 (6502 compatible with memory banking), Z80 available as option. **Operating System:** Commodore Kernal. **I/O:** IEEE 488 serial BUS, RS232, user port, cartridge port, two Atari-type joystick ports, four analogue to digital converters for paddles or proportional joysticks. **Number sold in UK:** 150,000. **Speed:** medium.

Add-ons: all of the VIC-20 add-ons produced by Commodore will fit. Others are exclusive to the 64 that involves the cartridge port, like the Z80 second processor with CP/M. There is also a speech synthesizer using the music synthesizer and several other options, including 32 Megabyte hard discs and daisy-wheel printers. Many add-ons available from independents.

Software: there is now quite a lot of software around, both for games and other applications. With business software and the vast amount of decent peripherals, the Commodore 64 is one of the few computers which can be seriously considered as an effective business micro as well as for use at home.

Opinion: an excellent computer and the available commercial software makes good use of its features. The big disadvantage is that the BASIC is simple, making it hard to write your own programs using the sophisticated features. Simon's BASIC, on cartridge, goes some way towards curing this. On the other hand, it is easy to use and memory space is not used to provide fashionable features at the expense of the functions you really need. It is almost totally compatible with the PET series of computers and the massive base of software that provides. Commodore's own cassette recorder must be brought at extra cost. Although interfaces to domestic recorders do exist, it is wise to go for Commodore's reliable recorder.

Commodore Business Machines, 675 Ajax Avenue, Slough, Berks SL1 4BG
Slough (75) 74111



Tandy Colour

£239.95

16K RAM 8K ROM

Keyboard: calculator type, 53 keys, space bar, no dedicated cursor control keys or user definable function keys.

Screen: 32 columns by 16 rows in two colours for text and eight colours for block graphics. No user definable graphics. Hi-res graphics are only available with Extended BASIC at extra cost.

Sound: one channel covering eight octaves. For full control over sound Extended BASIC is needed.

Languages: Microsoft BASIC built in but Extended Microsoft Colour BASIC is available and this is really needed to make the full use of the machines capabilities OS/09 is available for use with discs giving access to many other languages in the same way as CP/M but in a smaller way. **Operating system:** Microsoft's own, but compatible with Dragon 32. OS/09 available for discs. **Processor:** 6809E. **I/O:** Centronics printer port, two joystick ports, cartridge slot. **Number sold in UK:** Tandy refused to comment on number sold. **Speed:** medium.

Add-ons: from Tandy there are printers, plotters, an RS232 cartridge, disc drives and joysticks. This machine is not well supported by independents due to the arrival of the Dragon. **Software:** a range from Tandy stores, plus independents who also write for the Dragon.

Opinion: this machine, when expanded, is virtually the same as the Dragon except Extended BASIC is included in the Dragon. The Dragon keyboard is a real one, the Dragon has twice the memory capacity and, most surprisingly, it is a lot cheaper. So if you are considering buying the Colour Computer then consider the Dragon instead. Otherwise my opinion is the same as for the Dragon as the machines are so similar.

Tandy, Tameway Tower, Bridge Street, Walsall WS1 1LA
Walsall (0922) 648181

BUYERS' GUIDE

Memotech MTX512 £315

64K RAM (62K useable) 24K ROM

Identical to the MTX500 (£275), but with more RAM.
Memotech, Station Lane, Witney, Oxon OX8 6BX
(0993) 2977

Nascom 2 £327.75

2K RAM (800 bytes useable) 12K ROM

Keyboard: 57 keys, typewriter style.
Screen: monochrome, 48 columns by 16 rows, block graphics.
Sound: none.
Languages: Microsoft BASIC. Operating system: custom.
Processor: Z80A. **I/O:** RS-232 and eight-way input-output.
Number sold in UK: not known.
Add-ons: 64K and 256K RAM boards, I/O which also adds clock and extra RS-232 interface, floppy disc control board, video controller to add hi-res and colour, 5 1/4 in single and twin disc drives. Plus Lucas approved products from independents.
Software: Lucas says a lot is available.
Opinion: This computer is for the serious hobbyist. It comes as a keyboard and board. You have to either case it yourself — the Lucas case costs £100 — or get a dealer to do it for you. You would also have to add memory; you cannot do much with 800 bytes. Computer was first made in 1979 and taken over by Lucas about two years ago. The Nascom 2 can also be bought as a kit for £258.75. The Nascom 3, ready-built with 48K of RAM, costs £631.35.
Lucas Microcomputers, Welton Road, Wedgenock Industrial Estate, Warwick CV34 5PZ
(0926) 487733

Genie I 16K £330.05

16K RAM (15K useable) 13.5K ROM

Keyboard: typewriter style, 54 keys, dedicated cursor control keys, no user definable function keys, space bar.
Screen: 32 or 64 columns by 16 lines, no colour, no hi-res, no user definable characters. Inverse available, lower case, pixel graphics gives 148 by 48. Optional hi-res board gives 384 by 192.
Sound: one channel through internal speaker.
Languages: Microsoft BASIC, Pascal, Fortran, Cobol, Forth, APL, and PL1 are available from Lowe. **Processor:** Z80.
Operating System: custom included but various available including CP/M and LDOS for disc drives. Compatible with the TRS-80 model II. **I/O:** two cassette ports, otherwise none included but expansion box has printer interface. **Number sold in UK:** a reasonable amount, but to this must be added the vast number of TRS-80s that have been sold as the Genie is virtually identical in operation. **Speed:** slow to medium.
Add-ons: not many due to the decline of this type of computer and the rise of the colour hi-res machine.
Software: Large selection, mainly from Tandy.
Opinion: this type of machine was very popular in its day and as such has a larger user base, and this gives it a wide range of software. With the appropriate adaptor Tandy peripherals will work. A large sturdy machine that includes its own tape deck and is also reasonable for small business use.
Lowe Computers, Chesterfield Road, Matlock, Derbyshire DE4 5LE
Matlock (0629) 4057/4995

Genie II 48K £341.55

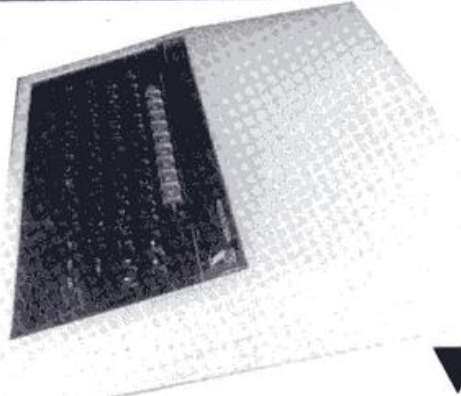
48K RAM (47K useable) 16K ROM

Except for increase in memory, identical to 16K Genie II.
Lowe Computers, Chesterfield Road, Matlock, Derbyshire DE4 5LE
Matlock (0629) 4057/4995

Genie I 48K £365.70

48K RAM (47K useable) 16K ROM

Identical to 16K Genie I except for the price and memory and the ability to run certain operating systems that will not fit on the 16K version.
Lowe Computers, Chesterfield Road, Matlock, Derbyshire DE4 5LE
Matlock (0629) 4057/4995



BBC model B £399

32K RAM (28K to 9K useable depending on graphics mode used) 32K ROM

Keyboard: typewriter style, 73 keys, 10 user definable function keys, dedicated cursor control keys, space bar.
Screen: very complex. The simplest mode is Teletext compatible and gives eight colours, flashing characters, double height, and block graphics. Text is 40 columns by 25 lines. There are seven other modes of screen operation ranging from 640 by 256 hi-res in two colours with 80 by 32 text to 160 by 256 hi-res in eight colours with 20 by 32 text with eight flashing colours. All 256 characters are user definable in all but the Teletext mode.
Sound: three channel music with a noise channel through internal speaker. Full envelope control is available from BASIC.
Languages: BBC BASIC is included — a very comprehensive implementation. An assembler is also built in for machine code access. Forth, Lisp and BCPL are also available. **Processor:** 6502 A. **Operating system:** BBC. **I/O:** RS432 and Centronics printer ports. Four analogue to digital converters for joysticks etc. Eight bit programmable user port. The Tube allows connection of second processors and so on to the 1 MHz bus. Disc interface, Econet networking, speech synthesizer can be added. **Number sold in UK:** 150,000. **Speed:** fast.
Add-ons: a great deal available from independents. However, Acorn has been slow to provide support and at present only disc drives, Econet and speech synthesizer are available. But Acorn are promising other things.
Software: a very large well written range available, including a lot from Acornsoft, the maker's software arm. Many educational programs of varying quality.
Opinion: the BBC is an excellent machine if you ignore the high price. Support from independent suppliers is superb, but Acorn has been slow on the hardware side. The keyboard is very good and there is a useful set of function keys. The screen uses split cursor screen editing which is the next best thing to full screen editing but not quite as easy to use. The BASIC is excellent and makes good use of all the hardware features. This computer is used by about 75 per cent of all secondary schools. So it is good for education as well as games. It also makes a good business computer, particularly with networking available for the future. A good all rounder.
Acorn Computers, 4 Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN
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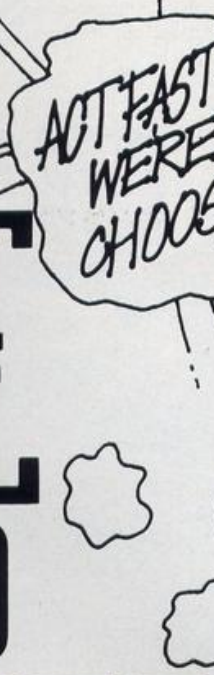
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Space hawks fly across the screen and lay eggs which hatch upon landing and try to devour you. The birds then pass on and snatch up a human and attempt to fly off with them.

All you have is a laser base with which to shoot them down but beware, they need two shots to kill them, although the human is freed after the first. If you miss then all you see of the poor being is his skull fall from the sky (yuk).

That, in brief, is the plot and it sounds more exciting than the

game proved to be.

The problems I found were that more than half the bullets went straight through the birds without leaving a mark.

After losing all four of your lives, you have to use the same keys to enter your name in the high score table, which makes it a very fiddly business to say the least.

The table itself was only displayed for a fraction of a second and nothing I could do would keep it on the screen long enough to read.

Although the graphics were adequate, I wasn't much inclined to play this game again. **N.B.**

instructions	45%
playability	50%
graphics	60%
value for money	50%



Firehawks 32K BBC £6.95

Postern, PO Box 2, Andoversford, Cheltenham, Glos GL54 5SW

Firehawks is yet another space-invaders type game, and a rather inferior one too.

The firehawks descend upon you in ever-increasing force until they finally break through your plasma screen, whereupon you must blast them with your laser guns. Sounds familiar?

If a firehawk should land, then it mutates into a phoenix and rises from the ashes of your planet — an impressive piece of graphics on the first two or three occasions.

The instructions in the program are brief — quite rightly, because there is very little to do.

You can of course choose the pace of the game and the faster speeds are certainly quite frantic. I found the laser controls rather imprecise even at the easiest level though. A league table of scores is maintained too.

Loading was faultless, and indeed the program had no apparent bugs. The graphics were quite reasonable.

Perhaps if this program has been released a year ago it might have been worth considering, but today there is so much software available in a similar vein, much of it far superior, that I cannot honestly recommend this one. **J.P.**

instructions	70%
playability	50%
graphics	80%
value for money	50%



Zarquon TI-99/4A £6

From Stainless Software, 10 Alstone Road, Stockport, Cheshire

The terse but informative documentation for this complex and rather challenging game remarks that all the console memory is required — hardly surprising when one line alone consists of 107 REMs.

All the ingredients for an absorbing game are here — perhaps too many for comfort. Use of either the keyboard or a joystick for control is given, and the graphics are colourful.

The aim is to protect three 'humanoids' from a fate worse than death, occasioned by contact with an alien ship's mutative secret weapon, and the dice seem

loaded heavily against your success.

