HCW drives you wild!

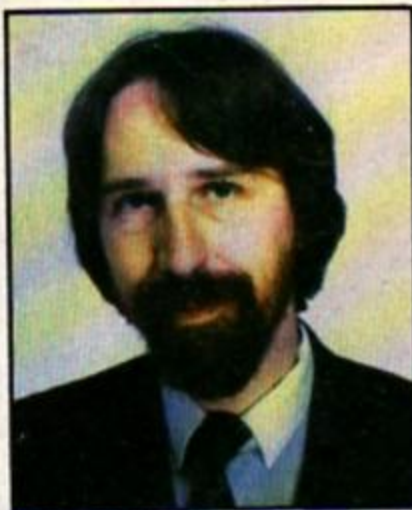### Win a disc drive from Amstrad

AMSTRAD

New releases

HCW FIRST

Reviewed inside p.12

Industry unites to combat piracy

Tim Langdell of GOSH

Software theft and piracy could become a thing of the past if the industry agencies have their wishes fulfilled.

The Guild of Software Houses (GOSH) and the Federation Against Software Theft (FAST) are looking forward to the Copyright (Computer Software) Amendment Bill becoming law within the next two months and are already investigating ways in which the law can be enforced.

There seems little doubt, writes Dave Carlos, that when the bill becomes law it will be illegal to copy any software product including games for home computers and the penalties for those found doing so are likely to be very high. There is no limit to the fine that can be imposed although the maximum fine per tape is £1000. Prison sentences can also be imposed.

Tim Langdell, Chairman of GOSH, said that GOSH is fighting the problem on a number of fronts.

"We are investigating software protection systems that make copying impossible, we are also trying to stop the publication of ads for copying products and trying to educate the public that this action is wrong. "What the public doesn't seem to realise is that tape copying is damaging the industry. The software industry is very much alive despite its problems and traumas and we don't simply want the hard business people to be survivors. It would be a real pity if the creative and living parts of the industry are the ones that disappear due to copying."

Nick Alexander, director of GOSH and managing director of Virgin Games, emphasised that it isn't the teenager pirates who are likely to be prosecuted but didn't rule out the possibility.

"Where someone is involved in copying on a large scale then they might have a real problem. Virgin is constantly on watch for leads to copying operations and we will take action where necessary."

● A deal has been struck between two leading software houses after one pointed out that the second appeared to be marketing what amounted to a "cover" version of their original program. HCW understands that the cash sum involved is substantial although both programs will remain on sale. A case of inadvertent copyright infringement?

BBC B+ now £469

Acorn computers this week announced a price cut in the BBC B+, the upgraded version of the BBC B.

The BBC B+ was launched on 1 May this year (HCW 110 April 30) and has 64K of RAM available to both BASIC and machine code programs. It also has a disc filing system as standard.

When launched the price of the computer was set at £499, however, the price cut announced by Acorn now means that the BBC B+ will retail at £469, a reduction of just £30.

John Caswell of Acorn gave the official reason for the price cut. "We want to bring the price in line with the earlier price of the BBC B with disc filing system which is no longer available," he said.

The official price of the BBC B is now £399. Until recently Acorn was running a £50 trade-in scheme but this offer has now finished and the price has returned to normal.

It is still unclear whether the BBC

64K
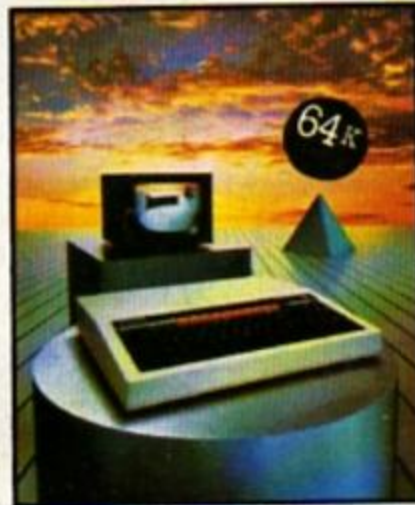
B+ is actually selling and many big retailers, for instance Dixons, Rumbelows and WH Smiths, are not even stocking it. One shop in London's Tottenham Court Road is selling a BBC B package with disc drive, DDFS and speech upgrade for £499, alongside the BBC B+ at the same price.

HOME COMPUTING WEEKLY

CONTENTS

July 2 - July 8, 1985   No. 119

Soapbox

I agree with Dave's comments about the attitude to micros in issue 117. I feel that much of the blame lies with the retailers.

There are three categories of retailer as far as I am concerned:

- Small business suppliers who don't want to know about "toy" computers.
- Semi-serious retailers — the saving grace of the serious micro user, but too few and far between.
- High Street retailers — these are the ones that have done most damage to the image of the home computer and should give up selling them in disgrace!

I decided to buy a printer recently. The shop which "saves you money and serves you right" had one in stock. I made the usual enquiries, asked for a demo from the manager and got the following responses:

- There wasn't even a single sheet of computer stationery in the shop!
- He couldn't connect up the computer and printer together.
- He openly admitted that he had only been on a three day computer course and had forgotten all of that by the end of the week.

I could go on — with stories about discs and cassettes but it is too depressing. If only the retailers could get their act together then perhaps "home" computing will have a chance.

C M S Lewis, Farnborough

BASIC LIVING

Jim Barker · Jon Wedge

WHATS GEORGE DOING WITH THE COMPUTER?

PLAYING A GAME CALLED "IRON FIST INVADES THE GALAXY"!

YIPPEE!

HE MUST BE DOING WELL THEN!

I DOUBT IT!

IVE LANDED TROOPS ON THE ISLE OF WIGHT!

BOUNCE!

BOUNCE

DRIVING YOU WILD

This week Amstrad owners have the chance to win an Amstrad DD1 disc drive and interface, but you'll have to use your brains so put on those thinking caps!

Top prize this week is worth £199 to a lucky Amstrad owner. You can be the envy of all your friends and fellow computer buffs with the Amstrad DDI 1 disc drive and interface.

If you don't manage to win this valuable prize, don't despair, there are 20 Amsoft games for runners-up. What is more exciting is that you can choose your own prize from the following list of top selling Amsoft titles: Roland in Space, Roland in Time, Blagger, The Prize and Punchy. Indicate the game that you would like to have on your entry coupon.

Just imagine the time that you will save and the extra power that will be yours if you win. Each interface comes complete with CP/M and DR LOGO. The CP/M operating system is the world standard for small business machines and will enable you to use your Amstrad for word processing, business planning and database information storage.

LOGO is the language devised by Pappert for children to use and has spawned a huge interest in turtles, buggies and other computer controlled creatures. Its interactive nature and its use of interactive procedures makes it ideal for use in a teaching environment.

Another huge advantage of the Amstrad disc drives is pure speed. We all know about the speed and reliability problems of cassettes. Although the in-built drive overcomes a number of these, speed or lack of it is still a major frustration with cassettes. The standard 3 inch drives in the DDI 1 will revolutionise your use of the machine. No more making coffee whilst the program loads, you'll have to be quick just to stir your sugar!

Winning a prize of this nature cannot be a simple matter though. You are going to have to put your brain into gear and think hard.

How to enter

Below you will find a list of the advantages that a DDI 1 drive and interface has over cassettes. Try and read the editor's mind and put them into the order of importance that he would choose. Fill in the coupon indicating the order and write the letters on the outside of your envelope. This is very important and any entries that don't have this information cannot be accepted. Place the coupon in the envelope, seal it and address it to: Disc Drive Competition, Home Computing Weekly, No.1 Golden Square, London W1R 3AB to arrive not later than Friday 19 July, 1985.

If more than one entrant manages to force their brain to work as strangely as the editor's all the correct entries will go into a hat and the winner's name will be pulled out. The 20 runners up will be chosen in the same manner.

The advantages

A Speed
B CP/M business software base
C Compatibility with CPC 664
D Reliability
E DR LOGO
F Files up to 180K long

The rules

Entries will not be accepted from employees of Amstrad, Argus Specialist Publications and Alabaster Passmore & Sons. This restriction also applies to employee's families and agents of the companies.

The How to enter section forms part of the rules.

The editor's decision is final and no correspondence can be entered into.

Amstrad Disc Drive Competition

Entry Coupon

Name _____

Address _____

_____

_____

_____ post code _____

Program choice _____

Answers

Priority	Feature
1	
2	
3	
4	
5	
6	

Complete fully and clearly — if you are a winner this will act as a label for your prize. Post to: Disc Drive Competition, Home Computing Weekly, No 1 Golden Square, London W1R 3AB. Closing date: first post, Friday, July 19, 1985.

Talking of winners

Our Dk'tronics competition had a number of you well fooled. We had answers ranging from 102 words to four words. We did say that the words should be speech connected and therefore we have only allowed 10 of the possible words.

There were a number of eagle eyed readers who came to the same conclusion and they have won the 20 prizes.

Spectrum talkers go to: Vincent Roche, Sutton; K Chua, Birmingham; Eric Waters, Solihull; Rick Gray, Gainsborough; Dennis Richards, London; A T Banks, Erdington; A Reynolds, London; Anne-Marie Mac-Adam, Glasgow; P J Dymond, Barnstaple; John Collins, Urmston.

Commodore versions go to: William Muamar, Eastleigh; A F Turner-Howe, Basingstoke; D Weerasinghe, London; F H Reed, Hoddesdon; Chris Whitehead, Bolton.

The Amstrad prizes will soon arrive at the homes of: John Smith, Bassett; P J J Young, Kidwelly; Bill Wilkinson, Westgate-on-sea; Mark Jones, Spilsby.

Our congratulations to all the winners.

Grannie hints

There is a hint sheet now available for anyone who is stuck on Supergran the adventure. If you want to help Gran sort herself out then contact Tynesoft at the address below.

Tynesoft, Addison Industrial Estate, Blaydon-upon-Tyne, Tyne & Wear NE21 42E

New for old

New micros for old is the latest idea from Mitsubishi. Until 31 August Mitsubishi will be offering a £50 trade-in on any computer or video games machine against the sale of a new Mitsubishi MSX computer.

This offer is running in addition to the free starter software pack which consists of six top games tapes worth over £45 and a comprehensive 300 page operating instruction manual and BASIC language handbook.

The Mitsubishi 32K ML-F48 and 64K ML-F80 MSX computers cost around £219 and £275 respectively.

Mitsubishi, Hertford Palace, Denham Way, Rickmansworth, Herts WD3 2BJ

Ted's saviour

Ted breaks out

Technician Ted has at last escaped the clutches of his tyrannical boss, collected his wages and gone home — all with the aid of arcade enthusiast, David Adams.

To celebrate his success, Hewson Consultants, producers of the game, presented David with a genuine silicon slice as featured in the game. David commented: "I found it tricky but I really wanted to finish it."

Hewson Consultants are now offering help to other fanatics who are stuck, so contact them for a hint sheet.

Hewson Consultants, 56b Milton Trading Estate, Abingdon, Oxfordshire OC14 4RX

Hospital Benefit

Computer users in North East Lancashire will have the chance to pick up a bargain and do a good turn at a special exhibition in August.

The event, Micro-Trend '85, will be held at Burnley General Hospital on Sunday 11th August and all proceeds will be given to the special care Baby unit at the hospital. This unit has been instrumental in the survival of some of the smallest premature babies ever born and there is always room for more help.

There will be demonstrations of computers and plenty of bargains on offer. Even HCW has been persuaded to donate a batch of software for the sale.

Prices are 60p for adults, 30p for children and £1.20 for a family of two adults and two children. Doors open at 9 am and close at 7 pm, and refreshments will be on offer all day.

£50 trade-in from Mitsubishi

Soft Aid going strong

Soft Aid, the computer industry's equivalent to Bob Geldof's Band Aid, has now raised over £250,000 for the Ethiopian Famine Appeal.

The Soft Aid compilation tape was launched three months ago and has managed to remain consistently at number one in the software charts. It has already sold more copies than any other game in the same time period.

The tape costs £4.99 and is available from multiple retailers and computer stores.

Go for golf

CRL is to launch two new titles for the Amstrad: Handicap Golf and Smuggler's Cove.

Handicap Golf is the latest in CRL's series of golf simulations and Smuggler's Cove is a graphic text adventure in which the player has to seek out buried treasure hidden by pirates centuries ago.

Smuggler's Cove will cost £5.95 and Handicap Golf will be priced at £6.95.

CRL, CRL Hse, 9 King's Yard, Carpenter's Rd, London E15 2HD

Gyron gyrations

Telecom's software arm, Firebird, has decided to make life a little easier for Gyron players.

The maze game, released some months ago, has had players rather frustrated and so with the help of the map, reproduced here, life should be more worthwhile.

Unfortunately the map shows only the Atrium labyrinth, this being the easier of the two and not having a prize!

We are assured however, that the Necropolis labyrinth has the same size and it is only different in terms of layout, complexity of towers and ball and subtlety of clues. What is there left you may ask!

Those of you who are old enough to be able to pay the insurance premium of a Porshe 924 should remember that you have until November to send your solutions to Firebird. They have already had one correct entry but expect that there will be a few more before the play-off on or after November 6th.

Firebird, Wellington House, Upper St Martin's Lane, London WC2H 9DL

In the bag

It's in the bag

This could be the next summer craze — Head Saunas. All you need to join in is a plastic bag and the skill to wear it for a few hours. The result is your very own shrunken head.

The first to follow this new fashion is Virgin Games' Gang of Five. All six of them are wearing their bags, but they claim that this is to keep the hordes of frustrated Strangeloop players from finding them. In an effort to cut down the number of contracts taken out on them, the group have released the hints detailed below.

The Jetcycle Room: keep left and blast away. Nearby P2 needs exactly the opposite action and can be lucrative. You'll need a bit of change when you spend what you get.

It may look a bit of a dead end up in A3, but on investigation you can get further. What you will discover will unravel some computer mysteries. It may surprise you to know that this has something to do with the Tesla room.

Don't even think of going into room M9.

Get a thrill in U6, but don't forget your depressed friends.

Something fishy has been plaiced in room 09 but it won't be called into play until later...

Warning

It is dangerous to play with plastic bags and you should not under any circumstances place them over your head. You could end up with far more serious problems than a shrunken head.

Virgin Games, 2-4 Vernon Yd, 119 Portobello Rd, London W11 2DX

GYRON
ATRIUM LABYRINTH

THE KEY — DARK GREEN

THE ALLEY — BLUE

THE CROSSROADS — PURPLE

THE STADIUM — YELLOW

THE CRYPT — WHITE

THE BEETLE — SALMON

THE WHEEL — LILAC

THE GARDEN — LIGHT GREEN

THE CHAPEL — GOLD

THE LOCK — DARK GREEN

THE GUILLOTINE — RED

MAZE SHOWS POSITION OF SPHERES AND TOWERS AT TIME OF ZERO.
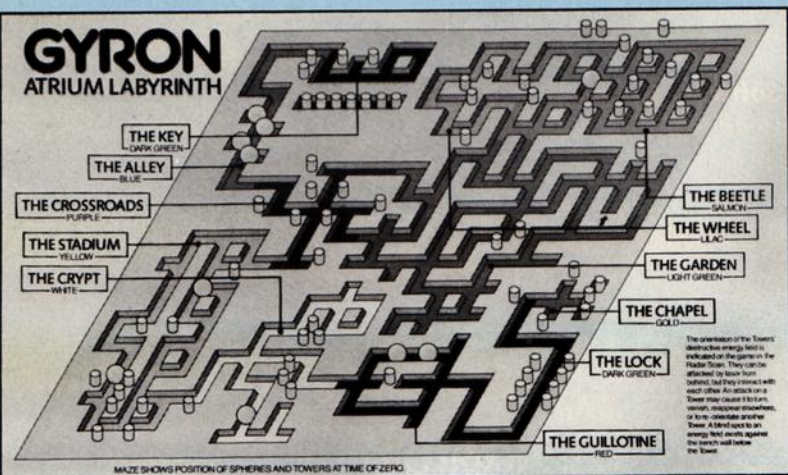
The Atrium Labyrinth in Gyron

Acorn show

The Third Official Acorn User Exhibition is to be staged at the Barbican Centre on 25-28 July 1985.

