

Home

An Argus Specialist Publication

Computing WEEKLY

45p

No. 63
May 22-28, 1984

Win

a 'flight' on a real simulator

WIN video tapes and learn about your computer from **MASTER CLASS**

FREE Spectrum screen designer

Software reviews for: BBC, Spectrum, ZX81, Dragon, Texas, Sord

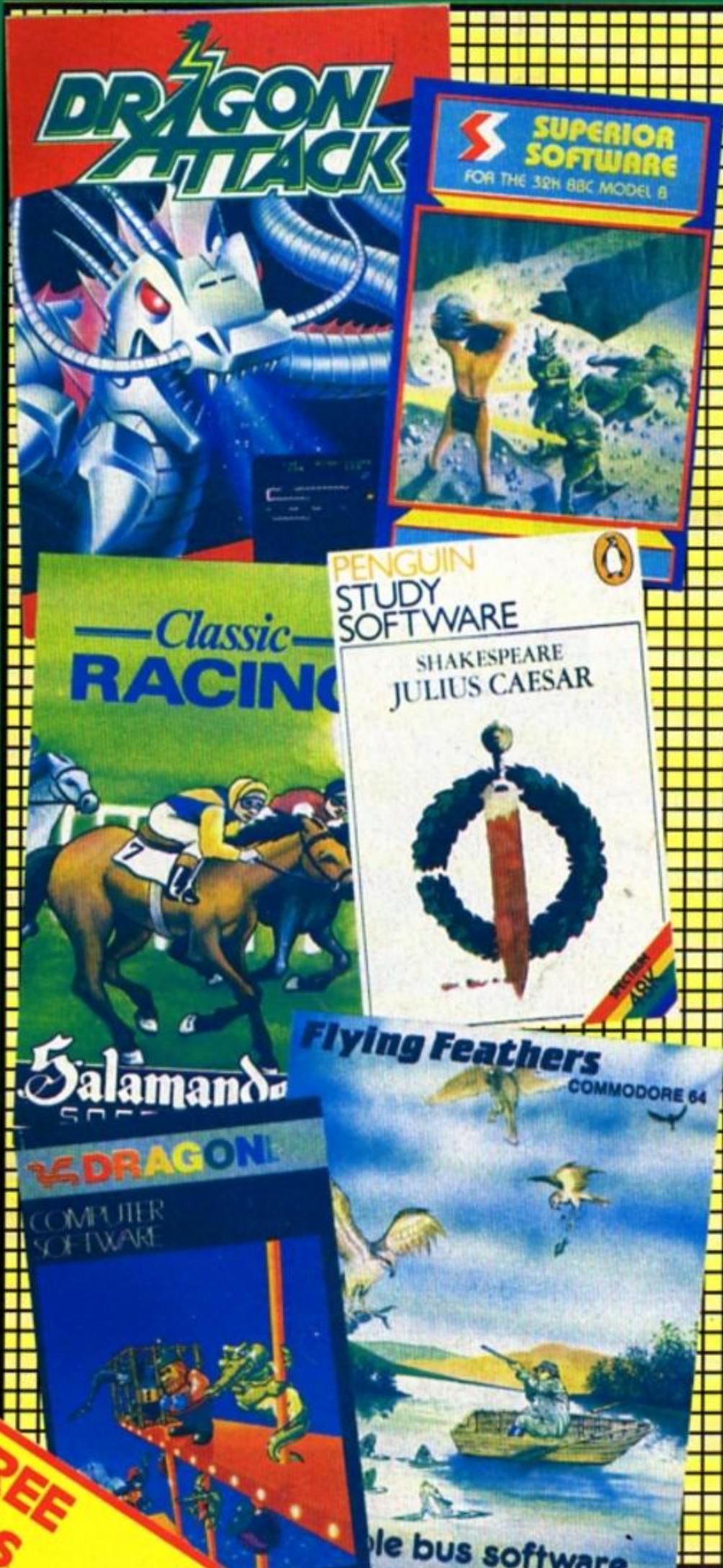
RAM-saving graphics routines for CBM 64

Games to type in for: Spectrum, ZX81 and VIC-20

How to make your Oric/Atmos make music

PLUS: u.s. scene, news, letters, charts...

Two great FREE competitions



Battle begins over budget software

More budget-priced software has been launched, starting a three-sided battle for pocket money.

All three companies have a background in video film distribution and Mastertronic, which started the trend with a range at £1.99, reckons dealers have bought more than 1/4m tapes in less than seven weeks.

Now it has been joined by Advance Computer Entertainment and Atlantis Software.

ACE boss Micky Shephard first brought out his 10 titles at £6.90 — then dropped to £2.99 when he learned of Mastertronic's pricing.

He said: "We know them very well because we market video films to the same outlets. We could not drop to £1.99 and still re-invest. I would lose money."

"Without any bias, ours are far better than Mastertronic's. All our games will be new — we Continued on page 5

Moves to block piracy

Software duplication companies are intent on beating piracy and have released new systems which they hope will be foolproof.

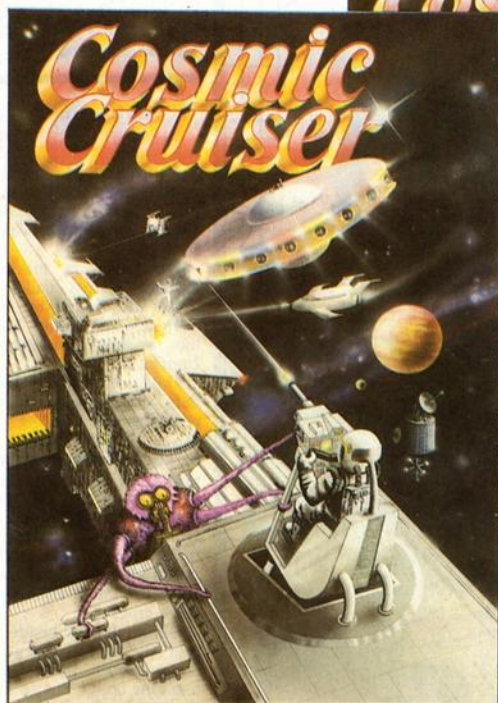
Dataclone is marketing a loading system called Power Load, developed by Incentive Software, and Bibi Magnetics has a new technique called Imprint 2.

Dataclone's Power Load uses data compression techniques, reducing the loading time by more than twice. Mike Ferguson, mastering engineer, said: "At Dataclone we are in the business of copying software but this is uncopyable. I've tried my hardest and I can't break it. I have techniques which 99 per cent of the public wouldn't know about — and I can't crack it."

"I can get the headers in but that's as far as I can get. These tapes won't audio copy or machine copy. The technique is that it is on fastload. Tapes which would normally load in five minutes on the Spectrum Continued on page 5

£5.50

HERE NOW!



For the:
48K Spectrum
Commodore 64
BBC Model B
Dragon 32



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Home Computing WEEKLY

AD ASTRA 
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 SPECTRUM ARCADE
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GARGOYLE GAMES
 021-236 2593

REGULARS

News **5,6**
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SOFTWARE REVIEWS

Flex your muscles on these **10**
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Pit your wits **20**
 New software for the Dragon assessed by our team
Take your pick **28**
 Choose here for your ZX81, Spectrum or TI-99/4A
Back to school **31**
 Will these help now you're back in class?
Blow up tanks **38**
 Games for BBC, Sord, Dragon/Tandy Colour

SPECIALS

Flight simulator competition **7**
 You could take to the "air" in a real flight simulator. There's 25
 Fighter Pilot tapes from Digital Integration for runners-up
Masterclass video tape competition **15**
 Just watch and learn about computing on the Spectrum, VIC-20,
 BBC, Electron or Commodore 64. Thirty tapes must be won — and
 there's a 10 per cent discount voucher for every entrant
Spectrum screen planner **25**
 Create great graphics and plot them on the screen with our special
 pull-out Pixel-Pad



• There's listings for these computers — and more — in this issue of Home Computing Weekly

PROGRAMS

ZX81 **8**
 Zap them before they blast us — a fast-moving space game for the 16K ZX81
Spectrum **12**
 Two games: rescue a maiden in distress and go for gold in the 400 metres
VIC-20 **16**
 Two games: Galaxy is for the unexpanded VIC and Pilot 20 needs 3K expansion
Commodore 64 **35**
 RAM-saving graphics — five listings and four demonstration programs to type in and use
Oric/Atmos **42**
 Type in our synthesiser and your computer is a musical instrument. And you can play back your masterpieces

Editor:
Paul Liptrot
Assistant Editor:
Liz Graham
Designer:
Bryan Pitchford

Managing Editor:
Ron Harris
Group Editor:
Elspeth Joiner

Advertisement Manager:
John Quinn
Assistant Advertisement Manager:
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Divisional Advertisement Manager:
Coleen Pimm
Classified Advertising:
Debra Stuppel
Chief Executive:
Jim Connell

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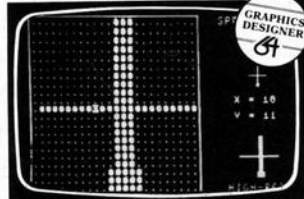
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MARCOL CABINETS, Solent Business Centre, Millbrook Road West, Southampton. Tel: (0703) 731168 (24 hr. answering service).

Showroom open Monday to Friday
or send SAE for colour leaflet of full range

Develop your programming skills with English Software.

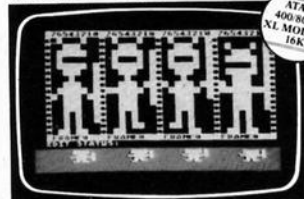
Here are five great titles to really help you enhance your programming abilities.



SPRITEMAKER 64 by M J Taylor
Design and save beautiful multi-coloured sprites, and then use them in your own programs. Full editing facilities under cursor control included. Saves files to cassette and disk. **ONLY £6.95**



SUPERFONT 4.0 by Stephen A Riding
Our character generator lets you re-define and shape your own character sets. Full editing facilities under cursor control included. Saves files to cassette and disk. **ONLY £6.95**



ATARI GRAPHICS WIZARD by Stephen A Riding
The Atari Graphics Wizard introduces you to the wonderful world of Atari Player (Sprite) and Character Graphics. Written totally in Machine Code, it contains Player Editor (Sprite Maker), Character Editor and Multicolour Character Editor. Operates via keyboard or joystick, full documentation supplied with each program. Soon, animated graphic capability will be at your fingertips! **ONLY £9.95**



ACE, THE ATARI CASSETTE ENHANCER by Jon Williams
Cassette features include: Names cassette-saved programs. Searches and loads named program. Displays contents of cassette on screen. Verifies facility. Lists variables. Automatic line numbering. Renumbers any basic program quickly. Creates binary files on tape. Plus many, many more features. Uses only 4K of memory maximum! **ONLY £7.95**

ES FORTH by A Kozakewycz

ES Forth unlocks the door to the wonderful world of Forth at an affordable price! Up to 100 times faster than BASIC, yet easy to learn and easy to use. ★ Basic dictionary compatible with FIG-FORTH ★ Many general purpose extensions ★ Full screen editor ★ Complete set I/O extensions ★ Built in editor definitions ★ Use with Atari Assembler Editor for debugging and machine code linking ★ Sound commands ★ Atari Basic compatible graphics commands ★ Automatic control of Player-Missile graphics ★ Complete set of controller commands ★ User selectable number of editing screens. **ONLY £14.95** (Inc detailed User's Manual)

ATARI 400/800 & XL MODELS 32K

(All English Software programs are sold according to the English Software Terms of Trading, copies of which are available on request.)

To the English Software Company, Box 43, Manchester M60 3AD

Please send on cassette/disk

ES Forth at £14.95 ACE at £7.95 cassette, Superfont 4.0 at £6.95 cassette (CBM 64)

Atari Graphics Wizard at £9.95 Spritemaker 64 at £6.95 cassette (CBM 64)

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Name _____

Address _____

HCW63

ENGLISH SOFTWARE

THE POWER OF EXCITEMENT

You could be on our pages

We welcome programs, articles and tips from our readers. If you feel that your work meets our standards, please submit it to us for consideration for publication.

- Programs must always be sent on cassette. Listings are helpful, but not necessary. Check carefully that your program does, include details of what your program does, how it works, variables you have used and hints on conversion.
- Articles on using home computers should be no longer than 2,000 words. Don't worry about your writing ability — just try to keep to the style in HCW. Articles most likely to be published will help our readers make better use of their micros by giving useful ideas, possibly with programing examples. We will convert any sketched illustrations into finished artwork.
- Tips are short articles, and brief programming routines. Your hints can aid other computer users.

All submissions will be acknowledged and the copyright in such works which will pass to Argus Specialist Publications Ltd will be paid for at competitive rates. Keep a copy of your work and include an SAE label everything clearly and give a daytime and home phone number if you can. All work for consideration should be sent to: Paul Liprot, Home Computing Weekly, No. 1 Golden Square, London W1R 3AB

Win £500 in the GLC Anti-Racist Computer Game Competition! The GLC will award this prize to the winning designer of a space invaders-type quiz around racial issues. You must be an amateur, and the programs you design must run on the BBC B or Spectrum. Closing date is 8 June 1984. Contact the GLC for entry details.

Computer Game Competition, GLC, Director-General's Dept (D/G/EMU), Room 686, County Hall, London SE1 7PB

Number One Systems, 94 Crown St, St Ives, Huntingdon, Cambs PE17 4EB

the component values and circuit configuration during a simulation, so that the designer can quickly assess the circuit's sensitivity to component tolerances, temperature and stray capacitances. Number One Systems believe this program will be of interest to students and junior engineers staff. Versions are also available for the BBC B and Newbrain. Cost of cassette: £35.

Number One Systems, 94 Crown St, St Ives, Huntingdon, Cambs PE17 4EB

Circuit analyser

Just out from Number One Systems: Analyser for the 48K Spectrum. This is a program to evaluate the performance of electronic circuits, enabling the circuit designer to interactively improve them without having to bench test or breadboard. Circuits of up to 16 nodes and 60 components can be analysed for input impedance, linearly or logarithmically spaced functions. Modifications can be made to

JLC. He was involved in the Ministry of Defence ban, and he certainly knows all about it. "Imprint only works for cassettes, but we also have methods of protecting discs against piracy."

Datadone, Unit 1, Roslin Square, Roslin Rd, London W3 8JH; Bibi Magnetics, Field Way, Greenford Industrial Estate, Greenford, Middx UB6 8UN

Piracy

From front page

now take 2 minutes 20 seconds. The unusual timing means that the code section reads in so fast that it's impossible to copy. "Since the tapes are quicker to load we are hoping that they will sell more. This system should't make much difference to the price of software in the shops."

"Incentive is marketing this system through us," Mr Ferguson said. "Incentive processes the software and then gives us specific instructions on how to handle it. Tapes using the biggies sell more. Then we sell 3,000 to 5,000, although the average game computer but the average game market. There are about 2½m that was not quite right with the Ferguson said. "Incentive thought there was something some games cassettes and we said: "We decided to make Cole Managing director Mike Cole another four within a month. bringing out its first four titles this week, all at £1.99, with three weeks, since his price cut. Atlantis Software was compared with the previous the business in seven days. He said he had done 10 times. It's the cart before the horse." There are not enough customers, making too much product and head in the sand. They are "The industry has got its to around £3.50-£3.99. summer we believe there's going Mr Shepherd said: "This Richard and David. Galactica Software, run by month — was prepared by street chains were also taking an distributors and the big high Conventional software newsgroups and grocers. include petrol stations, film rental shops, but others estimated 14,000-16,000 video people. Most outlets are the retailers through teams of sales companies are selling direct to

Battle

From front page

won't re-package old stuff. We don't want to be in that area. There's an old adage that you only get what you pay for." He said his range — which would increase by 10 next month — was prepared by Galactica Software, run by Richard Darling and sons Mr Shepherd said: "This summer we believe there's going to be a big price drop generally to around £3.50-£3.99. "The industry has got its head in the sand. They are making too much product and there are not enough customers. It's the cart before the horse." He said he had done 10 times the business in seven days. compared with the previous three weeks, since his price cut. Atlantis Software was bringing out its first four titles this week, all at £1.99, with another four within a month. Managing director Mike Cole said: "We decided to make Cole thought there was something some games cassettes and we said: "We decided to make Cole another four within a month. bringing out its first four titles this week, all at £1.99, with three weeks, since his price cut. Atlantis Software was compared with the previous the business in seven days. He said he had done 10 times. It's the cart before the horse." There are not enough customers, making too much product and head in the sand. They are "The industry has got its to around £3.50-£3.99. summer we believe there's going Mr Shepherd said: "This Richard and David. Galactica Software, run by month — was prepared by street chains were also taking an distributors and the big high Conventional software newsgroups and grocers. include petrol stations, film rental shops, but others estimated 14,000-16,000 video people. Most outlets are the retailers through teams of sales companies are selling direct to

beat the pirates, Imprint 2, is a technique added to the master before duplication. No dongle or other hardware is necessary. Nigel Boyle, sales manager for data duplicating, said: "There has been a lot of talk about how much income is lost through piracy. Options vary, but it is true that there is a significant loss through piracy. No-one will eradicate piracy, but we aim to help. "Imprint 2 will stop the schoolkid who makes 10 copies for a friend, who then makes 10 more for another friend. Before you know it there are thousands of illegal copies. Professional pirates will also find it hard to get round this imprint technique, as each cassette will need the imprint. "I will work on all computers on all cassettes. The price of software to the consumer should not go up noticeably, unlike cassettes using the dongle. The cost to the software companies will be minimal." Mr Boyle said: "This is the brainchild of Jim Lamont of

All our software is from well respected software houses. They have not been published before and they are not second-rate games. Originally we were going to market them at £5.95 to £6.95." Alan Sharram, of Master-front, said: "We have established ourselves and the games are selling, but we are in to slaughter the software market is nonsense." Nick Alexander, chairman of the Guild of Software Houses and managing director of Virgin Games, said he felt that the market was not yet big enough for budget priced software. He said: "They have got to sell a lot or the sums just don't add up. "I feel that there's no reason why full price and budget price software shouldn't sell side by side. There is a big danger, however, that people will over-react and pull down the record. The video and the record industries learned that mistake to their cost." All three of the new software

Learning is fun

Play and learn with *Clever Clogs*, those five pre-teen cousins who have recently linked up with Argus Press Software. Two new games have just been released: *Star Trucker* for age 9+ and *Music* for 7+.

Space Trucker: your mission is to reach beyond hyperspace and bring back power crystals. You must answer questions correctly in order to be able to buy fuel and commodities or increase the Force Field. Your aim is to fulfil your task in the shortest possible time — then you can print out a Space Commission certificate if you are successful.

Music: This package is three tapes in one — Piano Player, Composer and Musical Quiz. The program can be updated or the difficulty level increased.

Argus Press Software, No. 1 Golden Square, London W1R 3AB

Play and learn

New from Comsoft: *Staircase Stampede*, for the BBC 32K micro. Humphrey struggles to paint the staircase while being pursued by Horrible Harold and Helpful Horace. Watch out for exploding bombs or crushing boots! Cassette costs £7.50; 40 track disc £9.50.

Also from Comsoft for the BBC 32K and Electron: *Playbox*, a combination of three programs on one tape. *Memory* is a game for two, in which you must pair off a series of pictures; *Hangman* has a vocabulary of 280 words and *Bricksmash* keeps you trapped behind a brick wall until you can break out by answering the general knowledge questions.

Price for this package is £6.50 for cassette and £8.50 for 40 track disc.

Comsoft, 7 Roman Drive, Leeds, West Yorks LS8 2DR

Fantasy fun

The *Lords of Midnight* is a new game from Beyond for the 48K Spectrum. Described as "a living fantasy novel," it's an epic game which has similarities to the *Lord of the Rings*.

You may use your Spectrum printer to print out a pictorial record of the game, and Beyond is offering to turn the adventures of the first successful candidate into the first ever computer-generated novel. Price £9.99.

Beyond, Durrant House, 8 Herbal Hill, London EC1R 5EJ

Mammoth micro shop

What is reputed to be the world's largest computer store has opened in London, at Stonebridge Park on the North Circular. Steiger has dedicated 25,000 square foot of floor space to home and business computers. Software is also catered for; both educational and games packages are sold at competitive prices.