You begin with an armada of three ships, and you can lose them by colliding with something, being shot by an alien, allowing an alien ship to get through to clobber a humanoid, allowing your engine to overheat, and being got at by a 'killer mine'.

There are also 'invisible craft' whose presence is announced, naturally enough, by a sound described as 'Boing, boing'. **P.R.**

instructions	80%
playability	85%
graphics	80%
value for money	65%



Look out — there's an alien about

Those aliens are up to their old tricks in this selection of games. Before you get your laser gun out, though, read our reviewer's ratings

Defend the Cities II TI-99/4A plus MiniMemory £14

Intersoft, from Stainless Software, 10 Alstone Road, Stockport

This fairly addictive game involves the defence by you of the "five most important cities on the planet Earth" against up to four bombs dropped by an unsporting enemy alien. The cities in question are New York, Lubbock, Chicago, Washington and Los Angeles.

There are four levels of play, relating to speed of descent, although you can select from

The controls of your defending ship, operated from the keyboard, only become active after the last bomb is released, so at higher skill levels there can be quite a sense of urgency about the game.

You can fire in only one direction but your ship can rotate through 360 degrees in 45 degree steps and can move in the direction it fires.

This control can lead to some quite effective displays as you swoop down on an alien or a bomb, gun blazing. **P.B.**

instructions	95%
playability	100%
graphics	95%
value for money	50%



Defend the Cities TI-99/4A (Extended BASIC) £14

Intersoft, from Stainless Software, 10 Alstone Road, Stockport

This is the Extended BASIC version of the MiniMemory Defend The Cities II, and is different in several respects.

You have the option of using either the keyboard or joysticks, there are no skill levels but still four levels of difficulty.

Although you can fire the length of the screen, as in DTC II, the beam is only visible for part of the way. After three or so continuous salvos you are momentarily informed "lazer

overheated" but not to worry, your "lazer" starts working again almost immediately.

You can still fly about the screen, although of course the controls are not as responsive, and there is a different trick which can at times make a bomb 'miss' the city — very devious.

If you crash your ship into either a bomb or an alien, or a bomb hits the city, the game ends and the current highest score is displayed. Remember that because this module is not battery-backed the highest score is not retained. **P.B.**

instructions	95%
playability	80%
graphics	95%
value for money	40%



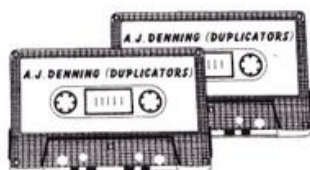
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Do not let anyone tell you that it is impossible to
"WIN ON THE POOLS" — since I perfected my
method, I HAVE WON REGULARLY for over
TWENTY-FIVE YEARS — proof that it is no
'flash-in-the-pan'.

I have CHALLENGED THE WORLD with my
record of wins and with all the evidence that I
possess — NO ONE has ever been able to accept the
Challenge — I KNOW NO ONE EVER WILL.

MY SECRET IS NOW PLACED ONTO
COMPUTER CASSETTE FOR YOU.

THE METHOD IS THE GREATEST TREBLE
CHANCE WINNER IN THE HISTORY OF
FOOTBALL POOLS — IT WILL LAST
FOREVER — BOTH FOR ENGLISH AND
AUSTRALIAN FOOTBALL POOLS, WITH
EQUAL SUCCESS.

I now intend to give a limited number of people the
opportunity of making use of my method — perfected
over 25 years and proving itself on EVERY ONE
OF THOSE TWENTY-FIVE YEARS.

You have noted details of my personal
achievements so far, as given to you above.

A GRAND TOTAL OF 8,201, yes 8,201 POOLS
DIVIDENDS, including 765 FIRST DIVIDENDS.

My Pools Winnings Dividend slips now number so
many, that they fill a very large suitcase and will
stand as my evidence of all claims in ANY COURT
OF LAW IN THE WHOLE WORLD.

Taking just the past 25 years into consideration, I
have won ON AVERAGE over 328, (THREE
HUNDRED AND TWENTY-EIGHT) Pools
Dividends EVERY YEAR — or — AN AVERAGE
of over SIX DIVIDENDS EVERY WEEK for
TWENTY-FIVE YEARS.

You have my absolute Guarantee of the complete
authenticity of every claim, cheque, document, letter,
etc, contained herein.

I do have losing weeks, but ON AVERAGE my
winnings show over SIX DIVIDENDS EVERY
WEEK for the past 25 years.

I know that you are now utterly flabbergasted, it
always happens to everyone with whom I come into
contact. Please just sit back and imagine for a
moment my FIRST DIVIDEND wins alone — they
now number 765 (seven hundred and sixty-five) and
will probably be even more by the time this
advertisement appears in print.

I AM NUMBER ONE IN THE WORLD AND
NO ONE DISPUTES IT.

For as long as I continue to enter the Football Pools
my wins will continue. I have already said, they
apply, with equal success to both English and
Australian Football Seasons.

I intend to release a STRICTLY LIMITED
NUMBER of copies of my cassette — DO NOT
DELAY AND FIND YOU ARE TOO LATE, in
which case I would have to refund your money.

I am so confident of YOUR success that if do not
win at least THREE FIRST TREBLE CHANCE
DIVIDENDS in the first 20 weeks of entering, I will
completely cancel the balance of the purchase price
and you do not have to pay me another penny, at any
time, no matter how vast your winnings.

I only wish that space would allow me to give you
photographs of my winnings slips, cancelled cheques,
etc, but it is of course impossible — they now
number 8,201 dividends. I have however given JUST
A FEW EXTRACTS from ORIGINAL LETTERS
I hold from my small Clientele.

I am the Inventor and Sole Proprietor of my method,
Registered as EUREKA — ('I have found it'). I am
known as The Professor in Pools Circles — I am of
the Highest Rank in Forecasting — this is beyond
dispute. I am marketing a limited number of
Computer Cassettes, under my Registered Company
— FOOTBALL ENTERPRISES.

My initial charge for a copy was £75, but for this
SPECIAL REDUCED PRICE OFFER I will send
you a copy, for £20, (twenty pounds) ONLY,
plus your Promise to pay me the balance of £55
— ONLY IF YOU WIN AT LEAST THREE
FIRST TREBLE CHANCE DIVIDENDS IN
YOUR FIRST 20 WEEKS OF ENTERING —
otherwise you owe me NOTHING FURTHER.

This is surely proof absolute of my supreme and
utter confidence in my own abilities and in the
capabilities of my discovery. I could easily CHARGE
£2,000 per cassette on the evidence I possess, but
that would not be fair to everyone, which is what I
want to do.

My method is WORLD COPYWRIGHT, any
infringement and immediate proceedings will be
taken, without prior warning. It is truly ingenious
and has stood the test of time.

My cassette is simplicity itself to operate and you'll
be given FULL DETAILS for weekly calculating.
Your entry need not involve you in any large weekly
stakes, you can enter for as little as 25p, if you wish.

I charge NO COMMISSION on any of your wins —
no matter how BIG they may be.

I realised a long time ago, that it was no good sitting
down and dreaming about winning the pools, so I
burnt the candle at both ends, working late into the
night, occasionally RIGHT THROUGH THE
NIGHT, I KNEW there was a way, eventually it all
paid off and has been doing so ever since.

I am unable to vary my offer to anyone, so please do
not request it, as I shall very easily dispose of the
cassettes I have prepared and am making available.

IMMEDIATELY I perfected my method I
commenced winning right away, (first with just a
little £163, the first week I used it), I HAVE
NEVER LOOKED BACK SINCE, amongst all
those dividends was one for over EIGHT
THOUSAND POUNDS for just one eighth of a
penny stake.

I will release a copy on cassette, to you, on receipt of
the completed order form and your Signature
thereon, confirming you will treat it in the
STRICTEST CONFIDENCE between us and retain it
for your OWN USE ONLY.

PLEASE NOTE:

If you happen to be the proud owner of a Computer,
other than a Sinclair Spectrum, you can still
purchase a copy of my method, for the same
price and program it YOURSELF on to YOUR
OWN COMPUTER — or even if you do NOT
have a COMPUTER.

Don't take my word for it, read what people write about me and my method:—

I won on Zettors last weekend. It was not a big sum, but all the same it was a very nice
surprise for me. J.C., Lancs.

I appreciate the straightforward method you adopt, which is such a contrast to the
rubbish of misrepresentation which is so common in the Betting World, by unscrupulous
and self-opinionated charlatans. C.H., Devon

Winnings cheque received today, sincere thanks. D.N., Devon

I congratulate you on your achievement. R.R., Wales

I should like to thank you for a most exciting season and look forward to hearing from
you again. J.C., Hants.

I would like to acknowledge cheque and say how much I appreciate your integrity.
J.M., Scotland

Many thanks for your system, it is all you say and more. J.C., Lancs.

Your wonderful system won me £3,527. I intend to visit London soon and will be able to
come and see you personally. (Overseas Client). P.M., Kampala.

Many thanks for trying so hard to please us all, your brother should be thanked also.
One of our daughters, WHOSE HUSBAND YOU HELPED ENORMOUSLY,
has just phoned, the four of them have just spent a lovely holiday in Spain.
K.R., Isle of Man.

I sent in my FIRST entry last week and won 2nd and 3rd dividends, as you will see
from the enclosed certificate. One more and I would have collected over £400 for FIRST
dividend. Once I've won a fair amount I shall be staking from winnings and at 2p per
line, A FIRST DIVIDEND last week at this would have been over £3,000.
C.A., Yorks.

I am very interested indeed and enclose £20 herewith. I agree to pay you the
balance of £55 ONLY if I win at least THREE FIRST TREBLE CHANCE
DIVIDENDS in my first 20 weeks of entering — otherwise I owe you NOTHING
FURTHER at any time — no matter how much money I win. My Signature below
is my Undertaking to retain complete and absolute confidence about the method.

Name.....

Address.....

.....

.....

Signature HCW34

The Managing Director,
Football Enterprises,
'Anvon',
9 New Road,
Haverfordwest, Pems.

Please tick if cassette is for:
Sinclair ZX81 (16K) ☐
Sinclair Spectrum (48K) ☐
Any other Computer ☐
No Computer at all ☐

**MXcopy
BBC £4.95**

Logic Systems, 129 High Street,
Cherry Hinton, Cambridge

This utility program is a multi-mode screen dump for the Epson range of matrix printers, the MX80 type 3, FX80 and RX80.

The program has two modes for dumps — for screen modes 0,1 and 2 a black and white fast dump, while screen mode 3 allows a grey shading slow colour dump.

The graphics program has to have a few extra lines added. These instructions load and run the cassette every time you wish to dump a screen and here is a failing — the program has to be loaded every time!

That's a slow job with cassette. However, at least Logic

Systems recorded the program on both sides of the tape so there is no delay in rewinding.

The instructions supplied are on the cassette insert and are good, but you will need very keen eyesight to read the small printing! The parameters that control the dumps are well explained, and give the user room for experimentation.

For the disc user it would have been nice to see instructions on how to transfer the program. This would speed up dumps and save the frustration of the slow loading of the cassette.

But it's a good value, adaptable and useful utility to have around.

J.H.

instructions	80%
ease of use	25%
display	50%
value for money	80%

**The
Generators
32K BBC £6.95**

Quicksilver, 13 Palmerston Road,
Southampton SO1 1LL

This cassette actually contains two programs for the price of one.

The first enables you to define graphics characters using the VDU 23 statement. The instruction leaflet is professional and comprehensive, and the program is easy to use. Once defined, the characters can be saved and merged into your own program.

The second enables you to design teletext screens (mode 7), save them, and merge them into your own program. The instructions are again comprehensive but are included in the program only, though they can be

referenced at any time without losing the current design — a nice touch.

Ten screens can be saved in memory, according to the instructions, but I could not discover how to save more than one.

Additionally, the BREAK key did not function as described and necessitated a complete reload, losing any screen design in progress.