Over 80 companies are to attend including Acorn, Advanced Memory Systems, Akhter, BBC, Beebug, Brainstorm, British Micro, British Telecom, Commotion, Computer Concepts, Cumana, Disco Technology, Eltec, Logotron, MUSE, Micronet, and many others.

Among the exciting features planned is a special area where visitors can try their hand at famous games such as Elite II and Revs. Acorn is showing the new BBC B+ for hands on experience.

Acorn User Exhibition, Rushworth Dales, 20 Orange St, London WC2H 7ED

Come into my parlour

Paul Fray Ltd has come up with an add-on for the BBC which is a combination of sideways RAM and advanced ROM-based software. The makers claim that the Spider, as it is called, extends the capabilities of the BBC into serious control applications — in the home, laboratory and industry.

According to Paul Fray Ltd, the spider makes the computer respond quickly to any event in its 'web' of sensors in the same way that a real spider responds to flies. Prices range from £65 to £115.

Paul Fray Ltd, Willowcroft, Histon Rd, Cambridge CB4 3JD

The Spider for the BBC

Spirit to success?

Challenge Research has been developing a new range of products including items for use with Spectrum and Commodore computers.

Now available is the MKII Sprint which, claim the makers, loads and saves programs on the Spectrum four times faster than conventional cassette recorders. It is Interface I and Microdrive compatible to further increase its versatility and Challenge claims that it provides an innovative yet inexpensive new concept in program storage.

The MKII Sprite costs £69.95.

Challenge Research, 218 High St, Potters Bar, Herts

BBC bangs its drum

Likely to drum up a great deal of trade in the next few months is Rice Computer Electronics' programmable drums for the BBC.

This hardware add-on does not use the internal sound chip but instead generates all the rhythms and beats from complex mathematical processes. There can be up to eight voices and up to 64 patterns each of 16 steps programmed at any one time.

Although we haven't yet seen the graphic display we have heard the output from the unit and it is most impressive. We hope to have a full review in a later issue of HCW. The unit costs £45.

Rice Computer Electronics, PO Box 2, Morecombe, Lance LA4 4PP

Spring clean your power

Rendar is now producing Spikebloc, a mains protector that prevents electromagnetic and radio-frequency interference causing extensive damage to sensitive equipkent.

The Spikebloc combines RFI filtering with high current surge protection and can absorb induced lightening surges up to 2,5000 A.

Fitted to sensitive electronic equipment the Spikebloc filters spikes allowing "clean" power to be supplied in an electrically noisy environment.

Rendar, Durban Rd, S Bersted, Bognor Regis, W Sussex PO22 9RL

Clean up your power supply

Software update

Firebird has at last launched Elite for the C64, after a delay to put the finishing touches to the program.

The Dragon 32 is doing well this week, for once, with several new releases from Microdeal in its new budget software range, called Pocket Money Software. All the games in this range are priced at £1.99.

Another company which has recently launched a range of budget software is CDS. CDS has christened the range of products Blue Ribbon. The titles were acquired when CDS took over MRM Software in January. The games in the Blue Ribbon range will cost £2.50 and will be available for BBC and Electron computers.

Title	Machine	Price	Publisher
The Epic	Spectrum	£8.95	Turtle Software
Zorro	Atari/Spec/	£9.95	
	Amstrad	£7.95	Datasoft
Elite	C64	£14.94	
		£17.95	Firebird
Physics, Chemistry,	Amstrad/		
Biology	C64	£7.95	School Software
Bandito	Dragon 32	£1.99	Microdeal
Robin Hood	Dragon 32	£1.99	Microdeal
Pitfiend	Dragon 32	£1.99	Microdeal
War Machine	C64	£1.99	Microdeal
Crazy Painter	C64	£1.99	Microdeal
Super Pipeline II	Spectrum	£7.95	Taskset
Chicane	BBC	£7.95	Kempston
Sword of Destiny	C16	£6.95	Gremlin
Dork's Dilemna	C16	£6.95	Gremlin
Activision Music Studio	C64	£14.99	
		£19.99	Activision
Timeslip	C16/Plus 4	£6.95	English Software

Fair's fair'

The 16th ZX Microfair kicked off at London's New Horticultural Hall on Saturday 16 June.

As you might expect, there were queues to get into the hall and a very high temperature once you were in. The aisles were crowded and there was a great deal of money passing over the, largely uncovered, tables.

I think one has to accept that the major success of the show was the discount software stalls. There were quite a number of these and they seemed to be doing very good business.

There were some good discounts to be had on hardware too. I saw a Spectrum 48K (yes, the one that isn't available any more) at under £80 brand new. AGF, who produce a number of Spectrum add-ons, were starting a new discount club. If you wish to be an agent for their range of products, which is most comprehensive, you can order at special ''Agent prices''.

What was missing from the whole affair was a major launch. Even the organiser Mike Johnston, admits that it is about time Sinclair had something new to offer. There were just a few new products being launched at the show but nowhere near the number that one might have expected a year ago.

Saga was demonstrating a new, icon driven, drawing package that uses either the Saga touch pad, Grafpad or a standard joystick as its input medium.

Gordon Micro was showing the Micro Frame motherboard and a number of new interface cards. The standard frame includes a disc interface and there's a wide range of cards for modems, printers, digital to analogue conversion and paged memory. The product certainly looks very sturdy and with its open design should have few overheating problems.

Dealer Deals was hoping to have a new Spectrum modem available but it missed this show.

On the software side there were a number of new products, though the bulk of them were for the QL.

Spectrum owners who wish to upgrade their BASIC will be interested in Betasoft's latest version of their Beta BASIC 3.0. It virtually turns your machine into a BBC or QL, with full procedure definition, amazing graphics and full toolkit facilities. It costs £14.95 for this version although previous purchasers can take advantage of an upgrade offer for just £6.95.

Kempston had a new disc interface with ROM based software on offer but the most crowded of the stands with new releases was Oxford Computer Systems. They had a new compiler to show, called Blast, which certainly seemed to catch the interest of those at the show and we hope to feature a review in HCW soon.

Those of you who are interested in machine code are likely to want to know more about Peker Computers' correspondence course. The twelve part course, designed for the ''absolute beginner'' costs a hefty £4.49 per lesson but there is the offer of help on a telephone hotline too. There is no time limit to your studies and you can order as many or as few lessons as you like. We are hoping to be able to review the course soon.

Overall, there is no doubt that there were bargains to be had at the Microfair, but it still lacked the excitement that follows from a new Sinclair product. Perhaps Sir Clive will have something new for the next fair.

Betasoft, 92 Oxford Rd, Mossley, Birmingham B13 9SQ

Dealer Deals, 20 Orange St, London WC2 7ED

Gordon Micro, 3 Callendar Rd, Heathfield, Ind Centre, Ayr KA8 9DJ

Kempston, Unit 30, Singer Way Woburn Rd Ind Est, Kempston, Beds MK42 7AF

Peker Computers, Hudson Hse Battery Rd, Gt Yarmouth, Norfolk

Sage Systems, 2 Eve Rd, Woking, Surrey

THE GORDON MICRO FRAME

Musical micro

If you own an Amstrad and are musical with it then Sunshine Books has just announced a title which may be of interest to you.

The book is called Making Music on the Amstrad CPC464 & 664 and was written by Ian Waugh who is author of a similar book for the BBC. Ian is a professional musician and shows the reader how to make music of all kinds including effects like vibrato, echo, trills, polyphonic music and sounds from seagulls to ricochets.

The book will be launched in August and will cost £6.95.

Sunshine, 12-13 Little Newport St, London WC2H 7PP

BOOKS

GRAPHICS PROGRAMMING TECHNIQUES ON THE AMSTRAD CPC 464
Wynford James
MICRO PRESS

A POCKET GUIDE TO MICRO COMPUTER BASIC
Go To, Go Sub, If..Then, STOP!
Del Morgan

Graphics Programming Techniques on the Amstrad CPC464

Techniques is the key word in the title of this informative book.

Like most basic dialects, Locomotive basic is extremely lenient towards the programmer, never more so than when writing graphics routines where smoothness of animation, clarity of image and perhaps most importantly, memory conservation are the three major targets.

This book points the programmer in the right direction to achieve these important objectives.

Containing seven chapters and an adequate index, it is only in the first chapter that any reiteration of the User Manual is perceptible.

This is necessarily so, as the remainder of the book is dependent on the readers total comprehension of the basic fundamentals of graphics programming.

Followed by a forthright explanation of the three most useful graphics commands, Plot, Move and Draw — an outline is given of the niceties, and the limitations, of each of the three screen modes.

Whilst taking an in depth look at the Amstrad colour pallet with its 27 inks, the author has devised some stunningly colourful routines, which serve to clarify any remaining ambiguities within the User Manual.

Codes and Characters, chapter two, takes an enlightened look at the control codes with numerous demonstration routines that reveal some of the mysteries surrounding their use.

Graphs, histograms and pie-charts are all covered in later chapters. For me, and I suspect for the majority of readers, the main part of the book concerning moving images and the many routines culminating in eye catching patterns, along with a superb drawing and painting program, are the pages that will be most thumbed.

For the more experienced programmer, a considerable chapter is devoted to transformations, accompanied by a brief but concise explanation of simple matrix manipulation.

All the listings are written in a modular fashion, enabling the reader to heed the authors advice to experiment by bespoking each routine to suit their own needs.

Indeed throughout the book the reader is prompted to experiment in various ways. Try changing the constant values of the main variables in the pattern generators, once this foot is in the water you'll be on the way to burning wells full of midnight oil.

If you are into games programming in BASIC, drawing pictures or printing pretty patterns on screen, then this book is an essential addition to your computing library.

Wynford James is well qualified to write such a book and has obviously spent considerable time at the keyboard to compose the variety of programs and routines that demonstrate the relevance of each point in the accompanying text.

Some prior knowledge of the basic principles involved in programming graphics is assumed, though the complete novice will find plenty to interest them by typing in the many listings.

All the programs are computer printed, so should all be bug free. The authors previous publication Basic Programming on the Amstrad will do well for starters who wish to follow Mr James along this yellow brick road. **D.H.**

Price: £7.95

Publisher: Micro Press

Address: 27 London Rd, Tunbridge Wells, Kent

AMSTRAD

A Pocket Guide to Microcomputer Basic

This portable, pocket sized, guide is packed with useful information about the most common basic language statements and functions.

All the popular reserved words are listed alphabetically followed by a concise explanation of their purpose.

Early in the book a general explanation of computer programming is given along with a modest demonstration listing which highlights the primary functions of Input and Output.

An insight into the use of variables, string and file handling, self-documentation and all the other popular commands that comprise the programmer's repertoire are adequately covered.

Not being machine specific, it is unlikely that reference to this book would be made when the user handbook is available. Having said that the main advantage of this booklet is its portability, so easy to smuggle away with you on holiday!

All computer books should be machine specific if they are to achieve the objective of informing and instructing without the reader having to make any allowance for the differences in BASIC dialects.

Extended basic commands are covered at some length towards the end of the book, but such is the speed of change in microcomputing that most of these commands are now accepted as standard.

The publishers might consider producing a machine specific version of this book as each new computer is launched, then I feel it could be many times more useful, and would surely sell in greater quantities than even this bargain basement price suggests. **D.H.**

Price: £1.50

Publisher: Penguin Books Ltd

Address: Harmondsworth, Middlesex

KEEPING IN TOUCH

Jon Revis has been looking at Microvitec's Touchtech 501. Read on to find out why he liked it.

Touchtech 501

Microvitec is a company best known for the Cub range of monitors. Microvitec's latest venture is still associated with monitors but provides the BBC computer with a facility which until now has been found only on specialist machines. This device is called the Touchtech 501 and is aimed at eliminating the computer keyboard as an input device.

The Touchtech resembles a picture frame behind which you sit your Microvitec Cub monitor, with the monitor in place they form a very sturdy unit. Connecting the unit to the BBC takes only a matter of minutes, one lead is inserted into the RS423 port, the second into the disc drive power supply unit underneath the BBC. Before the disc drive users complain, the Touchtech power lead provides a second socket to which your drives can be connected.

The Touchtech transmits and detects a series of infra red beams both vertically and horizontally to create a grid pattern over the surface of the monitor. By touching the screen with your finger/pen/umbrella etc you break one or more of the horizontal and vertical beams, the Touchtech's on-board microprocessor then calculates the position of your finger and relays this information to the computer.

Software which utilises the Touchtech is provided on a floppy disc, and consists of a suite of nine programs. Booting the disc displays a menu, this takes the form of a series of nine boxes each one containing the title of a program. From this point onwards the computer keyboard is made redundant as all input is entered via the screen. The programs provided all have an educational flavour to them eg Odd One Out, Simon, Money Manipulation. This gives some idea of the market at which the Touchtech is aimed. When introducing computers to young children the greatest problem to be overcome is the use of the computer's keyboard. The Touchtech eliminates this barrier and therefore opens up the world of computers to very young and even handicapped children.

My two year old daughter spent a long time playing with the Artist program, by touching a coloured box at the bottom of the screen she could select a colour and then proceed to plaster this colour all round the screen. All of the programs provided were excellent, they were bright, colourful, and uncrashable.

Finally we come to the documentation, this was in the form of a sturdy ring binder, the pages were of glossy card and liberally sprinkled with colour photographs. The manual was very thorough and covers setting up, fault finding, the programs provided, and finally a detailed section describing how to write your own Touchtech programs, all of the major subroutines required were present on the software disc. Another nice touch was the fact that none of the nine programs were protected in any way, this provided the user with even more information on how to program the Touchtech.

The Touchtech is an extremely well built and responsive device but at a cost of £ 210 for the Touchtech and a further £225.00 for the monitor I doubt whether it will sell in any great numbers in the home market, Microvitect must surely be aiming at the infant and junior schools.

Price: £210

Manufacturer: Microvitec

Address: Futures Way, Bolling Rd, Bradford BD4 7TU

BBC

SOFTWARE

Elite

For some time now Elite has been one of the best games to be devised for the BBC computer. Now it is being converted for other machines everyone can enjoy the thrill of flying a Cobra class trading ship from planet to planet through the universe.

The aim of the game is to rise to the rank of Elite through careful trading and skillful flight but few reach this elevated position.

At the beginning you are the owner of a craft which is a basic trader, with limited cargo space and humble fire power, in a universe full of pirates and rebels. You can choose whether to be a law-abiding trader, an asteroid miner, a dealer in illegal goods an an outright pirate. As you financial reserves increase the Cobra can be modified to suit your chosen lifestyle and increase your chances of survival.