John Patterson, director, said: "For the first time customers have got everything they need under one roof, from the smallest computer to a dedicated multi-user system."

He continued: "We support our products with skilled, trained people. Our programme of after sales support and maintenance is second to none. Our long-term aim is to open a chain of Steiger-owned or franchised shops and achieve nationwide coverage."

● As an introductory offer, Steiger is deducting up to 20 per cent from an Apple system, and permitting a seven-day free trial.

Steiger House, North Circular, Stonebridge Park, London NW10 7QZ

Face foes, rescue maidens!

Four more games and one utility are just out from English Software for Atari, each costing £9.95. In the *Adventures of Robin Hood*, foil the Sheriff of Nottingham, steal the silver and rescue Maid Marian!

Brian the Blob has stolen the great Diamond and hidden it in the deepest vault. In *Dan Strikes Back*, you must make your way through the vault, avoiding the creatures and trampling on the mushrooms.

Citadel Warrior 32K is a game in which your mission is to save the world from evil forces, set on destroying security citadels with their cyclotron bombs. *Neptune's Daughters* is an original game in which the Sea Serpent seizes Neptune's beautiful daughters and carries them off to his lair. Your task is to brave the Sea Serpent and rescue the maidens.

Atari Graphics Wizard enables you to create new characters and edit and create players (sprites) at the same time. It eliminates the need for a separate player and character editor.

English Software, Box 43, Manchester M60 3AD

Cut-price CBM 64 music box

My attention is drawn most readily to programs having to do with music. Therefore, I was attracted to the announcement by Human Engineered Software (HES) of its latest product for the Commodore 64. It is called Synthesizer 64. As you may know, the 64 has a chip inside it called SID (for Sound Interface Device) that is capable of producing all sorts of neat noises.

Unfortunately, it was designed to be PEEKed and POKEd from BASIC, which is a very tedious, not to mention time consuming and technical, way of getting the job done. In this manner it usually takes hours to design tunes that play for seconds. But that is all over now. Using the HES program, you no longer have to be a programming genius to get fantastic results. You will need some specialized knowledge of musical synthesizers, but that knowledge is passed along to you by the program itself, which in addition to being useful is also educational.

The program teaches all about the common electronic music buzzwords and acronyms, as well as teaching about the limitations and capabilities of the SID chip. The program allows the creation of up to eight low frequency oscillators, two piano-style keyboards displayed on the screen, is able to store and recall up to 256 predetermined pitch settings, and uses the disc drive as a "tape recorder" on which you can store as many as nine tunes and nine sets of 256 predetermined settings. A sample demo is included with the program which shows off its tremendous capabilities.

Among other things, the program is capable of producing three-note chords, something which, until very recently, all except the most expensive music synthesizers were not capable. Even at present, the most reasonable priced three-voice synth costs lots more than a CBM 64 system. It is also possible to match the pitch of the unit to other instruments by using the left and right arrow keys to increase or decrease the pitch in gradual increments — while playing in real time!

The program does have some limitations of which you should be aware. Its error handling is less than superb and occasionally the keyboard will go dead, requiring a complete reboot. Since the keyboard is used for entering the notes, it is obviously not going to be played as efficiently as a real keyboard instrument, nor is the sound going to resemble that produced by a commercial-grade synth. Still, no other special hardware is required to produce music, and there seems to be no other place you can learn so much about electronic music for such a low price.

The program costs all of \$19.95! If unavailable from your local HES dealer, you can enquire directly to Human Engineered Software, 150 North Hill Drive, Brisbane 94005, (415) 468-4111.



Hands Across The Water Dept. Our GTE (General Telephone and Electronics) Telenet Communications and British Telecom have just announced a jointly developed system of transmitting telex messages faster and cheaper. The new service does not require any specialized telex equipment other than standard terminals and micro computers — or even dedicated word processors — in order to send messages to the U.K. The system is called *Interstream One*, and will reduce the cost of standard telex communications from \$2 or \$3 per minute to as low as 17 cents per minute plus .08 cents for every 400 characters transmitted. Say, that's a more efficient way of getting my column to you...

No more space now. See you next week.

**Bud Izen
Fairfield, California**



Come fly with us

FASTEN your seat belt and prepare for take off!

This is your chance to win a once in a lifetime trip. However, you won't be going anywhere — you'll just think you are. Rediffusion simulators make you think you're flying while you stay in the same place.

Be the envy of your friends when you take a ride in a simulator in which civilian and military pilots train.

You'll travel to Rediffusion's head offices in Crawley, near Gatwick. You must be 10 or over and accompanied by an adult. Home Computing Weekly will pay for your travel expenses.

Rediffusion Simulation is the largest simulator products manufacturer in Europe. The aim of flight simulators is to create a realistic environment so trainee pilots can learn through practice. The flight deck has authentic instruments. A computer creates lifelike scenes.

You can choose your weather — snow, ice, rain, thunder or make it easy and go for fine weather — as well as time of day or night.

Each of Rediffusion's simulators costs £5m and there is a comprehensive range from BA146 to Boeing 747.

As a lasting souvenir of this memorable and exciting day out, Rediffusion will send you a photograph of yourself in control of your aircraft.

Additional prizes to keep you airborne are 25 cassettes of Fighter Pilot from Digital Integration for the 48K Spectrum. Usual price: £7.95.

Transform your front room into a simulator as you play this real time game. Based on the USAF jet fighter, the F15 Eagle, the 3D graphics give you the illusion of reality.

The creator of Fighter Pilot, Dave Marshall, is an expert — he's a former Ministry of Defence pilot and he's flown Hunters and Jet Provosts, so he's got inside knowledge.

So what are you waiting for? The competition is as straightforward as all the previous ones. Don't forget to write your age on your entry coupon.

How to enter

Hidden in the wordsquare are a number of aeronautical terms. Look closely and try and find as many terms associated with aircraft as possible. Mark these words with a ballpoint or semi-opaque felt-tip pen. Complete the coupon fully and clearly — if you are a winner it will be used as a label — and send the wordsquare and coupon to us.

Important: you must write on the back of the envelope the number of terms you found. Don't forget to write your age on the coupon.

You may enter as many times as you wish provided each is on the official wordsquare and coupon and in a separate envelope. Copies will not be accepted. Please do not enclose anything else.

Send your entry to Simulator Competition, Home Computing Weekly, No. 1 Golden Square, London W1R 3AB.

Closing date is at first post on Friday June 8, 1984. The top prize, a ride in a Rediffusion simulator, will be awarded to the sender of the first correct entry opened at random. Runners-up will be the senders of the next 25 correct entries opened at random; they will receive a copy of Fighter Pilot from Digital Integration for the 48K Spectrum.

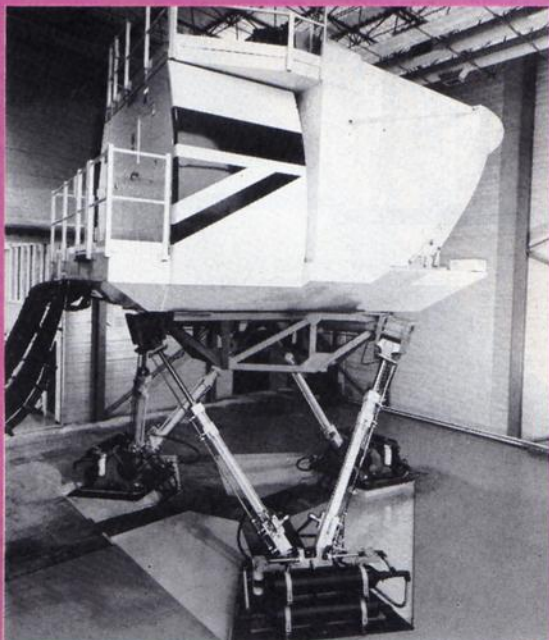
The winner of the simulator prize must be accompanied by an adult companion. The trip to Rediffusion offices in Crawley will be on a date convenient to Rediffusion. Home Computing Weekly will cover surface travel expenses from a mainland U.K. address.

Software will arrive from Digital Integration within 28 days of the results appearing in Home Computing Weekly, or earlier.

This competition is restricted to entrants over the age of 10.

The rules

Entries will not be accepted from employees of Argus Specialist Publications, Rediffusion Simulation, Digital Integration and Alabaster Passmore & Sons. This restriction also applies to employees' families and agents of the companies. The rules include the guidance in the How to Enter section. The editor's decision is final and no correspondence will be entered into.



A	U	G	S	I	M	L	A	T	O	R	C	B	H	B	
F	N	D	J	Z	E	C	D	I	L	A	J	M	D	I	F
K	D	E	C	K	Y	F	I	R	A	D	A	R	X	D	L
A	E	L	O	E	G	V	G	C	B	W	M	F	C	H	I
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N	C	I	K	X	R	I	E	A	P	S	J	Q	K	P	H
D	A	Q	P	L	A	K	W	F	I	G	H	T	E	R	T
N	R	M	I	P	I	L	O	T	R	L	V	H	P	O	D
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V	G	R	U	G	E	B	O	J	E	T	W	T	N	S	H
X	E	L	E	Z	L	T	A	F	X	Y	M	L	Y	U	D
V	Z	V	K	Y	D	A	F	D	W	J	Z	E	C	A	B
C	J	O	Y	S	T	I	C	K	H	B	X	C	D	B	E
W	G	X	Y	E	C	Z	E	A	R	U	N	W	A	Y	F

Simulator Competition

Entry Coupon

Name _____

Address _____

post code _____

Age _____ Number of titles found _____

Complete clearly and fully — if you are a prizewinner this will act as a label. Post to Simulator Competition, Home Computing Weekly, No. 1 Golden Square, London W1R 3AB. Closing date: first post, Friday June 8, 1984. Follow carefully the advice in the How to Enter section, including writing the number of titles you found on the back of the envelope

```

1 REM "ALIEN"
2 GOSUB 5900
3 DIM A(21,31)
4 LET LIVES=155
5 DIM A(5)
6 DIM A$(2,3)
7 LET A$(1)="███"
8 LET A$(2)="███"
9 LET SCORE=0
10 LET Z=16
11 LET S$=""
12
13
14 LET V=20
15 LET W=0
16 FOR X=0 TO 21
17 PRINT AT X,0;S$
18 NEXT X
19 FOR D=1 TO 5
20 LET A(D)=D*5
21 PRINT AT 3,D*5;A$(1);AT 4,D
22 *5;A$(2)
23 NEXT D
24 PRINT AT 0,0;"HI-Score=███"
25 BY)
26 PRINT AT 18,2;"SCORE=";AT
17,2;"SCORE=";AT 18,3;"SCORE"
27 *8;"AT 19,2;"
31 PRINT AT 21,16;CHR# LIVES;A
T 0,9;HISCORE;AT 0,19;F$
32 FOR S=1 TO 27 STEP 3
33 LET R(10,S)=2
34 LET R(10,S+1)=0
35 LET R(12,S+2)=0
36 LET R(12,S+3)=2
37 LET R(8,S+3)=2
38 LET R(14,S)=0
39 LET R(14,S+1)=2
40 LET R(8,S+2)=0
41 NEXT S
42 FOR S=1 TO 27 STEP 3
43 PRINT AT 10,S;"███";AT 12,S+
2;"███";AT 14,S;"███";AT 8,S+2;"███"
44 NEXT S
45 PRINT AT 5,3;"███"
105 PRINT AT 21,15;"███";AT 21,17
███"
110 LET B=INT (RND*5)+1
120 IF A(1)=0 AND A(2)=0 AND A(
3)=0 AND A(4)=0 AND A(5)=0 THEN
GOTO 1000
130 IF A(B)=0 THEN GOTO 110
140 PRINT AT 5,8*5;"███"
145 FOR I=0 TO 10
147 NEXT I
150 FOR M=0 TO 30
170 LET Z=Z-(INKEY#="0")+(INKEY
#="P")
190 LET V=V-1
200 LET P=R(V,Z)
210 PRINT AT V,Z;"███"
215 IF P=2 THEN GOTO 360
217 PRINT AT V,Z;"███";AT V,Z;"███"
220 IF V=6 AND Z=B*5+1 THEN GOT
0 300
225 IF V=6 THEN GOTO 325
230 NEXT M
300 PRINT AT 3,Z-1;"███";AT 4,Z
-1;"███"
310 LET A(B)=0
320 LET SCORE=SCORE+500
325 LET SCORE=SCORE+500
326 LET Z=16
335 PRINT AT 18,3;SCORE
340 LET V=20
355 GOTO 100
360 LET LIVES=LIVES-1
361 FOR Q=0 TO 8
362 PRINT AT V,Z;CHR# Q;AT 21,1
6;CHR# (Q+128)
363 NEXT Q
364 LET Z=16
365 PRINT AT 21,16;CHR# LIVES
367 IF LIVES=156 THEN GOTO 395
368 LET V=20
369 GOTO 45
395 FOR S=0 TO 21
400 PRINT AT 5,0;S$
410 PRINT AT 10,10;"GAME OVER";
AT 10,10;"GAME OVER"

```

Oh no! The unthinkable has happened. Your 16K ZX81's ground pilot has gone berserk and has left you, the only known sane survivor, to fight off the intergalactic aliens.

What's worse is that he has caused catastrophe in the missile launching room and has put you into auto-launching mode.

reach scores in the region of 15-25,000.

The game can be made to run slightly faster by omitting line 210.

To make the game easier, less barricades should appear. In order to do this, omit lines 33-38 and amend line 46 to:

Main variables

RB(x,y) screen dimension
lives lives (in inverse)
A vertical alien positions
Z,V vertical, horizontal missile position
B opening under alien position
FS high scorer's name

PRINT AT 14,S;"(2 GRAPH-ICS H)"; AT 8,S+2;"(2 GRAPHICS H)"

Words in inverse are 410 GAME OVER, 600 SCORE=, 758 YOU HAVE EQUALLED TODAY'S HI-Score **WELL DONE**, 1210 YOU HAVE GAINED TODAY'S HI-Score **CONGRATULATIONS**, 1222 TYPE IN YOUR NAME.

The game can be SAVED by typing GOTO 1400.

Hints on conversion

The game should not present too many difficulties to convert to other computers. The only major difference is the ZX81's character set: CHR5 159 is inverse S, CHR5 156 inverse 0, CHR5 118 newline (return), CHR5 128 onwards graphics characters.

How it works

2 GOSUB for instructions
3-16 set up main variables
17-20 print inverse screen
25-28 print aliens and record their positions
29-31 print score, lives etc
32-44 record barricades positions
47 print barricades
100-140 print opening under alien
150-230 main loop
300-320 alien destroyed
325 reached alien but not destroyed
326-355 print score and initialise missile positions
360-369 lose life routine
396-1200 game over routine
1210-1290 high score routine
5900-6050 print title in large letters
6060-9179 initialise high score variables and print instructions
9900-9935 print wait routine

Your only hope is to steer the missiles at the aliens.

Easy, you may think. It's not if their targets are at the other side of reinforced, indestructible barricades. Full instructions are in the listing.

When you have mastered the game you should be able to

```

420 NEXT S
500 PRINT AT 10,10;"███"
600 PRINT AT 12,8;"SCORE=";SCO
RE
601 PRINT
755 IF SCORE>HISCORE THEN GOTO
1210
758 IF SCORE=HISCORE THEN PRINT

```

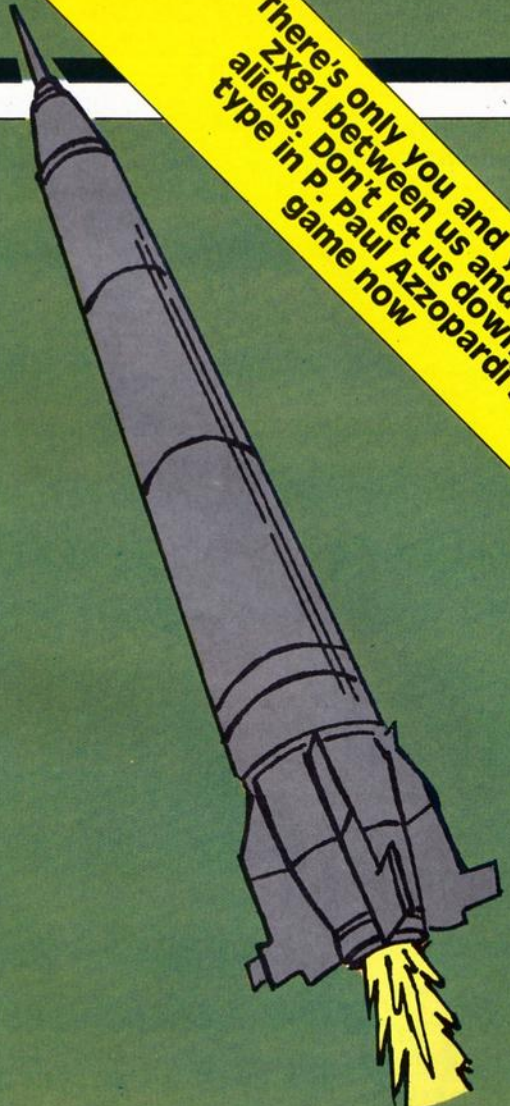
Zap before blast


```

"YOU HAVE EQUALLED TODAY'S HI-SCORE
GOSUB 9900
760 GOSUB 9900
900 GOTO 3
1000 LET LIVES=159
1100 LET SCORE=SCORE+1000
1200 GOTO 14
1210 PRINT "YOU HAVE GAINED TODAY'S
HI-SCORE *****CONGRATULATIONS*****"
1220 PRINT "-----"
1231 PRINT "-----"
1232 PRINT "-----TYPE IN YOUR NAME-----"
1233
1230 LET F$=""
1235 FOR O=11 TO 16
1236 IF INKEY$(">") THEN GOTO 1237
1237 IF INKEY$="" THEN GOTO 1237
1240 IF INKEY$=CHR$ 118 THEN GOT
O 1270
1245 LET X$=INKEY$
1249 PRINT AT 16,0;X$;
1250 LET F$=F$+X$
1260 NEXT O
1270 LET HISCORE=SCORE
1290 GOTO 760
1300 STOP
1400 SAVE "ALIEN"
1500 RUN
5900 PRINT "AT 3,4; *****"
6000 PRINT "AT 4,4; *****"
6010 PRINT "AT 5,4; *****"
6020 PRINT "AT 6,4; *****"
6030 PRINT "AT 7,4; *****"
6040 PRINT "AT 8,4; *****"
6050 PRINT "AT 9,4; *****"
6060 GOSUB 9900
6070 CLS
9000 PRINT TAB 11;"ALIEN";TAB 11
9010 GOSUB 9932
9110 PRINT "YOU HAVE TO ST
EER YOUR MISSILE (M) PAST THE B
ARRICADES (■) AND THEN INTO O
NE OF THE FIVE ALIENS WHICH ARE
WAITING ON THE TOP OF THE
SCREEN."
9112 GOSUB 9932
9115 GOSUB 9900
9116 GOSUB 9932
9120 PRINT "IF THE ALIEN IS
ACTIVE YOU GET 1000 POINTS AND I
T BLOWS UP. (YOU WILL KNOW IF
THE ALIEN IS ACTIVE OR NOT BECA
USE IT WILL HAVE AN OPENING AT
THE BOTTOM)."