Both programs loaded faultlessly, though the cassette labels had been put on the wrong sides! Incidentally, there is no warning on the printed leaflet that the 1.0 operating system is required.

J.P.

instructions	90%
ease of use	80%
display	80%
value for money	80%

**Games
Designer
Spectrum 48K
£14.95**

Quicksilver, Palmerston Park
House, 13 Palmerston Road,
Southampton SO1 1LL

I wonder how long it will be before someone writes a program to load a program without human intervention?

Until that day, this program loads in every time using old fashioned methods. Then you are presented with a Wonderland, by courtesy of superb programming skills.

There are eight resident games, with four different formats: invaders, asteroids, scramble or berserk, as options, for any, or all of them.

Everything, but everything, is

alterable by you, the now resident programmer. Re-defining all the characters, or sprites, used in any game is easy, as is controlling their movements.

Missile and bomb sounds, ship and alien explosions are all programmable, from frequency to duration.

Attack patterns, movement, numbers, directions, scores etc, etc, are all under your control.

Not only can literally everything in your game be programmed, you can see, or hear, your own creations as they are happening.

When you are satisfied with your creation you can SAVE it on your own tape.

B.B.

instructions	100%
playability	100%
graphics	100%
value for money	100%



Programs of convenience

**Our reviewer panel finds out
whether these programs live
up to their claim to make the
programmer's life easier**

**Dungeon
Creator/
Dungeon
Master
Spectrum 48K
£7.50**

Crystal Computing, 2 Ashton
Way, East Herrington,
Sunderland SR3 3RX

Two programs on one cassette. The Dungeon Creator allows you, within defined limits, to set the scenario for your own Dungeons and Dragons style game.

Up to 255 rooms, or locations, are allowed, and a variety of exits, in any direction, can be defined.

The task is to collect rings, and you can set up to a total of 20 rings in different locations.

Various other things, such as

weapons, potions, armour etc can also be allocated to locations, as can the number and variety of nasties.

Ample opportunity is given to alter things before you commit your creation to tape.

In order to play your game you must first load in the Dungeon Master, and then your SAVED game.

If you wish, you may play the game already on the tape, which I did. I like D & D type games, but this one didn't appeal to me.

The action was slow, and I had to keep pressing "any key to continue", which is not good programming practice

B.B.

instructions	100%
playability	60%
graphics	n/a
value for money	50%

**Zeus
Assembler
48K Spectrum
£12.95**

Sinclair Research, 25 Willis
Road, Cambridge CB1 2AQ

This program (hence this review) is aimed at those who understand the Z80 instruction set and the mechanics of assembly language.

There are two main command modes, assembler and editor, with a screen editor common to both of them. There are seven pseudo ops, or directives, including DEFB,DEFW,DEFM/string, and a very useful DIS-Placement.

Either or both the source file and the object code may be SAVED, but both are eradicated from the assembler on SAVEing.

Apart from a list of reserved

words, labels and comments may be used as you wish, following the rules laid down.

Using the monitor mode, there is an instant decimal/hex/decimal conversion, and a very good MODIFY command, plus others.

There are 10 error report codes which are easy to follow, but the program is keen on the correct use of spaces.

For those who do not know any ROM routines, there are 10 useful routines resident in Zeus which you may call. This does mean, however, that any object code using any of these routines cannot be used as a stand-alone program.

B.B.

instructions	100%
ease of use	85%
display	90%
value for money	90%



Now you can prove you're an ace at cards

Packet Boat

You have to collect a packet of four cards of the same denomination, removing them from the layout until all the pack has been collected.

The cards are dealt three at a time from stock, the top card being available for play.

As the pack becomes exhausted it is re-dealt. If a space becomes available in the layout it can only be filled by a card from the discard pile.

Cards can also be transferred between two columns. One of the tactics of this game is to try to make a space as quickly as possible, then wait until the top card of the discards matches a card in the layout. Place this card in the space and take the matching card from the column to the new position.

Two or more cards can be moved by placing the cursor on the lowest card in a column and pressing the trigger.

The pack will continue to be re-dealt even if you can't make any more progress in a game. If you are stuck in this situation use the option or start buttons to begin a new game.

Type in the program after the initialisation listing. It can also be typed in directly after last week's game or SAVED after adding later.

How it works

80-96 turns the pack over for re-dealing. It is placed near the beginning for faster turnover.
1700-1770 links program to joystick routine and controls cursor movement

2000-2060 sets up game and deals cards to layout and again saves this information in array D

2100-2300 deals with card movement, checks for set of four cards

2350-2560 checks for valid moves, transfers one or more cards in layout

2600-2693 deals cards to discard pile, moves cards from discard pile to layout. A check is made here to see if the pack needs re-dealing

2700-2810 replaces cards in original position if you have made a mistake or changed your mind. Also updates the display of the three face up cards

You can play these two patience games even if you missed last week's magazine – we're re-printing the initialisation listing. Our series, written for the Atari 400 and 800 by Les Howarth, continues next week

Variables

DONE is used in most games to check for game completed. All variables beginning with T are for counting

D1,D2 are used to remember particular cards

UP 3 is only used in this game and refers to the three cards face up

SET checks how many cards are being moved together

Special Instructions

2000 use inverse letters for the title

2630 uses cursor control arrows within the print statement, D means down arrow, L means left arrow – typed as follows: "SPACE DL SPACE D L SPACE D L SPACE D L SPACE" The arrows are printed by pressing ESC/CTRL and arrow

2795 The print statement is "CTRL/Q DL Vertical line DL Vertical line DL Vertical line DL CTRL/Z"

8109 Alter the variable GM to Read GM (greater than) N2

Block Eleven

The idea of this easy-to-play game is to collect all the cards into one pile by removing from the layout any two cards which add up to 11.

Picture cards can only be taken when Jack, Queen and King are all present at the same time. Spaces in the layout are filled from the pack by simply placing the cursor in a space and pressing the joystick trigger.

You will often come to a position where you cannot make any move . . . This can happen anytime even when the cards are first dealt. The only way out is to use option or start for a new game. Success depends on your observation and ability to count 11.

How it works

3000-3040 sets up game, similar to previous games

3050-3090 joystick and cursor movement

3100-3148 deal with picking up cards and checking for valid moves

3150-3310 picture cards are checked

3500 draws card taken from layout to new position

3520-3540 replace cards which have been wrongly taken

3600-3630 move cards to discard pile with a bit of music to accompany them. Also checks for game completed

3640-3670 deals new cards to layout.

Special instructions

3000 use inverse letters for title

3620 PRINT statement contains a tab character before the words YOU WIN – to print this, press ESC then TAB

8109 alter the variable GM to read GM (greater than) N3

The initialisation listing – type this in first

```
10 REM Patience by R.L.Howarth, NOV 82
20 DIM A$(512),B$(36),B1$(40):GRAPHICS 0
25 B$(1)="4":B$(36)="4":B$(2)=B$(1,3)
30 B$(34,36)="000":B1$(1)="0":B1$(40)
35 B1$(2)=B1$(36):POKE 559,62
40 I=PEEK(106)-16
45 POKE 54279,I:POKE 53256,I:POKE 53277,
3:UTAB=PEEK(134)+PEEK(135)*256:ATAB=PEEK
(140)+PEEK(141)*256
50 OFFS=I*256+1024-ATAB:HI=INT(OFFS/256)
:LO=OFFS-HI*256:POKE UTAB+2,LO:POKE UTAB
+3,HI
70 GOSUB 8000:GOSUB 8200:HI=85:GOTO 8100
80 U=HI:FOR T2=28 TO 49 STEP 13:FOR H=N3
TO N1 STEP -N1:SU=PT2+H:U=U+HI:NEXT
H:NEXT T2
90 U=29:H=53:FOR T2=N1 TO 24:IF S(T2)=N0
THEN H=H-N1:GOTO 95
93 PU=SU(T2):U=U+HI
95 NEXT T2:IF H<53 THEN FOR I=H TO N52:P
(I)=N0:NEXT I
96 RETURN
200 ? NUF:"***":SU$:RETURN
300 SUIT=N1:C=PT:POSITION N13,19:IF T1
(N1 THEN ? "":GOTO 320
310 ? T1:IF T1<N10 THEN ? " "
```

```
320 GOSUB 500:POSITION 6,18:GOSUB 200:RE
TURN
400 FOR T=N1 TO N52:PT=T:NEXT T:FOR I=
N1 TO N52:R=INT(N52/RND(N0))+N1:A=PT(I):P
(I)=P(R):P(R)=A:NEXT I:RETURN
500 SUIT=N1
505 IF C=N13 THEN C=C-N13:SUIT=SUIT+N1:G
OTO 505
510 NUF=STR$(C):IF C=N1 THEN NUF="A "
520 IF C=N10 THEN NUF="J ":IF C=N11 THEN
NUF="Q ":IF C=N12 THEN NUF="K "
525 IF C=N10 THEN NUF(N2,N2)=" "
530 SUF="♦":IF SUIT=N1 THEN SUF="♠":IF S
UIT=N2 THEN SUF="♥":IF SUIT=N3 THEN SUF=
"♣"
540 RETURN
700 ST=STICK(0):IF STR$(N0)=N0 THEN POP
:ON GM GOTO 810,2100,3100,4100,5100,610
0
701 IF PEEK(53279)=N6 THEN POP:GOTO 810
0
702 IF PEEK(53279)=N3 THEN POP:GOTO 812
0
703 IF ST=15 THEN 700
705 H=N0:U=N0:H=H+STAN7-(ST=H1)+ST=H
6)-(ST=N10)+(ST=N5)-(ST=9):Y1=Y:2=2+H*2
0:POKE 77,N0
710 IF GM=N2 THEN 714
712 IF (ST=N14 OR ST=N6 OR ST=N10) AND Y
=170 THEN Y=N130:GOTO 720
714 IF (ST=N14 OR ST=N10 OR ST=N6) AND Y
=N34 THEN Y=Y-GU:IF GM=N3 AND Y=N130 THE
N Y=114
716 IF (ST=N13 OR ST=9 OR ST=N5) THEN Y=
Y+GU:IF Y=N130 AND GM=N4 THEN Y=170:ABY
1,Y1+40=B1$:GOTO 722
720 ABY1,Y1+36=B1$
722 IF GM=N3 OR GM=N4 THEN RETURN
723 IF Z>176 THEN Z=176
```