You start your journey from the Coriolis space station orbiting the planet Lave with 100 Credits to spend on cargo. Once loaded up, you can take your chosen payload to any planet within seven light years of Lave. The greater part of the journey is completed by hyperspacing to your chosen destination but it's still a long haul to the safety of the space station and there is always a chance of pirate attacks.

Battles require great dexterity

using the keyboard to accelerate and decelerate, with the joystick controlling direction. Failure to win an engagement means death and a new game, success wins a bounty which may be added to your coffers.

If you reach the space station safely your troubles may not be over depending on the payload you are carrying. Slaves, narcotics and alcohol are forbidden substances and if the police suspect you are carrying contraband you are liable to attack. In the early stages of the game it is best to keep on the right side of the law or you will not last long against the powerful police vipers.

At each Coriolis station you can trade in goods for cash, it the price is right, and then fresh goods and fuel or weaponry can be bought.

The game is complex and the 3-D wire frame graphics are amazing. There is a novel 3-D radar which is soon easily read and the position and height of an attacker can be seen at a glance.

The game allows you to save your position at any space station so you can restart each stage if disaster strikes.

Although parts of the game seem very slow, I suppose this is acceptable because light year space travel must be immensely boring at times. All things considered the Elite package is unbeatable value and every home should have one. **E.D.**

Price: £14.95

Publisher: Firebird

Address: Wellington Hse, Upper St Martin's Lane, London WC2H 9DL

C64

Fiona Rides Out

This is a shoot-em-up game without aliens. Fiona is supposedly the most evil witch ever. She is so wicked that the rest of her coven have taken away her spell book and tools. Your task is to help Fiona retrieve her tools of the trade by working your way through twelve screens. The first, and every alternative screen, has Fiona flying through the sky avoiding adversaries. These come in many guises — witches on broomsticks, thunderbolts, ghosts and ghoulies — and all can sap her powers, thus stopping her from proceeding.

The even numbered screens all provide Fiona with a means of gaining one of her tools by shooting objects down and using their energy in her cauldron. Should your energy reach zero you are sent to hell. You must escape from there by avoiding lava bubbles, the devil and the red hot walls. Should you fail you forfeit a life.

Graphically, the game is well thought out, though in places it is quite gory. There is very little sound apart from the occasional thunderbolt, or exploding witch and the title music. Control is joystick only and quite easy, though at times collecting the energy and getting it back to the cauldron can be frantic. The reverse of the cassette has Vision's Dare Devil Dennis — the tale of a film stunt rider trying to find his Oscar; so for the price you get two games. **M.W.**

Price: £7.95

Publisher: Viper Software Ltd.

Address: 182/184 Campden Hill Rd, London W8.

C64

Kikstart

Kikstart isn't a great game, but it is very good value for money — it's only £1.99. Whilst other software houses have been increasing prices, Mastertronic has continued to produce games at such a low price that you can buy four or five tapes for the price of one from most manufacturers.

In this game, your task is to guide your scrambler bike through a combination of obstacles. There are water jumps, barrels, tyres, rough ground, gates, walls, pot holes and ups and downs of all descriptions. You can select your course by choosing a sequence of three of the eight various laps, that's 512 different combinations. The controls are accelerate, decelerate, wheelie and jump. It takes swift reactions and exact timing not to be taking flying leaps, minus your bike. Those spills mean you loose time before you can get going again.

There are three options — one player with joystick or keyboard, two players — one joystick the other keyboard and two players, both with joysticks. You get a horizontally split screen for the two riders — even if it's a one player game. There's optional musical accompaniment, fast load, adequate graphics and a fastest time league table. Apart from upgrading the game to very hi-resolution graphics, I can't really see what else you could ask for. So, if money is short you could do a lot worse that Kikstart. **B.J.**

Price: £1.99

Publisher: Mastertronic

Address: 2 Park Lorne, 11 Park Rd, London NW8 7JL

C64
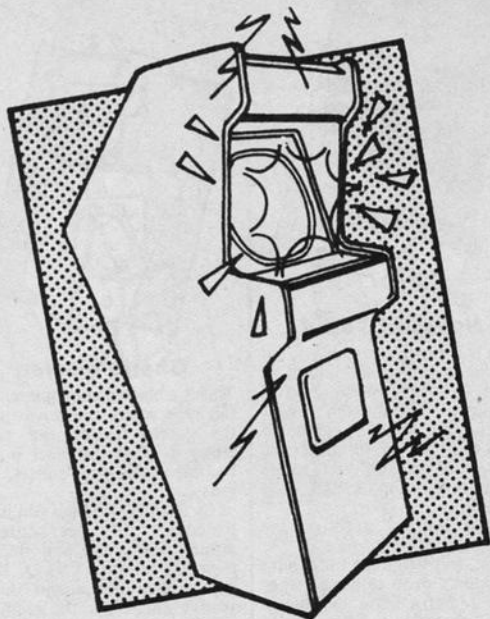
Rupert and the Toymaker's Party

Rupert the Bear is a famous name, who's now become a computer game. To the Toymaker's party he must run, by dodging the toys. What super fun!

Sum-one at Quicksilva had a spiffing wheeze to put my childhod heero into a gaim which has no killing. Crumbs, not a zappable ailian in site.

Of corse it had to be okayed by the Dailie Expres becos it woodnt be rite if it didnt come up to skratch. But skratch it does come up to and with a venjence. If you think its a gaim for kids then all I can sai is yah boo sucks! More fool you.

The grafix is wunderfull in fact it rates as one of the most spektakular graficle representashuns what I have ever seen and the moosik is beatifull to.

Ruper haz bin invited to join his frendz at the Toymaker's Party somwhere in the cassil. To find his wey there he must collect all the messidjes pinned to the wals but the toys will give him a tumble if he dusnt doj them. Corks, wot a dilemna cos there is seven lokashuns to investergait an each one has three floors and spreds over about five screnes.

Price: £7.99

Publisher: Quicksilva

Address: Liberty Hse, 222 Regent St, London W1

At first the onlie toys are soljers which march up and down and can eesly be jumpt but its not all eesy peesy cos some of the floors hav gaps which Rupert carnt alwais jump. Lucky for him that a frendlie bird is around and he can jump on its bak for a freebie trip akross the bigger gaps.

When he has colekted al the messijes, a dor opens and he can go to the next levill. As he progreses he meats al sorts of other problim toys like puff-puffs an airplains which are sumtimes frendlie and sumtimes absolootlie beestlee.

After takling al seven levills, Rupert reeches the eighth screne wear he meetz his frendz an joins in the bun-fight with lotz of tuck to eet. Whizzo!

Although the style of the game resembles a Manic Miner type of program the challenges become really tough as you reach the higher levels. At times I was also reminded of Impossible Mission especially because the graphics are so superb. As a Commodore 64 showpiece this has few peers, programming at its best.

Even if you think Rupert is a relic of a bygone age, I recommend that you try this game and it may even change your mind. For once superlatives fail me. **E.D.**

C64

★ ★ ★ ★ ★
Flipped

★ ★ ★ ★
Hooked

★ ★ ★
Keen

★ ★
Yawning

★
Comatose
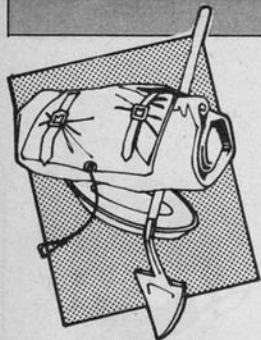
Smuggler's Cove

Smugglers' Cove is an illustrated adventure written by Camel, but published by CRL. No instructions came with the review copy.

The screen is nicely laid out with a graphics window at the top which appears to function in mode 0. However, the text area seems to be working in mode 1, which is rather clever. I suspect that the programmer is POKEing the graphics chip direct, as the screen flashes peculiarly after drawing a new picture. As a result, the program may be incompatible with the 664. In any event, it won't work with the DDI-1 switched on. A memory full error occurs. Every time a location is entered the picture is redrawn, but the "fill" routine is fairly slow. Waiting becomes a bit of a drag. The drawings, though low-res, are certainly up to the Hobbit standard.

The plot appears to cast you in an underground cave system on an island, so I must presume the target is smugglers' treasure. Immediately striking is the humour of the programmer, evident in both the objects and the responses of your computer guide which has a variety of abusive remarks at its command. Unfortunately, I was soon killed off by a partially decomposed corpse whilst carrying a lifebelt and a bag of monster munchies. The input interpreter also denied the existence of objects just described, which is a bit off.

Good value compared with other Amstrad offerings, but I've seen it advertised £2 cheaper direct from Camel.

D.M.

Price: £5.95

Publisher: CRL

Address: 9 Kings Yd, Carpenters Rd, London E15 2HD

AMSTRAD

Nodes of Yesod

This is a super game, if you go for the searching and collecting genre set on the Moon. There's a super complicated background, but what it boils down to is that you are to collect the keys which will admit you to the chamber holding a 2001 style monolith.

Your journey starts on the superbly drawn surface of the Moon, but you must make sure you don't drop down a crater before befriending a moon-mole! Once you do, you can drop in on a huge range of smooth scrolling antagonists, who make jumping from platform to platform difficult. Better still, it's breezy down there, and on occasions, the wind takes you well off course. Left and right movement are easy, but jumping is accomplished using a series of back flips, which are beautifully animated. And the mole? When you reach a wall, you can call up the mole and get him to eat through it as a means to escape. You'll only get back to the surface by very clever manoeuvering, or a jet of rising air. Watch out for the marauding red space-person though, he'll nick your goodies!

I nearly forgot, there's great music at the beginning, which just shows what can be done on the Spectrum, and, would you believe, some tolerable speech, though you only get that once. I found this a real challenge, and the quality of programming shows that somebody at Odin really took a pride in their work. Pricey, but could be a smash. **D.M.**

Price: £9.95

Publisher: Odin Computer Graphics

Address: The Podium, Steers Hse, Canning Pl, Liverpool L1 8HN

SPECTRUM
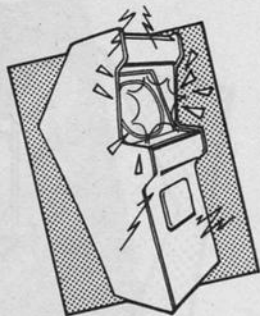
Ghetto blaster

This is a blasted good game. It's the type where the novice and the games fanatic can both enjoy it. And the blast is not bombs, rockets or bullets, it's music.

As Rockin' Rodney you have to collect 10 tapes scattered around the town and deliver them to Interdisc's H.Q. But, before they will accept them, you've got to get the required number of the local population dancing by "firing" the sounds at them. Unfortunately there are one or two tone-deaf jay-walkers who delight in crashing your ghettoblaster to the ground. You then need to find a repair shop, at which you receive the most amazingly speedy service and you're back on the job.

The volume is controllable with F1 and F3, the louder the music, the easier it is to get passers-by freaking out to the music, but beware, the local fuzz get unhappy if you play the music too loud. And don't forget to keep an eye on the battery level and tape-counter in case either the batteries or your time limit run out.

Finding your way around takes a bit of getting used to as the screen suddenly changes when you go round a corner, or cross over the road. Fortunately there is a map in the cassette insert so you find your way from Funky Street to Tobacco Road, via My Way to Strawberry Fields and Blackberry Way. Overall an excellent game, 12 original funky tunes and great graphics — a definite winner. **B.J.**

Price: £8.95

Publisher: Virgin Games

Address: 2-4 Vernon Yd, Portobello Rd, London W11 2DX

C64

Web Dimension

When reading the description of this program on the cassette insert I got very interested — "There is no time limit. there is no scoring, no lives to loose and very few rules. What you are about to feel, hear and witness is a totally new approach to home computing entertainment." When I read about "exquisite visual effects and "outrageous tunes", I couldn't wait to load it. Did it live up to the build-up? Sadly, no.

The game is in eight parts of three stages each, and is based on a spider's web. Shapes move around the web and the first stage is to move to an intersection — or node — and, spider-like, trap a shape when it arrives, then off to another node for another victim. The problem is that the shapes leave vapour-trails that you must not touch or all the shapes are freed. Having trapped all five, the music, and stage two begins. That means chasing the shapes whilst avoiding your own vapour trail. Success yields stage three — a light-show, more music and on to the next part. With each part the shapes evolve, Darwin style, finishing up with homosapiens. Complete all eight parts and you start again.

I still like the idea of few rules, no lives to loose, etc., but to sell a game primarily on music and visual effects, the music has to be up to the standards like Jammin and the light-show approaching Jeff Minter's Psychedelia. Web Dimension is good, but not that mind-blowing. Sorry Activision, nice try, but not a hit. **B.J.**

Price: £10.99

Publisher: Activision

Address: 15 Harley Hse, Marylebone Rd, London NW1

C64
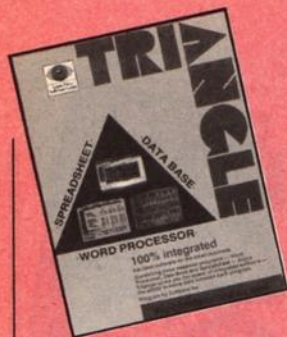
Triangle

Triangle is three programs in one — a wordprocessor, spreadsheet and database, all for £19.95. It's undoubtedly the best value package of its type I've ever seen.

As I worked my way around it, I was continually amazed at the power of the programs and their ease of use. There were even pop-up "help" windows at the touch of the F8 key when I wasn't certain.

These three programs, plus a menu/loader program and the help files come on one disc. Whilst the three are separate, they are designed so that data from one can be used in another. For example, names and addresses from the database put onto a letter in the wordprocessor, or data on stock into a balance sheet or order form. It's a bit involved, but it can be done.

The wordprocessor and spreadsheet are both extremely powerful, both easy to get started on but it may take a while to learn all the keystrokes to use them to the full. The database is slightly more basic, for example it limits you to a maximum of 17 fields, each up to 29 characters, but such that the whole record is under 231 characters. Nevertheless it will satisfy most home-computing needs.

The disc comes with a very clear and easy to follow 14 page manual. If you've been wondering about turning your C64 from a games computer into useful office equipment, all you need is a printer and Triangle. **B.J.**

Price: £19.95

Publisher: Argus Press Software

Address: Liberty Hse, 222 Regent St, London W1R 7DB

C64

Timeslip

The C16 is a new area of interest for English Software. The instructions are somewhat curt and burble on about time disturbances and other odd things. What you get on the screen are three scrolling windows; one depicts a landscape, one, the inside of a factory and the third, an underwater scene.

You control a rocket ship, a man in a rocket powered suit, or a submarine, depending on the zone you're in. Each zone scrolls from side to side as in Skramble, the idea being to destroy the 36 Time Orbs — 12 in each scenario. To do this you must shoot objects in your way and avoid others. Contact with any object looses you 15 minutes on your timer. Since you start with 24 hours, you have roughly 48 lives. Every five lives lost, the timers for each zone slip. Since the idea is to synchronise the clocks, this makes life trickier.

The game shows to good effect the colour capabilities of the 16. The design of the graphics are neat and the scrolling is very smooth. Sound is limited to zapping and other noises, but is quite effective.

Whilst this game isn't startlingly original, it is slick, pretty and very challenging. Each zone requires different tactics and all are infuriatingly testing. Even at the price, it's pretty good. **M.W.**

Price: £6.95

Publisher: English Software

Address: 1 North Parade, Parsonage Gds, Manchester

C16

Drop Zone

Once upon a time, there was a game called Defender. This was an all action zapping game and people flipped over it. Then, along came an intrepid hero who took the idea, improved it by 100% and called it Drop Zone.