```

There's only you and your 16K ZX81 between us and the aliens. Don't let us down — type in P. Paul Azzopardi's game now



them
e they
US...

```

9130 PRINT "AN ALIEN WILL ONLY
STAY ACTIVE FOR A FEW SECONDS.
IF YOU DON'T MANAGE TO HIT AN A
CTIVE ALIEN YOU WILL GET 500 P
OINTS."
9135 GOSUB 9932
9136 GOSUB 9900
9137 GOSUB 9932
9140 PRINT "YOU HAVE 3 LIVES
AND YOU LOSE 1 EACH TIME YOU HIT
A BARRICADE."
9170 PRINT "KEYS : Q MOVES LEF
T;TAB 7;"P MOVES RIGHT"
9172 GOSUB 9932
9175 GOSUB 9900
9178 LET HISCORE=0
9179 LET F$="?????"
9180 RETURN
9900 PRINT AT 18,3;"←-PRESS A KE
Y TO CONTINUE-→"
9902 FOR W=0 TO 5
9903 NEXT W
9905 PRINT AT 18,3;"←-PRESS A KE
Y TO CONTINUE-→"
9910 IF INKEY$="" THEN GOTO 9900
9920 CLS
9930 RETURN
9932 PRINT
9933 PRINT
9934 PRINT "-----"
9935 RETURN

```

Croakit 32K BBC £5.95

Kerian, 29 Gisburn Rd, Hessele, Hull HU13 9HZ

There has to be a limit to the number of versions of a single game the market can stand and in the case of Frogger I'm sure we must have reached it by now! I was somewhat taken aback therefore to receive this one for review.

It is a perfectly reasonable version with most of the features you expect: interrupt driven music routines, smooth animation and a reasonable playing speed, although I prefer the fastest version available (Croaker).

Snakes, flies, lady frogs and crocodiles all have their

particular rewards or punishments in store for you. There are a few features which do make this stand out from the crowd, although I don't feel they are improvements. The frog does not change attitude when you change direction, there is only ever a forward facing frog on screen, there are two rows of logs both moving in the same direction and there can be more than one fly on the screen at once.

Rather too late to catch a mass market and not the best available I'm afraid.

instructions	50%
playability	60%
graphics	75%
value for money	60%



Rocky 32K BBC £7.95

Superior Software, Dept C, Ground Floor, Regent House, Skinner Lane, Leeds

This game has nothing to do with boxing!

Instructions are given during the loading process and are quite adequate. A nice extra is the revolving score table, on which you can see your name spin round, if you're good enough!

The major setback of the game is that the graphics are small. The small characters make the game appear to be really fast.

You have to kill the mutant robots by dropping rocks on them. They have one large eye which emits a yellow beam of light. If you're caught in this,

your strength is sapped and if you're not carrying a rock the mutant will metamorphose into a cruncher or spectre.

The game is situated in a maze. Two separate keys are used to pick up rocks and drop them. This makes the game very difficult. Some of you 'wonder players' out there may be able to pick up this sort of game with no problem, but slow people like myself would have great difficulty.

£7.95? Well, I wouldn't buy it. **D.B.**

instructions	80%
playability	50%
graphics	90%
value for money	60%



Bumble Bee BBC B £7.95

Powper, 8/8a Regent St, Chapel Allerton, Leeds LS7 4PE

If you like chasing and BEEing chased around mazes then this is for you. Not particularly original but certainly inventive.

It's based on a similar idea to Pac-man. You are a bee wandering around eating pollen and occasional fruit. However all is not rosy in the garden. There are hazards to watch out for. Toadstools and tasty looking foodstuffs are poisoned. Worse! Spiders appear to chase and devour you. However, there are some tricks in your favour if your reactions are fast enough.

Parts of the maze contain swinging gates which can guard your escape. Spiders can be lured to eat the food and so die!

It's an extremely colourful game with excellent graphics. There is a useful sound on/off option which meant I could play late into the night and a high-score table to satisfy the competitive player.

My only problem was with the choice of keys for movement — the asterisk and question mark were not a good idea for up and down. There is a joystick option which made it slightly easier although changes of direction were still tricky. **M.P.**

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



Flex your muscles on these!

Escape from Colditz, hurl boulders at robots and chase round mazes! Our reviewers have cooled down enough to tell you how they rated these active games

Planetfall 32K BBC £11.95

Argus Press Software, No.1 Golden Square, London WC2 0EE

This trading game is brought to you by the publishers of this magazine. You may be somewhat sceptical therefore when I describe it as one of the best trading type games I have seen for the BBC. My main reason is not that I like working here but that it is the most understandable trading game I have played, with simple rules but interesting and lively action.

The program has 11 different screen displays, all attractively laid out in teletext with plenty of colour and sound. You have many options and can alter skill

levels and time span.

You pilot a cargo ship around the galaxy buying and selling as you go and at each stop you have the chance to haggle over the prices. For anyone with a passion for games playing it will be a wonderland.

The only difficulty I have had is trying to get to the bank as the instructions don't give enough detail on this aspect. An exciting two- or more player game which is a little overpriced but good fun. **D.C.**

instructions	70%
playability	95%
graphics	80%
value for money	80%



Colditz 32K BBC £8.65

LVL, Electron House, Bridge St, Sandiacre, Notts

A nice extra here is a sheet explaining how to run this program with a 0.10 operating system. The loading instructions are very clear and a 16-page booklet is included.

As you may have guessed, Colditz involves you escaping from the German POW camp. The screen displays a map of the level you are on. Using the cursor keys you can move around searching for escape routes and equipment.

A door which is normally closed has a German guard outside. If you show him your pass, you may enter. Other doors need keys.

There are eight escape routes, the most obvious being through the drains. When you have collected five essentials, (e.g. compass) you can escape. However, trying to leave the prison with the wrong equipment leaves you with 30 days in the cooler. This is equivalent to a new start.

Of course it's not that easy. Occasionally an *appel* is called, and if you are caught for not appearing or you arrive with escape equipment you're in the cooler.

Two word commands are used and they can't be abbreviated: a lot of typing. **D.B.**

instructions	95%
playability	80%
graphics	50%
value for money	70%



WHAT IS EDU-GAME?



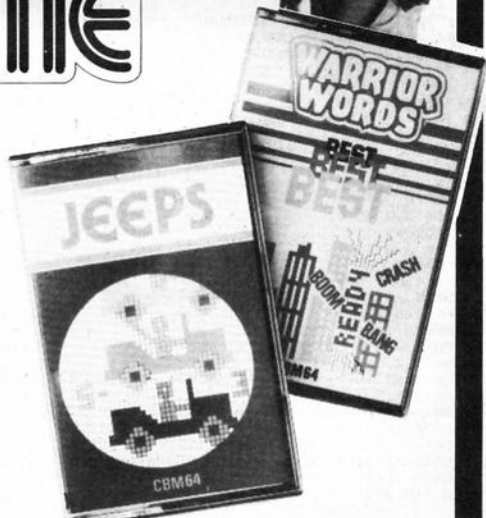
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PLEASE SEND FOR FURTHER DETAILS ON YOUR PROGRAMMES:

NAME _____

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P/CODE _____

Listing for Beauty and the Beast

```

1 GO SUB 90: BRIGHT 1: INK 5: BORDER 0: PAPER 0: PRINT AT 10,5: FLASH 1:"BEAU
TY AND THE BEAST":AT 12,13: FLASH 0:"BY":AT 14,8: FLASH 0:"SAMEER SHETH": LET o=
0:
2 PRINT AT 20,3: FLASH 1:"PRESS ANY KEY TO CONTINUE": PAUSE 0: CLS : PRINT "O
-LEFT": PRINT "P-RIGHT": PRINT "O-UP": PRINT "A-DOWN": PRINT AT 21,3:"PRESS ANY
KEY TO START":
3 PRINT AT 5,0:"THE OBJECT OF THE GAME IS TO RESCUE THE PRINCESS BEFORE TH
E HEAVY LOAD,WHICH THE BEAST HAS DROPPED FLATENS HER."
4 PRINT AT 10,0:"HOWEVER THIS CAN ONLY BE DONE BY FIRST FETCHING THE ROSES.
":AT 13,0:"WATCH OUT FOR THE THORNS."
5 PRINT AT 15,0: INK 2;"E": INK 5;"-ROSE": PRINT : PRINT INK 4;"E":"-THORN"
:
PRINT : PRINT INK 7;"O": INK 5;"-THORN": PAUSE 0: CLS
6 LET t=0: INK 5: GO SUB 150
7 LET k=0: LET l=28
8 FOR x=0 TO 20 STEP 2: PRINT AT x,4: INK 7;"O":AT x+1,4;"E": NEXT x:
10 LET a=1
20 PRINT AT a-1,0:" "
21 PRINT AT k,1: INK 5;"E"
22 IF INKEY#="p" THEN LET l=1+1: PRINT AT k,1-1:" "
23 IF INKEY#="o" THEN LET l=1-1: PRINT AT k,1+1:" "
24 IF INKEY#="q" THEN LET k=k-1: PRINT AT k+1,1:" "
25 IF INKEY#="a" THEN LET k=k+1: PRINT AT k-1,1:" "
26 IF ATTR (k,1)=68 THEN BEEP .008,20: BEEP .008,14: GO TO 400
27 IF ATTR (k,1)=70 THEN BEEP .08,10: BEEP .08,14: LET o=o+100: IF o>=140 THE
N CLS : RESTORE : GO TO 6
28 IF ATTR (k,1)=71 THEN BEEP .08,10: BEEP .08,10: GO TO 400
29 IF ATTR (k,1)=66 THEN BEEP .0,10: LET t=t+1: LET o=o+10
30 IF ATTR (a+1,1)=70 THEN BEEP .08,10: BEEP .08,14: BEEP .08,10
31 PRINT AT a,0: INK 7;" "
32 PRINT AT a+1,0: INK 7;" "
33 PRINT AT 19,1: INK 6;"O":AT 20,1: INK 6;"B"
34 LET a=a+1
35 PRINT AT 0,1: INK 7: BRIGHT 1:"E"
40 IF a>19 THEN PRINT AT a,0:" "
41 IF a>19 THEN PRINT AT a+1,0:" " : GO TO 10
44 IF ATTR (a,1)=70 THEN PRINT AT a-1,0:" " :AT a,0: INK 3;" " :AT a+1,0:
I
NK 3;" " : PRINT AT 10,0: FLASH 1:"SPLAT !": GO TO 400
50 IF t=4 THEN GO SUB 1000
51 IF l<0 THEN LET l=0
52 IF l>31 THEN LET l=31
53 IF k<0 THEN LET k=0
54 IF k>21 THEN LET k=21
70 GO TO 20
90 FOR d=0 TO 8
99 READ s#
100 FOR z=0 TO 7
111 READ a
112 POKE USR s#+z,a
114 NEXT z
115 NEXT d
116 RETURN
150 FOR n=0 TO 50: PRINT AT RND*20,RND*25+(5): INK 4;"E"
200 NEXT n
210 FOR n=0 TO 3: PRINT AT RND*20,RND*20+(5): INK 2;"E": NEXT n
300 RETURN
400 PRINT AT 10,10: INK 7: FLASH 1:"YOUR SCORE= ";o: STOP
500 DATA "q",192,224,248,255,254,252,248,192
600 DATA "a",192,192,192,192,192,192,192,192
700 DATA "s",8,8,28,56,60,254,BIN 01111100,255
800 DATA "h",255,BIN 00111100,BIN 00111100,255,BIN 00100100,BIN 00100100,BIN 00
100100,BIN 01100110
900 DATA "o",8,255,62,127,93,93,BIN 10001011,42
901 DATA "p",24,126,60,24,255,60,124,198
904 DATA "k",15,15,31,74,54,98,80,128
905 DATA "u",196,127,63,15,5,7,7,3
906 DATA "i",134,252,248,192,64,192,192,128
1000 PRINT AT RND*19,4:" " : LET t=0: BEEP .008,10: BEEP .008,14: BEEP .008,10:
BEEP .008,14: BEEP .008,10: BEEP .008,14: BEEP .008,10: BEEP .008,14: BEEP .008,
10: BEEP .008,14: BEEP .008,10: BEEP .008,14: BEEP .008,10: BEEP .008,14: BEEP .
008,10: BEEP .008,14
2000 RETURN

```

Listing for Olympic Runner

```

1 REM OLYMPIC RUNNER By A.G.Bird.1984
2 POKE 23658,8: DIM x(64): DIM y(64)
3 GO SUB 90000: GO SUB 80000: GO SUB 70000
4 LET i=INT (RND*4): LET m=0: LET s=0: LET run=0: LET n=1: LET 1=0
5 LET s#=" " ON YOUR MARKS..... GET SET..... GO!
6 BORDER 4: PAPER 7: CLS
7 REM DRAW GAME
8 FOR f=5 TO 16: PRINT AT f,10: PAPER4:" " : NEXT f
10 PAPER 7: INK 4: PRINT AT 0,0:" " :AT 1,0:" " :AT 2,0:" "
:AT 3,
0:" " :AT 4,0:" " :AT 5,0:" " :AT 6,0:" "
12 PRINT AT 0,25:" " :AT 1,26:" " :AT 2,27:" " :AT 3,28:" "
:AT
:AT

```

Wh your — res princ win gold

Beauty and the Beast by Sameer Sheth

You are the Prince. The Princess has been captured by a nasty beast and your task is to rescue her.

Her life is in danger. The beast has dropped a heavy weight which is descending towards her and threatens to crush her.

For the first part of your quest you must pick the roses in the garden.

Beware the sharp thorns which surround the roses and which will hurt you. Try and save the Princess before it is too late!

How it works

- 2-5 instructions
- 6-25 movement of prince and movement of heavy load
- 50-54 make sure prince does not go out of screen
- 90-115 set up of USR defined graphics
- 150-200 set up of thorns

Olympic Runner by Andrew Bird

What could be more appropriate in Olympic year than Olympic Runner, based on one of Britain's strongest hopes in the Games, the track events?

Cheer your favourite runner on to win the 400 metres. Skill and dexterity are vital. Fast reactions will speed your athlete on to get the gold, and set a new world record.

In the middle of the track, a key will be specified. To complete one circuit you must press the correct keys about 16 times. Meanwhile the seconds are ticking away...

See if your record times can beat the likes of Coe and Ovett. You may even qualify for the 1988 Olympics!

What is your target? Defeating a boss or winning a medal?

Decide on your mission and then strive to complete it with your Spectrum. Defeat all obstacles to rescue a maiden in distress or go for gold and set a new world track record

How it works

- 2-6 set cursor to upper case, define variables
- 8-60 draw game, prepare player
- 100-300 main loop. Sets up random letter to be pressed, checks if pressed, if so advances runner, keeps time
- 1000 random letter subroutine
- 5000-5030 end of game subroutine
- 7000-7100 set up array for runner position
- 8000-8050 instructions
- 9000-9100 graphics

Variables

- x,y array co-ordinates
- i colour of runner
- m minutes
- s seconds
- n defines which part of array
- l check for letter set up
- run spaces to run
- letter actual letter to be pressed
- a\$,b\$,c\$ runner
- s\$ countdown to race

• When typing in these programs, underlined characters should be entered in GRAPHICS mode.

```

4,29;"O";AT 5,30;"O";AT 6,31;"O"
14 PRINT AT 15,0;"N";AT 16,0;"N";AT 17,0;"N";AT 18,0;"N";AT 19,0;"N"
;AT 20,0;"N";AT 21,0;"N"
16 PRINT AT 15,31;"E";AT 16,30;"E";AT 17,29;"E";AT 18,28;"E";AT 19,27;"E"
;AT 20,26;"E";AT 21,25;"E"
20 PRINT AT 5,9;"E";AT 6,8;"E";AT 7,7;"E";AT 8,6;"E";AT 9,5;"E"
;AT 10,5;"E"
22 PRINT AT 11,5;"O";AT 12,5;"O";AT 13,6;"O";AT 14,7;"O";AT 15,8;"O"
;AT 16,9;"O"
24 PRINT AT 5,22;"N";AT 6,22;"N";AT 7,22;"N";AT 8,22;"N";AT 9,22;"N"
;AT 10,22;"N"
26 PRINT AT 11,22;"M";AT 12,22;"M";AT 13,22;"M";AT 14,22;"M"
;AT 15,22;"M";AT 16,22;"M"
30 PRINT AT 15,10; INK 0; PAPER 6;"OLYMPIC RUN"
35 INK 0; CIRCLE 104,100,10; CIRCLE 128,100,10; CIRCLE 152,100,10; CIRCLE 116,90,10; CIRCLE 140,90,10
40 PAUSE 50
45 PRINT AT 13,10; PAPER 7;" "
50 FOR f=1 TO LEN s$: PRINT AT 13,10;s$(f TO f+1): BEEP .05,-20: NEXT f
55 PRINT AT 13,10; PAPER 7;" "
60 BEEP .5,40
9 REM MAIN LOOP
100 IF 1=0 THEN GO SUB 1000
120 IF PEEK 23560=letter THEN LET run=run+3: LET 1=0
140 IF run=0 THEN GO TO 160
150 LET n=n+1: LET run=run-1
155 IF n=65 THEN GO TO 5000
160 IF n>0 THEN LET a$=" O " : LET b$=" M " : LET c$=" KL "
165 IF n>13 THEN LET a$=" BB " : LET b$=" EE " : LET c$=" IJ "
170 IF n>45 THEN LET a$=" CD " : LET b$=" FF " : LET c$=" KL "
200 PAPER 7: INK 1: PRINT AT x(n),y(n);a$;AT x(n)+1,y(n);b$
205 PRINT AT x(n)-1,y(n);" " ;AT x(n)+2,y(n);" "
210 BEEP .05,(n/3)-10
220 PRINT AT x(n),y(n);a$;AT x(n)+1,y(n);c$
230 BEEP .05,(n/2)-10
240 LET s=s+39
245 IF s>60 THEN LET m=m+1: PRINT AT 13,17;m;AT 13,18;" ";AT 13,20;" ": LET s=0
250 PRINT AT 13,11;"TIME"
255 IF INT s<10 THEN PRINT AT 13,19;"0";INT s
260 IF INT s=10 THEN PRINT AT 13,19;INT s
300 GO TO 100
999 REM LETTER
1000 LET letter=INT (RND*26)+65: PRINT AT 6,10; INK 0; PAPER 5;" Press ";CHR$(letter);" ": LET 1=1: RETURN
4999 REM END OF GAME
5000 FOR f=1 TO 100: BEEP .01,f/4: BORDER 7: BORDER 6: BORDER 4: NEXT f
5010 PAPER 6: INK 0: CLS : PRINT AT 8,6;"YOU HAVE JUST RUN";AT 10,8;"400 METRES IN"
5015 IF m=0 THEN GO TO 5025
5020 PRINT AT 14,7;m;" MIN. ";INT s;" SECONDS": GO TO 5030
5025 PRINT AT 14,10;INT s;" SECONDS"
5030 PAUSE 50: PRINT AT 21,1;"PRESS ANY KEY FOR ANOTHER RACE.":PAUSE 0: GO TO 4999
6999 REM SET UP ARRAY
7000 FOR f=1 TO 9: LET x(f)=18: NEXT f
7010 FOR f=10 TO 24: LET x(f)=27-f: NEXT f
7020 FOR f=25 TO 41: LET x(f)=21: NEXT f
7030 FOR f=42 TO 56: LET x(f)=f-39: NEXT f
7040 FOR f=57 TO 64: LET x(f)=18: NEXT f
7050 FOR f=1 TO 13: LET y(f)=13+f: NEXT f
7060 FOR f=14 TO 20: LET y(f)=27: NEXT f
7070 FOR f=21 TO 45: LET y(f)=47-f: NEXT f
7080 FOR f=46 TO 52: LET y(f)=1: NEXT f
7090 FOR f=53 TO 64: LET y(f)=f-51: NEXT f
7100 RETURN
7999 REM INSTRUCTIONS
8000 CLS : PRINT AT 0,0; PAPER 1; INK 6;" OLYMPIC RUNNER. "
8010 PRINT AT 2,10; INK 3;"By A.G.Bird"
8020 INK 1: PRINT AT 4,0;"HAVE YOU EVER DREAMED THAT""YOU WOULD TAKE PART IN THE"" OLYMPIC GAMES?"
8025 PRINT AT 10,2; INK 2;"WELL NOW IS YOUR CHANCE."
8030 PRINT AT 13,0;"Use your skill & quick reaction""time to press the correct keys""and you will be sprinting around""the 400 metres circuit in the"" Olympic Stadium."
800 PAUSE 500: RETURN
8999 REM GRAPHICS
9000 FOR f=65368 TO 65495: READ a: POKE f,a: NEXT f
9010 DATA 12,30,12,4,15,22,23,99,0,0,0,0,192,32,32,0
9020 DATA 0,0,0,0,3,4,4,0,48,120,48,32,240,104,232,198
9030 DATA 3,3,2,3,2,2,2,6,128,128,128,0,128,64,64,0
9040 DATA 1,1,1,0,1,2,2,0,192,192,64,192,64,64,64,96
9050 DATA 3,15,16,32,192,0,0,0,128,128,128,140,112,0,0,0
9060 DATA 1,1,1,49,14,0,0,0,192,240,8,4,3,0,0,0
9070 DATA 255,254,252,248,240,224,192,128,128,192,224,240,248,252,254,255
9080 DATA 255,127,63,31,15,7,3,1,1,3,7,15,31,63,127,255
9100 RETURN
    
```

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HCW63

COMPETITION

EVERYONE stands to gain in this free competition from Home Computing Weekly and Masterclass.