ATARI PROGRAMS

```

724 IF Z=N56 THEN Z=N56
726 IF Y<N34 THEN Y=N34
728 IF Y=N130 AND G=N1 THEN Z=96
730 IF G=N2 THEN RETURN
734 IF Y=162 AND G=N3 THEN Y=162
740 A=Y,Y+35=B:Poke 53248,Z:RETURN
1000 SOUND N0,255,N10,8:FOR I=N1 TO N52:
NEXT I:SOUND N0,N0,N0,N0:RETURN
1100 FOR I=N1 TO N2:SOUND N0,200,I*(PICK+
N1),N10,N4:SOUND N1,200,I*(PICK+N2),N10,N
4
1110 FOR H=N1 TO 8:NEXT H:NEXT I:SOUND N
0,N0,N0,N0:SOUND N1,N0,N0,N0:RETURN
1200 U=PEEK(709):FOR I=N0 TO N3:FOR H=N3
TO N10 STEP 0.5:ON G1 GOTO 1210,1212,12
14,1216,1218,1220
1210 SOUND I,240/(I+G1),N12,N12-H:NEXT H
:NEXT I:GOTO 1240
1212 SOUND I,240/(I+G1),N12,N12-H:NEXT H
:NEXT I:GOTO 1240
1214 SOUND I,N4*(I+G1),N2,N12-H:NEXT H:
NEXT I:GOTO 1240
1216 SOUND I,120*(I+G1),N10,N12-H:NEXT H
:NEXT I:GOTO 1240
1218 SOUND I,120/(I+G1),N12,N12-H:NEXT H
:NEXT I:GOTO 1240
1220 SOUND I,220/(I+G1),N10,N12-H:NEXT H
:NEXT I:GOTO 1240
1240 FOR I=N0 TO N3:Poke 709,16-I*I:FOR
H=N1 TO N10:SOUND I,(N10+I*G1),N12,N10-
H*(G1+N6):FOR A=N1 TO N3:NEXT A
1250 NEXT H:NEXT I:Poke 709,U:FOR I=N0 T
O N3:SOUND I,N0,N0,N0:NEXT I
1300 SOUND N0,N10,N0,N4:FOR H=N1 TO N5:N
EXT H:SOUND N0,N0,N0,N0:RETURN
9000 N1=1:N0=N1-N1:N2=N1+N1:N3=N2+N1:N4=
N3+N1:N5=N4+N1:N6=N5+N1:N7=N6+N1:N10=N5+
N2:N11=N10+N1:N12=N10+N2
8005 N13=N12+N1:N14=N12+N2:N17=N12+N5:N2
2=N17+N5:N23=N22+N1:N34=N17+N2:N52=52:N5
6=56:N130=130
8010 PS=N0:DIM P(N52),SUS(N1),NUS(N2),D(
N7,N6),CARD(40),BLANK(40),FD(40),S(25
):OPEN #N1,N4,N0,"K":PICK=N1
8020 CARD$=" "
8030 FD$=" "
8040 RETURN
9050 A$K1="":A$K512="":A$K2="":A$K6:GOSU
B 740:RETURN
9060 FOR I=N0 TO N7:FOR ROH=N0 TO N6:D(
I,ROH)=N0:NEXT ROH:NEXT I:RETURN
9100 GRAPHICS N1:Poke 711,12:Poke 559,62
:Poke 752,N1:Poke 710,116:Poke 712,116:P
OKE 53248,N0
9101 ? #N6:" "
9102 Poke 764,255:G1=N0: ? #N6:" SELEC
T GAME"
9103 ? #N6: ? #N6:" r HOLE IN ONE"? #N6
" - PACKET BOAT"? #N6: ? #N6: ? #N6: ? #N6:
" REVERSE PUZZLE"
9104 ? #N6:" MONTE CARLO"? #N6: ? #N6: ? #N6:
" SOLITAIRE"? #N6
9105 ? #N6:" during play press option
to restart game"? #N6:" star
t to return to menu"
9109 GET #N1,G1=L:G1+256:G1=G1-48:IF G1<
N1 OR G1>N6 THEN 8109
9110 Poke 704,N0:GOSUB 1100:POSITION N2,
N0: ? #N6:"selected game":CHR$(L):GOSUB
9000:GRAPHICS N0:Poke 752,N1
9120 ? "":GOSUB 400:Poke 559,62:Poke 75
2,N1:ON G1 GOTO 600,2000,3000,4000,5000,
6000
9200 GRAPHICS N0:Poke 82,N0:DL=PEEK(560)
+256:PEEK(561)+N4:Poke 752,N1:Poke 710,3
4:Poke 709,9:Poke 712,N0
9210 Poke 708,200:FOR I=N2 TO N11:Poke D
L,I,N5:NEXT I:FOR I=N12 TO 17:Poke DL+I,
N6:NEXT I
9226 POSITION N0,N10: ? "XXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX":POSITION N3,N
12: ? "BY r,l,howarth"
9230 FOR I=N0 TO 35 STEP N5:POSITION I,N
4: ? CARD$:NEXT I:FOR I=N1 TO 36 STEP N5
9240 READ SUS:SOUND 0,ASC(SUS)-I,N10,N4:
SOUND N1,ASC(SUS)-I+N1,N10,N4:POSITION I
,N5: ? SUS:FOR H=N1 TO N7:NEXT H
9250 POSITION I=N1,N7: ? " ":NEXT I:SOUND
N0,N0,N0,N0:SOUND N1,N0,N0,N0:FOR I=N1
TO 70:NEXT I:Poke 82,N2
9260 RESTORE 8310:FOR I=N0 TO N10:READ C
:Poke 1536+I,C:NEXT I:Poke 512,N0:Poke 5
13,N6:RETURN
8300 DATA P,A,T,I,E,N,C,E
8310 DATA 72,169,22,141,10,212,141,24,20
8,104,64
9000 ? " DO YOU REQUIRE INSTRUCTIONS? Y/
N"?
9010 Poke 764,255:GET #N1,H:IF H=78 THEN
10020
9020 IF H<89 THEN 9010
9030 GRAPHICS N0:Poke 710,N4:Poke 559,62
:Poke 752,N1:ON G1 GOTO 9100,9200,9300,9
400,9500,9600

```

```

9200 ? " 28 cards are dealt in seven col
umns, only the bottom card of each colum
n is playable ";
9210 ? "The object of the game is to col
lect packets of 4 cards of the same deno
mination.Cards can be played";
9220 ? " on each other if they are simi
lar. When 4 similar cards have been bro
ught together,";
9230 ? " they are removed by placing th
e cursor on the bottom card and press
ing the button. Cards are dealt";
9240 ? " from the pack by placing curs
or on pack and pressing button. A spa
ce can only be filled by a card";
9250 ? " from the discard pile. Pack
is redealt from discards":GOTO 10000
9300 ? " 9 Cards are dealt in a square.
The object of the game is to get rid
of all the pack,";
9310 ? "by taking any 2 cards which add
to eleven. Picture cards can only be
taken when Jack,Queen,King ";
9320 ? "are on the board at the same tim
e. Spaces can be filled from the pack
by placing cursor on a space ";
9330 ? "and pressing button.":GOTO 10000
9400 ? " 20 Cards are dealt face up in a
large square"
9410 ? "The object of the game is to en
d up with the cards in the layout all f
ace down,";
9420 ? " Place the cursor over any card
and press button to turn face down.": ?
" Count this as 1."
9440 ? " Now move in a clockwise directi
on counting 2,3,4. Turn the fourth ca
rd face down. Choose ";
9450 ? "any other card,count 1 and turn
down.Turn down the fourth card and carry
on turning 1 and 4 "
9460 ? "until all the cards are reversed
":GOTO 10000
9500 ? "25 Cards are dealt in a 5x5 layo
ut.Theobject of the game is to pair off
all the cards.A pair can only ";
9510 ? "be taken,if they are next to ea
ch other in any direction.": ? " VERT
ICAL,HORIZONTAL or DIAGONAL."
9520 ? "Place cursor on card and press b
utton. If ";
9530 ? "you cant go,then place cursor on
pack and press button.The cards in the
layout will be re-dealt ";
9540 ? "minus any spaces.The layout wi
ll be increased to 25 cards from the dec
k":GOTO 10000
9600 ? "25 Cards are dealt from the sto
ck one by one.Place each card anywhere on
a 5x5 grid to make the best ";
9610 ? "poker hands.Once laid,a card can
not be moved.": ? "When the grid is fille
d,the score will be calculated ";
9620 ? "for 10 hands.": ? " 5 across,5 d
own and 2 diagonal.": ? "The object bein
g to get the best score possible"
10000 ? " : ? "PRESS START TO BEGIN"
10010 IF PEEK(53279)<N6 THEN 10010
10020 GOSUB 1100: ? "":RETURN

```

Listing for Packet Boat

```

1600 REM Game 2
1690 GOSUB 1000
1700 GOSUB 700:IF ST=N13 AND Y=N130 THEN
Z=(136*(Z+110))/(Z+110)+96:GOTO 1740
1710 IF Y=N130 THEN Z=96+(ST*340)
1740 A=Y,Y+35=B:Poke 53248,Z
1770 FOR I=N1 TO N6:NEXT I:GOTO 1700
2000 POSITION N14,N23: ? "PACKET BOAT":PO
KE 704,140:Poke 709,N0:Poke 710,120:Poke
712,120:Poke 1536,N22:G1=16
2005 Poke DL+N17,130:Poke 54286,192:FOR
ROH=N0 TO N6:FOR I=N1 TO N7:D(
I,ROH)=N0:IF ROH<N3 THEN D(1,ROH)=100
2008 NEXT I:NEXT ROH
2010 T=N1:FOR ROH=N0 TO N6 STEP N2:FOR I
=N2 TO 32 STEP N5:C=P(T):POSITION I,ROH:
IF ROH<N6 THEN ? FD$:GOTO 2040
2020 ? CARD$:GOSUB 500:POSITION I+N1,ROH
+N1:GOSUB 200
2040 D1=(I+N3)/N5:D2=(ROH+N2)/N2-N1:D(
D1,D2)=D(D1,D2)+P(T):T=T+N1:NEXT I:NEXT RO
H:T=21:T=N0:T5=24:UP3=N3:V1=20
2050 DONE=N0:POSITION N12,N17: ? FD$:FOR
I=20 TO N22:POSITION I,N17: ? CARD$:NEXT
I:G1=23:EMPTY=N0
2060 GOSUB 300:PICK=N1:Y=N34:Z=N56:GOSUB
9500:GOTO 1700
2100 A=INT(2/20)-N1:R=INT(Y/16)-N2:IF PI
CK=N2 THEN 2350
2110 IF Y=N130 THEN IF D(A,R+N1)<N0 THE
N GOTO 1690
2120 IF Y=N130 THEN 2600
2130 IF D(A,R)=N0 THEN GOTO 1690
2135 D2=100:R5=R:SET=N0:FOR U=N1 TO N4:S
(U)=N0:NEXT U:IF Y=N34 THEN D2=D(A,R-N1)