The idea is to collect a number of pod-shaped objects scattered about the surface of a planet and stow them in a protective hopper. Your efforts are opposed by sundry nasties intent upon getting you. The main mob, Planters, creep around searching for pods. If they find one, they drop an Android which will destroy the pod. Having dropped an Android, the Planter mutates into a nastier form. There are a handful of other nasties with differing tactics which also try to get you. These appear at different levels and include acid rain clouds and erupting volcanoes.

You control a man with a jet pack and are armed with a rapid-fire gun. With this, you must shoot everything in sight. Clear a screen and it's onto the next, nastier level. To help you in your task you have a protective cloak and some smart bombs.

The graphics are superb, with a highly detailed multicolour landscape. The scrolling and movement is smooth and many of the effects are similar to those in Defender. The most impressive effect comes when you loose a life.

If you like slick, high action zapping games, you'll love this. It's a real corker even if it's a little pricey. **A.W.**

Price: £9.95

Publisher: US Gold

Address: Unit 10, The Parkway Industrial Centre, Heneage St, Birmingham

C64

Manic Death Chase

When I first saw this cassette I expected some sort of frantic game in which you have to avoid hoards of voracious nasties intent on slicing you up. Much to my disappointment the game didn't quite live up to its title. What you have to do is escape from a large maze comprised of the usual platforms and steps. Littered about the maze are clumps of poisonous spikes and marauding nasties, and contact with either of these results in the loss of one of your three lives. You control the little man by means of three keys enabling him to move left, right or jump. Control of the game was very tricky and being limited to just the keyboard aggravated matters. Some of us do have joysticks!

The graphics were rather uninspired with the platforms built up from brick patterns. The only animation was the irritating flicker of the main figure, although his movement was quite smooth. As you reach the edge of the screen, the next portion scrolls across.

To put it bluntly, this is a remarkably unexceptional game with almost no excitement potential. The nasties move in a predictable pattern leaving you to simply work out the optimum route. Notwithstanding these comments, the game is difficult and requires good timing, but this leads to its downfall since it's very difficult to achieve the correct timing via the keyboard.

At £6.95 this game is grossly overpriced and doesn't do justice to the C16's graphics capabilities. There's better than this around! **A.W.**
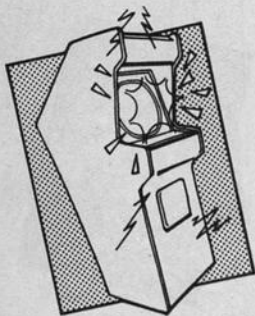
Price: £6.95

Publisher: Knightsoft

Address: The Round Table, 87 Brunswick St, Burnley, Lancs

C16

Paws

I loved this, but as I like cats I might be biased. A superb feline loading screen leads to an arcade adventure which casts you as Selwyn the cat, searching for your 10 lost kittens in rooms, streets, mazes and parkland.

Naturally, you have nine lives! Scattered around the 100 screen playing area is a supply of food, different things give you varying amounts of stamina and energy, both of which you are going to need. That's because Bullydog Billy and his mates are after you! They roam the streets making for the den, and when 24 of them have arrived it's the end for you. There are three varieties of dog each more evil than the last, who join together given the chance. Your only chance is to fight and beat them, very energy consuming, or fire fluff balls at them, though you can distract them with small purple piles of "catoplectic" energy — looks smelly!

The graphics, though making no attempt at 3-D, range from charming — Selwyn carrying his kittens — to stunning — in the park and woodland areas. Some of the best I've seen in multi-colour, with an amazing lack of attribute problems. Very, very smooth movement. Sound is there too. Better still, there's a complete map with scanners on call so you don't wander blindly, full facility for all joysticks — though Selwyn is sometimes hard to steer — and a save game option. Addictive and great fun; don't miss this one.   **D.M.**

Price: £6.95

Publisher: Artic

Address: Main St, Brandesburton, Driffield, YO25 8RL

SPECTRUM
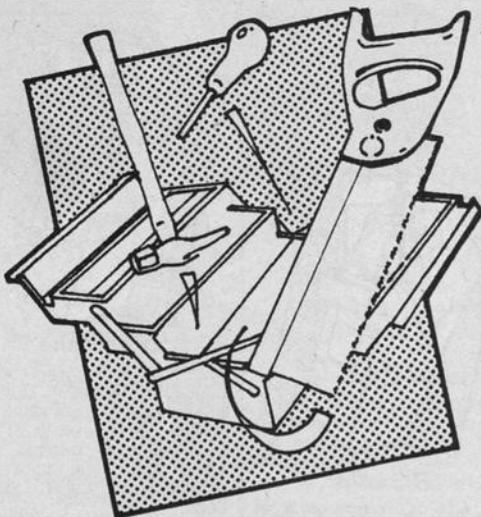
MasterCalc

A spreadsheet is just the old idea of a large piece of paper divided up into squares. Along the top axis you write months or categories, with others along the side. You can show how many of something you have sold, bought, acquired, or destroyed for each unit of time. It could be categories of household expenditure, but it could just as easily be an analysis of anything with components which make up a larger unit.

A piece of paper, however, has a finite size, you have to draw all the squares, do all the calculating yourself, rub out entries, write new ones, and if you want to compare the first column with the last, fold the paper over! With MasterCalc, the Amstrad does it for you.

Via a detailed manual, complete with teaching tutorial and a series of menus, you are led to set up the sheet with the number of rows and columns. Up to 3000 squares are allowed. If you find you want certain columns totted up, tell the computer, and if you require more complex calculations, you can enter up to 99 different formulae. Just inform Master-Calc which ones you want in which squares. Then press a key and all the arithmetic is done for you in a flash! The contents of the screen can then be output to a printer.

Better still, however, is the possibility for asking "what if?" questions. Suppose you had all your motoring details on the sheet, including miles per gallon, repayments on the car, servicing costs, petrol costs, depreciation costs etc. and you wanted to know whether buying a more "economical" car would save money. Simply change the m.p.g. figures, together with the relevant costs, then press a key, and the new total costs, and monthly costs can be seen at a glance. Equally impressive is the ability to draw histograms for up to three categories from your chart in the blinking of an eye.

Not content with that, MasterCalc allows you to overlay columns next to each other, which would otherwise cause you to have to switch to another display, and to split the screen so that the extreme off screen section of the sheet can be displayed under the current area. If you forget your formulae, it reminds you which is where, and the eight byte floating point arithmetic holds your numeric data with great precision.

The whole package is very friendly, though I would like to have seen all the features taught in the tutorial, and a screen dump of the graphs for more than just Epson printers, together with more examples of uses. Even so, these are small gripes. Almost 100% machine code, and equally compatible with 464 and 664, MasterCalc is, like Masterfile before it, a masterpiece.   **D.M.**

Price: £24.94 (tape) £29.95 (disc)

Publisher: Amsoft

Address: 169 Kings Rd, Brentwood, Essex CM14 4EF

AMSTRAD

Handicap Golf

Handicap Golf features a one or two player game over nine or 18 holes. Before play starts, the course can be previewed hole by hole. Unlike similar games, the course is viewed from the side, each hole being in sections, usually three. As a result, you can't see the green from the tee, which is rather a disadvantage when aiming! Only when you reach the green does the display change to an overhead view.

Graphically the program is fairly unsophisticated in comparison with the best, I wonder if it's BASIC? Even so it plays a good game.

You have the choice of clubs for each shot, illustrated with the distance each is capable of. Throughout the game, the distance remaining and other scoring information is available in a window. Once chosen you set your direction by moving a small cursor taking into account the wind. Your small stick man then takes a swipe, and trudges off, followed by his caddy. After five strides, the screen scrolls to the left, and you continue to play. On reaching the green, you aim towards another cursor to hole the ball, having preset the distance. Sometimes the ball stops on the very edge of the hole and disappears because it's the same colour. Rather frustrating!

I did enjoy playing this, though to be frank, it's about the standard of a good magazine listing, and not as sophisticated as implementations seen on other machines. Good value, however.   **D.M.**

Price: £5.95

Publisher: CRL

Address: 9 Kings Yard, Carpenters Rd, London E15 2HD

AMSTRAD

ZX Spectrum

BEGINNING MACHINE CODE

You'll be able to load your registers and jump around memory in this spritely second part of our series.

In this, the second in our machine code series, we will be covering machine code equivalents to the BASIC instructions LET, POKE, PEEK, and FOR....NEXT. These will enable you to write a short sprite graphics routine which can be customised to your own requirements.

Firstly, it helps to understand that machine code only deals with positive whole numbers. PEEKing into the Spectrum's memory will always give a number between 0 and 255. Such numbers are called bytes. There are no negative numbers or strings in machine code.

Numbers can be stored in the computer either inside the Z80 microprocessor or in separate memory chips. Within the Z80 chip, the numbers are stored in registers. We are only going to deal with the seven registers named A, B, C, D, E, H and L. There are others but we can manage quite well with these. You can think of them as BASIC variables which can only hold a whole number between 0 and 255. See Fig. 1 to visualise the registers.

The significance of the arrangement is that six of the registers can be used in pairs to represent numbers in the range 0 to 65535. Just as in decimal

$$25 = 2 \times 10 + 5$$

so in the HL register pair,

$$25 = 2 \times 256 + 5 \, (= 517 \text{ decimal})$$

2 is in the H (high byte) register and 5 is in the L (low byte) register. Register pairs BC and DE operate in the same way.

Numbers can also be stored in the Spectrum's memory. This is broken up into storage locations which are given address numbers between 0 and 65535, held in two bytes. The first 16384 addresses are the Spectrum's ROM and the remainder form the RAM. Two-byte numbers are stored with the low byte at address a, and the high byte at address $a+1$.

Z80 machine code has an instruction LD (read as LoaD) which, in its various forms, is equivalent to the BASIC state-ments LET, PEEK and POKE. Make up a DATA statement with the code given in Listing 1 and load the code using the decimal loader given in the first article. Run the code with RAND USR 30000 ENTER and the copyright symbol should be displayed...

This example included two forms of LD instruction:
LD B, 127 (Load B with 127) is the same as LET B = 127
LD A, B (Load A with value of B) is the same as LET A = B
In general terms we had:
LD register, number
and LD register, register
Another instruction is:
LD A, (nn) (Load the A register with the contents of address nn) — equivalent to LET A = PEEK address
(Note, you can **only** do this operation with the A register.)

This is a very handy instruction as it lets you look through code that you may not have entered. An obvious example is to use ROM addresses to see what crafty tricks Sir Clive's wizards used when writing your Basic operating system.

There is a single, complimentary instruction:
LD (nn), A (Load the box at address nn with the value of A) — similar to BASIC's POKE address, A

These PEEK and POKE equivalents can be very useful for storing and retrieving numbers, as you might use constants in BASIC. For instance, you could earmark an address to keep a record of the aliens zapped in a space invaders game.

Just as you can load a single byte number in a single register, so you can load a two-byte number (up to 65535) into a register pair

	B	D	H	High byte
A	C	E	L	Low byte

Fig. 1 Register arrangement

Listing 1


```
30000          LD      A,2          62
                                     2
30002          CALL    5633         205
                                     1
                                     22
30005          LD      B,127        6
                                     127
30007          LD      A,B          120
30008          RST     16           215
30009          RET                  201
```

e.g. LD HL,nn (Load with a two-byte number)

Remember that the low byte comes first, followed by the high byte

e.g. LD HL,3000 becomes 33,48,117 — LET L = 30000-INT(30000/256)*256:

LET H = INT (30000/256) in Basic

Similarly,

LD HL,(address) = LET L = PEEK address:

LET H = PEEK (address + 1)

Note that the L register comes first again, being loaded with the value at the address, while H is loaded with the value at address + 1.

LD (address),HL reverses the process i.e. POKE address, L: POKE (address + 1),H

It will probably now come as no surprise to learn that if LD A,(HL) means "load the A register with the value of the byte whose address is in HL", there is a complimentary instruction LD(HL),A which will put it back again. These are called indirect addressing instructions. In Basic, the first instruction is like LET A = PEEK(L + 256*H) and the second instruction is POKE(L + 256*H),A.

If you scan Appendix A of the manual, you will see that there are a limited number of instructions allowing indirect addressing e.g. LD A,(HL). Indeed the A register and the HL register pair seem to have more than their fair share of load instructions and some of the other instructions which we will see in future articles. They are "favoured registers" and there are instructions for these registers which are not available for others. Luckily, there are ways around this, using "constructions".

There is no instruction for LD (DE), C but you could use the construction

LD A, C
LD (DE), A

which does the same job but unfortunately alters the A register too.

These instructions may not have you riveted to your magazine with excitement, but they are crucial to most machine code routines.

Let's look at some more instructions which will allow us to make more use of what we have covered so far.

The DJNZ,dis instruction is the equivalent of a Basic FOR...NEXT loop i.e. FOR B = repe-titions to 0 STEP -1: (state-ment) : NEXT B. It can be read as "Decrease the value in the B register and jump if B is not zero". We first need to load B with the number of repetitions of the loop required, up to a maximum of 256. It is a very useful instruction and enables us to start making use of the computers ability to do repe-titive things very quickly. We can tell the computer where to jump to, by using a displace-ment. Start with a count of zero at the byte following the dis-placement byte. (See Fig. 2 example.)

```
        LD B,n        250
Loop 1  . . . . .     251
        . . . . .     252
        . . . . .     253
        DJNZ          254
        dis           255
        . . . . .       0
        . . . . .       1
        . . . . .       2
        . . . . .       3
Loop 2  . . . . .       4
```

Fig 2. DJNZ displacements

In the above example, DJNZ 251 would jump back 5 bytes to the start of loop 1. DJNZ 4 would jump forward 4 bytes to begin another loop at loop 2. We would then need to get back to the DJNZ instruction with a JP instruction. Using this convention can jump up to 128 bytes backwards or up to 127 bytes forwards.

Let's look at an example. Key the bytes of Listing 2 into a DATA statement and use the loader to load them into memory. Run the routine with RAND USR 30002 ENTER and you should see a crude space vehicle printed out centre screen. Delete the loader and enter the Basic lines of Listing 3 and run the routine with RUN 5000. Voila! Sprite graphics!

The comments in Listing 2 explain what the routine is doing. Note the techniques being used. We specify a new position of the sprite by POKEing into the code. We are using bytes in RAM to store numbers; we are using the C register as a temporary store for B, the FOR...NEXT loop counter, so that we can nest one loop inside another loop and we are using HL as a pointer to print a series of characters. The INC instruction adds one to the value in a register or register pair.

In the next article we will cover some single byte arithetic and the machine code equiva-lent of IF...THEN statements. In the meantime you could amuse yourself by modifying the sprite routine, e.g. change the 9 bytes 30042 to 30050 to hold user defined graphics characters ("design a better spacecraft and the world will beat a path to your door"!). How can you change the size of the sprite? — answers in part 3 of this series.