We're giving away 30 video tapes on computing with the Spectrum, VIC-20, BBC, Electron and Commodore 64.

But even if you're not among the winners you still get a bonus. Masterclass will send every entrant a 10 per cent discount voucher for any of its computer video tapes ordered by mail.

Each tape costs £19.95, so the discount offer is worth nearly £2.

Masterclass takes a new angle on learning. First you watch the video tutorial then you transfer the programs from it to your computer. Now you can play the games and study how they work.

The range of Masterclass tapes includes BASIC, programming, graphics and games and education.

The graphics and games video tapes, for the BBC and Electron, give you the chance to use your imagination and create new games from the knowledge you have gained. Playing and learning will be so intermingled that you won't know the difference!

For those of you who are teachers, there is a Masterclass video tape to show how the BBC computer can be used to best effect in the primary classroom.

David Redclift is the presenter on both the BBC BASIC video tapes and the primary education one. Mr Redcliffe has worked with computers since 1965, which makes him an old hand. He has been involved with the training of programmers for the past 12 years, so he really knows what he is talking about! His video-based courses on PL/1 and COBOL are now in world-wide use.

Masterclass 10 per cent discount vouchers will only be accepted as part of a mail order sent directly to Masterclass.

Here is a list of the complete computer video tape range from Masterclass:

BBC
Primary Education
BASIC No. 1
BASIC No. 2
Graphics and Games

Electron
BASIC No. 1
Graphics and Games

Spectrum
Programming Level 1
Programming Level 2

Commodore 64
Programming Level 1
Programming Level 2

VIC-20
Programming Level 1
Programming Level 2

How to enter

Examine the two cartoons carefully — there are several differences between them.

Circle the differences on cartoon B and then fill in your name, address, the number of differences you found and the computer you own — BBC, Electron, Spectrum, Commodore 64 or VIC-20 — and your video recorder format, VHS or Beta.

Seal the coupon and cartoon B in an envelope and write clearly on the back of the envelope the number of differences you found.

Post your entry to Masterclass Competition, Home Computing Weekly, No. 1 Golden Square, London W1R 3AB.

Entries close at first post on Friday June 8, 1984. The winners will be the first 30 entries opened at random, regardless of computer. All contestants will receive a voucher entitling them to a 10 per cent discount off a Masterclass video tape ordered directly from Masterclass.

MASTER CLASS

video tapes to win

You may enter as many times as you wish, but each entry must be on the official coupon and cartoon — not a copy — and sealed in a separate envelope.

The prizes will arrive from Masterclass within 28 days of the publication of the issue containing the names of the winners.

Important: please follow carefully the guidelines for entering — incomplete coupons and entries in envelopes with no number on the back cannot be considered. If you are a winner, the coupon will be used as a label to send your prize so clear writing is essential.

Masterclass Competition

Entry Coupon

Name _____

Address _____

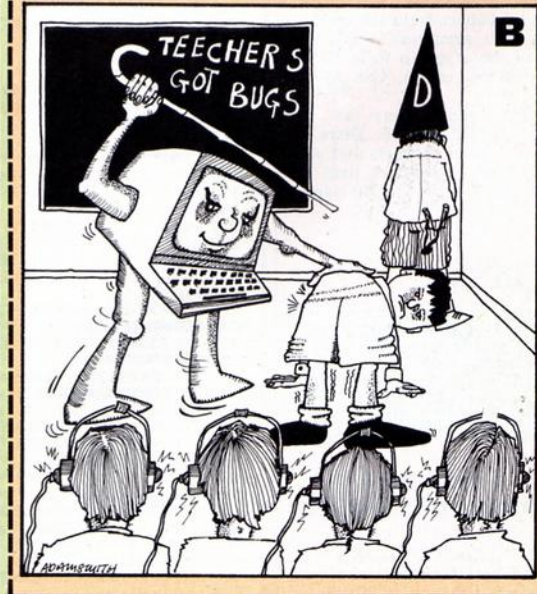
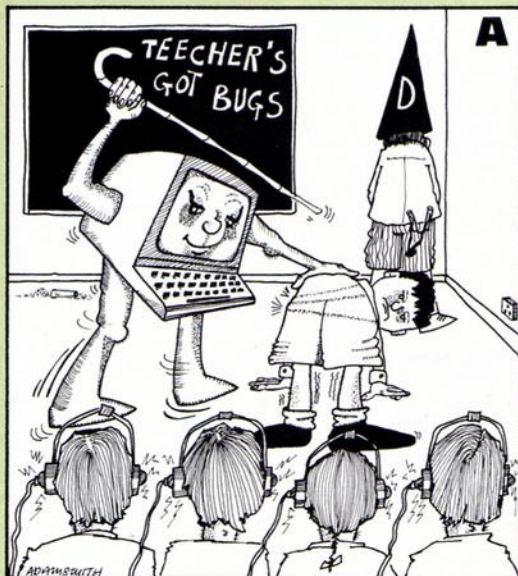
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Number of differences found _____

Computer _____

VHS/Beta (delete inapplicable format)

Complete clearly and fully — if you are a prizewinner this will act as a label. Post to Masterclass Competition, Home Computing Weekly, No. 1 Golden Square, London W1R 3AB. Closing date: first post, Friday June 8, 1984. Don't forget to follow carefully the guidelines in the How to Enter section. Write the number of differences on the back of the envelope



Two great VIC-20 programs to type in and play. One is for the unexpanded computer and the second needs an extra 3K of RAM

Galaxy by Chris Pettit and Nic Brereton

Many moons ago a party of earthlings left their war-torn planet to search for a new home far across the universe.

The survivors of this danger-prone trip landed on a seemingly uninhabited planet to establish a new civilisation. But Planos was far from peaceful, as they found out when an evil space fleet began a bombardment.

How it works

- 0-10 define characters
- 11-18 introduction
- 19-22 set up variables
- 90-96 set up game values
- 105 input routine
- 110-150 check movement and collision of first swooper
- 190-250 as above for second swooper
- 300-430 move your blaster
- 400 check fire button (SHIFT key)
- 500-600, 605-650 firing routine for first, second swooper
- 700 output score
- 2000-2002 hit a swooper routine
- 3000 sound effects
- 4000-5000 you are hit
- 5000-5010 adjust lives routine
- 6000-6050 end game routine

The terrified citizens managed to save one ground-based blaster from the remains of their armaments store and they chose you to fight off the mysterious enemy. Can you do it?

The game runs on the unexpanded VIC-20. There are two types of invaders and your score and number of lives left are displayed in the top right.

Use these keys:

Z left
X right
SHIFT fire

Main variables

- LI number of lives
- S your position
- LI, I2 positions of two swoopers
- P stops screen scrolling
- X counter

Pilot 20 by Graham Wells

My program runs on the 3K expanded VIC-20 and simulates the flight of a light aircraft.

I have tried to make it as authentic as possible. Your controls are:

less than key	revs up
greater than key	revs down
up arrow	nose up
	(climb)
*(asterisk)	nose down
	(dive)

Listing for Galaxy

```

0 POKE36878,15:POKE56,28:POKE52,28
1 FORX=1T0512:POKE7167+X,PEEK(32767+X):NEXT
2 FORX=1T064:READJ:POKE7167+X,J:NEXT
3 DATA0,16,16,124,254,254,146,16
4 DATA0,20,28,107,93,85,0,0
5 DATA16,84,124,84,16,186,254,146
6 DATA0,16,16,0,0,16,16,0
7 DATA0,0,0,0,16,16,16,0
8 DATA0,108,146,170,84,170,146,108
9 DATA1,1,1,1,1,1,1,1
10 DATA128,128,128,128,128,128,128,128
11 LI=3:POKE808,127
12 POKE36869,240
13 CT=30720:POKE36879,25
14 PRINT"      GALAXY!          ":PRINT" BY CHRIS AND NIC"
15 PRINT"X/Z" = LEFT":PRINT"X/X" = RIGHT":PRINT"X/SHIFT" = FIRE"
16 PRINT"FIIGHT OFF THE DIVING XSPACERS. HIT BIRDS INX FLIGHT FOR BONUSES."
17 PRINT"X HIT A KEY AFTER LOSINGX LIFE, AND TO START XTHE GAME.":FORT=1T02000
: NEXT
18 GETA#:IFA#=""THEN18
19 POKE36869,255
20 I1=23:I2=21:GK=0
22 P=8186
85 REM[CLR][GRN]
90 PRINT"X":POKE36879,8:PRINT" @ @ @"
91 FORX=1T0155STEP2:POKE7790+X,1:POKE7746+X,1:NEXT
92 PRINT"XXXXXXXX"
93 FORX=1T016:PRINT"IFG":NEXT:PRINT"IFG":PRINT"X"
94 FORX=1T01:POKE7696+X,2:POKE7696+X+CT,2:NEXT:POKE8185,6
95 GOSUB2000:G1=T:C1=C:GOSUB2000:G2=T:C2=C
96 FORX=1T020:POKEX+38884,4:NEXT
100 REM START PROG
105 S=8165:POKES,2:IFPEEK(203)=64THEN105
107 REM
110 IFG1=0THEN190
111 POKEG1,32:G1=G1+11
120 IFPEEK(G1)=7THENI1=23:G1=G1+2
123 IFPEEK(G1)=2THEN5000
125 IFPEEK(G1)=6THENI1=21:G1=G1-2
130 POKEG1,C1
135 IFG1>8185THENG1=G1-376
140 IFRND(1),5ANDB1=0THENB1=1:P1=G1+22
150 POKE36875,200:POKE36875,0
190 IFG2=0THEN300
210 POKEG2,32:G2=G2+12
220 IFPEEK(G2)=7THENI2=23:G2=G2+2
223 IFPEEK(G2)=2THEN5000
225 IFPEEK(G2)=6THENI2=21:G2=G2-2
230 POKEG2,C2
235 IFG2>8185THENG2=G2-376
240 IFRND(1),5ANDB2=0THENB2=1:P2=G2+22
250 POKE36875,200:POKE36875,0
300 POKES,32
305 IFPEEK(203)=33THENS=S-1:IFPEEK(S)=7THENS=S+1
310 IFPEEK(203)=26THENS=S+1:IFPEEK(S)=6THENS=S-1
320 POKES,2
399 POKEP,32
400 IFPEEK(653)=1ANDB=0THENB=1:P=S-22:POKE36876,200:POKE36876,0
410 IFB=0THEN500
415 FORDF=1T02
420 POKEP,32:P=P-22
430 IFF<7702THENP=P+22:B=0:GOT0110
435 IFPEEK(P)=10RPEEK(P)=0THEN4000
440 POKEP,3
450 POKEP,32:P=P-22
460 IFF<7702THENP=P+22:B=0:GOT0110

```

Defend planet... learn to

your and fly

left square bracket bank left
right square bracket bank right
G gear up
H gear down
F flaps (lower)
D flaps (raise)
M map display

These are meanings of the flight deck display:

VSI vertical speed indicator — by how much your aircraft climbs in a second

ASI air speed indicator

ALT altitude — height above sea level

HEAD your compass heading

DME distance from beacon

BRG your bearing relative to the beacon. When starting on runway, heading is 360, BRG is 180. If you look on the map you will see that the beacon is directly behind the runway and so behind you, a compass bearing of 180 (south).

Stall speed is 60 ASI, the undercarriage is damaged above 150 ASI and ceiling is 3,000.

I hope you enjoy playing it. One improvement would be to add some sound effects.

How it works

- 1-5 initialisation, GOSUB for introduction
- 10-20 variables for take-off
- 100-260 display instruments
- 270-290 controls from keyboard
- 300-340 change variables
- 345-347 print scenery
- 355-390 POKE artificial horizon
- 420-490 change speed, altitude etc
- 500-1000 check for crash, stall etc
- 1000-1180, 1200-1290 bank left, bank right
- 1500-1540 print why you crashed
- 3000-3050 landing lights before runway
- 3900-3110 runway lights
- 3200-3320 print mast lights, check for crash into masts
- 4000-4150 print map
- 4500-4670 introduction
- 4680-4690 variables for in flight
- 5000-6080 crash routine, play again?

```

465 IFPEEK(P)=10RPEEK(P)=0THEN4000
470 POKEP,3
480 NEXT
500 IFB1=0THEN600
505 FORDF=1TO2
510 POKEP1,32:P1=P1+22
515 IFPEEK(P1)=2THEN5000
520 IFP1>8185THENB1=0
525 POKEP1,4
550 NEXT
600 IFB2=0THEN700
605 FORDF=1TO2
610 POKEP2,32:P2=P2+22
615 IFPEEK(P2)=2THEN5000
620 IFP2>8185THENB2=0
625 POKEP2,4
650 NEXT
690 REM(HOME)[HOME]
700 PRINT"SC"
1999 GOTO107
2000 T=0:FORX=7810TO7702STEP-1:IFPEEK(X)<>32THENX=X:O=PEEK(X):X=7702:POKET,32
2002 NEXT:RETURN
3000 FORZ=240TO190STEP-2:POKE36876,Z:NEXT:POKE36876,0:RETURN
4000 IFPEEK(P)=1THENS=SC+10:GK=GK+1:IFP=610RP=G2THENS=SC+90
4005 B=0
4010 IFPEEK(P)=0THENS=SC+50:GK=GK+1:IFP=610RP=G2THENS=SC+450
4020 POKEP,5
4030 GOSUB3000
4040 IFP=G1THENGOSUB2000:G1=T:C1=C
4050 IFP=G2THENGOSUB2000:G2=T:C2=C
4055 IFGK=19THEN20
4060 GOTO1999
5000 LI=LI-1:IFLI=0THEN6000
5005 POKES,5:FORX=1TO50:POKE36877,177-X:NEXT
5007 IFPEEK(203)=64THEN5007
5010 POKE7697+LI,32:GOTO1999
6000 POKES,5:POKES+T,7:FORX=255TO127STEP-1:POKE36877,X:NEXT
6001 REM(CLR)[3 CRSR DOWN][WHT][2 CRSR DOWN][CRSR DOWN]
6005 POKE36869,240:PRINT"TOUGH LUCK !! YOU DIED,BUT YOU
ORED "SC":
6019 LI=3:PRINT"
6020 IFSC>HSTHENHS=SC:PRINT"NEW ";
6025 SC=0:B=0
6030 PRINT"HIGH SCORE"HS
6032 REM[2 CRSR DOWN]
6035 PRINT"HIT A KEY TO CONTINUE"
6040 IFPEEK(203)=64THEN6040
6050 GOTO12
    
```

Listing for Pilot 20

```

1 REM"#####PILOT 20 BY G.WELLS
2 POKE650,128
3 REM INITILISATION
4 M$=""
5 GOSUB4500
9 REM [CLR][GRN]
10 POKE36879,8:PRINT"J":A=0:S=0:R=0:U$="DOWN":BRG=180:H=360
20 POKE36878,10:D=10:U=0:B=1:V=0
90 REM INSTRUMENTS
95 REM [HOME][9 CRSR DOWN][VEL]
100 PRINT"#####";
110 PRINT" A/H ASI"
115 REM[WHT]
120 PRINT"VSI ALT";
130 PRINT" ";
140 PRINT" ";
150 PRINT" HEAD ";
160 PRINT" ";
170 PRINT" ";
185 REM[VEL][WHT][CRSR UP][14 CRSR RIGHT]
190 PRINT" FUEL "INT(F):PRINT"STALL":S#
195 REM[VEL][WHT][CRSR UP][14 CRSR RIGHT]
200 PRINT" REVS "R" ":PRINT"#####"/C"U$
205 REM[VEL][WHT][CRSR UP][14 CRSR RIGHT]
210 PRINT" BECN "A":PRINT"#####BRG"INT(BRG)
215 REM(HOME)[19CRSR DOWN][VEL][WHT][VEL][CRSRUP][14CRSRRIGHT][VEL][CRSR LEFT]
220 PRINT"#####FLAP "FL:" DEG":PRINT"#####MEM"
INT(D)"
225 REM(HOME)[12 CRSR DOWN][CRSR RIGHT][CRSR LEFT]
230 PRINT"#####V"
235 REM(HOME)[13 CRSR DOWN][17 CRSR RIGHT]
240 PRINT"#####INT(S)
245 REM(HOME)[12 CRSR DOWN][11 CRSR RIGHT]
250 PRINT"#####A
255 REM(HOME)[15 CRSR DOWN][11 CRSR RIGHT]
260 PRINT"#####H
    
```

As usual, we have inserted REMs in the lines above control characters as a guide when you are typing in the programs. These REMs should not be entered.