```

```

2140 D1=D(A,R):C=D1:D(A,R)=N0:A1=A:R1=R:
C1=C:GOSUB 500:MATCH=C
2170 POSITION A=N5-N3,R=N2: ? BLANK$:
2175 IF Y=N34 THEN R5=R-N1:IF D(A,R5)<1
00 THEN POSITION A=N5-N3,R5:N2: ? BLANK$:
SET=SET+N1:GOTO 2200
2180 IF (Y=N34 AND R5<N0) OR Y=N34 THEN
2190
2185 POSITION A=N5-N3,R5:N2: ? FD$:
2190 GOSUB 1100:IF SET=N3 THEN DONE=DONE
+N1:POSITION N2,N17: ? FD$:POSITION N3,19
: ? DONE:R1=R5+N2:GOTO 2470
2195 GOSUB 2300:GOTO 1700
2200 TRAP 2210:S(SET)=D(A,R5):D(A,R5)=N0
:D2=D(A,R5-N1):GOTO 2175
2210 TRAP 4000:D2=100:R5=N1:GOTO 2180
2300 GOSUB 2810:POSITION 33,19: ? NU$:PO
SITION N34,20: ? SU$:C1=C:S1=UIT:PICK=N2:
RETURN
2350 IF (A1=A AND R1=R) OR (A1=A AND SET
=N0) OR Y=130 THEN 2700
2352 IF D(A,R)<N0 OR (D(A,R)=N0 AND Y=3
4 AND PS=N0) THEN 1690
2353 IF Y=N34 THEN IF D(A,R-N1)=N0 THEN
1690
2354 IF Y=N34 THEN 2358
2355 C=D(A,R-N1):GOSUB 500:IF C<>MATCH T
HEN C=MATCH:GOSUB 500:GOTO 1690
2358 R5=R:R1=R1-SET:IF PS=N1 THEN PS=N0
2360 IF SET=N0 THEN C=S(SET):GOSUB 500:G
OSUB 2500:GOTO 2380
2370 C=D1:GOSUB 500:GOSUB 2500:D(A,R)=D1
:GOTO 2470
2380 D(A,R)=S(SET):SET=SET-N1:R=R+N1:GOT
O 2360
2470 IF DONE=N13 THEN GOSUB 1200:GOTO 90
0
2471 IF D2=100 THEN SET=N0:GOSUB 2800:GO
TO 2550
2473 IF SET=N3 THEN D2=D(A,R-N4):R1=R1-N
1
2475 SET=N0:IF D2>100 THEN D2=D2-100
2480 C=D2:GOSUB 500:POSITION A1=N5-N3,R1
=N2-N2: ? CARD$:POSITION A1=N5-N2,R1=N2-N
1:GOSUB 200:GOSUB 2300
2490 D(A1,R1-N1)=D2:GOTO 2550
2500 GOSUB 1100:POSITION A=N5-N3,R=N2: ?
CARD$:POSITION A=N5-N2,R=N2+N1:GOSUB 200
:RETURN
2550 IF DONE=N13 THEN 900
2555 IF STRIG(N0)=N0 THEN 2550
2560 GOTO 1700
2600 IF Z=96 THEN T=T+ UP3=N3:GOTO 264
5
2620 IF UP3<N1 THEN PICK=N1:GOTO 1690
2622 GOSUB 2690:UP3=UP3-N1:C=P(T):D1=C:G
OSUB 500:MATCH=C:GOSUB 2300:PCT=N0:T=T+
N1:D2=100:T5=T5-N1
2625 PS=N1:IF UP3=N0 THEN POSITION N22,N
17: ? BLANK$:GOTO 2640
2630 POSITION N22-UP3,N17: ? " * * * * "
* " :GOSUB 2690:GOSUB 300
2640 A1=A:R1=R:GOSUB 1100:GOTO 1700
2645 IF T5<N1 THEN POSITION N12,N17: ? BL
ANK$:GOTO 1690
2650 IF EMPTY=N1 THEN EMPTY=N0:U=N1:H=N0
:GOSUB 80:T=T5:IF T1<N1 THEN T1=N0:POSI
TION N12,N17: ? BLANK$:GOTO 1690
2652 T1=T1-N3:IF T1<N1 THEN 2658
2654 U1=20-T1:UP3=UP3+T1:IF T1<N2 THEN
U1=20:UP3=N3:T1=N0
2658 FOR U=20 TO N22:POSITION U,N17: ? BL
ANK$:NEXT U:IF T1<N1 THEN EMPTY=N1
2660 FOR U=U1 TO N22:POSITION U,N17: ? CA
RD$:GOSUB 1300:NEXT U:GOSUB 2690:GOSUB 3
00:U1=20:GOTO 2550
2690 IF T<N52 THEN T=29
2692 IF PCT=N0 THEN T=T+N1:GOTO 2690
2693 RETURN
2700 IF (Y=N130 AND Z=96) OR PS=N0 THEN
GOTO 2760
2710 IF Y=N130 THEN GOSUB 2790:T=T-N1:P(
T)=D1:GOSUB 300:GOTO 2740
2720 D(A,R)=D1:C=D1:GOSUB 500:GOSUB 2500
:GOSUB 2800:GOTO 2550
2740 GOSUB 2900:PS=N0:GOSUB 1100:T5=T5+N
1:GOTO 2550
2760 IF A1=A AND R1=R AND SET=N0 THEN 27
20
2770 IF A1=A AND R=R1-SET AND SET=N0 THE
N D(A,R)=D1:C=D1:D2=100:GOTO 2358
2780 GOTO 1690
2790 IF UP3=N0 THEN POSITION N22,N17: ? C
ARD$:UP3=N1:RETURN
2795 POSITION N22-UP3,N17: ? " * * * * "
* " :UP3=UP3+N1:RETURN
2800 PICK=N1:POSITION 32,N17: ? BLANK$:RE
TURN
2810 POSITION 32,N17: ? CARD$:RETURN

```


Listing for Block Eleven

```

2990 REM Game 3
3000 POSITION N14,N23: "BLOCK ELEVEN":P
OKE 752,N1:1=N1:6=48:PICK=N0:POKE 710,N
52:POKE 712,N52:POKE 709,N10
3010 POKE 1538,66:POKE DL+N17,130:POKE 5
4286,192
3020 DONE=N0:POKE 704,134:Y=N34:Z=96:FOR
ROH=N0 TO N10 STEP N5:FOR I=N12 TO N22
STEP N5:POSITION I,ROH
3030 ? CARD$:C=P(T):D((1-7)/N5,(ROH+N5)/
N5)=P(T):GOSUB 500:POSITION I+N1,ROH+N1:
GOSUB 200
3040 I=I+N1:NEXT I:NEXT ROH:POSITION N12
,N17: ? FD$:POSITION N2,N17: ? FD$:POSITIO
N N13,19: ? "43":T=9:GOSUB 8050
3050 GOSUB 700:IF Z<96 THEN Z=96
3060 IF Z>136 THEN Z=114
3065 IF Y>N130 THEN Y=114
3070 GOSUB 726:GOTO 3050
3090 GOSUB 1000:GOTO 3050
3100 A=(Z-76)/20:R=(Y+6)/40:C=D(A,R):T5=
C
3103 IF C=N0 AND PICK=N0 AND A1=N0 THEN
GOSUB 3640:GOTO 3300
3105 IF C=N0 THEN A1=A1-N1:GOSUB 3520:GO
TO 3300
3110 PICK=PICK+N1:D(A,R)=N0:GOSUB 500:IF
PICK=N2 THEN D2=C:U=27:GOTO 3140
3120 U=N22:D1=C:IF PICK=N3 THEN U=32:GOT
O 3150
3130 GOTO 3160
3140 T2=D1+D2:IF T2>N22 THEN 3160
3145 IF T2<N11 THEN D(A,R)=D2:PICK=N1:G
OTO 3090
3148 GOSUB 3500:T2=N0:DONE=DONE+N2:GOSUB
3600:GOTO 3300
3150 T2=T2+D1:IF T2>36 THEN PICK=N2:T2=
T2-D1:D(A,R)=T5:GOTO 3090
3160 A1=A1+N1:S(A1)=T5:GOSUB 3500:IF T2=
36 THEN DONE=DONE+N3:T2=N0:GOSUB 3600
3300 IF STRIG(N0)=N0 THEN 3300
3310 GOTO 3050

```

```

3500 GOSUB 1100:POSITION U,N17: ? CARD$:P
OSITION U+N1,18:GOSUB 200:POSITION A+N5+
N7,R+N5-N5: ? BLANK$:R5=U:RETURN
3520 GOSUB 1100:POSITION R5,N17: ? BLANK$
: C=S(PICK):D(A,R)=C:GOSUB 500:POSITION A
+N5+7,R+N5-N5: ? CARD$
3530 R5=R5-N5:PICK=PICK-N1:IF PICK=N0 TH
EN PICK=N0
3540 POSITION A+N5+8,R+N5-N4:GOSUB 200:R
ETURN
3600 FOR I=N1 TO N52:NEXT I:FOR I=N22 TO
32 STEP N5:POSITION I,N17: ? BLANK$:SOUN
D N0,I*INT(100/RND(N0)),N10,N5
3610 FOR U=N1 TO N10:NEXT U:SOUND N0,N0,
N0,N0:S(PICK)=N0:NEXT I
3620 PICK=N0:POSITION N3,19: ? DONE:A1=N0
:IF DONE=N52 THEN ? "YOU WIN":GOSUB 120
0:GOTO 900
3630 RETURN
3640 T=T+N1:IF T>N52 THEN GOSUB 1000:RET
URN
3645 POSITION A+N5+N7,R+N5-N5: ? CARD$:C=
P(T):GOSUB 500
3650 GOSUB 1100:POSITION A+N5+8,R+N5-N4:
GOSUB 200:POSITION N13,19: ? (N52-T):IF
N52-T<N10 THEN ? " "
3660 D(A,R)=P(T):IF T=N52 THEN POSITION
N12,N17: ? BLANK$
3670 RETURN

```

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A game to invest in... funny, genuinely original, and the graphics are great... hit the key to begin, the Spectrum plays a real Hollywood-style movie theme tune, and the hunt is on!

Personal Computer News

Marvellous adventure, really dotty... a refreshing change from some of the doomladen programs encountered nowadays... a game where you won't get to the next stage without solving the present conundrum.

Popular Computing Weekly

And now -

Mad Martha II



Time for the annual holiday and Martha decides to visit her half-cousin Manuel, who is a waiter in a plush hotel in Barcelona. One afternoon, Martha sets out on a bus tour with her son, young Arbuthnot, leaving orders for Manuel to keep an eye on Henry. Unbeknown to Martha, crafty Henry has a Spanish pen-pal, and has planned a secret rendezvous. Henry leaves the hotel, brimming with enthusiasm and Manuel (who is totally wacky!) is hot on his trail. The adventure takes us through the thrills and spills of a madcap chase, taking in amongst other delights, a bull fight in which poor Henry is forced to play the leading role. Guaranteed laughs and fun for all the family!



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Adventures in space and time

Our reviewers' verdicts on some new releases for adventurous micro owners

Pirate 32K BBC £9.25

Chalksoft, Lowmoor Cottage, Tonedale, Wellington, Somerset.

Pirate is a two-part adventure aimed at young people, and featuring full colour graphics, animation and sound.

You are the captain of a pirate ship and you must steer it through the maze of reefs and islands, battling with other ships to collect jewels and treasure.

If you successfully complete part 1, the computer will let you go on to part 2. The function keys are used for the commands, making it very easy for youngsters to communicate with the computer.

Instructions are displayed on the cassette insert, and more are available on request in the introductory program.

The displays are very colourful, using a split-screen technique to show the scene graphically at the top, using Teletext graphics, and the narrative at the bottom.

I personally found the pace of the game somewhat slow, but right for the youngsters who are likely to be playing the game.

Sound is used extensively, although the repetitive sea shanties began to grate after a while; a sound on/off feature would have been nice. A game SAVE facility is sensibly included.

More interesting and colourful than plain narrative adventures, children should find lots to interest them here.

instructions	90%
playability	80%
graphics	75%
value for money	75%

★★★★★

Death Mines Of Sirus Dragon £9.99

Phoenix, Spangles House, 116 Marsh Road, Pinner, Middlesex.

A splendid idea from Phoenix Software which combines an adventure and an arcade game.

You must play the arcade game, and play it well, to receive clues to help you succeed in the adventure.

If, like me, you are a ham-fisted amateur when it comes to playing arcade games, you are in trouble. Without getting a reasonable score, you will not be given the code to allow you to even start the adventure!

The arcade game is a form of space rescue where you must control your rescue ship through the clouds of asteroids to land safely on the landing pads below.

Once landed, you must attempt to carry your passengers back to the ship in the top-left hand corner of the screen. You must continue doing this until you have reached a certain score where clues to the adventure will be given.

The two cassettes come in a quality presentation pack and there was no trouble with loading.

The adventure game part is difficult to get into and provides quite a challenge.

What you get for your £10 is a balanced package of entertaining software. Phoenix must be congratulated on such an enterprising concept.

instructions	55%
playability	75%
graphics	70%
value for money	90%

★★★★★

Hell's Temple 48K Oric £12

Kenema, 1 Marlborough Drive, Worle, Avon SB22 0DQ

The immortal ones of Satan and those brave enough to enter Hell's Temple collide in this intriguing adventure game, in which more than 75 monsters await your foolishness in trying to find riches beyond dreams.

The monsters you will encounter include a manticore, minotaur, Erinye's Devil, Vrock Demond and a jaculi; you may also find yourself dropping down deep pits, perhaps into acid pools, which drastically reduces your strength.

Unfortunately, because of the large number of monsters in the adventure, they are not illustrated

in what are part text, part graphics screen displays.

The top half of the screen represents an area you are facing, and underneath are detailed your strength, spells, gold and floor levels in a constantly updated grid.

Decisions on whether to enter a room or enter combat with a monster are I for in, L for leave, H for help in discovering the strength of opponents and D for detecting what is in a room through the use of your spells.