Listing 2


```
                        "Sprite Graphic"

30000    DEFB   11         11    r, the row
30001    DEFB   15         15    c, the column
30002    LD     A,2        62    Print to screen
                            2
30004    CALL   5633       205
                            1
                            22
30007    LD     HL,30042   33    HL points to 1st character
                            90
                            117
30010    LD     DE,(30000) 237   D holds column
                            91    E holds row
                            48
                            117
30014    LD     B,3         6    FOR 3 rows
                            3
30016    LD     A,22       62    AT
                            22
30018    RST    16         215
30019    LD     A,E        123   r,
30020    RST    16         215
30021    INC    B          28    r=r+1
30022    LD     A,D        122   c,
30023    RST    16         215
30024    LD     A,21       62    OVER
                            21
30026    RST    16         215
30027    LD     A,1        62    1;
                            1
30029    RST    16         215
30030    LD     C,B        72    save value of B
30031    LD     B,3         6    FOR 3 columns
                            3
30033    LD     A,(HL)     126   Print character
30034    RST    16         215
30035    INC    HL         35    Point to next character
30036    DJNZ   251        16    NEXT column
                            251
30038    LD     B,C        65    get value of B
30039    DJNZ   231        16    NEXT row
                            231
30041    RET               201   RETURN
```

```
30042   DEFB  138      138    Character table
30043   DEFB  140      140
30044   FEFB  133      133
30045   DEFB  139      139
30046   DEFB  143      143
30047   DEFB  135      135
30048   DEFB  130      130
30049   DEFB  128      128
30050   DEFB  129      129
```

Listing 3

```
5000 FOR r=6 TO 15
5010 POKE 30000,r
5020 RANDOMIZE USR 30002
5030 PAUSE 30
5040 RANDOMIZE USR 30002
5050 NEXT r
5060 STOP
```

This week we bring you an extra special ventures, packed with reviews and lots of helpful hints

One of the problems of writing this column is that I write it several weeks before you read it. Thus if a game reaches me on its release, you read about it around the time it appears in the charts, and if a game reaches me late, you read the review very late! However, I still feel that it is worth looking at major releases, particularly if they are any good — hence the Gremlins review in this issue. With Dummy Run I am a little more prompt, mainly thanks to the helpful guys at Mikro-Gen.

The helpline seems to have grown, and you need never be stuck in dark, damp dungeons again. I am, incidentally, still here at the very bottom of the hideous Argus Towers, and can only just see the sunshine out of my tiny window, high above. Where is Thorin when you need him?

Reviews

Oh dear. Another insulting title from Mikro-Gen. After making a Wally of myself earlier in the year, I have become both a dummy and a Herbert. Herbert's Dummy Run features the pesky little baby who crawled around getting in everyone's way in Everyone's A Wally. The game is packaged in a multi coloured box, with mercifully, better artwork than last time. Gone is the 'hit' single — sighs of relief from music lovers everywhere — although you are given a little Wally sticker.

The game is set in a department store. Herbert, who has now learnt to walk, has becomed separated from his parents (Wally and Wilma Week, in case you have missed the rest of this epic saga.) They are waiting for him in the lost and found department — but first Herbert has numerous tasks to complete. Once again, objects that may or may not be of any use are scattered around the store. There is also a lift to be used.

One of the differences between this game and previous Wally arcventures is this has more of an arcade feel to it. Whereas in Everyone's A Wally there was not much to avoid, here almost every room is full of energy-sapping . . . well,

things. Some rooms contain mini-arcade games (shades of Mad Martha) but these do have a real purpose. For example, once you have the tennis racquet you can play Breakout, causing the glove to enter the lost and found department to fall. Other games include a centipede clone and a really tough city-bomb game.

Graphics are, as usual, in a class of their own, although they resemble Pyjamarama more than Everyone's A Wally. Sound is adequate, and it's not identical to past games — are you listening, Ultimate? Strangely, the complex theme tune — a charming rendition of "Babyface" — is only played once, at the very beginning, which would seem a bit of a waste of memory.

Dummy Run is a competent sequel which will doubtless satisfy the arcventurers. Mikro-Gen haven't just produced a carbon copy of their past releases, and the added arcade bias makes a refreshing change. Mikro-Gen must be careful, however, not to release too many of this type of game or the public will become bored.

It is a shame that a SAVE function has not been included, although this game does not need it as much as Everyone's A Wally did. Despite Mikro-Gen's claimed programming costs, I still feel this is a pound overpriced. After all, when it is completed, there is little point in playing again — as with all arcventures. It is an excellent piece of software, but not quite special or unique enough to gain a flipped rating. Hence, hooked. Dummy Run costs £9.95, available on the "big three" — Spectrum, Commodore and Amstrad.

Now, a look at Gremlins from Adventure International. Surprisingly, this is not an American game; instead it is written by our own, very talented Brian Howarth. Howarth is a British equivalent of Scott Adams, and has established a deservedly good reputation through his Mysterious Adventures series. Gremlins was a blockbusting film last Christmas and in my opinion far better and more amusing than the over-rated

and over-hyped Ghostbusters.

Gremlins — the film — started with an eccentric inventor buying a cute, furry creature called a mogwai for his son's Christmas present. Three rules accompany such creatures: never get them wet (they reproduce), never expose them to bright light (they run away), and never, never feed them after midnight (they turn into evil Gremlins!)

Well, the hero, Billy, does all three, and thus the evil Gremlins are on the rampage. They delight in mischief, and can be quite revolting. They also like killing people. . .

The first thing you notice in the game is the stunning graphics. They really are quite incredible, and add a lot to the atmosphere. There is some, limited, animation as well. In the first location, for example, there is a dart throwing gremlin, and the graphics show it moving its arm back and forth. Text is brief, but informative.

The gremlins will kill you with its dart unless you move downstairs at once. Here you find another gremlin, who blocks your way, unless you take the sword which is conveniently hanging on the wall and type KILL GREMLIN. This causes the computer to respond "I beheaded a GREMLIN" and, lo and behold, the graphics have changed to show a gremlin head in the fire.

Moving into the kitchen provides even more gruesome fun. There is a gremlin in the microwave, a gremlin in the blender (great animation when you kill that one), and Gizmo the mogwai is in the laundry chute. He will follow you around once rescued. Typing EXAMINE GIZMO provides the cutest graphic of the game guaranteed to make even the most hard-hearted reviewer go "Aaah!"

There are about fifty locations, which is hardly Level 9 standard, but better than Scott Adams. Vocabulary is a touch unfriendly, but on the whole acceptable. The problems are not very difficult, particularly if you have seen the film. I think this is supposed to be a beginner's game, but if so AI really need to polish up their instructions. They are incoherent, inconsistent (at one point they say to use two-word input, at another full sentences) and don't really explain the scenario.

The worst error is that the playing hints section suggests typing HELP, but the computer does not understand that word! Spectrum owners might also be confused by the reference to the RETURN key, which the Spectrum doesn't have. The computer can be illogical at times too: in one location is "A PELTZER remote control". However, the computer does not recognise the word Peltzer (or remote), so why was PELTZER in capital letters?

These are minor points though, that don't really spoil an entertaining game. It is certainly a very commercial product, and deserved its recent high placings in the GALLUP chart. Its simplicity may put some people off, but in general, I haven't had so much fun in ages! It really captures the feel of the film. My rating: hooked. As usual with AI products, it is available for a large range of computers, including the Dragon and C16. Only "big three" users can savour the graphics unfortunately. Now pass me the blender, I've just seen another gremlin. . .

Herbert's Dummy Run

Price: £9.95

Publisher: Mikro-Gen

Address: 44 The Broadway, Bracknell, Berks

C64
SPECTRUM
AMSTRAD

Gremlins

Price: £9.95 (Non graphics versions £7.95)

Publisher: Adventure International

Address: 85 New Summer St, Birmingham B19 3TE

Machine: Most

Helpline

After the last time's stunning revelation as to how to beat those ants in The Hulk, I expect many of you have completed the popular game. For those still stuck, don't forget to remember your bad dreams. Once super strong, you can do something with those walls as well as eating raw egg. The ants have a nasty tendancy to eat bio — gems it would seem, so beware! Ant-man will give you a present if you GET him what he needs.

Meanwhile in the world of Scott Adams, those poor souls who have attempted to pit their wits against the devious Sorcerer Of Claymourge Castle, like Mike Curry of Norwich, may be having problems finding new locations. Try pushing those strange walls in an early locations, Mike. Also, try casting a flammable spell at something in a very early location — you never know what you may find on closer examination of what remains...

Now, as promised last time, more Everyone's A Wally hints. We were the first to reveal how to mend the pylon I hope you remember. Those who don't want a generous push towards completion, skip the next paragraph!

Wilma can change books one and two for objects, then book three for the first letter of the code, which she must deposit. Tom can get the battery from the fork lift truck, which should be mended by Harry, with the jump leads, in the garage. Once reactivated, Wally can jump up and get the final letter of the code. The gas mask stops you dying in the cave. Mend the leaking pipe with the patch and chewing gum, in the work shed, of course. The parcel can be stamped by Wilma at the end of the post office, and the hook mended using super glue, again in the work shed. Final tips soon...

Valhallarists were left looking for Felstrong last time. Well, if you're stuck, go to Valheim, jump, go east, drop your ring, go south, and the object is in, guess what? No, not a tightly locked chest like everything else, but in a tightly locked cupboard.

The final quest is Grimnir, but I'll leave you to find that. You will find the HELP function more useful now. You need to head for Ecstasy. Then move to Valhalla itself, and watch the world congratulate you (which is very boring — benefitting ending, some might say). The wonderful hints were, once again, supplied by John Rundle from Aldershot.

A few quick Dummy Run hints next week (the Week family and friends are beginning to dominate this column!). Mending the torch should not be too difficult. The box key refers not to the shape, but to what it unlocks. Teddy bears need honey, naturally. Take them through the dalek room. Lower a rope down from the wardrobe, then the duck is yours. To defeat the soldiers, load a pop gun. To enter the arcade, swap the chocolate coin for a real one. You need to build up to the till...

A quickie from Gordon Sum-mers from Somerset to end with. He asks how to get the rope from the cavezats in Kentilla, the game with the one letter per minute typing speed. Apart from killing them all, which is not very nice and uses much energy, I suggest giving them the damp moss found on the banks of the river. Then tie the rope to a stalagmite and you can climb away.

Following my pleas a few weeks back, I've received several offers of help. T J Avery from Dorset and Londoner G V White both sent me Interceptor solutions, although at the time of writing I still have to play any Interceptor adventures. J G Edwards from Kent is responsible for the Wally hints. I'll be dealing with their letters in more detail next time. Also, in a future HCW, some excellent Entombed hints from Kevin Young of Northumberland. Meanwhile, keep the mail coming in. To make life easier for you (and me, for that matter) I have designed...

The Coupon

Yes, from time to time, Ventures will include this wonderful coupon. Now if you have a problem, all you have to do is fill in all the sections you can and post it. If you have a Micronet mailbox I will try to contact you that way. Happy venturing...

Game Name: _____

Company: _____

Problem: _____
_____
_____
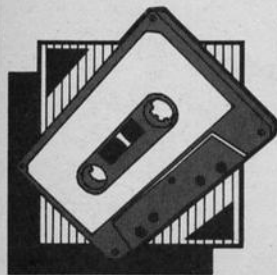_____

Hints: _____
_____
_____

Machine owned: _____

Name: _____

Address: _____
_____
_____
_____

Micronet Mailbox: _____

SPECTRUM GAME

ELECTRO

ZX Spectrum

This game from Dilwyn Jones will have you fairly sparking with pleasure. It's electric!

The original version of this program, by Margaret Norman, appeared in HCW a while back. Originally written for the Dragon micro, it has been converted and enhanced for the Spectrum.

The plot for the game is very simple. A negative terminal at the top of the screen (indicated by the row of "-" symbols) is under threat from the positive currents rising from the bottom of the screen (represented by a row of "+" symbols). You are in charge of an earth spike (represented by the green "earth" symbol), whose task is to push the rising currents back down to earth.

You have to move the earth spike to the top of the red columns as they rise then push downwards. As you reduce the height of the columns, you score more points. Incidentally, the number of points scored depends on the height of the red columns, more Volts, more points. The daring amongst you will deliberately permit the red columns to get near to the top of the screen in order to get a higher score.

The game starts by asking for the skill level at which you wish to start. Press any key from 0 to 9 to indicate the difficulty level. This is effectively the speed at which the red columns grow. You start with just two columns, but as your score grows, so does the number of columns, up to 10.

The longer a game goes on, the more the difficulty level is increased to adjust to your skill level and to prevent the columns from seeming to grow more slowly since there would be more of them. If you survive long enough, the difficulty level will eventually become impossible, so that the game can keep up with the best amongst you! Incidentally, starting off with a skill level of 0 will prove almost impossible, while 9 will seem ridiculously easy. I suggest you start with 5 or 6 and work from there.

The earth spike hops from above one column straight to the next one. You cannot move directly into the middle of a column, but you may move sideways onto the top of a column. The controls are:

up — k
down — m
left — z
right — x (well, it is a
                ZX computer!)

This choice of keys is the best compromise between Spectrum and Spectrum Plus computers. References to these keys are made in lines 130, 140 and 820 should you wish to change them.

Extensive use of sound is made throughout the program,

especially when one of the three lives are lost and at the beginning of a game.