VIC-20 PROGRAMS

```

950 GOT0100
1000 IFU=1 THEN H=1
1010 IFU=-1 THEN H=H+1
1060 IFH<0 THEN H=360
1070 IFH>360 THEN H=0
1075 REM HOME LIGHT
1080 IFR<0 THEN PRINT "RETURN TOO LOW":GOTO1540
1085 REM BANK LIGHT
1090 IFUC<0 THEN GOT01200
1095 REM HOME JICRSR UP JICRNJ
1100 PRINT "000"
1110 PRINT " "
1120 PRINT " "
1130 PRINT " "
1140 PRINT " "
1150 PRINT " "
1160 PRINT " "
1170 PRINT " "
1180 GOT0290
1190 REM BANK RIGHT
1200 IFU<0 THEN GOT0290
1205 REM HOME JICRSR UP JICRNJ
1210 PRINT "000"
1220 PRINT " "
1230 PRINT " "
1240 PRINT " "
1250 PRINT " "
1260 PRINT " "
1270 PRINT " "
1280 PRINT " "
1290 GOT0290
1500 IFD<180R>11 AND BRG<180,90R BRG<179,9 THEN PRINT "SHRASHED INTO
GROUND":GOTO1540
1505 REM IGRNJ
1510 IFUS="DOWN" THEN I530
1515 REM HOME LIGHTJ
1520 PRINT "SUNDR CART UP":GOTO1540
1530 REM HOME LIGHTJ
1535 PRINT "SDOWN":FORT=1 TO 4000: NEXT "S"
1540 GOT04500
1535 REM PHONEJ
1540 FORT=1 TO 2000: NEXT "PRINT" S
3000 IFD>10,8 THEN M=2
3005 IFA>49 THEN GOT03050
3010 REM LANDING LIGHTS
3012 REM HOME JIC3 CRSR DOWN JICMHTJ
3015 PRINT "00000"
3020 PRINT " "
3025 PRINT " "
3030 PRINT " "
3035 PRINT " "
3040 IFD>10,9 THEN POKE36876,255
3050 RETURN
3090 REM RUNWAY LIGHTS
3095 IFA>49 THEN RETURN
3098 REM HOME JIC3 CRSR DOWN JICMHTJ CRSR DOWN JICRNJ CRSR DOWN JICMHTJ
3100 PRINT "00000"
3101 PRINT " "
3102 PRINT " "
3103 PRINT " "
3104 PRINT " "
3105 PRINT " "
3190 REM MAST LIGHTS
3195 REM HOME JIC5 CRSR DOWN JIC10 CRSR RIGHT JICMHTJ

```

```

266 REM CONTROLS
270 GET# : IFR#="": THEN 290
271 IFR#="G" THEN U#=" UP " : REM REDJ
272 IFR#="H" THEN U#="DOWN" : REM IGRNJ
273 IFR#="R" THEN R=600 : IFR>3600 THEN R=3600
274 IFR#="": THEN R=R-600 : IFR<0 THEN R=0
275 IFR#="": THEN U#=1 : GOT01000
276 IFR#="": THEN D#=1 : V=V+1
277 IFR#="": THEN D#=1 : V=V-1
278 IFR#="F" THEN FEL=1 : IFFL>5 THEN FEL=5
279 IFR#="D" THEN FEL=1 : IFFL<0 THEN FEL=0
280 IFR#="M" THEN M=1 : REM IGRNJ
285 IFR#="M" THEN M=4000
288 REM MAIN LOOP
290 IFS<60 THEN S#="000" : REM IGRNJ
295 IFS<60 THEN S#="000" : REM REDJ
300 REM HOME JICMHTJ
305 IFC<60 AND D<10,9 AND D<11,5 THEN PRINT "SUNRUNNY OVERSHOOT":GOTO1540
306 IFC<60 AND D<10,9 AND D<11,5 AND R<1000 THEN R=0 : GOT01500
308 REM HOME JICMHTJ
310 IFS<60 AND D<0 THEN S=0 : PRINT "S" STALLED "":GOTO1540
320 POKE7680+7*(22*13)+(22*0),32
330 IFV>5 THEN 0=1 : N=67
335 IFV<5 THEN 0=-1 : N=67
336 IFV<ANDV>5 THEN 0=0
340 IFU<0 THEN GOT0360
341 REM SCENERY
344 REM HOMEJ
345 PRINT "S": FORT=0 TO INT(A)/500 : PRINT " "
346 PRINT "M": MID#<N# : INT(B),22 : " "
347 IFC<500R>3500 THEN FORT=1 TO 7 : INT(A)/500 : PRINT " "
350 FORT=1 TO 7 : INT(A)/500 : V=INT(RND(1)*10) : PRINT "R": MID#<N# : INT(B)+V,22 : " " : NEXT " " : NEXT " "
355 REM ARTIFICIAL HORIZON
360 IFU=0 THEN N=67
365 IFU<0 THEN N=78
370 IFU>0 THEN N=77
380 POKE7680+7*(22*13)+(22*0),N : POKE36400+7*(22*0),7 : U=0
385 REM HOME JICMHTJ
390 IFR>3500 THEN R=3500 : PRINT "S" CEILING " "
420 A#A#V=S+S#R/1000
421 REM CHANGE SPEED/ALTITUDE ETC.
422 IFS#R/1000 THEN S=S-2
425 IFS#R/1000 THEN S=S+1
430 S=S-FL#2 : F=F-R/100000
441 IFC<60 AND D<270 THEN BRG=BRG-1 : D/10 : B=B-1 : IFC<1 THEN R=61
442 IFC<270 AND D<180 THEN BRG=BRG+1 : D/10 : B=B+1 : IFC>61 THEN R=1
443 IFC<180 AND D<90 THEN BRG=BRG+1 : D/10 : B=B+1 : IFC>61 THEN R=1
444 IFC<180 AND D<90 THEN BRG=BRG-1 : D/10 : B=B-1 : IFC<1 THEN R=61
445 IFS<0 THEN S=50
450 IFC<270 OR H<30 THEN D=D+01 : GOT0470
460 IFC<270 OR H<30 THEN D=D-01
470 IFD<11 AND D<10 AND H<360 AND BRG<179,9 AND H<60 AND BRG<181 AND U=0 THEN S=3000
480 IFD<11 AND D<10 AND H<360 AND BRG<179,9 AND H<60 AND BRG<181 AND U=0 THEN S=3005
485 REM REDJ
490 IFC<1 AND U#=" UP " THEN GOT01500
550 IFR<30,9 AND BRG<31 AND D<3 AND H<3000
560 IFR<289,9 AND BRG<271 AND D<11,5 AND H<3000
565 REM HOME JICMHTJ
570 IFF<0 THEN PRINT "S" OUT OF FUEL "":GOTO1540
575 REM ORNJICMHTJ
580 IFS<150 AND U#="DOWN" THEN PRINT "S" GEAR DAMAGED "":GOTO1540
590 PRINT "S"
600 IFD<12 AND BRG<140 AND BRG<210 AND R<50 THEN PRINT "S" SHRASH INTO BUILDING "":GOTO1540

```

VIC-20 PROGRAMS

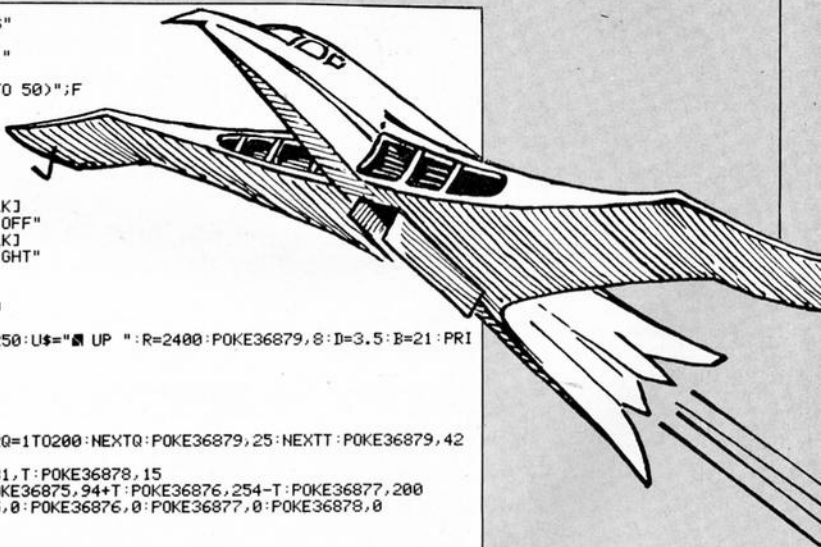


```

3200 PRINT"XXXXXXXXXXXXXXXXXXXX,"
3210 IFA<150THENPRINT"CRASH INTO MAST":GOTO1540
3220 RETURN
3295 REM[HOME]I6 CRSR DOWN]I5 CRSR RIGHT][RED][WHT]
3300 PRINT"XXXXXXXXXXXXXXXXXXXXXXXX,"
3310 IFA<100THENPRINT"CRASH INTO MAST":GOTO1540
3320 RETURN
3390 REM MAP
3395 REM[CLR][WHT]
4000 PRINT"[]"
4005 REM[HOME]
4010 PRINT"      TOWN      "
4020 PRINT"      HHH      "
4030 PRINT"      HHH      "
4040 PRINT"      N           "
4050 PRINT"      S-H        "
4060 PRINT"      W           "
4070 PRINT"
4080 PRINT"      II         "
4090 PRINT"      II         "
4100 FORT=IT010
4120 PRINT"      .":NEXTT
4130 PRINT"      .(100) . .(150) "
4140 PRINT"      10 MILES"
4150 FORT=IT03000:NEXTT:PRINT"[]":GOTO090
4490 REM INTRODUCTION
4500 POKE36879,25:POKE36878,0:PRINT"[]
PILOT":PRINT"[] YOU ARE THE PIL
OT"
4510 PRINT" OF A LIGHT AIRCRAFT"
4520 PRINT" YOU MUST FIND THE"
4530 PRINT" RUNWAY AT NIGHT "
    
```

```

4540 PRINT"BEFORE YOUR FUEL GOES"
4545 REM[RED][BLU]
4550 PRINT" BRG: RUNWAY 100' "
4555 REM[CRSR DOWN][BLU]
4560 PRINT"[]: INPUT" FUEL (1 TO 50)":F
4570 IFF<0ORF>50THENGOTO4500
4575 REM[CRSR DOWN][BLU]
4600 PRINT"[] DURING FLIGHT"
4610 PRINT" PRESS 'M' FOR MAP"
4615 REM[CRSR DOWN][GRN]
4620 PRINT"[] OPTIONS -"
4625 REM[CRSR DOWN][BLU][GRN][BLK]
4630 PRINT"[] 1:-----TAKE OFF"
4635 REM[CRSR DOWN][BLU][GRN][BLK]
4640 PRINT"[] 2:-----IN FLIGHT"
4650 GETA$:IFA$=""THEN4650
4655 REM[CLR]
4660 IFA$=""THENPRINT"[]":GOTO10
4670 IFA$<"2"THEN4650
4680 BRG=90:H=270:A=1000:V=0:S=250:U$=" UP " :R=2400:POKE36879,8:D=3.5:B=21:PRI
NT"[]"
4685 REM[RED][CLR]
4690 GOTO90
5000 POKE36878,15
5010 POKE36877,220
5020 FORT=IT010:POKE36879,42:F0R0=IT0200:NEXT0:POKE36879,25:NEXTT:POKE36879,42
5030 POKE36877,0:POKE36878,0
5040 FORT=3870160STEP.5:POKE36881,T:POKE36878,15
5050 POKE36874,150+RND(1)*100:POKE36875,94+T:POKE36876,254-T:POKE36877,200
5060 NEXTT:POKE36874,0:POKE36875,0:POKE36876,0:POKE36877,0:POKE36878,0
5080 POKE36879,25
5085 REM[CLR][BLU]I5 CRSR DOWN]
5090 PRINT"[] YOU KILLED YOURSELF"
6000 PRINT"[] NOT TO MENTION THE"
6010 PRINT"[] PASSENGERS ABOARD"
6020 PRINT"[] HOPE YOU WILL SLEEP"
6030 PRINT"[] WELL TONIGHT IN HEAVEN";
6040 FORT=160738STEP-.1:POKE36881,T:NEXTT
6050 PRINT"[] ANOTHER GO [V/N]":POKE198,0
6060 GETA$:IFA$=""THEN6060
6065 REM[CLR][CRSR UP][BLU]
6070 IFA$<"V"THENPOKE36879,27:PRINT"[]":END
6080 GOTO4500
    
```



Bridge Master Dragon 32 £29.95

Dragon Data, Kenfig Industrial Estate, Margam, Port Talbot, Wales SA13 2PE

I am not a bridge buff. I know only a little about the game so when Bridge Master dropped through my door, I thought this might be my chance to learn the grand game of bridge. This expensive package includes a cartridge, a cassette containing 100 different hands (more complex hands will be available on cassette, we are told) and two quite extensive manuals, one detailing the game and the other how the cartridge works. All this is extremely well packaged but what of the content?

The program is designed for the beginner or less experienced player. The tutor takes you through the basics of the game and on to the more complex stages. The package is far too extensive to detail, but uses excellent graphics for the four hands, has many helpful features for the novice and numerous little touches that add fun and realism. The acid test was to place a proper bridge player down in front of the computer; I did so and had to drag him away when I wanted to go home. This is a winner. C.G.

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



If I had a Million Dragon 32 £9.99

Phoenix, Spangles House, 116 Marsh Rd, Pinner, Middx

This is not the usual one-game package but two linked games, one of which must be successfully completed in order to move to the next one. Phoenix describes them as action and adventure games, but don't be misled by this; they are not arcade action and text type adventure! Rather the first game is faster moving than the second and has the added interest of being for more than one player, should you so wish.

The first is actually very like a famous property speculation

board game but instead of having the full board on display you see only the square you land on. The aim of this game is to get £20,000 so that the powers that be lend you a million for the next game. Having got your codes, and by now only the winner of game one is playing, you try to turn your million into five million by stock trading and other investments. The program has the facility to check your mail for good or bad news. Overall an involving package good on fun but low on originality. D.C.

instructions	90%
playability	80%
graphics	50%
value for money	80%



Lunar Rover Patrol Dragon £10.95

Dragon Data, Kenfig Industrial Estate, Margam, Port Talbot, West Glam SA13 2PE

Drive your lunar buggy across the surface of the moon avoiding or destroying a number of obstacles, including boulders, craters and spaceships.

Movement is controlled by the joystick. Moving left or right controls speed while upwards enables the buggy to jump over craters. The fire button activates horizontal and vertical lasers. As there are only four main actions I am surprised there is no facility to use keys.

Points are given for jumping or shooting obstacles. A bonus is awarded according to speed of progress.

Your current score and the highest score are displayed on screen, as is the number of buggies left. When your buggy is destroyed you re-start from the last point successfully passed.

The screen display varies considerably as you progress. I especially liked the way the buggy fell to pieces when it was hit.

Loading gave no problems and the instructions included are clear.

Not the sort of game to which I would become addicted, but certainly very enjoyable. J.E.M.

instructions	75%
playability	75%
graphics	80%
value for money	70%



Pit your wits against these!

New software for the Dragon is assessed by our reviewers

Junior's Revenge Dragon 32 £10.95

Dragon Data, Kenfig Industrial Estate, Margam, Port Talbot, Wales SA13 2PE

Microdeal's Donkey King (renamed The King) has been one of the biggest selling Dragon games. This is the long-awaited sequel to the masterful original and something I could not wait to get my hands on. You are the son of the gorilla that was captured in the first game and must try to rescue your dad from the evil clutches of Luigi. This entails jumping across vines, scampering up and down them and avoiding obstacles and unfriendly beasts sent by Luigi to trap you. As in the original

game, once you reach the top of the screen you are taken to a different screen. There are four screens involving trampolines, conveyor belts and all the obstacles you would expect from this type of game.

There is a choice of one of the two-colour screens or the higher resolution black and white screen. The title page, demonstration mode and high score table are all up to the usual high standard but I cannot help feeling that this game is not as good as the original. This is far too expensive for an arcade game. C.G.

instructions	55%
playability	75%
graphics	75%
value for money	30%



El Bandito Dragon £7.95

Dragon Data, Kenfig Industrial Estate, Margam, Port Talbot, West Glam SA13 2PE

The unlikely hero of this amusing game is an ant who scurries around a maze stealing fruit while being hunted by spiders. The ant walks up to the fruit and disappears. You can then move the fruit slowly back to your lair. If the spider is in hot pursuit you can drop the fruit and escape more quickly. The spider cannot get you in your lair.

There are eight skill levels and playing areas which control the number of spiders and complexity of the maze.

Two people can play, and then not only must you avoid spiders but also try and grab the fruit before your opponent does.

You begin each game with three lives but it is possible to gain more. Score for each player and the highest score are displayed.

Screen display is excellent. I particularly liked the marauding spiders. I had no problems loading the game and the instructions are sufficient.

Playing this gave me a lot of laughs and I shall certainly be playing many more times. J.E.M.

instructions	70%
playability	85%
graphics	90%
value for money	85%



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FOR SPECTRUM 48K



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PIXEL-PAD

for ZX-SPECTRUM

Programming Information

Colours

0. Black
1. Blue
2. Red
3. Magenta
4. Green
5. Cyan
6. Yellow
7. White
8. No Change
9. Contrast

Graphics Characters

	Normal	Inverse
1		
2		
3		
4		
5		
6		
7		
8		

Colour Control

- INK n** : n: Colour (0 to 9)
PAPER n : n: Colour (0 to 9)
FLASH n : n: 0 Steady, 1 Flashing, 8 No Change
BRIGHT n : n: 0 Normal, 1 Bright, 8 No Change
INVERSE n : n: 0 Normal (Ink on Paper)
 n: 1 Inverse (Paper on Ink)
OVER n : n: 0 New character obliterates old one
 n: 1 New and old characters combine to
 give ink colour where either (not both)
 were ink, otherwise paper colour
BORDER n : n: Colour (0 to 7)
ATTR(I,c) : Function returning attributes of the
 character at line I, column c
 Bit: 7 is 1 for Flashing; 6 is 1 for Bright
 5,4,3 - Paper Colour
 2,1,0 - Ink Colour

Graphics Commands

- PLOT c;x,y** : Ink in pixel x,y
DRAW c;x,y,θ : Draw line x,y pixels long (relative)
 while turning θ radians (Optional)
CIRCLE c;x,y,r : Draw circle centred at pixel x,y
 with radius r pixels
 (Note: c is any local colour controls required)
POINT(x,y) : Function which returns:-
 0 if pixel x,y is paper colour
 1 if it is ink colour

Character Commands

- PRINT item, item...** A print item can be one of
 - Null
 - Numeric expression
 - String expression
 - **AT I, c** : moves cursor to line I, column c
 - **TAB c** : moves cursor to column c, same line
 - Colour control command

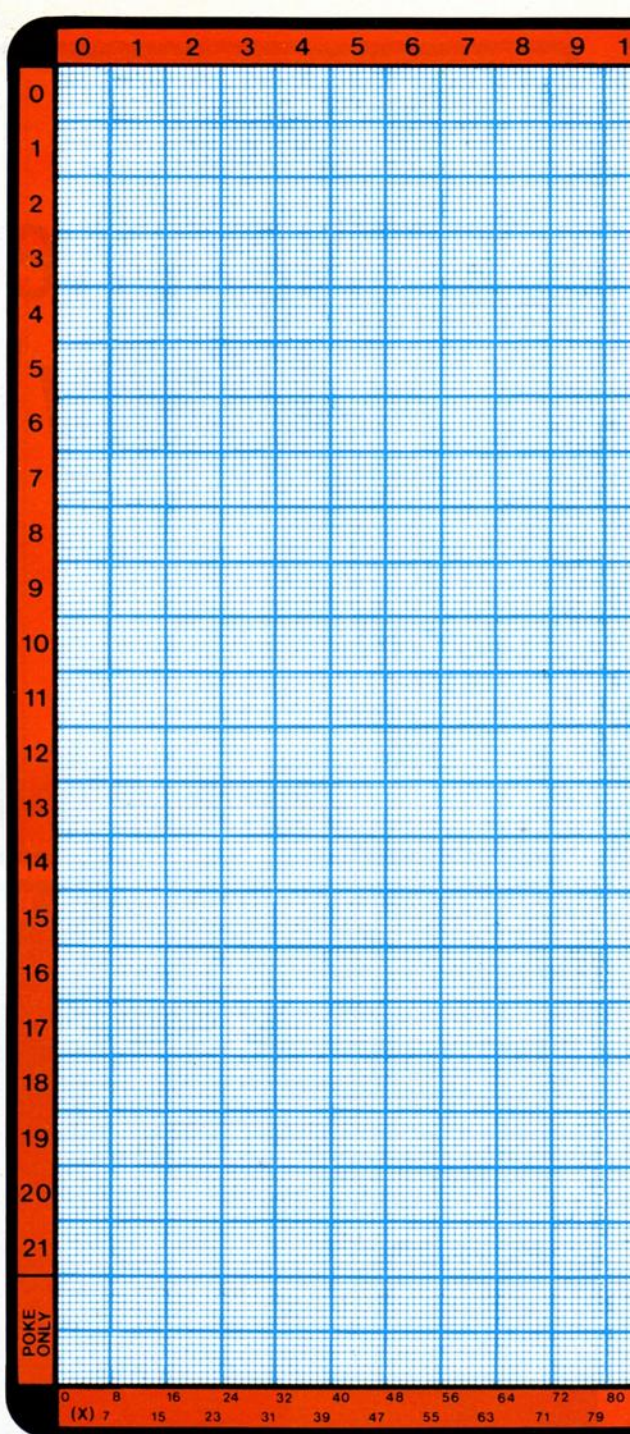
Items can be separated by

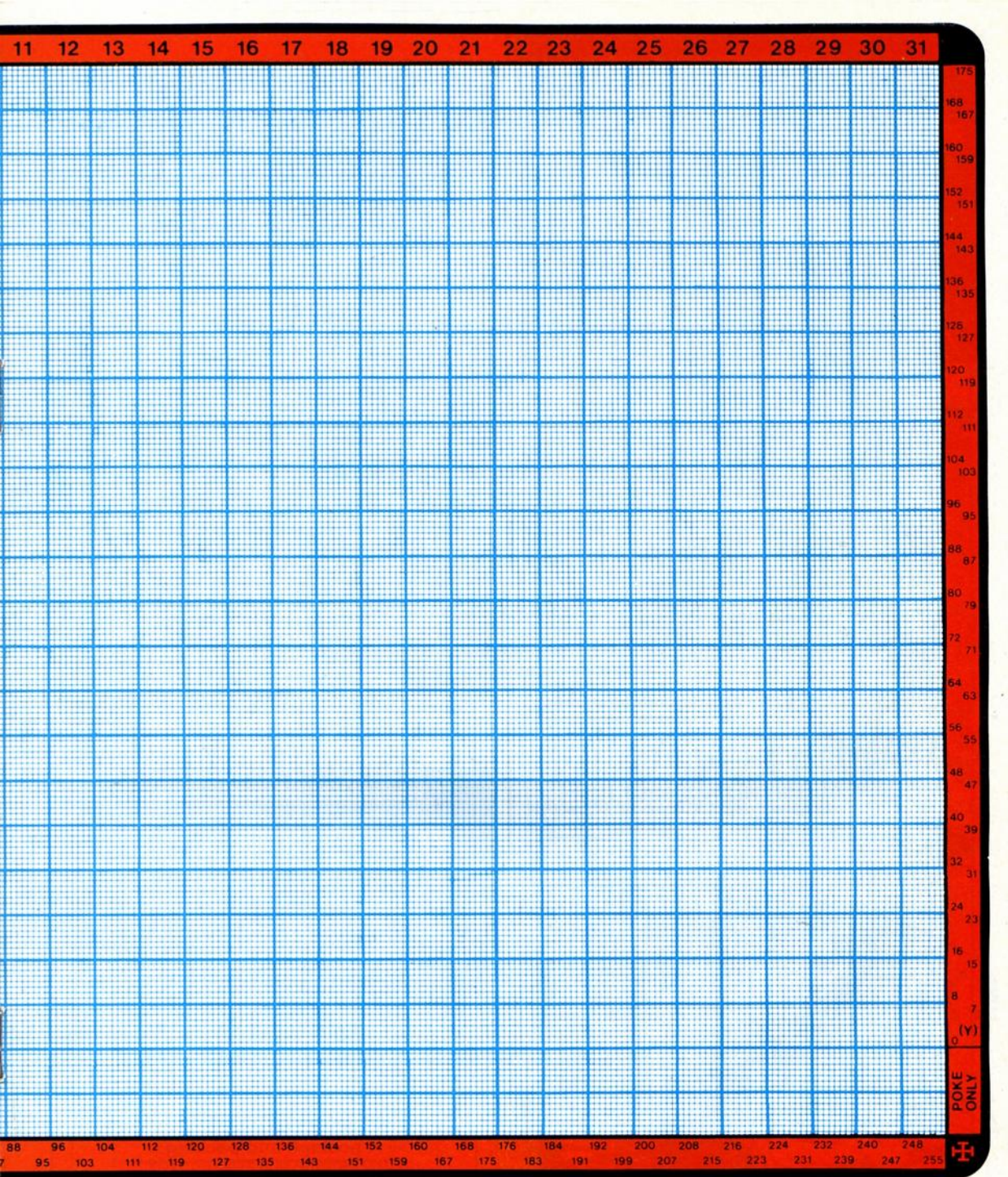
- a comma, next item at next half line
- a semi-colon; next item follows immediately
- an apostrophe next item on new line