The combat routine is C for combat, S for spell, B for bribe and R for retreat (if you are lucky!), with all these stages being clearly marked on the screen. S.I.

instructions	90%
playability	90%
graphics	60%
value for money	65%

★★★★

The Hobbit Commodore 64 £14.94

Melbourne House, 131 Trafalgar Road, London SE10

This is the Commodore 64 version of the Spectrum text/graphics adventure based on the book written by J.R.R. Tolkien.

The object of the game is to get the gold and treasure hoarded by the evil Dragon and place it into the chest in your home. Gandalf the wizard and Thorin the dwarf are your two main helpers.

All the characters in the game react to the situations around them, even when you are not there. They all have minds of their own and are independent of each other. So every time you play The Hobbit, you will face different problems and have to solve them

in different ways.

The game is very well written. Some of the places that you go to will be described in the form of a picture; others will be an accurate text description.

The four-colour hi-res graphics that are used are of an extremely high standard. The same is true of the text, which is displayed in different colours.

The game comes with an option to print your adventure on to your printer if you have one. This could be useful for remembering how you got past an obstacle or for seeing where you went wrong.

instructions	K.I.
playability	100%
graphics	100%
value for money	100%

★★★★★

White Crystal Dragon £9.99

Romik, 272 Argyll Avenue, Slough, Berks.

There are not many totally graphic adventures about so I viewed this one with interest.

White Crystal is a great adventure game that really does make good use of the capabilities of the Dragon. The program starts with a melodic theme tune and a colourful title page.

The instructions are detailed but do not explain to you what really is in store as you start your quest for the fabled crystal.

You control a walking stick man and must travel around the screen trying to collect food, treasures and the vital sword.

There is the evil Scard with his powerful laser which you must avoid or you receive the punishment of hearing the funeral dirge played out of tune by your Dragon.

Climbing up the very top ladder on the screen will take you to a new, different screen with new perils to overcome.

If this game had been written in machine code and could run a little faster, then I would call it an arcade game — the graphics and the action are that good.

I have yet to succeed in getting the white crystal and expect to be playing this game for quite some time. Recommended.

instructions	65%
playability	80%
graphics	88%
value for money	70%

★★★★

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Most random maze programs are too random, with the result either that the maze is ridiculously easy, or otherwise completely impossible to get through.

This program, however, produces mazes that are both a delight to behold and taxing to solve. Working on a completely different principle from most ZX81 mazes, it uses the UNPLOT function to maximise the available display area.

To initialise the program, RUN 100. The running time is very long - it may take two hours in FAST mode to produce a maze - so I advise setting it off then going away to have dinner while it gets on with its work.

When it has produced a maze, if a ZX printer is attached it will PRINT a copy (which serves also as an audible signal).

A flashing cursor can then be manipulated through the winding passages by means of unshifted keys 5 through 8.

You may want to have a look and see how things are going while the maze is being made. It is not necessary to STOP the program to do this - just put your finger on key "M" (PAUSE) and hold it there until you get a display (you may have to wait a few seconds).

Should you decide that the maze is sufficiently complicated for your purposes, press shifted "A" (STOP) to continue onto the play routine.

You can STOP the program if you wish, but do not use BREAK as this could cause problems. Simply put your finger on (unshifted) "A" and hold it there until the program stops with report code 9346. To re-start from where it left off, GOTO 1.

It is not necessary to STOP the program in order to SAVE it.

Put your finger on key "S" and wait until a string input cursor appears. Type a program name, turn on your tape-recorder, then press NEWLINE. When the program is re-LOADED it will carry on working from where it left off.

SAVE also works once the maze has been complete and the program is in the "play" routine. The present cursor position will be held on the SAVE'd program, so you can continue trying to solve the maze from the point where you left off.

If you want to STOP the program at this stage, shifted "A" will do the trick. To re-start, GOTO 1500.

Having produced a maze, you may well want to apply it, possibly to some game. This will entail transferring it to some other program, or to a blank BASIC area. There are machine-code ways of doing this, but for most purposes BASIC will suf-

At last, a worthwhile maze-creation program for the 16K ZX81. Our expert, Nick Codwin, explains how it works and how to use it

```

1 GOTO 150
7 LET X=X+(X<62)*(D=4)-(X>1)*
(D=3)
8 LET Y=Y+(Y<Y1)*(D=1)-(Y>Y2)*
(D=2)
10 LET L=21-INT(Y/2)
20 LET C=INT(X/2)
30 PRINT AT L,C:
40 LET Z=PEEK(PEEK 16398+256*
PEEK 16399)
50 LET Q=(X/2=INT(X/2))+2*(Y/
2=INT(Y/2))
60 LET P=(Z=128 OR Z=1 AND Q=1
OR Z=2 AND NOT Q OR Z=3 AND Q<2
OR Z=4 AND Q=3 OR Z=5 AND (Q=1
OR Q=3) OR Z=6 AND (NOT Q OR Q=3
) OR Z=7 AND Q<2 OR Z=129 AND Q
<1 OR Z=130 AND Q OR Z=131 AND
(Q=2 OR Q=3) OR Z=132 AND Q<3 OR
Z=133 AND (NOT Q OR Q=2) OR Z=
134 AND (Q=1 OR Q=2) OR Z=135 AN
D Q=2)
69 RETURN
100 FAST
101 LET SAVE=340
103 DIM C$(2680)
104 LET CN=5
105 LET Y1=41
106 LET Y2=3
110 LET D$=""
120 LET E$=""
130 LET X=INT(RND*53)+5
140 LET C$=CHR$ X+" "+CHR$ X+" "
150 FOR L=1 TO 20
160 PRINT AT L,0:
170 NEXT L
180 FOR J=1 TO CN-2 STEP 2
190 LET X=CODE C$(J)
200 LET Y=CODE C$(J+1)
210 UNPLOT X,Y
220 NEXT J
230 UNPLOT X,Y
240 LET XM=X
250 LET YM=Y
265 LET C$(CN TO )=CHR$ X+CHR$
Y
266 LET CN=CN+2
267 IF CN>LEN C$ THEN GOTO 1000
270 DIM A$(2,4)
280 FOR D=1 TO 4
290 LET X=XM
300 LET Y=YM
310 GOSUB 6
320 LET A$(1,D)=CHR$ (128*(P=1)
)
330 NEXT D
340 LET B$=""
341 IF INKEY$="" THEN GOTO 350
342 SLOW
343 IF INKEY$="M" THEN GOTO 340
344 FAST
345 IF INKEY$="S" THEN GOTO 995
346 IF INKEY$="A" THEN STOP
347 IF INKEY$=" " STOP THEN GOT
O 1000
350 FOR J=1 TO 4

```

fice, and that is the method I describe here.

First, SAVE the program with maze intact - press key "S" and follow the procedure described above. Next, press shifted A to STOP the program, and do the following commands:

```

POKE 16388,64
POKE 16389,125
NEW

```

LOAD the program again, and press key "A" to STOP it. Now add the following lines:

```

9000 LET R=32063
9010 FOR J=1 TO 704
9020 POKE R+J,CODE Z$(J)
9030 NEXT J
9040 STOP

```

GOTO 9000 (not RUN) and when it stops (with report code 9340) either enter NEW or LOAD the program to which you want to transfer the maze. Write the following lines:

```

9000 LET Z$=""
9010 LET R=32063
9020 FOR J=1 TO 704
9030 LET Z$=Z$+CHR$
PEEK(R+J)
9040 NEXT J
9050 PRINT Z$
9060 STOP

```

RUN 9000 (or GOTO 9000 if you have data to preserve). When the program stops with report code 9346, there is your maze displayed on the screen and stored in Z\$.

To make use of it (ie, to be able to push a flashing cursor through it) you will need to write in lines 6 through 69, and 1161 through 1300 from the maze routine, with the following alterations:

```

1170 LET NM=30
Delete line 1221

```

Bonus 1

This maze routine can double as a labyrinth-making routine (for minotaurs, etc). To do this, I suggest changing the DIM statement at line 103 to DIM C\$(1000) or less, and then touching-up the resulting sparse maze by means of a simple UNPLOT routine (to add caves, connecting passages, etc).

Bonus 2

Quite apart from the aesthetic considerations, the maze program includes a great deal of interest to ambitious home program-writers.

For example, Lines 10 through 69 consist of a subroutine which performs a potentially very useful operation which I believe to be something of a breakthrough in terms of ZX81 software, and which will interest anyone who

ZX81 PROGRAMMING

likes to use PLOT and UNPLOT.

Assuming X and Y as PLOT co-ordinates, the subroutine returns the following variables:

L - line and C - column of the character in which the X,Y co-ord pair is situated.

Z - the character code at that L,C location.

P - 1 if that X,Y location is already PLOTted, otherwise P=0 (ie, if UNPLOTted or some other character).

Q is returned with a value (0 through 3) indicating the location of the X,Y co-ord pair within that L,C location, as defined in figure 1.

1	0
3	2

Anyone who is involved in serious work with PLOT and UNPLOT will recognise the value of this routine, and it is well worth the trouble to isolate and SAVE it separately for use in other programs.

Although it is quite fast as it is, I plan to write it into machine-code.

Another routine that is likely to

```

360 LET X=XM
370 LET Y=YM
380 LET D=INT (RND*4)+1
390 FOR K=1 TO LEN B$
400 IF CODE B$(K)=D THEN GOTO 5
410 NEXT K
420 LET B$=B$+CHR$ D
430 IF NOT CODE A$(1,D) THEN GO
TO 621
440 GOSUB 6
450 LET XM1=X
460 LET YM1=Y
470 FOR D=1 TO 4
480 LET X=XM1
490 LET Y=YM1
500 GOSUB 6
510 LET A$(2,D)=CHR$ (128*(P=1))
520 NEXT D
530 LET Q=0
540 FOR K=1 TO 4
550 LET Q=Q+(A$(2,K)=" ")
560 NEXT K
570 IF Q<3 OR Y=41 THEN GOTO 61

```

Figure 1: Showing value of Q returned from subroutine 10, according to location of X,Y co-ordinate pair in relation to the character in which this occurs

```

2
580 LET X=XM1
590 LET Y=YM1
610 GOTO 230
621 NEXT J
625 IF Y=41 AND CN>LEN C$/3 THE
N GOTO 930
630 LET E=0
640 IF LEN E$=4 THEN LET E=256*
(CODE E$(3)-CODE E$(2)-CODE E$(4))
650 LET R=2*INT (RND*CN/2)+1
670 LET X$=CHR$ INT (R/256)+CHR
$(R-256*INT (R/256))

```

```

680 IF LEN E$=4 THEN IF X$>E$(
TO 2) AND X$<E$(3 TO ) THEN GO
TO 660
685 IF LEN D$>CN-E-10 THEN GOTO
950
690 LET L=0
700 LET H=LEN D$
710 LET J=H
720 LET J=J+(J<1)
730 IF J>1 THEN GOTO 760
740 LET D$=X$+D$
750 GOTO 900
760 LET J=INT (J-(J-L)/2)
770 LET J=J-(J-2*INT (J/2))
780 IF X$>D$(J TO J+1) THEN GOT
O 660
790 IF X$>D$(J TO J+1) THEN GOT
O 840
800 LET H=J
810 IF L<H-2 THEN GOTO 730
820 LET D$=D$( TO J-1)+X$+D$(J
TO )
830 GOTO 900
840 LET L=J
850 LET J=INT (J+(H-J)/2)
860 LET J=J+(J-2*INT (J/2))
870 IF J<LEN D$-1 THEN GOTO 780
880 IF X$<D$(J TO J+1) THEN GOT
O 820
885 IF X$>D$(J TO J+1) THEN GOT
O 660
890 LET D$=D$+X$
900 LET XM=CODE C$(R)
910 LET YM=CODE C$(R+1)
915 IF LEN E$=2 THEN LET E$=X$
920 GOTO 270
930 IF LEN E$=4 OR RND<.5 THEN
GOTO 630
935 IF E$>" " THEN GOTO 940
936 LET E=INT (CN*.8)
937 LET E$=CHR$ INT (E/256)+CHR
$(E-256*INT (E/256))
940 LET E$=E$+CHR$ INT (CN/256)
+CHR$ (CN-256*INT (CN/256))