How it works

10-60 credits
70-90 call subroutines as shown by REMs
100-250 the main game loop
110-180 move earth spike
160 increment score
170 change skill level
190-200 determine number of columns
210 make one column taller, if possible
250 has it got to the top?
270-320 the "oops" routine
330-370 demolish earth spike
380-390 action to be taken
400-470 the hi-score routine
480-670 initialisation
520-600 user defined graphics
680-750 start new game and choose skill level
760-920 new screen and next life

Variables

n$ name of highest scorer
hiscore highest score so far in this game
a general loop variable
c(10) array holding y PRINT co-ordinate of top of each column
score score at the moment
columns the number of columns growing at this time
lives number of lives (out of 3) remaining
skill difficulty level selected
x,y x and y PRINT co-ordinates of earth spike
oldx,oldy previous co-ordinates of earth spike
a$ string holding "C5" and control codes at game start
number column currently growing

Conversion hints

A difficult game to convert because of the Spectrum-specific features. User defined graphics are defined on an 8 × 8 grid using eight bits for each row of dots across POKEd into memory at address USR "a" for graphic A and so on. PAPER is the background colour, INK is the foreground colour. Some printed strings contain control characters. CHR$(17) is the PAPER character followed by one byte of data (4 for green, for example). Sound is controlled by the BEEP command which takes the form BEEP duration, pitch. INKEY$ reads the character currently being pressed on the keyboard, returning a null (CHR$ 0) without waiting if no key is being pressed. PRINT AT y,x places the following characters at location y,x on the screen, where y is the number of rows down and x is the number of columns across. The top left of the screen is 0,0 and the bottom right is 21,31. FLASH makes printed characters flash between foreground and background colours at a regular rate. The Spectrum can have local colour parameters within print statements such as PRINT PAPER 4; score as long as the effect only lasts as the single program statement and is then cancelled automatically. User defined characters start with graphic A as CHR$(144) and so on. INVERSE swaps the foreground and background colours or reverses the dot patterns on the screen.

```
LEVEL 4    ELECTRO  3009
```

(bar chart graphic)

```
left-z   right-x   up-k   down-m
```

HI-SCORE 2057 by FRED BLOGGS

```
  10 REM ------- ELECTRO -------
  20 REM -- converted from a --
  30 REM - program by Margaret -
  40 REM -Norman for Dragon 32 -
  50 REM - DILWYN JONES,Feb 85 -
  60 REM -
  70 GO SUB 480: REM initialise
  80 GO SUB 680: REM new game
  90 GO SUB 760: REM next life
 100 REM game loop
 110 LET oldx=x: LET oldy=y
 120 LET k$=INKEY$
 130 LET x=x+(k$="x" AND x<10)-(k$="z" AND x>
1)
 140 LET y=y+(k$="m" AND y<18)-(k$="k" AND y>2
)
 150 IF c(x)<y THEN LET x=oldx: LET y=oldy:
GO TO 190
 160 IF c(x)=y THEN LET score=score+19-y: LE
T c(x)=c(x)+19: PRINT AT 0,21;score: BEEP .002
5,76+4*y
 170 IF skill>.001 THEN LET skill=skill-.001
: PRINT AT 0,6;INT (skill+.5)
 180 IF x<>oldx OR y<>oldy THEN PRINT AT old
y,oldx*3-1;" ";AT y,x*3-1; PAPER 4;CHR$ 144
 190 LET columns=2+INT (score/300)
 200 IF columns>10 THEN LET columns=10
 210 LET number=INT (RND*columns)+1
 220 IF x=number AND y=c(number)-1 OR RND<ski
ll/10 THEN GO TO 110
 230 LET c(number)=c(number)-1
 240 PRINT AT c(number),number*3-1; PAPER 2;"
 "
 250 IF c(number)>2 THEN GO TO 110
 260 REM oops it's made it !
 270 PRINT AT 21,10; FLASH 1;" OH-OH.... "
 280 FOR a=19 TO 1 STEP -1
 290 PRINT AT a,numer*3-1; PAPER 2; INK 7;"+"
 300 BEEP .02,48-5*a
 310 NEXT a
 320 PRINT AT 21,10; FLASH 1;" OOPS !!!! "
 330 FOR a=1 TO 10
 340 PRINT AT a,x*3-1;CHR$ (145+(RND<.5))
 350 BEEP .025,-30: LET c(a)=19
 360 NEXT a: LET lives=lives-1
 370 FOR a=1 TO 250: NEXT a
 380 IF lives>0 THEN GO TO 90
 390 IF score<=hiscore THEN GO TO 80
 400 CLS
 410 PRINT ''TAB 6; FLASH 1;" CONGRATULATIONS
!!! "
 420 PRINT ''TAB 11;score;" beats"
 430 PRINT ''TAB 5; INVERSE 1;hiscore; INVER
SE 0;" by "; INVERSE 1;n$
 440 PRINT AT 15,8;"Enter your name"
 450 INPUT LINE n$
 460 LET hiscore=score
 470 GO TO 80
 480 REM initialise
 490 INVERSE 0: OVER 0: FLASH 0
 500 BRIGHT 0: PAPER 6: INK 0
 510 BORDER 5: CLS : RESTORE
 520 FOR a=USR "a" TO USR "e"+7
 530 READ v: POKE a,v
 540 NEXT a: RANDOMIZE
 550 DATA 24,24,24,255,0,60,0,24
 560 DATA 8,73,34,148,41,68,146
 570 DATA 17,16,64,18,0,170,0,82
 580 DATA 16,7,30,60,120,255,127
 590 DATA 56,16,132,12,28,126
 600 DATA 255,255,28,8
 610 POKE 23658,0: REM caps off
 620 DIM c(10): DIM n$(12)
 630 FOR a=1 TO 10
 640 LET c(a)=19
 650 NEXT a: LET hiscore=1000
 660 LET n$="Dilwyn Jones"
 670 RETURN
 680 REM new game
 690 CLS : LET score=0
 700 LET columns=2: LET lives=3
 710 PRINT '''TAB 12;"NEW GAME";TAB 11;"-----
----"
 720 PRINT AT 10,0;"Skill level 0 (hard)- 9 (
easy)?"
 730 LET skill=CODE INKEY$-48
 740 IF skill<0 OR skill>9 THEN GO TO 730
 750 RETURN
 760 REM next life
 770 CLS : LET x=5: LET y=2
 780 PRINT "LEVEL ";INT (skill+.5);TAB 11; IN
VERSE 1;" ELECTRO "
 790 PRINT AT 0,30; PAPER 4;(CHR$ 144+CHR$ 14
4)( TO lives)
 800 PRINT AT 1,0; PAPER 1; INK 7;"----------
-------------------"
 810 PRINT AT 19,0; PAPER 2; INK 7;"+++++++++
++++++++++++++++++++++++"
 820 PRINT "  left-z  right-x  up-k  down-m"
 830 PRINT AT 0,21;score
 840 PRINT #0;"HI-SCORE ";hiscore;" by ";n$
 850 LET a$=CHR$ 147+CHR$ 148+CHR$ 17+CHR$ 4+
CHR$ 144+CHR$ 17+CHR$ 6+" "
 860 FOR a=29 TO 0 STEP -1
 870 IF a=11 THEN LET a$=a$( TO 2)+"+"
 880 PRINT AT 2,a;a$
 890 BEEP .04,-20
 900 NEXT a
 910 PRINT AT 2,0;"   "
 920 RETURN
```

Since the dawn of the computer age the prices of home computers have been steadily falling.

But, remarkably, the price of a genuine, full-blooded disk drive has remained almost constant.

Constantly expensive.

You'll be lucky to pick up a decent one for less than £200 in the shops.

Now, however, you can have one delivered to your doorstep for only £119.95 (including VAT and postage and packing).

The new Triton Quick Disk from Radofin.

Its specifications are every bit the equal of a £200 disk drive, as a glance at our card above will confirm.

Quick Disk uses the very latest technology to store up to 100K on high quality Hitachi Maxell double-sided 2.8" disks.

Its disk operating system (DOS) uses standard commands so it is truly easy to use, as any computer novice will be glad to hear.

While the price will be compatible with most wallets, there is a Triton Quick Disk compatible with most computers – Commodore 64, Spectrum (16K, 48K and Spectrum plus), Aquarius, Dragon 64 and all MSX Systems.

And, naturally, included is an interface box plus all connecting cables and instructions.

In short, what we deliver is a complete, genuine disk drive. Not a tape or wafer in sight. All for only £119.95.

And when it comes to speed of loading, the Triton Quick Disk more than lives up to its name.

AS A COMPUT
APPRECIATE THE

FROM 0 TO READY IN 7 SECONDS.

To put the Triton Quick Drive through its paces we used an ordinary computer game – Jet Set Willy.

From tape it took 170 seconds to load.

When loaded from the Triton Quick Disk it took a mere seven seconds. That is 163 seconds less than the tape and certainly as quick as most disk drives on the market.

AS A WALLET
APPRECIATI
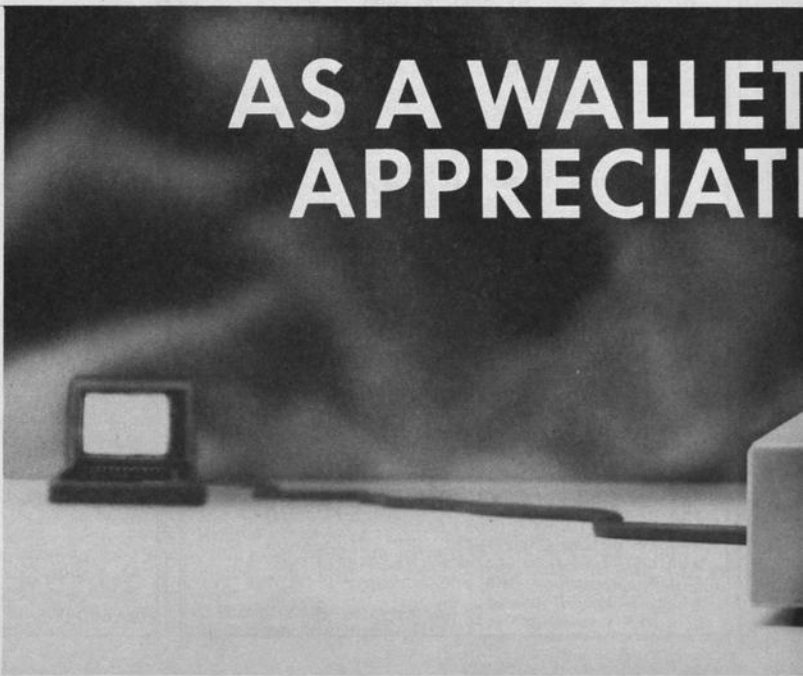
R USER YOU'LL SPECIFICATIONS.

TRITON | POWER | FLOPPY DISC DRIVE | QD

Proof indeed that the Triton has all the capabilities of its more expensive rivals.

AS TEST DRIVEN BY THE EXPERTS.

New it may be, but the Triton Quick Disk is already receiving rave reviews in the computer press. For example, in a recent Home Computing Weekly article it picked up their much coveted "Flipped" award.

As their journalist said "…. I am very impressed by the Quick Disk. Not only is it very quick, and both smaller and neater than other drives, but it's easier to use as well…the Quick Drive performed faultlessly.

It's easy to use and at around £120 is probably the best buy for the first time user."

High praise indeed for any disk drive.

For one costing £80 less than any comparable piece of equipment it's exceptional.

HOW TO BUY YOUR TRITON QUICK DISK.

As yet you won't find the Triton Disk Drive in any shop. You can only lay your hands on one by filling in the coupon below.

Send it, along with a cheque or P/O for £119.95 to, Radofin Electronics (UK) Ltd., Hyde House, The Hyde, London NW9 6LG. (Postage free in the UK. Add additional postage for outside the UK.)

In the unlikely event of you being in any way dissatisfied, simply return the disk drive and we'll happily return your money.

USER YOU'LL THE PRICE.

TRITON | POWER | FLOPPY DISC DRIVE | QD

AMSTRAD GAME
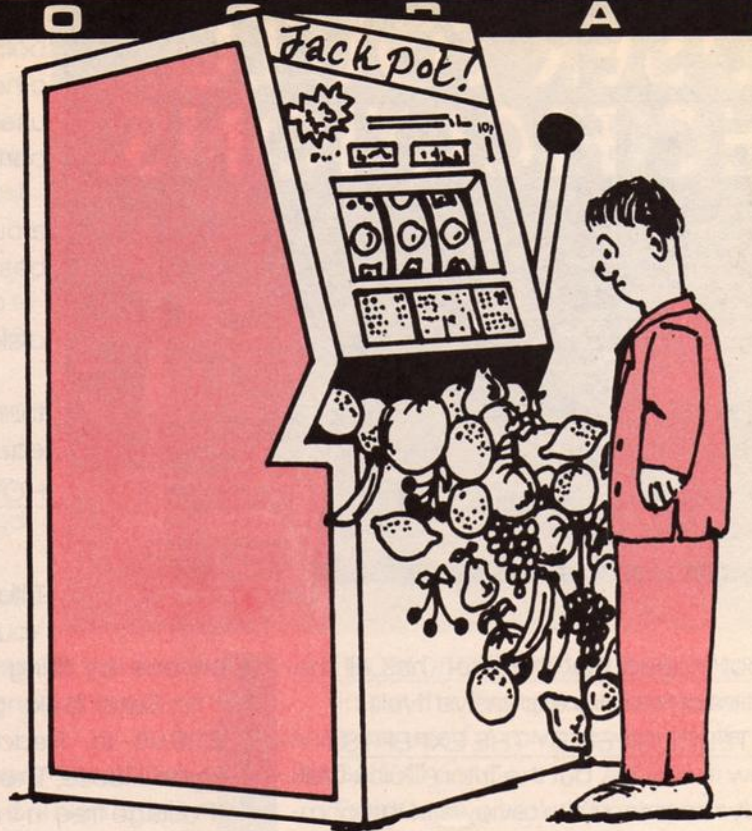
FRUIT MACHINE

Richard Kemley's fruit machine game is just like the real thing — but you don't lose any money

This is a fruit machine simulation, with most of the features you would expect of an arcade fruit machine, except the cally-doh payout. There is a list of the keys here, which are hopefully quite sensible.

The main aim is to amass as much digital money as possible before pressing CTRL, SHIFT and ESC. There should be no problem in typing in this program, and remember to SAVE and CAT it immediately.

Keys

NB: NK means Numeric Keypad.

gamble	spacebar
collect	large enter
start	large enter
hold reel 1	NK 1
hold reel 2	NK 2
hold reel 3	NK 3
nudge reel 1 up	NK 7
nudge reel 2 up	NK 8
nudge reel 3 up	NK 9
nudge reel 1 down	NK 4
nudge reel 2 down	NK 5
nudge reel 3 down	NK 6
stop nudge counter	spacebar

Variables

reel$	reel 1 held indicator
reel2$	reel 2 held indicator
reel3$	reel 3 held indicator
win(array)	win available
reel$(1)	contents of reel 1
reel$(2)	contents of reel 2
reel$(3)	contents of reel 3
nudges	nudge counter
dough	money you have

How it works

99	control (main loop)
699	silly sound routine
999	decide which reel to roll
1499	roll reel one
1999	roll reel two
2499	roll reel three
2999	check for win
3499	start
3999	nudge routine
4199	gamble or collect sound routine
4299	nudge sound routine
4499	hold routine
4999	draw screen
5499	decide whether or not to give nudges
5999	decide whether or not to give holds
7499	input credits
7999	display win if applicable

8499	title screen
8699	winning combinations
8799	characters
8999	variables, initialisation
9499	user defined graphics
9999	take the money
10499	game over
11999	instructions
12999	instructions?

Hints on conversion

If you have either a good grasp of Amstrad BASIC or an Amstrad manual then conversion should be simple enough. Otherwise rewriting the program yourself would be a far more educational and rewarding task. It isn't too difficult a program to write anyway, but if you get stuck, you can always refer to the appropriate segment of my program.

Remember to use the modular approach to programming. The best method is to first of all write down all the subroutines you think you will need, and make these into REM statements using sensible line numbers. For example, you could take my list of subroutines on this page and type them in. When you list the program you should have just a list of REMs. Then write the BASIC for these subroutines.

When you have done this for all the REMs, write a control routine at the beginning which calls up all the subroutines (in the right order, remember).

Using this method, debugging is amazingly simple. Use BREAK-POINTS, which are STOP statements placed strategically in a program.

For example, if you have an error but don't know where it is in the program, then place a STOP statement somewhere in your control routine, then RUN the program. If the error hasn't cropped up by the time the

program STOPs, then the error comes after the STOP statement, otherwise it comes before it. Then you can place another STOP somewhere else, thus homing in on the error.