- POKE a,n** : Writes the value n to address a
PEEK a : Function which returns the value at
 address a
USR "a" : Function which returns the start
 address of character a
SCREEN\$(I,c) : Function which returns the character
 at line I, column c
BIN n : Indicates n is a binary number

User Defined Graphics

- POKE USR "a"+x, BIN n** : will write the binary
 number n to the xth row of the bit pattern for
 character a





128	128	128	128	128
64	64	64	64	64
32	32	32	32	32
16	16	16	16	16
8	8	8	8	8
4	4	4	4	4
2	2	2	2	2
1	1	1	1	1

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At random intervals a goose flies across the screen. You may

shoot it by pressing the spacebar, but this is difficult and slow to respond.

Word Race will be familiar to viewers of Channel Four's Countdown. Two players participate, each taking turns to ask for vowels or consonants, randomly selected by the computer. Both players must then make a word using as many of the nine letters as possible in a limited time. Points are scored for using the most letters. The computer cannot verify the meaning or spelling of words, but will check that the letters used are legal.

instructions	85%
playability	80%
graphics	65%
value for money	90%

J.W.



Speed Snake + 16K ZX81 £4.95

Softchoice, 52 Platts Lane,
London NW3 7NT

Two keys are all you need to steer the snake around the 10 mazes in this game. And, at times, two keys don't seem to give enough control. Plus signs represent the nuts you must eat to gather points, and inverse plus signs are berries to gather when ripe, but which only stay ripe for a tantalising short time. Poison balls are your enemy; if you eat them you die, you also die if you eat yourself.

Impossible, I hear you cry. Don't you believe it. The game is so fast and furious you can easily

bump into yourself or any of the maze boundaries.

This is one of the few snake games in which the snake moves faster, the longer it gets. Imaginative use of the very limited graphics capabilities of the ZX81 make for a very enjoyable and exciting game. Although at first it might seem easy, it is deceptively difficult to master. Getting your name at the top of the hall of fame requires a lot of effort.

instructions	100%
playability	100%
graphics	95%
value for money	85%

B.B.



Computerized Diet + 16K ZX81 £5.95

Softchoice, 52 Platts Lane,
London NW3 7NT

If you have a weight problem it seems the modern solution is to talk it over with your ZX81!

This package is quite large with two cassettes and a 22-page booklet, and your first problem is digging out the cassettes from their plastic beds. However, the book is easier to extract, and is worth reading if only to dream of blueberry pie and baked bluefish.

Seriously though, you must read the book first because you have to prepare certain information about your eating habits before you can answer the questions on the first cassette. After the computer has digested the information regarding your age, sex, height and eating habits your own personal weight goals are assessed. Side B is concerned with producing menus based on different foods of different caloric values, giving recommended quantities and even taking your mood into account.

Because dieting is such a personal, sometimes very serious business, I can neither recommend nor condemn this program. Although I understand the program was written by a Dr M. Minsky I can find no reference to him in the handbook.

B.B.

instructions	100%
playability	100%
graphics	40%
value for money	75%



Take your pick

Make your choice from this collection of the latest software. Read what HCW's regular reviewers have to say before you pay out

Mr Munchee + 16K ZX81 £4.95

Softchoice, 52 Platts Lane,
London NW3 7NT

Pac-Man, which started life on arcade video games machines, has been re-programmed for just about every home computer. Mr Munchee is not just a version for the ZX81, it is *the* version for the ZX81.

This is the third program by the same author I have reviewed, and each program has two things in common: good programming techniques and a very imaginative use of the rather dull ZX81 graphics.

There are three mazes, and with variable speed, this game is as challenging as any you are

likely to meet on any machine. Having eaten one of the pellets scattered around the maze you have a very limited time in which to turn the tables on your pursuer. If you do manage to catch and eat it, you are rewarded with 200 points, which is also the prize for eating one of the protected cherries.

Although I am not an addict of this type of game, I did find this version very playable. As with all ZX81 games though, the rather negative feel of the keyboard doesn't make for very long games sessions.

B.B.

instructions	100%
playability	100%
graphics	90%
value for money	90%



Home Budget 48K Spectrum £5.75

Kuma, Unit 12, Horseshoe Park,
Horseshoe Rd, Pangbourne,
Berks RG8 7JW

Computer budgeting should help those who are useless with figures and free those who are numerate from unnecessary tedium. Home Budget is a well laid-out program. You can adjust the expense headings as you wish, it offers help pages at most stages and it appears to be foolproof against wrong key entry.

However, there is no written documentation or loading instructions when simple explanations of how to budget would be invaluable. Also, why must the forecast figures be entered 12 times for each heading? The program should duplicate itself once the first month has been entered.

The answer "No" to "Are Actuals Correct?" after mis-entry is supposed to allow entry to a revision stage, but when I did it I found I could only exit by re-starting. The same answer to "Replace Forecast with Actual?" erased the forecast, and comparing the budget with actual is pointless if half the figures are missing.

Graphic representation of individual expenses and rolling budget feature. The reasonable price might make the problems bearable for those who are numerate.

D.C.

instructions	80%
ease of use	50%
display	80%
value for money	75%



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ONE MAN'S VIEW

What's next for a ban?

It is generally accepted throughout the world that micro-technology is the field in which most of the future lies. Yet recent events — which occurred almost simultaneously — seem to suggest that the Establishment wishes to interfere with and directly control any advances made in this area.

The main event I speak of is, of course, the Ministry of Defence ban on JLC Data's software protection device.

The reason given for this was that it posed a threat to national security. Now, I'm only a 15-year-old schoolboy, but I don't think you'll consider my opinion too naive when I state that surely any enterprising criminal/Russian spy could get hold of this device, or at least adapt the permitted version (and make use of it), ban or no ban.

Surely then, considering that software houses have craved after such a device for years and the fact that it is a British product and would save the country millions from piracy, it would be best not to impose such a ban?

The only conclusion I can reach over this, then, is that the government wishes to stop the product (which can apparently be used down phone lines) from becoming generally available, giving them the ability to keep unrestricted tabs on the vast majority of us.

A recent Horizon programme, which many readers will have seen, dealt with exactly this subject and raised the question: "Given the choice of the government being able to listen in to all of us or none of us, which would you choose?"

They decided for none of us. The government itself, however, seems to think otherwise.

It is perhaps worth noting the security shindig which occurred at the GCHQ — a very sensitive area as far as bugging computer communications is concerned.

Now, I don't pretend for a minute to know how much of a threat its trade unions or whatever actually are, but the ban on them emphasises the already prominent question of what other restrictions Big Brother shall impose upon the computer industry in the name of National Security.

*Ian Mitchell
Ponderer of Random Thoughts
South Shields, Tyne and Wear*

● This space is for you to sound off about the micro scene, to present bouquets, to hurl brickbats, or just to share your opinions or experiences. Contributions from individuals earn a fee. Send your views to Paul Liptrot, Editor, Home Computing Weekly, No.1 Golden Square, London W1R 3AB

ABC 32K BBC £5.99

Compusoft, 32 Watchyard Lane, Formby, Nr Liverpool L37 3JU

This game is in BASIC and takes ages to load. I leave you to decide whether it's worth it.

'This had better educate me', he thinks, looking at the price.

I imagine this program is designed for four- to five-year olds. The menu gives you the choice of games or work. This bit must be for the teacher. Any child who can read this is too bright for the questions. Being your usual hardworking type of person, I opted for the games.

The letter game involves pressing the letter shown on the screen. If you get it right the picture is drawn; if you're wrong then you get a load buzz. The

two other games are similar.

Alphabet display involves pressing a key so that the corresponding letter and picture are drawn.

The instructions give no idea what happens if you are wrong. Small children may not understand. The pictures are reasonable but take a long time to draw. A child may be more patient but I'm sure would soon become bored.

I don't think many schools would be willing to spend £6 on a game of this quality. D.B.

instructions	60%
playability	80%
graphics	70%
value for money	40%



Music (7 +) 48K Spectrum £7.95

Argus Press Software, No.1 Golden Square, London W1R 3AB

There are two programs on side one, Piano Player and Composer, and one on side two, Musical Quiz.

Piano Player shows five black and seven white keys. The note played is depressed on screen while shown below, together with the octave and length of note (from 0.05 to 1 second) which may both be altered by four keys. Pressing z returns us to the menu — a useful facility.

Composer allows you to play a composed or demonstration tune, save, load or compose a

tune. For composition, using up to 1000 notes, screen top has five staves and notes of rest and note number. Nine keys allow choice of note, duration, rest or correction and playback.

In Musical Quiz, Clever Clogs asks 100 Grade One multiple choice questions, which may be altered. You start with a choice of six tunes, building up note by note at screen top with the correct answers. Clever Clogs smiles or grimaces, correct answers are shown and the tune plays at the end. T.W.

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



Star Trucker (9 +) 48K Spectrum £7.95

Argus Press Software, No.1 Golden Square, London W1R 3AB

An addictive learning game, a competition to win a year's magazine subscription and a Secret Parents' Page enabling questions to be reset: what more can Computertutor offer? Full use is made of the Spectrum's potential in this brainteasing game built around general knowledge questions.

A star-studded screen has a noisy rocket leaving 'welcome to Star Trucker' behind, followed by an invitation to enter a 'Christian' name: wouldn't 'first' name be more multicultural?

On screen is the view forward, above digital read-outs of time, score, credits, cargo, fuel, field and points. The first task is to manoeuvre through the asteroid belt to refuel at Earth with 100 credits. Credits and force field are topped up from points gained by correctly answering general knowledge questions.

A hyper-jump leads to the planet screen, where galactic dust guards the trading planets. Remembering what they exchange, you work out a route around the planets to end up with power gems. Disasters strike unexpectedly, robbing you of force field or credits, and you can be killed: if so, an official Star Trucker newflash tells the world. T.W.

instructions	90%
ease of use	90%
display	85%
value for money	88%



Back to school

Start the new term with these reviews of the latest in educational software

Wizard Box 48K Spectrum £6.95

Scisoft, 5 Minster Gardens, Newthorpe, Eastwood, Notts

A wizard program for teachers and parents who are eager to improve children's spelling and vocabulary on an individual basis. For the busy non-programmer it is the ideal answer, as it provides all the necessary cues to enter up to 10 sets of 10 words.

After each test there is a magic trick and then the set repeats if any were wrong, or a new one is set. A report card appears with name, score and comment, which may be printed. Then a top hat is shown, from which comes ten stars listing those

words spelt wrongly. Up to 45 names can be accepted — enough for a whole class — and up to ten sets of scores for each child.

It is a shame that this first-class program should be spoiled by the poor instructions in the accompanying booklet. Can anyone tell me how to reach the French vocabulary or general knowledge quiz? That aside, this program makes good use of the colour, sounds and graphics capabilities of the Spectrum, although they could have devised a means of escaping back to the menu. T.W.

instructions	50%
ease of use	70%
display	80%
value for money	85%



Chemistry 1 Electron/BBC B £6.90

Sunland, 204 High St West, Sunderland SR1 1UA

Sadly there are still many educational programmers who insist upon producing computer packages comprising rote learning better suited to simple teaching machines or crammers. This is such a package.

The program does not make use of the sophistication available on the BBC and the use of colour is appalling. Green sand! Red palm trees! Poor graphics; no variation of colour in printing; very poor layout; poor programming structure and one facility missing from this package, vital to non-programmers, is a simple method of changing data. Neither is there any protection against young fingers hitting escape or break.

The program has adequate but poorly laid out screen instructions and a total of 100 questions contained in four blocks of data. There is a choice of revision or three types of test on typical 'O' level chemistry exam questions. Answers to wrongly answered questions are displayed at the end of each test and an irrelevant picture is then displayed showing how close the user came to collecting a coconut.

A very unimaginative and tedious program suited to someone desperate to learn limited facts as quickly as possible.

instructions	60%
playability	80%
graphics	20%
value for money	20%



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by the ASP Market Research Group

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2 Chequered Flag	Psion	Spectrum (9)
3 Manic Miner	Software Projects	CBM 64 (-)
4 Atic Atac	Ultimate	Spectrum (3)
5 Scuba Dive	Durrell	Spectrum (2)
6 Jack & The Beanstalk	Thor	Spectrum (-)
7 Crazy Kong	Intega Micros	VIC-20 (-)
8 Moon Alert	Ocean	Spectrum (-)
9 Codename MAT	Micromega	Spectrum (7)
10 The Guardian	PSS	Spectrum (-)

NON-ARCADE

1 Fall of Rome	APS	Spectrum (-)
2 Golf 64	Abrasco	CBM 64 (2)
3 Fighter Pilot	Digital	Spectrum (-)
4 Flight Path 737	Anirog	CBM 64 (-)
5 Twin Kingdom Valley	Bug Byte	CBM 64 (1)
6 Colossus Chess	CDS	CBM 64 (-)
7 Star Trucker	Clever Clogs	Spectrum (-)
8 Test Match	CRL	Spectrum (-)
9 The Wizard & The Princess	Melbourne House	VIC-20 (-)
10 Pool	Bug Byte	Spectrum (-)

Compiled with the assistance of Britain's leading software distributors, including: Pinnacle, SDL, PCE, Websters, PCS and Software Centre.

SPECTRUM

1 Jet Set Willy	Software Projects (1)
2 Chequered Flag	Psion (9)
3 Lunar Jetman	Ultimate (7)
4 Atic Atac	Ultimate (3)
5 Scuba Dive	Durrell (6)
3 Atic Atac	Ultimate (6)
4 Blue Thunder	Richard Wilcox (-)
5 Hunchback	Ocean (4)
6 Jack and the Beanstalk	Thor (-)
7 Escape from Krakatoa	AbbeX (-)
8 Moon Alert	Ocean (-)
9 Codename MAT	Micromega (5)
10 The Guardian	PSS (8)

COMMODORE 64

1 Manic Miner	Software Projects (-)
2 Black Hawk	Thorn EMI (4)
4 Space Shuttle	Microdeal (6)
5 Pedro	Imagine (-)
6 Space Pilot	Anirog (-)
7 Slurpy	Thorn EMI (5)
8 Mr Wimpy	Ocean (3)
9 Transylvanian Tower	Richard Shepherd (-)
10 It's only Rock 'n' Roll	K-tel (7)
8 Intro to Basic	Commodore (-)
9 Falcon Patrol	Virgin (-)
10 Revenge of the Mutant Camels	Llamosoft (9)

DRAGON 32

1 Chuckle Egg	A & F (2)
2 Pedro	Imagine (7)
3 Ugh!	Softek (4)
4 Kriegspiel	Beyond (5)
5 Hungry Horace	Melbourne House (3)
6 Skramble	Microdeal (-)
7 Space Shuttle Simulator	Microdeal (-)
8 S.A.S.	Peaksoft (10)
9 Up Periscope	Beyond (8)
10 Cuthbert In the Jungle	Microdeal (-)

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

VIC-20

1 Crazy Kong	Interceptor Micro (6)
2 Sub Commander	Thorn EMI (2)
3 M.L.B.A.T.E.T.	Llamosoft (8)
4 Tank Commander	Thorn EMI (3)
5 Jet Pac	Ultimate (10)
6 Tower of Evil	Thorn EMI (4)
7 Snooker	Visions (5)
7 Tiny Tutor	Marketing Micro (-)
9 Gridrunner	Llamosoft (7)
10 Mine Madness	Thorn EMI (9)

BBC

1737 Simulator	Salamander (-)
2 Q Man	MRM (2)
3 Chess	BBC (5)
4 Q Man's Brother	MRM (3)
5 Killer	Precision
6 Gorilla	Micro (7)
6 3D Munchy	MRM (4)
7 Demolator	Visions (1)
8 Diamond Mine	MRM (6)
9 Tank Attack	Gemini (-)
10 Dr Who 1st Adventure	BBC (-)
10 GB Ltd	Simon Hessel (8)

ZX81

1 Crazy Kong	PSS (1)
2 Skramble	Quicksilva (3)
3 Mothership	Sinclair (5)
4 Chess	Sinclair (7)
5 Space Raiders	Sinclair (2)
6 Asteroids	Quicksilva (10)
7 Flight Simulation	Sinclair (6)
8 Defenders	Quicksilva (8)
9 Football Manager	Addictive Games (4)
10 Invaders	Quicksilva (9)



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COMMODORE 64 PROGRAMMING

Most 64 owners will be aware how powerful the graphics capabilities of the machine are. There are several packages on the market for extending BASIC to use these capabilities and, in fact, David Rees described a do-it-yourself package in recent issues of Home Computing Weekly.

Most packages, David Rees' version included, have the disadvantage that although they offer a full range of facilities, they also tend to steal a large chunk of RAM. If you only want one or two bits of the package, they may prove impracticable.

In this article I shall describe some routines which, although they may be included in David's package, can be used on their own with a minimal overhead in RAM. The routines are all aimed at the use of graphics.

There seems to be a lot of inverted snobbery concerning high-resolution graphics. Whilst their use is ideal for graph plotting routines, they tend to be RAM hungry, often slow and do have some limitations. For example, can you create an animated drawing of a river using high-resolution graphics? It's easy using redefined characters! These routines will offer easy alternatives to hi-res. Whilst all routines operate independently, they can be used together.

The first routine gives pseudo teletext capabilities by enabling you to plot points and draw lines to a 80 by 50 resolution. Two simple commands are available:

To set or clear a point: SYS 49152,X,Y,Colour,Type. Type = 1 to set the point, type = 0 to clear the point.