```

```

945 LET START=XM
949 GOTO 230
990 UNPLOT XM1,YM1
1000 IF INKEY$=" STOP " THEN PAU
SE 4E4
1001 POKE 16437,255
1005 IF LEN E$=4 THEN GOTO 1100
1010 LET X=INT (RND*53)+5
1015 LET START=X
1020 LET Y=41
1030 GOSUB 10
1040 IF NOT P THEN GOTO 1100
1050 UNPLOT X,Y
1060 LET Y=Y-1
1099 GOTO 1030
1100 DIM Z$(704)
1101 LET SAVE=1500
1102 COPY
1110 LET Q=PEEK 16396+256*PEEK 1
6397
1120 FOR J=1 TO 704
1130 LET Q=Q+1
1140 LET Q=Q+(PEEK Q=118)
1150 LET Z$(J)=CHR$ PEEK Q
1160 NEXT J
1161 LET Y1=43
1162 LET Y2=0
1164 DIM C$(1)
1165 LET D$=""
1170 LET XM=START
1180 LET YM=43
1190 SLOW
1200 PLOT XM,YM
1210 UNPLOT XM,YM
1220 IF INKEY$="" THEN GOTO 1200
1221 IF INKEY$="S" THEN GOTO 993
0
1222 IF INKEY$=" STOP " THEN ST
O P
1223 IF INKEY$="Z" THEN COPY
1230 LET D=(INKEY$="7")+2*(INKEY
$="6")+3*(INKEY$="5")+4*(INKEY$
="8")
1240 LET X=XM
1250 LET Y=YM

```

prove of interest to serious programmers starts at line 670. This relates to the economic storage of two-byte values in a string.

Input to the routine is the variable R (a random number generated at line 660). The routine scans DS, looking for the two-byte code as translated into XS (line 670).

The scanning process is by the bisection method, which is much quicker than searching through the string from beginning to end. Starting at approximately the middle the string, it bisects upwards if XS (variable R) is greater than the value found, or downwards if it is lower, and repeats the process until it either finds the identical value, or finds two successive numbers, one lower and one higher than XS (variable R).

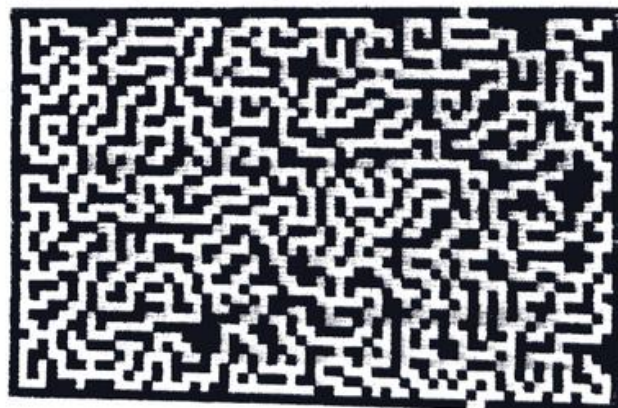
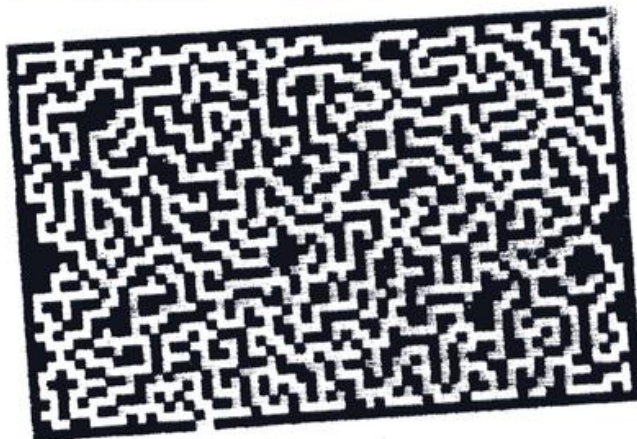
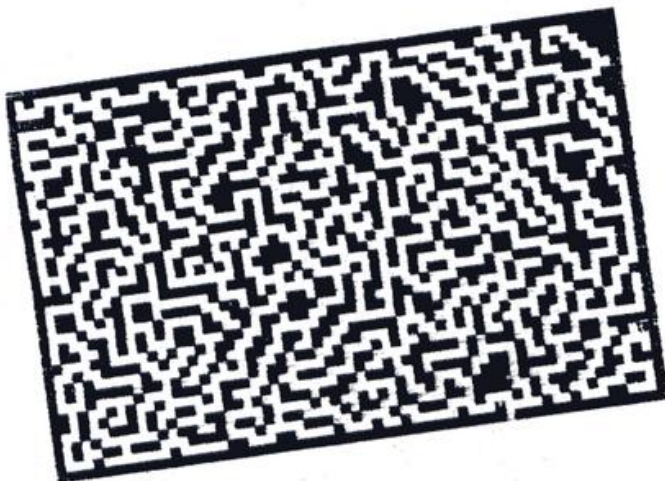
In the former case, it jumps out of the routine at either line 780 or 885, in this case returning to line 660 to find another random number. If it does not find the number, it inserts it into the correct place in the string, and jumps to line 900.

I should mention that I have the Open University to thank for this valuable concept; despite the fact that I failed my maths course (miserably) with the O.U., I nevertheless learned a great deal that has been invaluable in my subsequent dealings with the ZX81.

ZX81 PROGRAMMING

```

1250 GOSUB 5
1270 IF P THEN GOTO 1200
1280 LET XM=X
1290 LET YM=Y
1300 GOTO 1200
1500 PRINT AT 0,0;Z$
1509 GOTO 1200
9990 INPUT X$
9995 IF X$>" " THEN SAVE X$
9999 GOTO SAVE
    
```



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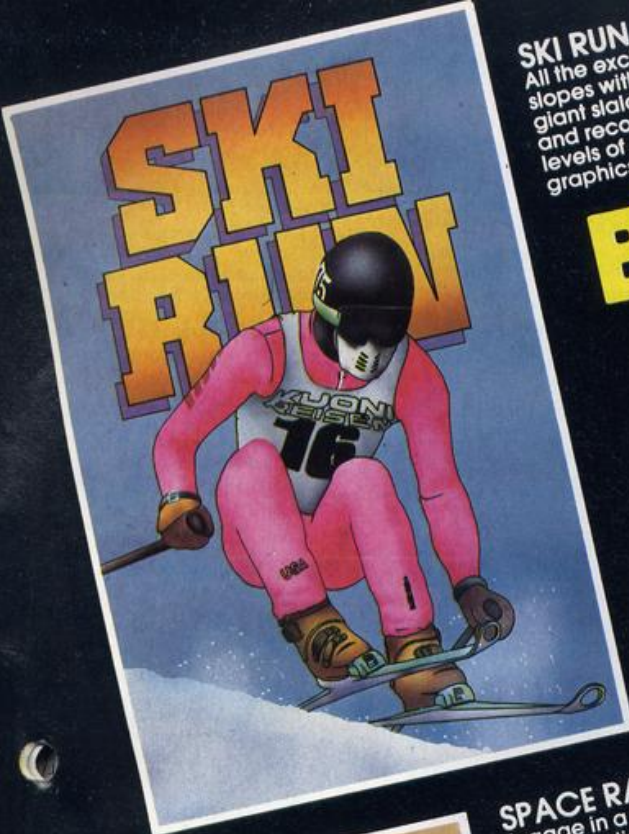
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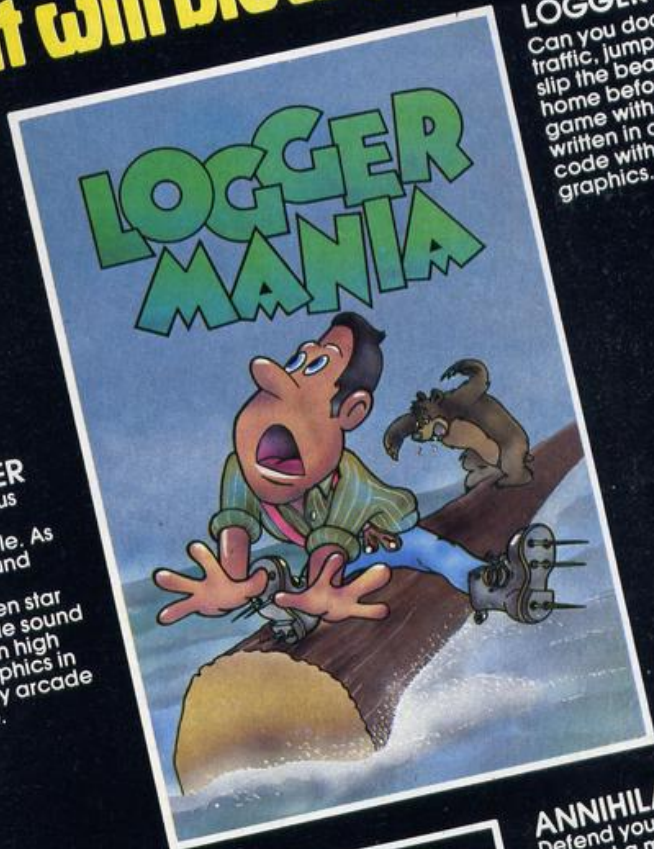
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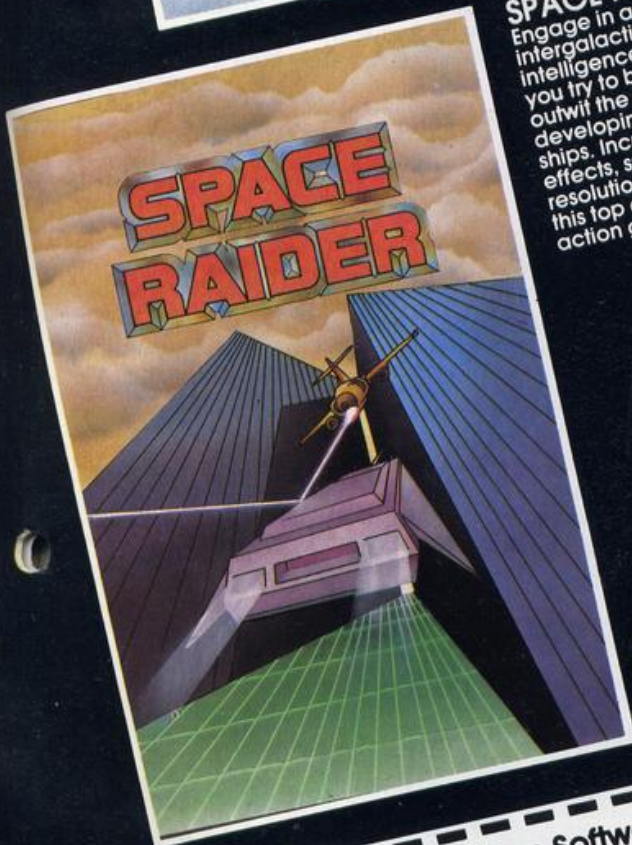
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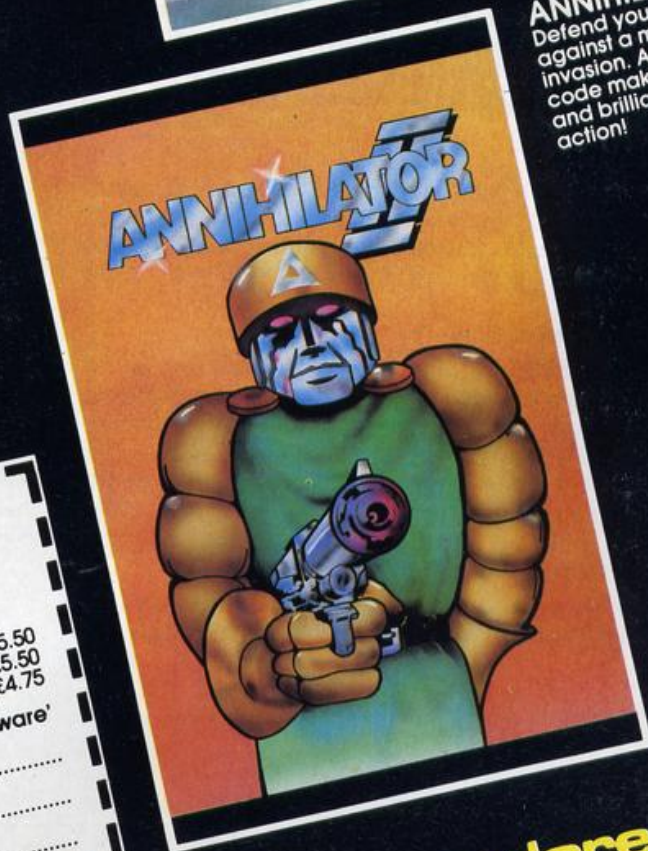
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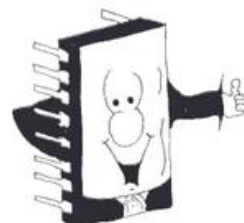
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The sheer mention of the ZX81 when you speak to one of these shop assistants makes them look down their nose at you, and that is the end of any help you are likely to get — at least in Cambridge and Peterborough.