This way you can easily isolate the faulty subroutine and fix it. This is much better than having to wade through lines of garbage programming, as I like to call them.

```
99 REM control
100 GOSUB 9000:  ' variables
110 GOTO 8500:  ' title screen
120 GOSUB 13000:' instructions?
130 GOSUB 12000:' instructions
150 GOSUB 5000:  ' draw fruit machine graphics
155 GOSUB 6000:  ' decide if holds to be given
160 GOSUB 7500:  ' input credits or end game
165 GOSUB 3500:  ' start
170 GOSUB 1000:  ' roll reels
180 GOSUB 3000:  ' check for win
185 GOSUB 8000:  ' if win available then displ
ay it, returning to line 150
190 GOSUB 5500:  ' decide if nudges to be give
n
200 GOTO 150
210 REM
699 REM silly sound routine
700 cnt=0:count=0:RESTORE 750:ENT -1,1,1,4,2,
-1,4,1,1,5:ENV 1,5,3,1,4,-1,5,1,0,50,11,-1,10
710 SOUND 1,snd,15,15,1,1,0:SOUND 2,snd+100,2
5,15,1,1,0:SOUND 3,snd+200,35,15,1,1,0
720 cnt=cnt+1:IF cnt=7 THEN READ snd:cnt=0:co
unt=count+1:IF count=8 THEN 800
730 GOTO 710
750 DATA 100,300,200,350,150,300,100,50
800 cnt=0:count=0:RESTORE 750:ENT 1,1,1,4,2,
-1,4,1,1,5:ENV 1,5,3,1,4,-1,5,1,0,50,11,-1,10
810 SOUND 1,snd,10,15,1,1,1:SOUND 2,snd+100,1
5,15,1,1,0:SOUND 3,snd+200,25,15,1,1,0
820 cnt=cnt+1:IF cnt=7 THEN READ snd:cnt=0:co
unt=count+1:IF count=8 THEN 900
830 GOTO 810
900 CALL &BB00:cnt=0:count=0:RESTORE 750:ENT
1,1,1,4,2,-1,4,1,1,5:ENV 1,5,3,1,4,-1,5,1,0,
50,11,-1,10
910 SOUND 1,snd,3,15,1,1,1:SOUND 2,snd+100,9,
15,1,1,0:SOUND 3,snd+200,15,15,1,1,0
920 cnt=cnt+1:IF cnt=7 THEN READ snd:cnt=0:co
unt=count+1:IF count=8 THEN RETURN
930 GOTO 910
950 IF flga=1 THEN LOCATE 17,13:PRINT CHR$(23
0):LOCATE 17,12:PRINT CHR$(231):LOCATE 16,13:
PRINT CHR$(232) ELSE LOCATE 17,13:PRINT CHR$(
230):LOCATE 16,13:PRINT CHR$(233)
955 IF INKEY$<>"" THEN 120
960 IF flga=1 THEN flga=0 ELSE IF flga=0 THEN
 flga=1
970 RETURN
999 REM decide which reel to roll
1000 credits=credits-1
1002 IF reel1$="H" AND reel2$="H" AND reel3$=
"H" THEN GOTO 1030
1005 IF reel1$="H" THEN 1010 ELSE GOSUB 1500
1010 IF reel2$="H" THEN 1020 ELSE GOSUB 2000
1020 IF reel3$="H" THEN 1030 ELSE GOSUB 2500
1030 RETURN
1499 REM roll reel one
1500 FOR outloop=1 TO INT(RND*3)+20
1505 reel1$(1)=RIGHT$(reel$(1),LEN(reel$(1))-1
)+LEFT$(reel$(1),1)
1510 FOR loop=1 TO 3:PEN #1,0:LOCATE #1,2,loo
p:PRINT #1,MID$(reel$(1),1+(loop-1),1)
1512 NEXT loop
1520 NEXT outloop
1525 SOUND 1,500,3,7:SOUND 2,503,3,7:SOUND 3,
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506,3,7:' reel stop sound
1530 RETURN
1999 REM roll reel two
2000 FOR outloop=1 TO INT(RND*3)+20
2005 reel$(2)=RIGHT$(reel$(2),LEN(reel$(2))-1
)+LEFT$(reel$(2),1)
2010 FOR loop=1 TO 3:PEN #2,0:LOCATE #2,2,loo
p:PRINT #2,MID$(reel$(2),1+(loop-1),1)
2030 NEXT loop
2050 NEXT outloop
2055 SOUND 1,480,3,7:SOUND 2,483,3,7:SOUND 3,
486,3,7:' reel stop sound
2060 RETURN
2499 REM roll reel three
2500 FOR outloop=1 TO INT(RND*3)+20
2505 reel$(3)=RIGHT$(reel$(3),LEN(reel$(3))-1
)+LEFT$(reel$(3),1)
2510 FOR loop=1 TO 3:PEN #3,0:LOCATE #3,2,loo
p:PRINT #3,MID$(reel$(3),1+(loop-1),1)
2530 NEXT loop
2550 NEXT outloop
2555 SOUND 1,460,3,7:SOUND 2,463,3,7:SOUND 3,
466,3,7:' reel stop sound
2560 RETURN
2999 REM check for win
3000 value$=MID$(reel$(1),2,1):value$=value$+
MID$(reel$(2),2,1):value$=value$+MID$(reel$(3
),2,1)
3010 IF value$=win1$ THEN win=win(1):RETURN
3020 IF LEFT$(value$,2)=win2$ THEN win=win(2)
:RETURN
3030 IF value$=win3$ THEN win=win(3):RETURN
3040 IF LEFT$(value$,2)=win4$ THEN win=win(4)
:RETURN
3050 IF value$=win5$ THEN win=win(5):RETURN
3060 IF value$=win6$ THEN win=win(6):RETURN
3070 IF LEFT$(value$,2)=win7$ THEN win=win(7)
:RETURN
3080 IF value$=win8$ THEN win=win(8):RETURN
3090 IF value$=win9$ THEN win=win(9):RETURN
3100 IF value$=win10$ THEN win=win(10):RETURN
3110 IF value$=win11$ THEN win=win(11):RETURN
3120 IF value$=win12$ THEN win=win(12):RETURN
3130 IF value$=win13$ THEN win=win(13):RETURN
3140 IF value$=win14$ THEN win=win(14):RETURN
3150 IF value$=win15$ THEN win=win(15):RETURN
3160 IF LEFT$(value$,2)=win16$ THEN win=win(1
6):RETURN
3170 IF value$=win17$ THEN win=win(17):RETURN
3180 IF value$=win18$ THEN win=win(18):RETURN
3190 IF value$=win19$ THEN win=(19):RETURN
3200 IF value$=win20$ THEN win=win(20):RETURN
3210 win=0:RETURN
3499 REM start
3500 INK 8,5,15
3510 IF INKEY(18)=0 THEN INK 8,10:SOUND 1,100
,3,7:SOUND 2,102,5,7:SOUND 3,104,7,7:RETURN
3520 GOTO 3510
3999 REM nudge routine
4000 PEN 2:PAPER 1:SPEED INK 10,10
4005 GOSUB 4300:nudges=INT(RND*8)+1:LOCATE 13
,12:PRINT nudges:IF INKEY(47)<>0 THEN 4005
4007 nudge=nudges
4015 IF nudges=0 THEN 4100 ELSE LOCATE 13,12:
PRINT nudges
4017 tmp1$=reel$(1):tmp2$=reel$(2):tmp3$=reel
$(3)
4020 IF INKEY(10)=0 THEN reel$(1)=RIGHT$(reel
$(1),15):reel$(1)=reel$(1)+LEFT$(tmp1$,1) ELS
E 4030.
4025 FOR lop=1 TO 3:PEN #1,0:LOCATE #1,2,lop:
PRINT #1,MID$(reel$(1),1+(lop-1),1):NEXT lop:
nudges=nudges-1:GOTO 4015
4030 IF INKEY(11)=0 THEN reel$(2)=RIGHT$(reel
$(2),15):reel$(2)=reel$(2)+LEFT$(tmp2$,1) ELS
E 4040
4035 FOR lop=1 TO 3:PEN #2,0:LOCATE #2,2,lop:
PRINT #2,MID$(reel$(2),1+(lop-1),1):NEXT lop:
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nudges=nudges-1:GOTO 4015
4040 IF INKEY(3)=0 THEN reel$(3)=RIGHT$(reel$
(3),15):reel$(3)=reel$(3)+LEFT$(tmp3$,1) ELSE
4050
4045 FOR lop=1 TO 3:PEN #3,0:LOCATE #3,2,lop:
PRINT #3,MID$(reel$(3),1+(lop-1),1):NEXT lop:
nudges=nudges-1:GOTO 4015
4050 IF INKEY(20)=0 THEN temp$=RIGHT$(reel$(1
),1):temp$=temp$+LEFT$(tmp1$,15):reel$(1)=tem
p$:temp$="" ELSE 4060
4055 FOR lop=1 TO 3:PEN #1,0:LOCATE #1,2,lop:
PRINT #1,MID$(reel$(1),1+(lop-1),1):NEXT:nudg
es=nudges-1:GOTO 4015
4060 IF INKEY(12)=0 THEN temp$=RIGHT$(reel$(2
),1):temp$=temp$+LEFT$(tmp2$,15):reel$(2)=tem
p$:temp$="" ELSE 4070
4065 FOR lop=1 TO 3:PEN #2,0:LOCATE #2,2,lop:
PRINT #2,MID$(reel$(2),1+(lop-1),1):NEXT lop:
nudges=nudges-1:GOTO 4015
4070 IF INKEY(4)=0 THEN temp$=RIGHT$(reel$(3)
,1):temp$=temp$+LEFT$(tmp3$,15):reel$(3)=temp
$:temp$="" ELSE 4080
4075 FOR lop=1 TO 3:PEN #3,0:LOCATE #3,2,lop:
PRINT #3,MID$(reel$(3),1+(lop-1),1):NEXT lop:
nudges=nudges-1:GOTO 4015
4080 IF INKEY(18)=0 THEN 4100
4090 GOTO 4020
4100 GOSUB 3000
4110 IF win>0 THEN GOSUB 8000
4115 GOSUB 5000
4120 RETURN
4199 REM gamble or collect sound routine
4200 SOUND 1,flg,7,7:SOUND 2,flg+2,7,7:SOUND
3,flg+4,7,7
4210 IF flg=1000 THEN flg=900 ELSE IF flg=900
THEN flg=1000:' note value
4220 RETURN
4299 REM nudge sound routine
4300 SOUND 1,flag,10,7:SOUND 2,flag+2,10,7:SO
UND 3,flag+4,10,7
4310 IF flag=100 THEN flag=200 ELSE IF flag=2
00 THEN flag=100
4320 RETURN
4499 REM hold routine
4500 INK 11,3,22:SPEED INK 20,20
4510 IF INKEY(13)=0 THEN reel1$="H":PAPER 0:P
EN 1:LOCATE 6,21:PRINT "H":LOCATE 6,22:PRINT
"E":LOCATE 6,23:PRINT "L":LOCATE 6,24:PRINT "
D"
4520 IF INKEY(14)=0 THEN reel2$="H":PAPER 0:P
EN 1:LOCATE 10,21:PRINT "H":LOCATE 10,22:PRIN
T "E":LOCATE 10,23:PRINT "L":LOCATE 10,24:PRI
NT "D"
4530 IF INKEY(5)=0 THEN reel3$="H":PAPER 0:PE
N 1:LOCATE 14,21:PRINT "H":LOCATE 14,22:PRINT
"E":LOCATE 14,23:PRINT "L":LOCATE 14,24:PRIN
T "D"
4540 IF INKEY(6)=0 THEN reel1$="":reel2$="":r
eel3$="":PAPER 11:PEN 1:OUTp$="HOLD":inw=21:F
OR mnloop=1 TO 4:LOCATE 6,inw:PRINT MID$(OUTp
$,mnloop,1):LOCATE 10,inw:PRINT MID$(OUTp$,mn
loop,1):LOCATE 14,inw:PRINT MID$(OUTp$,mnloop
,1):inw=inw+1:NEXT mnloop
4545 SOUND 1,20,3,7:SOUND 2,40,6,7
4550 IF INKEY(18)=0 THEN INK 11,8:RETURN
4560 GOTO 4510
4999 REM draw fruit machine graphics in mode
0 on screen
5000 DI:SPEED INK 30,30
5005 MOVE 10,10:DRAW 70,200,2:MOVE 630,10:DRA
W 570,200,2:MOVE 70,200:DRAW 570,200,2:MOVE 1
0,10:DRAW 630,10,2:MOVE 10,10:DRAW 10,0,2:MOV
E 630,10:DRAW 630,0,2:' lower half outline
5010 MOVE 70,200:DRAW 70,390,3:DRAW 570,390,3
:DRAW 570,200,3:' upper half outline
5020 IF prog=0 THEN MOVE 48,120:DRAW 590,120,
1
5030 IF prog=0 THEN WINDOW #1,5,7,17,19:WINDO
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W #2,9,11,17,19:WINDOW #3,13,15,17,19:PAPER #
1,4:PAPER #2,4:PAPER #3,4:CLS #1:CLS.#2:CLS #
3:' windows for reels
5040 IF prog=0 THEN WINDOW #4,13,17,8,10:PAPE
R #4,8:CLS #4:PEN #4,0:LOCATE #4,1,2:PRINT #4
,"START"
5050 IF prog=0 THEN WINDOW #5,4,8,8,10:PAPER
#5,9:PEN #5,0:CLS #5:LOCATE #5,1,2:PRINT #5,"
NUDGE"
5060 PAPER 11:PEN 1:OUTp$="HOLD"
5065 inw=21
5070 FOR mnloop=1 TO 4
5080 LOCATE 6,inw:PRINT MID$(OUTp$,mnloop,1):
LOCATE 10,inw:PRINT MID$(OUTp$,mnloop,1):LOCA
TE 14,inw:PRINT MID$(OUTp$,mnloop,1)
5090 inw=inw+1:NEXT mnloop
5100 PAPER 0:PEN 0:LOCATE 8,6:PRINT "#":LOCAT
E 9,6:PRINT USING "##.##";win
5110 PAPER 2:LOCATE 5,2:PEN 0:PRINT "DOUGH:#"
;:PRINT USING "##.##";dough
5120 PAPER 1:LOCATE 6,12:PEN 2:PRINT "NUDGES:
";nudges
5130 PAPER 10:LOCATE 5,14:PEN 3:PRINT "CREDIT
S:";credits
5135 PAPER 0:PEN 0:LOCATE 9,6:PRINT " "
5140 FOR loop=1 TO 3:PEN #1,0:LOCATE #1,2,loo
p:PRINT #1,MID$(reel$(1),1+(loop-1),1):NEXT l
oop:FOR loop=1 TO 3:PEN #2,0:LOCATE #2,2,loop
:PRINT #2,MID$(reel$(2),1+(loop-1),1):NEXT lo
op:FOR loop=1 TO 3:PEN #3,0:LOCATE #3,2,loop
5150 PRINT #3,MID$(reel$(3),1+(loop-1),1):NEX
T loop
5190 PAPER 0
5480 prog=1:IF credits=0 AND dough<=0.05 THEN
10500
5490 INK 9,10:RETURN
5499 REM decide whether to give nudges
5500 IF RND>0.87 THEN INK 9,0,26:GOSUB 4000:I
NK 9,12:RETURN
5510 RETURN
5999 REM decide whether to give holds
6000 IF credits<=0 THEN RETURN ELSE reel1$=""