To draw a line: SYS 49155,X1,Y1,X2,Y2,Colour,Type

Type
1 draw line
0 erase line

These routines assume that the screen memory is in its normal place. They will not work if you move the screen. For fast drawing, it is best to use the routines directly from machine code. For machine code hacks, I'll give details of the entry points later.

Listing 1 gives a BASIC loader for these routines. Demo 1 shows how they work.

Most computers have the option for user defined characters. The 64 is no exception and, true to form, there is no command for creating them. The next set of routines fill this gap.

The first problem is where to put the new characters. To

Great graphics which don't steal too much of your RAM

Listing 1 — medium resolution plot

```

20 REM
30 REM
40 DATA 76,51,194,76,111,194,72,152,72,185,72,165,8,141,89,3,141,64,3,133,252
50 DATA 73,133,3,153,251,165,251,221,50,144,3,226,89,3,178,132,3,201,90,144
60 DATA 239,89,3,173,88,3,240,3,76,197,192,169,49,36,229,201,133,251,78,132
70 DATA 46,64,3,70,251,46,64,3,6,251,6,251,6,251,165,251,6,251,201,201,252,6,251
80 DATA 252,24,101,251,133,251,165,252,180,4,133,252,1,4,64,3,169,1,141,64
90 DATA 224,0,240,6,14,64,3,224,144,246,172,132,3,177,251,166,6,221,153,152
100 DATA 13,232,226,16,144,246,169,4,141,96,3,76,197,192,178,133,3,440,8
110 DATA 138,13,64,3,24,178,144,13,173,64,373,255,141,64,3,139,45,104,0,170,189
120 DATA 193,192,172,132,3,145,251,24,165,252,160,616,166,252,179,16,3,145,251
130 DATA 124,180,169,184,96,32,126,143,97,124,226,255,236,108,120,98,252
140 DATA 225,251,254,168,72,132,72,136,72,169,155,141,136,3,173,134,3,201,90
150 DATA 145,168,1,76,42,194,173,136,3,201,90,144,5,158,2,76,42,194,173,136
160 DATA 281,50,144,5,168,3,76,42,194,173,136,3,201,90,144,5,160,4,76,42,194
170 DATA 136,3,56,237,134,3,141,55,3,173,137,56,237,135,3,141,55,3,169
180 DATA 141,67,3,141,68,3,173,66,3,16,18,160,255,140,67,73,405,24,185,1
190 DATA 141,69,3,173,65,3,16,18,160,255,140,69,3,73,235,24,185,1,141,70,3,173
200 DATA 70,56,237,69,3,141,71,3,16,18,160,255,141,72,3,169,0,141,73,3,173
210 DATA 69,3,141,74,3,173,70,3,141,75,3,173,66,3,16,18,141,74,3,173,69,3,141
220 DATA 159,0,141,72,3,169,255,141,73,3,116,78,3,141,74,3,173,69,3,141
230 DATA 70,3,173,65,3,46,5,169,1,141,70,3,173,74,3,141,76,3,56,237,70,3,141
240 DATA 70,3,173,75,3,141,77,3,76,74,3,173,75,3,56,237,74,3,141,79,3,159,134
250 DATA 141,132,3,173,135,3,141,133,3,173,139,3,266,4,169,0,240,13,201,1
260 DATA 208,4,169,1,286,5,173,139,3,173,250,141,136,3,24,5,124,173,13,16,90
270 DATA 24,169,77,3,141,79,3,173,134,3,24,189,78,3,141,134,3,173,139,3,24,169,68,3
280 DATA 72,3,141,135,3,76,32,194,86,237,76,3,141,79,3,173,134,3,24,169,68,3
290 DATA 133,3,173,135,3,24,189,67,3,141,135,3,207,76,3,46,3,76,166,139
300 DATA 169,0,140,69,3,184,178,184,166,184,96,32,252,174,32,188,173,32,247
310 DATA 189,165,204,141,132,3,32,253,174,32,136,173,32,247,189,165,204,141,132
320 DATA 32,189,174,32,136,173,32,247,189,165,204,141,132,3,32,253,174,32,136
330 DATA 32,189,174,32,136,165,204,141,132,3,76,6,192,96,32,253,189,165,204,141
340 DATA 169,165,204,141,132,3,84,253,174,32,136,173,32,247,189,165,204,141,132
350 DATA 135,3,32,253,174,32,136,173,32,247,189,165,204,141,132,3,32,253,174
360 DATA 132,173,32,247,189,165,204,141,132,3,32,253,174,32,136,173,32,247
370 DATA 189,165,204,141,132,3,32,253,174,32,136,173,32,247,189,165,204,141,132
380 DATA 76,285,192
390 T=0:FOR I=49152 TO 49661
400 REM W: T=I:POK I: X=NEXT
410 IF T<4975355 THEN PRINT"DATA ERROR"
420 REM *****
430 REM MEDIUM RESOLUTION PLOT *
440 REM THIS OCCUPIES #C000-#C405 *
450 REM *
460 REM *****
    
```

Listing 2 — user-defined characters

```

10 LISTING 2
20 REM
30 REM
40 DATA 76,15,195,76,282,195,76,67,196,76,100,196,76,187,196,32,253,174,32,136
50 DATA 173,32,247,189,165,204,141,132,3,169,224,141,131,3,169,249,141,136,3,76
60 DATA 195,169,216,141,131,3,169,226,141,130,3,169,243,141,130,3,138
70 DATA 254,169,0,133,251,169,0,133,252,173,14,226,4,284,141,14,226,165,1,41
80 DATA 251,133,1,160,0,177,253,145,251,165,251,24,206,1,133,251,166,252,100
90 DATA 133,252,24,169,253,185,1,133,253,169,254,185,0,133,254,169,255,209
100 DATA 222,165,254,205,131,3,285,213,165,15,4,133,1,133,254,169,255,209,131
110 DATA 220,169,16,141,24,286,173,222,3,201,405,288,1,36,169,168,168,195,32
120 DATA 80,67,84,69,84,67,84,69,84,67,84,69,84,67,84,69,84,67,84,69,84,67,84,69
130 DATA 82,65,67,84,69,84,67,84,69,84,67,84,69,84,67,84,69,84,67,84,69,84,67,84,69
140 DATA 169,91,32,255,174,32,138,173,32,247,189,165,204,133,251,165,21,240,44
150 DATA 169,225,160,195,32,30,171,96,63,32,67,72,65,82,65,67,84,69,84,67,84,69
160 DATA 85,77,66,69,82,32,71,62,69,65,84,69,84,67,84,67,84,65,78,32,50,33,0,0
170 DATA 169,0,133,252,169,33,32,253,174,6,251,38,252,6,251,38,252,6,251,38
180 DATA 24,169,252,185,0,133,252,169,0,141,232,3,32,253,174,32,138,173
190 DATA 247,189,172,232,3,165,20,145,251,208,232,3,192,0,28,232,196
200 DATA 233,174,32,138,173,32,247,189,165,204,281,255,208,5,169,131,141,119
210 DATA 169,1,133,199,169,16,141,130,2,32,248,252,96,169,18,141,24,208,96
220 DATA 96,169,21,141,24,208,96
230 T=0:FOR I=49920 TO 50488
240 REM W: POKEL X: T=X:NEXT
250 IF T<494374 THEN PRINT"ERROR IN DATA"
260 REM *****
270 REM USER DEFINED CHARACTERS *
280 REM *
290 REM THIS OCCUPIES #C000-#C478 *
300 REM *
310 REM *****
    
```

maintain compatibility with the plotting routines we are compelled to keep the screen in its normal place. To minimise loss of RAM, the new characters are put in a block from 2048 to 4095. To protect this area, we must shunt the start of BASIC up to 4096. There are two ways of doing this. First type in as a direct command the line:

POKE 44,16: POKE 256*16,0: NEW

As an alternative, a routine in this package can be used to do the job. Both of these methods will destroy any BASIC program in memory, so it is wise to do this job first. The call to protect the graphics is:

SYS 49926,X

If X has any value other than 255, the bottom of BASIC is simply raised. A value of 255 will auto load the next program on tape giving a means of booting a sequence of programs. The remainder of the commands are:

1 SYS 49920,SET
SET = 0 gives upper case.
SET = 1 gives lower case.

This routine switches in the new set and copies the specified characters from RAM to the new set. So that you know that all is well, a message is given when this command has finished. If you don't want the message to appear, e.g. in the middle of a program, poko location 1000 with 255.

2 SYS 49923 [N],B1,B2,B3, B4,B5,B6,B7,B8

This defines the shape of character N. The square brackets are used so that you can easily see which character is involved. The eight parameters specify the shape of the character.

3 SYS 49929.. enable user defined set.
SYS 49932.. disable user defined set.

These are simple switches to enable you to use text or redefined characters as required.

Listing 2 gives a BASIC loader for these routines. Try demo 2 to see what can be achieved with redefined characters. Look at Jeff Minter's Matrix or COSMI's Aztec Challenge to see what can be done with some cunning tricks.

The next block of routine,

COMMODORE 64 PROGRAMMING

Listing 3, is of more limited value but can be linked with the plotting routines to produce billboard type displays. The routine draws a large character at a specified position on the screen. The characters generated are macros built up from the standard CBM characters and are four characters high and four characters wide. Any of the numbers or alphabet are available. The routine is called with:

SYS 50432,X,Y,CH,COLOUR

where Y is the row where the top left hand corner of the character starts (0-24); X is the column where the character starts (0-39); CH is the ASCII value of the character (eg CH = ASC("A")); COLOUR is the colour of the character.

The final set of routines give a full range of scroll and roll routines. The scroll routines move the screen one character in the required direction and put a blank line at the other end of the screen. Roll moves the screen contents and puts the lost line at the other end of the screen (similar to a continuous conveyor belt). Both the screen and colour memories are scrolled so that the appearance of the screen is preserved.

The routines are called by:

Listing 3 — large 4 x 4 characters

```

20 REM
30 REM
40 DATA32,253,174,32,138,173,32,247,183,165,20,141,134,3,32,253,174,32,138
50 DATA173,32,247,183,165,20,141,134,3,32,253,174,32,138,173,32,247,183,165
60 DATA20,141,132,3,32,253,174,32,138,173,32,247,183,165,20,141,134,3,32,253,174,32,138
70 DATA3,32,253,174,32,138,173,32,247,183,165,20,141,134,3,32,253,174,32,138
80 DATA24,32,240,255,172,132,3,185,111,187,133,281,195,154,187,133,281,168
90 DATA0,177,251,281,64,240,6,32,210,255,200,208,244,95,146,179,194,215,240
100 DATA13,40,73,90,123,156,157,158,159,160,161,162,197,229,7,36,67,90,189,140
110 DATA174,193,212,235,250,29,64,95,121,152,182,209,227,4,35,69,99,121,200
120 DATA200,200,200,200,201,201,201,201,201,201,201,201,201,201,201,201,201,197
130 DATA197,197,197,197,198,198,198,198,198,198,198,198,198,198,198,198,197
140 DATA198,199,199,200,200,200,200,200,172,18,162,146,187,17,157,157,157,161
150 DATA32,18,161,17,157,157,157,157,157,157,157,157,157,157,157,157,157,161
160 DATA146,64,18,172,162,146,191,17,157,157,157,157,157,157,157,157,157,161
170 DATA157,157,146,161,32,18,161,17,157,157,157,157,157,157,157,157,157,161
180 DATA172,18,162,146,191,17,157,157,157,157,157,157,157,157,157,157,157,161
190 DATA171,157,157,157,157,157,157,157,157,157,157,157,157,157,157,157,157,161
200 DATA157,161,32,18,161,17,157,157,157,157,157,157,157,157,157,157,157,161
210 DATA146,162,190,64,18,172,162,152,17,157,157,157,157,157,157,157,157,157,161
220 DATA161,17,157,157,157,157,157,157,157,157,157,157,157,157,157,157,157,161
230 DATA146,162,17,157,157,157,157,157,157,157,157,157,157,157,157,157,157,161
240 DATA157,161,32,18,161,17,157,157,157,157,157,157,157,157,157,157,157,161
250 DATA18,191,146,64,161,32,18,161,17,157,157,157,157,157,157,157,157,157,161
260 DATA157,157,157,146,161,32,18,161,146,17,157,157,157,157,157,157,157,161
270 DATA60,29,189,18,172,146,17,157,161,17,157,161,17,157,157,172,18,188,146
280 DATA29,189,18,172,17,157,146,161,17,157,161,17,157,157,157,157,157,157,161
290 DATA64,161,32,18,191,17,157,157,157,157,157,157,157,157,157,157,157,161
300 DATA157,161,32,191,64,161,17,157,157,157,157,157,157,157,157,157,157,161
310 DATA18,189,146,32,18,190,17,157,157,157,157,157,157,157,157,157,157,161
320 DATA157,161,32,18,161,17,157,157,157,157,157,157,157,157,157,157,161
330 DATA146,32,18,161,146,17,157,157,157,157,157,157,157,157,157,157,161
340 DATA161,18,161,151,146,17,157,157,157,157,157,157,157,157,157,157,161
350 DATA187,17,157,157,157,157,157,157,157,157,157,157,157,157,157,157,161
360 DATA17,157,157,157,157,157,157,157,157,157,157,157,157,157,157,157,161
370 DATA188,146,162,18,191,17,157,157,157,157,157,157,157,157,157,157,161
380 DATA162,146,167,17,157,157,157,157,157,157,157,157,157,157,157,157,161
390 DATA18,161,146,17,157,157,157,157,157,157,157,157,157,157,157,157,161
400 DATA157,157,18,188,146,162,18,191,17,157,157,157,157,157,157,157,161
410 DATA146,161,32,191,64,18,191,162,146,191,17,157,157,157,157,157,161
420 DATA157,32,188,191,17,157,157,157,157,157,157,157,157,157,157,157,161
430 DATA17,157,146,18,161,17,157,157,157,157,157,157,157,157,157,157,161
440 DATA17,157,157,157,157,157,157,157,157,157,157,157,157,157,157,157,161
450 DATA157,157,157,157,157,157,157,157,157,157,157,157,157,157,157,157,161
460 DATA161,32,18,161,146,17,157,157,157,157,157,157,157,157,157,157,161
470 DATA162,190,64,161,32,18,161,146,17,157,157,157,157,157,157,157,161
480 DATA157,157,161,162,18,161,17,157,157,157,157,157,157,157,157,157,161
490 DATA32,18,161,146,17,157,157,157,157,157,157,157,157,157,157,157,161
500 DATA146,167,17,157,157,157,157,157,157,157,157,157,157,157,157,157,161
510 DATA17,157,157,157,157,157,157,157,157,157,157,157,157,157,157,157,161
520 DATA146,17,157,157,157,157,157,157,157,157,157,157,157,157,157,157,161
530 DATA162,162,64,18,191,162,146,191,17,157,157,157,157,157,157,157,161
540 DATA157,146,161,29,18,161,17,157,157,157,157,157,157,157,157,157,161
550 DATA161,29,18,161,17,157,157,157,157,157,157,157,157,157,157,157,161
560 DATA17,157,157,157,157,157,157,157,157,157,157,157,157,157,157,157,161
570 DATA146,191,17,157,157,157,157,157,157,157,157,157,157,157,157,157,161
    
```

- scroll down SYS 52742
- roll down SYS 51826
- scroll left SYS 52123
- roll left SYS 52182
- scroll right SYS 51992
- roll right SYS 52049

The contents of location 901 specifies the number of rows scrolled or rolled to the left or right. It has no effect on the scroll and roll down. Listings 4 and 5 load these routines. The listings can be used independently. Demo 4 incorporates many of these routines to show what is possible.

Machine code aspects of low-res plot: The interfacing of the plotting routines to your own machine code routines is a simple matter:

Point plot:
X in location 900
Y in location 901
Colour in 786
Point type in 906
Entry point \$C006

Line plot:
X1 in 902
Y1 in 903
X2 in 904
Y2 in 905
Colour in 786
Line type in 907
Entry Point \$C0D1

```

580 DATA18,191,146,64,29,18,191,146,161,17,157,157,157,18,191,29,146,161,17
590 DATA157,157,157,18,188,146,162,18,188,17,157,146,161,64,18,172,162,162
600 DATA17,157,157,157,188,146,162,18,17,157,18,161,17,157,157,157,157,161
610 DATA162,18,191,146,64,18,191,162,146,191,17,157,157,157,18,188,146,162
620 DATA187,17,157,157,157,157,29,18,161,17,157,157,157,146,191,162,18,191
630 DATA146,64,18,161,162,187,17,157,191,17,157,157,18,161,17,157,161,146,64
640 DATA18,191,162,146,191,17,157,157,157,157,157,162,18,191,17,157,157,157,146
590 DATA161,29,18,161,17,157,157,157,146,191,162,18,191,146,64,191,162,146
650 DATA191,17,157,157,157,161,29,18,161,17,157,157,157,157,157,157,157,161
670 DATA17,157,157,157,146,191,162,18,191,146,64,64,64,64,64,64,64,64
700 T=0:FOR I=50432 TO 51618
710 READ X:Y=T+X:POKE I,X:Y+X
720 IF Y<0:Y=0:IF Y>24:Y=24:PRINT"DATA ERROR"
730 REM *****
730 REM LARGE 4 x 4 CHARACTERS *
730 REM * OCCUPIES $C000-$C092 *
740 REM *****
    
```

Listing 4 — scroll and roll down

```

10 LISTING 4
20 REM
30 REM
40 DATA169,192,133,176,133,187,169,152,133,190,133,189,169,7,133,177,139,181
50 DATA169,219,133,188,133,190,169,24,141,9,192,96,32,6,202,160,39,177,160
60 DATA145,176,177,189,145,197,136,16,245,206,6,192,48,49,155,160,133,174,165
70 DATA181,133,177,165,189,133,187,165,180,133,186,82,85,184,233,183,188
80 DATA165,181,233,0,133,181,56,165,189,233,40,133,189,145,190,233,0,133,190
90 DATA24,144,193,160,39,169,0,133,176,169,4,133,177,169,32,145,176,136,16
100 DATA251,96,160,39,185,192,7,153,62,3,185,192,219,193,122,3,196,16,241,32
110 DATA0,202,160,39,177,190,145,176,177,189,145,187,136,16,245,206,0,192,48
120 DATA45,165,180,133,176,165,181,133,177,165,181,133,176,165,181,133,188,56
130 DATA165,180,233,40,133,190,165,181,233,0,133,181,56,165,189,233,40,133
140 DATA189,165,190,233,0,133,190,24,144,193,160,39,165,62,3,185,0,4,185,122
150 DATA5,153,0,216,136,16,241,96
160 T=0:FOR I=51712 TO 51926
170 READ X:T=T+X:POKE I,X+T
180 IF Y<0:Y=0:IF Y>24:Y=24:PRINT"ERROR IN DATA"
190 REM *****
200 REM * SCROLL AND ROLL DOWN *
210 REM *
220 REM * THIS OCCUPIES $D00 TO $D07 *
230 REM *****
    
```

Listing 5 — scroll/roll left and right

```

10 LISTING 5
20 REM
30 REM
40 DATA173,133,3,141,132,3,206,132,3,169,0,133,176,133,187,169,4,133,177,169
50 DATA216,133,188,96,32,0,203,160,98,177,176,200,145,176,136,177,187,200,145
60 DATA187,136,161,15,241,0,169,32,145,176,206,132,3,48,25,24,165,105
70 DATA40,133,176,144,2,200,177,24,165,187,105,40,133,187,144,200,200,188,24
80 DATA144,203,96,32,0,203,160,39,177,176,141,134,3,177,187,141,135,3,136,177
90 DATA176,200,145,176,136,177,187,200,145,187,136,136,16,241,160,0,173,134
100 DATA3,145,176,173,135,3,145,167,206,132,3,48,25,24,165,105,40,133,176
110 DATA144,2,200,177,135,3,145,167,206,132,3,48,25,24,165,105,40,133,176
120 DATA62,0,203,160,1,177,187,136,145,187,200,177,176,136,145,176,200,200,192
130 DATA40,208,239,160,39,169,32,145,176,206,132,3,48,25,24,165,105,40
140 DATA123,176,144,2,200,177,24,165,187,105,40,133,187,144,200,230,188,24
150 DATA144,2,200,177,135,3,145,167,206,132,3,48,25,24,165,105,40,133,176
160 DATA187,136,145,187,200,177,176,136,145,176,200,200,192,40,208,239,160
170 DATA39,173,134,3,145,176,173,135,3,145,187,206,132,3,48,25,24,165,176,105
180 DATA0,133,176,144,2,200,177,24,165,187,105,40,133,187,144,189,230,188
190 DATA24,144,164,96
200 T=0:FOR I=1969 TO 82257
210 READ X:T=T+X:POKE I,X:T+X
220 IF Y<0:Y=0:IF Y>24:Y=24:PRINT"ERROR IN DATA"
230 REM *****
240 REM * SCROLL/ROLL LEFT AND RIGHT *
250 REM *
260 REM * THIS OCCUPIES $D00 TO $D02 *
270 REM *****
    
```