I am unemployed, and thought that by getting a cheap computer — after a lot of hard saving out of my dole money — I could learn to program, which I did, and am now in the process of learning machine code.

In actual fact, all I seem to have done is give shop assistants a good laugh, except when they sold me the ZX81.

Is it wrong to learn computing instead of killing colourful Martians? I am not saying there is anything wrong with games, but be fair — live and let live. And remember that the ZX81 was once as popular as the Spectrum is now.

B. E. Smith, Huntingdon, Cambs

It's the shop assistant that are at fault, not you. As anyone who has had a lot of experience working on main-frame computers will tell you, the ZX81 is as powerful as machines that used to fill a whole room a few years ago. Even now that more sophisticated machines have come on to the market, the ZX81 is still an excellent way of learning programming if you're on a tight budget. Lastly, you can always point out to those assistants that it was the ZX80 and ZX81 that really opened up the market for low-cost home computing in this country — if it wasn't for them, lots of computer shops' assistants wouldn't be in a job today!

Keyed-up over keyboards

I write to inform your readers of my personal award for the current most lousy supplier of equipment. The company is Fuller and the supply of their FDS keyboard for the Spectrum.

I placed an order and sent my cheque to this company at the beginning of August.

At the end of that month I received an acknowledgement informing me that the object of my desire would be

Send your letter to Letters, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE. Don't forget to name your computer — the best letter could win £5-worth of software. Got a problem with your micro? We'll soon be starting a queries page, so send your technical questions to Queries at the above address



a further 21 days before arrival.

At the time of writing (mid-October) I am still waiting. However, that's not the whole story.

When the keyboard did not arrive on or near the given date I telephoned Fuller and was told by a gentleman that there had been problems with production and that I would receive it at the end of that week.

Two weeks elapsed and I again telephoned (this time it was a Frank Lawton who answered): "Sure, no problem they are going out this week. I'll put you at the top of the list."

The following week I spoke to a Miss McKenna: "There's been a problem with production. They are going out this week."

By this time I had noticed several advertisements in computer magazines with a whole list of dealers stocking these magazines with a whole list of dealers stocking these products and Fuller making claims for their excellent service.

I phoned two dealers; the first told me that the keyboards had not arrived yet and he didn't know when they would arrive and the second said that Fuller had made a mess of the dealer network and were scrapping it for the time being.

Confirmation of this would seem to be gained from the fact that the next rash of advertisements appeared without the dealer list.

I have tried on several occasions to speak to the managing director, a Mr Backhouse, but I am always informed that he is either not in yet or that he is out.

David B. Drury, York

Keith Archer, for Fuller, said: "We have had very extensive production delays with the keyboard. First the base of the case came out warped. Then there was a problem with the printed circuit board. Then we had a fire, in which the injection-moulding tool for the keyboard was destroyed — that set us back two months."

"We didn't at first realise

how long the delays were going to be — we've been getting the same promises from our suppliers that we've been passing on to customers.

"But now we're not quoting delivery dates. All I can say is that the old orders are now going out, very slowly — we're currently processing orders received in early July."

Private Lines revisited

While Andrew Turek's article Private Lines (HCW 31, Micro Tips) was very interesting, he is incorrect in stating that INPUT LINE X5 makes it impossible to use BREAK or STOP on the Spectrum.

If Mr Turek had studied his manual, he would have read that CAPS SHIFT and 6 stops the program from within an INPUT LINE statement.

Having said that, there will be many who do not know this (like Mr Turek!), so the routine may be of use to some readers.

A further improvement would be to replace the NEW statement in line 10 with RANDOMIZE USR 0. This will reset the machine completely, including UDGs and any machine code stored above RAMtop.

Raymond Blake, Rayleigh, Essex

Small and friendly

As you can see from the address I'm a small shop serving a small area. I only retail home computers, like Atari, Commodore and Sinclair, so my clientele tends to be families and small business.

I was reading HCW's review of Ramtop's sales ledger purchase ledger. As I use this system for my own accounts I have considerable knowledge of it. I have held a demonstration for the small businesses in my area and they all agreed that it was a user friendly system so consequently I sold a number of them! I have not received any complaints about it being disjointed or confusing.

I think there's a big gap still to be filled in the home computing market especially in the small business sector. I mean one man shops etc. that could benefit in time and expense from a type of system like this instead of having to pay about £2,000+ for a normal business system.

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3 Deep Space 32K BBC £7.95

Postern, PO Box 2, Andoversford, Cheltenham, Glos GL54 5SW

I was really looking forward to this program. It loaded perfectly, so I donned my 3D glasses and waited for the 3D images to appear.

The illusion comes from viewing a red and a blue image through separate eyes, and the instructions say best results come from having as pure a red and blue as possible.

I thought my TV/RGB monitor would be ideal but try as I might, I could not see a 3D effect.

I plugged into the TV port but that was no better. I dragged friends and relatives in to see if my eyes were peculiar — no, they

couldn't see it either.

I tried another pair of glasses, I tried both pairs at once, I tried another TV set, I tried viewing from two to 10 feet. No 3D!

I read the setting-up instructions several times and the only thing I didn't try was a TV with adjustable tint control.

The mathematics say it should work but all we could see were separate red and blue images.

The game itself is mediocre, its chief attraction being the 3D effect which would be marvellous, I'm sure, if it worked.

Do get a demonstration before buying. The ratings are based on my findings.

instructions	95%
playability	35%
graphics	20%
value for money	20%



Flying Train Spectrum £3.99

Random Records, 20 Cotton Road, Withington, Manchester M20.

Chris Sievey's claim to fame was his novel idea of putting ZX81 programs on a single.

Apparently he has now abandoned this idea, since his latest offering for the Spectrum appears on cassette. Still, he throws in a free single for you to play along with the game.

The game itself is one of the craziest I have played, but good fun. According to the on-screen instructions, the only way to properly view a supernova is through the window of a flying train!

As you may guess, getting the

train to fly, viewing the supernova and landing safely back on earth is not easy.

Your mission to the moon is split into various tasks. Firstly you must put the train together. To be honest I couldn't get past this screen, and so I cheated by altering the listing to suit myself.

After you have put the train together, you must navigate through a stargate, watch the supernova and then return safely to earth. Only then are you granted the full title of railwayman.

instructions	80%
playability	55%
graphics	60%
value for money	85%



Stampit/Early Bird TI-99/4A £7.95

Phoenix Software, 48 Rannock Drive, Mansfield, Notts

A fireman's nightmare, that's the only way to describe Stampit. There you are, out in the country for a picnic, when sparks from your campfire cause fires to break out all over the place.

With ever-increasing panic you race about trying to extinguish the fires by stamping on them with a very large boot that you just happen to be wearing.

Frustration increases as additional fires break out, and tents and motor cars burst into flames, leaving you with a sense of helplessness and a very hot foot.

There are five levels of difficulty, ranging (or is it raging?) from indifferent through bud-

ding arsonist to raving pyromaniac.

The second game, Early Bird, is set in a typically English country garden which is beset with a particularly nasty case of worms.

You move the early bird around the garden making a royal feast of the worms and trying to eat as many as you can without being caught by a runaway lawnmower, a lurking cat or the grand daddy worm.

You lose a life when caught and the game ends when your three lives have all been lost.

Both games are nicely presented, with instructions printed on a card inset.

instructions	80%
playability	80%
graphics	70%
value for money	80%



Games with a difference

Our reviewers try out some
new games with new twists

Purple Turtles Commodore 64 £7.95

Quicksilver, Palmerston Park House, 13 Palmerston Road, Southampton

This game from Quicksilver is very unusual, and seems to be aimed at the younger micro user, although it is quite addictive to play. You could describe it as a 'cute' video game.

The object of play is to gather up fruit which falls from a tree on the opposite side of the riverbank.

To cross the river, your man must leap onto the backs of turtles which float on the surface — but watch out, because the turtles may suddenly sink without warning, leaving you to a watery grave.

Each screen consists of a number of each type of fruit which must be cleared within a time limit. As the game goes on, the turtles sink more rapidly and sometimes all four sink at once.

The graphics in this game are superb, with clouds and balloons floating on the skyline, and a strange cackling vulture which sits on a tree on the riverbank.

Sound is also well used — a jaunty rendition of 'Messing about on the river' heralds the start of each game.

As I said, the game might suit younger children best; otherwise, after a few hours playing the game could be slightly tedious.

instructions	55%
playability	70%
graphics	97%
value for money	75%



Crunch TI-99/4A £7

Byteware, Unit 25, Handyside Arcade, Newcastle-upon-Tyne NE1 4PZ

The Cruncher is our intrepid hero in this game, and the object is to move him through a set of four caves. Each cave is filled with dots which are eaten by the cruncher as he progresses.

In the far corner of the cave is a piece of cave caviar, and bonus points are awarded when this is eaten.

In order to pass from one cave to another, you must travel through the monsters' mansion.

At this point, a rather unfriendly chap rejoicing in the name of 'Orrible 'Orris appears on the scene, and his one aim in life is to chase and eliminate the cruncher.

If you fancy your chances you can try to collect a piece of fruit left in the mansion and gather extra points on your way to the next cave.

If you stop for a breather anywhere on your journey 'Orrible 'Orris will attack.

In addition to being eaten by 'Orrible 'Orris, or using the wrong doorway, the cruncher will be eliminated if he hits a wall or tries to retrace his steps.

Graphics are very good and sound effects, including a very catchy signature tune, are excellent.

instructions	90%
playability	80%
graphics	70%
value for money	80%



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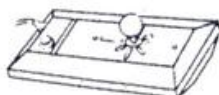
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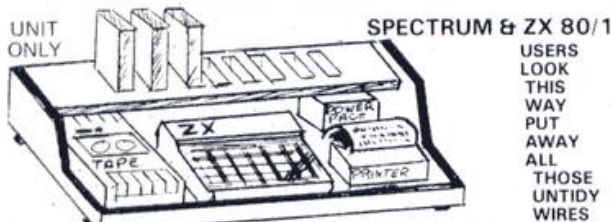
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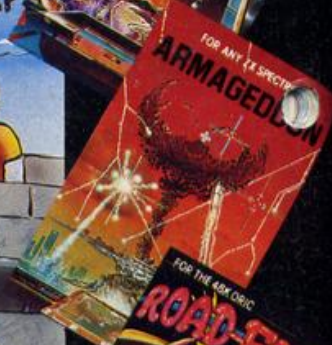
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