Why use a big graphics program when you're only going to use parts of it?
These routines, by HCW regular Allen Webb, are fast memory-efficient alternatives

COMMODORE 64 PROGRAMMING

```

10 REM DEMONSTRATION 1
20 REM
30 REM LOW RESOLUTION PLOTTING
40 REM
50 SA = 49152: COLOUR = 1: TYPE = 1: PRINTCHR$(147)
60 FOR X2 = 0 TO 79 STEP 2
70 SYS SA+3,39,0,X2,49:COLOUR,TYPE
80 NEXT X2
90 COLOUR = 3
100 FOR X2 = 0 TO 79 STEP 2
110 SYS SA+3,39,49,X2,0:COLOUR,TYPE
120 NEXT X2
130 COLOUR = 5:FOR Y = 0 TO 49
140 DN = RND(1)*20
150 FOR I = 1 TO DN
160 SYS SA, RND(1)*20,Y,COLOUR,TYPE
170 NEXT I
180 NEXT Y
190 FOR D = 1 TO 1000 :NEXT
200 RUN
    
```

Demonstration 1 — low resolution plotting



```

10 REM DEMONSTRATION 2
20 REM
30 REM USER DEFINED CHARACTERS
40 REM
50 REM ***** WARNING *****
60 REM RAISE THE START OF BASIC BEFORE
70 REM RUNNING THIS PROGRAM
80 REM *****
90 REM
100 POKE1000,255:REM NO MESSAGE
110 POKE53280,1:POKE53281,1:REM WHITE SCREEN
120 SA=49520:REM START OF ROUTINES
130 SYS SA,0:REM UPPER CASE SET
140 GOSUB 310
150 GOSUB450 : REM FILL SCREEN WITH BLANKS (CHARACTER 32)
160 SYS SA+3 (32),255,129,129,129,129,129,129,255:GOSUB440
170 SYS SA+3 (32),255,255,195,195,195,195,255,255:GOSUB440
180 SYS SA+3 (32),255,255,255,231,231,255,255,255:GOSUB440
190 SYS SA+3 (32),255,255,255,255,255,255,255,255:GOSUB440
200 C=C+1:IF C=20 THEN 160
210 SYS 49923 (32),0,0,0,0,0,0,0,0
220 GOSUB450:FOR I=1 TO 8:READ X(I):NEXT
230 FOR I=1 TO 8
240 FOR J=1 TO 8:X(J)=V(I):NEXT
250 X(I)=255
260 SYS SA+3 (32),X(1),X(2),X(3),X(4),X(5),X(6),X(7),X(8)
270 NEXT C=C+1:IF C=20 THEN 230
280 RUN
290 DATA 7,1,4,0,2,6,3,5
300 DATA 128,64,32,16,8,4,2,1
310 FOR I=1 TO 255:SYS SA+3 (I),0,0,0,0,0,0,0,0 : NEXT:GOSUB450
320 PRINT "*****"TAB(3)"A SHORT DEMONSTRATION SHOWING WHAT"
330 PRINT "*****"TAB(3)"CAN BE ACHIEVED WITH USER DEFINED"
340 PRINT "*****"TAB(15)"CHARACTERS"
350 POKE56334,PEEK(56334)AND254
360 POKE1,PEEK(1)AND251
370 FOR I=1 TO 8:READ K
380 FOR J=1 TO 27
390 POKE 2048+(J-1)*8+K,PEEK(53248+(J-1)*8+K):NEXT J,I
400 POKE1,PEEK(1)OR4
410 POKE56334,PEEK(56334)OR1
420 FOR D=1 TO 1000 :Z=AND(1)*256 :SYS 49923 (32),Z,Z,Z,Z,Z,Z,Z,Z:RETURN
430 SYS 49923 (32),0,0,0,0,0,0,0,0 RETURN
440 FOR I=1 TO 200 :NEXT:REM DELAY
450 O=S:FOR I=1 TO 300 :O=S+CHR$(32):NEXT
460 PRINT "*****"FOR I=1 TO 203:PRINT "*****":NEXT:PRINT "*****":RETURN
    
```

Demonstration 2 — user-defined characters

```

10 REM DEMONSTRATION 3
20 REM
30 REM USE OF 4 BY 4 ENLARGED CHARACTERS
40 REM
50 PRINTCHR$(147)
60 ME#="A TEST":V=0:XS=0:GOSUB 120
70 ME#=" DEMO":V=5:XS=6:GOSUB 120
80 ME#=" USING":V=10:XS=3:GOSUB 120
90 ME#=" LARGE":V=15:XS=3:GOSUB 120
100 ME#="LETTERS":V=20:XS=3:GOSUB 120
110 COLOUR=RND(1)*16:PRINT"*****"
120 FOR I=1 TO LEN(ME#)
130 CH=ASC(MID$(ME#,I,1))
140 X=(I-1)*4+XS
150 SYS 58432:X,V,CH,COLOUR:NEXT
160 RETURN
    
```

Demonstration 3 — use of 4 x 4 characters

```

10 REM DEMONSTRATION 4
20 REM SCROLLS AND ROLLS
30 REM
40 PRINTCHR$(147)
50 PRINT"*****"
60 PRINT"*****"
70 PRINT"*****"
80 PRINT"*****"
90 PRINT"*****"
100 PRINT"*****"
110 FOR I=1 TO 8:SYS 51742:NEXT
120 POKE 901,24:FOR I=1 TO 96:SYS 52049:NEXT
130 POKE 901,12:FOR I=1 TO 40:SYS 52049:NEXT
140 POKE 901,24:FOR I=1 TO 15:SYS 51992:NEXT
150 POKE 901,24:FOR I=1 TO 37:SYS 52123:NEXT
160 FOR I=1 TO 15:SYS 51992:NEXT
170 FOR I=1 TO 30:SYS 51826:NEXT
180 POKE 901,4:FOR I=1 TO 12:SYS 52182:NEXT
190 POKE 901,25
200 SYS 52182:GOTO 200
    
```

Demonstration 4 — scrolls and rolls

Cosmic Kidnap 32K BBC £7.95

Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX

This is a complicated take-off of one of the oldest arcade games, Space Invaders. The lower section of the screen remains the same, but the marching intruders have been scrapped to be replaced by funny blue things (cronies). The mother ship has stayed, but there are now three alien captives in the middle of the screen, surrounded by a tough red wall.

It is your job as the Autoguard to stop the cronies dismantling the wall and so rescuing your prisoners.

You can lose one of your three

lives by being hit by one of the bombs dropped from above, or if a prisoner is freed by a crony.

The normal left, right and fire controls are used and as soon as you have blasted all the cronies from one screen you immediately move to the next. From the third screen onwards you are often confronted with a menacing creature called the bug. He must be hit in a specific place and is worth 10 times more points than the cronies.

A definite must for all 'shoot 'em out of the sky' fans. **M.B.**

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



Dragon Attack Sord M5 £19.95

Computer Games, CGL House, Goldings Hill, Loughton, Essex IG10 2RR

In this game you are a fighter robot and you must move right or left and fire missiles at dragons or UFOs. If you are hit by fire from the dragon, or if the dragon moves to the base of the screen you are knocked out. You can hide below shelters which gradually crumble under the fire of the dragons.

All this may sound strangely familiar, and so it should. Dragon Attack is a souped-up version of the now out-dated game of Space Invaders. Dragons, not invaders, descend

in centipede fashion. One modification is that if a dragon is hit in the head, it will be completely knocked out; however, if it is hit in the torso, the torso disappears and the dragon divides into two. Tactics are therefore necessary.

Graphics and animation are adequate and the sound is good. However this type of game is now totally out of date, and I can't see people flocking to buy this. **S.S.**

instructions	80%
playability	60%
graphics	65%
value for money	60%



Galax Attax Dragon £12.95

Dragon Data, Kenfig Industrial Estate, Margam, Port Talbot, West Glam SA13 2PE

A machine code arcade game which to my mind closely resembles Space Invaders.

The enemy space craft progress in formation from the top of the screen dropping bombs as they go. If you do not shoot them first they can leave the formation to attack you. Movement to left and right is controlled by the joystick and the fire button shoots the missiles. There is nowhere to hide on the screen. You must keep on shooting and running until all your lives are lost.

The aliens come in three varieties. The score for each is doubled if you can hit it once it has left the formation.

Bonus points are awarded if a formation is completely destroyed. Another wave then appears. An extra ship is gained for every six convoys destroyed.

The screen display is adequate if unexciting. One of the aliens looks to me like a flying bowtie. The game loaded without any problems. The packaging is elaborate and concise instructions come in a small booklet.

A reasonable game of Space Invaders but I have seen more interesting versions. **J.E.M.**

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



Blow up tanks, shoot down aliens!

Old favourites are adapted, with new modifications. See what our team of reviewers think

Tank Battalion Sord M5 £23.95

Computer Games, CGL House, Golding Hill, Loughton, Essex IG10 2RR

This is a game in which you control a tank in the middle of a battlefield. Enemy tanks slowly advance towards their goal — command headquarters. Your job is to defend by destroying the enemy tanks as they approach... and so goes the accompanying informative instruction booklet.

Sounds exciting, doesn't it? Well, I'm afraid that Tank Battalion is nowhere near as exciting as it sounds. Basically, you take pot shots at the enemy tanks as they ramble around the screen and if you manage to destroy 20 before they blow up

the command headquarters, which incidentally is represented as a flower, you go on to the next screen to do the whole thing all over again.

Your tank is a simple character, not a sprite, resembling a tank and the enemy tanks are just the same apart from their colour. Sound isn't very exciting either. There are some nice touches to this game, such as different street patterns for successive screens, realistic explosions, two players option and nice tunes, but at £23.95, I honestly can't recommend it. **S.S.**

instructions	90%
playability	60%
graphics	40%
value for money	40%



Johnny Reb Dragon 32/ Tandy Colour £6.95

Lothlorien, 56a Park Lane, Poynton, Cheshire, SK12 1AE

From the makers of specialist Battle Games comes this simulation of the American civil war. There are two versions on one tape, one for the Dragon and the other for its near cousin the CoCo.

The game is one of strategy and there are many options for you to ponder over. The first is quite easy: do you wish to play the computer or another human being? After that they become more difficult.

You can set the game to a fixed number of moves: this means that games need not take too long and you have a result at the end. Then you must choose the size and composition of your army for the battle.

The battlefield is made up of different vegetation and a river with each unit. Any units which touch are in conflict and the computer decides the outcome. The game is visually good and very clear, as are the movement routines. I cannot judge how accurate the tactical adjustments are but I have enjoyed playing the game and will do so again. **D.C.**

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

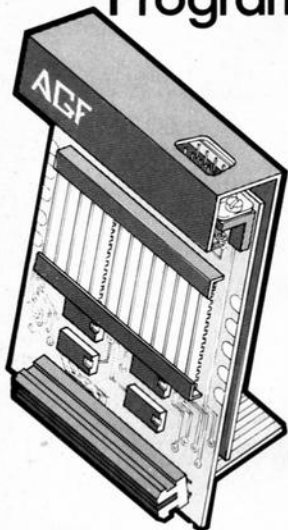


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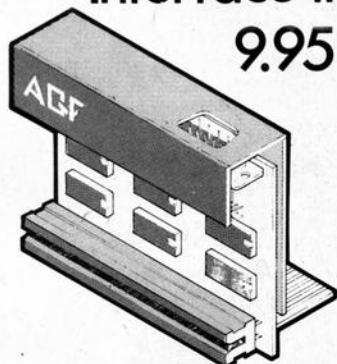
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Make your micro make music

In this fairly short program you can play the notes within a given octave using the letters as shown on the screen.

As a tune is played the music is stored in the array X(X) and you can play it back later by pressing Y.

These are the keys for entering music:

S D G H J
Z X C V B N M

And these are the operational keys:

Q alters the octave (0-6), followed by 1 to lower or 2 to increase. Space bar returns you to entering music

W change the length of the note, followed by 1 to shorten duration or 2 to lengthen it. Space bar returns you to the menu

E ends the program

R allows you to alter the envelope shape, 1 to lower and 2 to increase the number

T alters the envelope period, again followed by 1 to shorten and 2 to increase

I have tried to keep the program fairly short and in order to do so I have only used one of the four available sound channels.

In addition, you can only

```

1 REM ** SYNTHESISER **
2 REM ** A PROGRAM FOR THE ORIC 1 --WORKS IN 16K AND 4
8K MACHINES **
3 REM ** WITHOUT ALTERATIONS **
4 REM
5 REM ** S.W. LUCAS **
10 TEXT:GRAB:PAPER7:INK4
12 PRINTCHR$(6):REM TURN OFF KEY CLICK
13 PRINTCHR$(17):REM TURN OFF CURSOR
15 DIMX(1000):REM USED TO STORE MUSIC - MAKE LARGER IF
YOU HAVE 48K
17 CLS
20 GOSUB1000:REM SET SCREEN DISPLAY
25 B=20:C=3:D=5:E=200:Y=1
30 GOSUB2000:REM GET NOTE AND PLAY IT!
40 IFA$="Q"THENGOSUB3000:GOTO30:REM CHANGE OCTAVE
50 IFA$="W"THENGOSUB4000:GOTO30:REM CHANGE DURATION
60 IFA$="E"THENCLS:PLOT10,15,"THANK YOU FOR PLAYING":P
RINTCHR$(6)CHR$(17):END
70 IFA$="R"THENGOSUB5000:GOTO30:REM CHANGE ENVELOPE
80 IFA$="T"THENGOSUB6000:GOTO30
90 IFA$="Y"THENGOSUB10000:GOTO30:REM REPLAY MUSIC
999 END
1000 FORX=20TO25:PLOT0,X,17:PLOT1,X,7:PLOT38,X,23:NEXT
1010 PLOT3,24,"Z X C V B N M"
1020 PLOT5,22,"S D G H J"
1030 PLOT14,16,"KEYS USED"
1040 PLOT3,19,"C D E F G A B"
1050 PLOT12,18,"for the notes:-"
1055 PLOT1,14,1:PLOT2,14," S. W. Lucas"
1060 FORX=1TO2:PLOT10,X,X*2:PLOT11,X,14:PLOT12,X,"Mini
synth":NEXT
1500 RETURN
2000 PLOT30,4,"KEYS":PLOT25,5,"Q= octave":PLOT25,6,"W=
note length"
2001 PLOT25,7,"E= end program":PLOT25,8,"R= envelope"
2002 PLOT25,9,"T= period"
2003 PLOT23,10,"Y= replay music"
2004 REPEAT
2005 A=0
2030 BETA$:REM SET VALUE OF A FOR NOTE BEING PLAYED
2040 IFA$="Z"THENA=1 ELSEIFA$="X"THENA=3 ELSEIFA$="C"
HENA=5
2050 IFA$="V"THENA=6 ELSEIFA$="B"THENA=8 ELSEIFA$="N"
HENA=10
2060 IFA$="M"THENA=12
    
```

Turn your Oric into a musical instrument and play back your masterpieces. Steve Lucas wrote his synthesiser program for 16K or 48K models

ORIC PROGRAM

```

2070 IFA#="S" THENA=2 ELSEIFA#="D" THENA=4 ELSEIFA#="G" T
HENA=7
2080 IFA#="H" THENA=9 ELSEIFA#="J" THENA=11
2090 IFA<>0 THENMUSIC1,C,A,0:PLAY3,0,D,E
2095 Y=Y+1:REM INCREMENT NOTE
2097 X(Y)=A:REM ADD NOTE TO SAVED MUSIC
2100 WAITB
2110 PLAY0,0,0,0
2500 UNTILAF#="G" ORAF#="W" ORAF#="E" ORAF#="R" ORAF#="T" ORAF#="
Y"
2510 RETURN
3000 PLOT30,4,"      ":PLOT25,5,"      ":PLOT25,6,"
      "
3001 PLOT25,7,"      "      ":PLOT25,8,"      "      ":
PLOT25,9,"      "
3009 PLOT10,4,"CHANGE OCTAVE"
3010 PLOT10,5,"lower=1 higher=2"
3020 PLOT9,6,"press <space bar> when ready"
3025 REPEAT
3030 F#=KEY#
3040 IFF#="1" THENC=C-1 ELSEIFF#="2" THENC=C+1
3050 IFC<=0 THENC=0
3060 IFC>+6 THENC=6 :REM C=OCTAVE NUMBER
3065 PLOT10,8,"OCTAVE No;-"
3066 PLOT20,8,STR$(C)
3070 UNTILF#=" "
3080 PLOT10,4,"      "
3090 PLOT10,5,"      "
3100 PLOT9,6,"      "
3110 PLOT9,8,"      "
3120 RETURN
4000 PLOT30,4,"      ":PLOT25,5,"      ":PLOT25,6,"
      "
4001 PLOT25,7,"      "      ":PLOT25,8,"      "      ":
PLOT25,9,"      "
4009 PLOT10,4,"CHANGE DURATION"
4010 PLOT10,5,"lower=1 higher=2"
4020 PLOT9,6,"press <space bar> when ready"
4025 REPEAT:F#=KEY#
4040 IFF#="1" THENB=B-10ELSEIFF#="2" THENB=B+10
4050 IFB<=0 THENB=0
4060 IFB>70 THENB=70
4065 PLOT10,8,"DURATION:-"
4066 PLOT20,8,STR$(B)
4070 UNTILF#=" "
4080 PLOT10,4,"      "
4090 PLOT10,5,"      "
4100 PLOT9,6,"      "

```

How it works

- 10 sets colours of screen and text mode: GRAB allows the program to use the hi-res screen memory area.
- 12-13 turn off key click and cursor
- 15 DIMensions array X — used to store musical notes
- 20 calls screen display subroutine (lines 1000-1500)
- 25 sets default values of variables
- 30 calls subroutine at 2000-2510 which is the main routine for entering music
- 40 calls octave change subroutine, lines 3000-3120
- 50 calls note duration subroutine, lines 4000-4120
- 60 ends program when E is entered
- 70 calls envelope change routine, lines 5000-5210
- 80 calls routine to alter the envelope rise/decay times, lines 6000-6800
- 90 calls the REPLAY subroutine lines 10000-10060
- 1000-4100 subroutines called by lines above

store 1,000 notes in array X before an error occurs. This is to make it compatible with the 16K Oric. If you want to write longer pieces you must increase the DIM statement in line 15.

Main variables

- X(X) musical notes written
- SS key pressed
- A note
- B duration of WAIT command
- C octave
- D envelope mode
- E envelope period
- Y number of notes in array

Note: Use the space bar, or any other key, for a pause. I would recommend that you write the music and then alter the envelopes to investigate the different effects.



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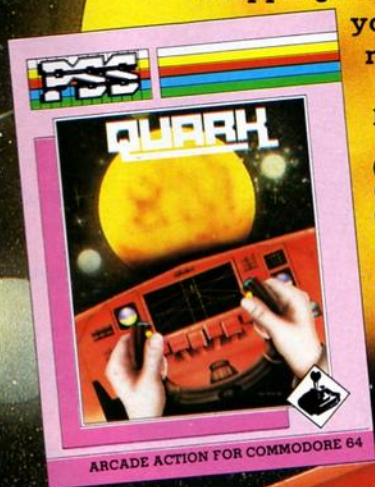
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