:reel2$="":reel3$=""
6005 IF RND<0.73 THEN reel1$="":reel2$="":ree
l3$="":SPEED INK 40,40:RETURN
6010 GOSUB 4500:RETURN
7499 REM input credits
7500 IF dough>0.05 THEN INK 10,2,17
7501 IF INKEY(68)<>0 THEN 7504
7502 IF INKEY(68)=0 AND ddough>0.5 THEN credi
ts=credits+1:ddough=ddough-0.5:dough=ddough/1
0
7503 IF dough>0 THEN SOUND 7,500,3,7
7504 IF credits>0 THEN INK 8,5,15
7505 LOCATE 13,14:PEN 4:PRINT credits:LOCATE
12,2:PEN 1:PRINT USING "##.##";dough
7510 IF INKEY(18)=0 AND credits=0 THEN 10000
ELSE IF INKEY(18)=0 THEN INK 10,14:INK 8,10:R
ETURN
7515 WHILE INKEY$<>"":WEND
7520 GOTO 7500
7999 REM display win if available then return
to line 150 else return
8000 IF win=0 THEN RETURN
8005 INK 9,10:SPEED INK 15,15:PAPER 0
8010 LOCATE 7,4:PEN 11:PRINT "!!WIN!!"
8020 FOR f=100 TO 10 STEP -10:SOUND 1,f,5,7:S
OUND 2,f+2,6,7:SOUND 3,f+4,7,7:NEXT
8030 LOCATE 7,6:PRINT "#";USING "##.##";win
8040 PAPER 0:INK 14,0,26:INK 13,26,0:LOCATE 3
,15:PEN 13:PRINT "GAMBLE":LOCATE 12,15:PEN 14
:PRINT "COLLECT"
8050 GOSUB 4200:IF INKEY(47)=0 THEN 8100 ELSE
IF INKEY(18)=0 THEN 8200 ELSE 8050
8099 REM gamble win
8100 IF RND>0.5 THEN wnflg=1 ELSE wnflg=0
8105 IF wnflg=0 THEN 8120
8110 IF wnflg=1 THEN LOCATE 7,4:PEN 14:PRINT
"!!WIN!!":FOR f=100 TO 10 STEP -10:SOUND 1,f,
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5,7:SOUND 2,f+2,6,7:SOUND 3,f+4,7,7:NEXT
8112 win=win*2
8115 LOCATE 8,6:PEN 1:PRINT USING "##.##";win
:GOTO 8040
8120 LOCATE 7,4:PEN 15:PRINT " LOSE!!"
8125 FOR f=10 TO 100 STEP 10:SOUND 1,f,5,7:SO
UND 2,f+2,6,7:SOUND 3,f+4,7,7:NEXT
8130 IF win=0.1 THEN win=0 ELSE win=win/2
8140 IF win=0 THEN LOCATE 7,4:PRINT "        "
:GOTO 150
8150 ddough=ddough+(win*10):dough=ddough/10:L
OCATE 12,2:PEN 1:PAPER 0:PRINT USING "##.##";
dough
8160 PAPER 0:LOCATE 3,15:PRINT SPACE$(16):LOC
ATE 7,4:PRINT "        ":GOTO 150
8199 REM take win
8200 ddough=ddough+(win*10):dough=ddough/10:L
OCATE 12,2:PEN 1:PAPER 0:PRINT USING "##.##";
dough
8210 PAPER 0:LOCATE 3,15:PRINT SPACE$(16):LOC
ATE 7,4:PRINT "        ":GOTO 150
8499 REM title screen
8500 BORDER 1:CLS:fl=1:INK 12,0,26:INK 13,26,
0:SPEED INK 7,7:flga=1:DI:EVERY 10,3 GOSUB 95
0
8510 FOR loop=1 TO 20
8520 IF fl=1 THEN PEN 12 ELSE PEN 13
8530 LOCATE loop,1:PRINT CHR$(164):LOCATE loo
p,24:PRINT CHR$(164)
8540 IF fl=1 THEN fl=0 ELSE IF fl=0 THEN fl=1
8550 NEXT
8560 FOR loop=2 TO 23
8570 IF fl=1 THEN PEN 12 ELSE PEN 13
8580 LOCATE 1,loop:PRINT CHR$(164):LOCATE 20,
loop:PRINT CHR$(164)
8590 IF fl=1 THEN fl=0 ELSE IF fl=0 THEN fl=1
8600 NEXT
8610 PEN 8:d$="FRUIT MACHINE!":FOR loop=12 TO
5 STEP -1:LOCATE 4,loop:PRINT d$:NEXT:FOR lo
op=12 TO 6 STEP -1:LOCATE 4,loop:PRINT SPACE$
(14):NEXT
8620 PEN 9:LOCATE 2,10:PRINT "(C) Richard Kem
ley"
8630 PEN 10:LOCATE 3,13:PRINT "DECEMBER 1984.
"
8640 PEN 12:LOCATE 4,20:PRINT "PRESS":LOCATE
14,20:PRINT "KEY":PEN 13:LOCATE.10,20:PRINT "
ANY"
8647 PEN 10:EI
8650 GOSUB 700
8699 REM winning combinations
8700 snd=200:CLS:PEN 3:LOCATE 1,1:PRINT "WINN
ING COMBINATIONS"
8710 PEN 2:FOR loop=1 TO 20:SOUND 1,snd,5,7:S
OUND 2,snd+2,5,7:SOUND 3,snd+4,5,7:LOCATE 1,l
oop+2:PRINT demo$(loop):snd=snd-10:NEXT
8715 PEN 1:FOR loop=3 TO 22:SOUND 7,RND*1000,
5,7:LOCATE 7,loop:PRINT "#":NEXT
8720 PEN 1:LOCATE 4,25:PRINT "PRESS ANY KEY"
8725 PEN 10
8730 GOSUB 700
8799 REM characters
8800 DI:snd=100:CLS:PEN 4:LOCATE 3,1:PRINT "G
AME CHARACTERS"
8810 FOR loop=1 TO 16:SOUND 1,snd,5,7:SOUND 2
,snd+2,5,7:SOUND 3,snd+4,5,7:PEN (RND*2)+1:LO
CATE 1,loop+2:PRINT CHR$(239+loop):LOCATE 3,1
oop+2:PRINT desc$(loop):snd=snd-5:NEXT
8815 EI
8820 PEN 12:LOCATE 4,25:PRINT "PRESS ANY KEY"
8825 PEN 10
8830 GOSUB 700
8850 GOTO 8500
8999 REM variables
9000 zxz=FRE(""):MODE 0:CLS:RANDOMIZE TIME:SP
EED INK 25,25
9003 reel1$="":reel2$="":reel3$="":' if these
hold 'H' then reels are held
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```
9005 DIM win(21):RESTORE 9007:FOR f=1 TO 20:R
EAD value:win(f)=value:NEXT
9007 DATA 1,.8,2,1.5,.5,1.5,.5,1,.75,3,.5,.5,
.3,.5,1,.75,.5,.75,1,1
9010 FOR loop=240 TO 255:reel$(1)=reel$(1)+CH
R$(loop):NEXT
9020 FOR loop=246 TO 255:reel$(2)=reel$(2)+CH
R$(loop):NEXT:FOR loop=240 TO 245:reel$(2)=re
el$(2)+CHR$(loop):NEXT
9030 FOR loop=250 TO 255:reel$(3)=reel$(3)+CH
R$(loop):NEXT:FOR loop=240 TO 249:reel$(3)=re
el$(3)+CHR$(loop):NEXT
9035 reel$(mnloop)=reel$(mnloop)+CHR$(random)
9037 DEFREAL d-d
9040 flg=900:flag=100:prog=0:ddough=10:dough=
ddough/10:nudges=0
9090 RESTORE 9100:PAPER 0:FOR loop=0 TO 13:RE
AD col:INK loop,col:NEXT:INK 14,1,24:INK 15,1
6,11
9100 DATA 1,24,20,6,26,0,2,8,10,12,14,16,18,2
2
9110 win1$=CHR$(240)+CHR$(240)+CHR$(240)
9115 win2$=CHR$(240)+CHR$(240)
9120 win3$=CHR$(241)+CHR$(241)+CHR$(241)
9125 win4$=CHR$(241)+CHR$(241)
9130 win5$=CHR$(242)+CHR$(242)+CHR$(242)
9135 win6$=CHR$(243)+CHR$(243)+CHR$(243)
9140 win7$=CHR$(243)+CHR$(243)
9145 win8$=CHR$(244)+CHR$(244)+CHR$(244)
9150 win9$=CHR$(245)+CHR$(245)+CHR$(245)
9155 win10$=CHR$(246)+CHR$(246)+CHR$(246)
9160 win11$=CHR$(247)+CHR$(247)+CHR$(247)
9165 win12$=CHR$(248)+CHR$(248)+CHR$(248)
9170 win13$=CHR$(249)+CHR$(249)+CHR$(249)
9175 win14$=CHR$(250)+CHR$(250)+CHR$(250)
9180 win15$=CHR$(251)+CHR$(251)+CHR$(251)
9185 win16$=CHR$(251)+CHR$(251)
9190 win17$=CHR$(252)+CHR$(252)+CHR$(252)
9195 win18$=CHR$(253)+CHR$(253)+CHR$(253)
9200 win19$=CHR$(254)+CHR$(254)+CHR$(254)
9205 win20$=CHR$(255)+CHR$(255)+CHR$(255)
9210 DIM demo$(21)
9215 demo$(1)=win1$:demo$(1)=demo$(1)+SPACE$(
3):demo$(1)=demo$(1)+STR$(win(1))
9220 demo$(2)=win2$:demo$(2)=demo$(2)+SPACE$(
4):demo$(2)=demo$(2)+STR$(win(2))
9225 demo$(3)=win3$:demo$(3)=demo$(3)+SPACE$(
3):demo$(3)=demo$(3)+STR$(win(3))
9230 demo$(4)=win4$:demo$(4)=demo$(4)+SPACE$(
4):demo$(4)=demo$(4)+STR$(win(4))
9235 demo$(5)=win5$:demo$(5)=demo$(5)+SPACE$(
3):demo$(5)=demo$(5)+STR$(win(5))
9240 demo$(6)=win6$:demo$(6)=demo$(6)+SPACE$(
3):demo$(6)=demo$(6)+STR$(win(6))
9245 demo$(7)=win7$:demo$(7)=demo$(7)+SPACE$(
4):demo$(7)=demo$(7)+STR$(win(7))
9250 demo$(8)=win8$:demo$(8)=demo$(8)+SPACE$(
3):demo$(8)=demo$(8)+STR$(win(8))
9255 demo$(9)=win9$:demo$(9)=demo$(9)+SPACE$(
3):demo$(9)=demo$(9)+STR$(win(9))
9260 demo$(10)=win10$:demo$(10)=demo$(10)+SPA
CE$(3):demo$(10)=demo$(10)+STR$(win(10))
9265 demo$(11)=win11$:demo$(11)=demo$(11)+SPA
CE$(3):demo$(11)=demo$(11)+STR$(win(11))
9270 demo$(12)=win12$:demo$(12)=demo$(12)+SPA
CE$(3):demo$(12)=demo$(12)+STR$(win(12))
9275 demo$(13)=win13$:demo$(13)=demo$(13)+SPA
CE$(3):demo$(13)=demo$(13)+STR$(win(13))
9280 demo$(14)=win14$:demo$(14)=demo$(14)+SPA
CE$(3):demo$(14)=demo$(14)+STR$(win(14))
9285 demo$(15)=win15$:demo$(15)=demo$(15)+SPA
CE$(3):demo$(15)=demo$(15)+STR$(win(15))
9290 demo$(16)=win16$:demo$(16)=demo$(16)+SPA
CE$(4):demo$(16)=demo$(16)+STR$(win(16))
9295 demo$(17)=win17$:demo$(17)=demo$(17)+SPA
CE$(3):demo$(17)=demo$(17)+STR$(win(17))
9300 demo$(18)=win18$:demo$(18)=demo$(18)+SPA
CE$(3):demo$(18)=demo$(18)+STR$(win(18))
```

```
9305 demo$(19)=win19$:demo$(19)=demo$(19)+SPA
CE$(3):demo$(19)=demo$(19)+STR$(win(19))
9310 demo$(20)=win20$:demo$(20)=demo$(20)+SPA
CE$(3):demo$(20)=demo$(20)+STR$(win(20))
9320 RESTORE 9350
9330 DIM desc$(17)
9340 FOR loop=1 TO 16:READ value$:desc$(loop)
=value$:NEXT
9350 DATA The bells!,BAR symbol,Silly shape,P
ac-Man,3d box?,Arthur Scargill,Ultimate initi
als,A Resistor,Thane of Cawdor,A medal,A Game
,Floppy Disk,1989???,Who Knows..,Sensible Arr
ows,Silly Arrows
9480 GOSUB 9500
9490 RETURN
9499 REM user defined graphics
9500 SYMBOL AFTER 230:' i can define all char
s from 230 to 255 now
9510 SYMBOL 240,&18,&24,&42,&5A,&42,&81,&FF,&
18
9520 SYMBOL 241,&FF,&0,&FF,&B6,&FE,&B6,&F6,&0
9530 SYMBOL 242,&0,&1C,&22,&49,&5D,&49,&22,&1
C
9540 SYMBOL 243,&0,&30,&68,&FC,&E0,&F0,&7C,&3
0
9550 SYMBOL 244,&0,&FC,&C6,&BF,&A5,&FD,&63,&3
F
9560 SYMBOL 245,&18,&24,&42,&A5,&81,&5A,&24,&
18
9570 SYMBOL 246,&E7,&A0,&E9,&CA,&AC,&AC,&A,&E
9
9580 SYMBOL 247,&0,&0,&3C,&FF,&BD,&81,&81,&0
9590 SYMBOL 248,&7E,&C3,&BD,&B5,&AD,&BD,&C3,&
7E
9600 SYMBOL 249,&FF,&10,&28,&54,&AA,&54,&28,&
10
9610 SYMBOL 250,&E8,&54,&49,&56,&ED,&80,&C0,&
8F
9620 SYMBOL 251,&FF,&99,&A5,&99,&81,&99,&99,&
FF
9630 SYMBOL 230,&BC,&6C,&F4,&F8,&7E,&3D,&24,&
6C
9640 SYMBOL 231,&3C,&3C,&7E,&2C,&7C,&3C,&18,&
FC
9650 SYMBOL 232,&1,&2,&4,&38,&0,&30,&30,&30
9660 SYMBOL 233,&3F,&0,&30,&30,&0,&0,&0,&0
9990 RETURN
9999 REM take the money and run
10000 amount=dough-5:IF amount<0 THEN amount=
0
10005 MODE 0:CLS:PEN 1:LOCATE 1,5:PRINT "    Y
ou won #";USING "##.##";dough
10010 tt=TIME:INK 12,0,26:INK 13,26,0
10020 LOCATE 6,12:PEN 12:PRINT "TRY ";:PEN 13
:PRINT "AGAIN"
10030 IF (TIME-tt>6000 OR INKEY$<>"") THEN RU
N
10040 GOTO 10030
10499 REM game over
10500 a$="!!GAME OVER!!":FOR loop=1 TO 25:PEN
RND*15:LOCATE 4,loop:PRINT a$:SOUND 1,loop*1
00,10,7:SOUND 2,loop*101,10,7:SOUND 4,loop*99
```

```
,10,7:NEXT
10505 ERASE win:ERASE reel$:ERASE demo$:ERASE
desc$
10510 RUN
11999 REM instructions
12000 IF a$<>"y" AND a$<>"Y" THEN RETURN
12005 MODE 1:CLS:ins$="PRESS ANY KEY"
12010 LOCATE 5,1:PEN 3:PRINT "***FRUIT MACHIN
E INSTRUCTIONS***":PEN 1
12030 LOCATE 1,3:PRINT "    The aim of the gam
e is to win as muchmoney as possible by b
oth luck andskill. The game is very easy to
play...."
12040 LOCATE 1,8:PRINT "    The large ENTER
key is the STARTbutton and the COLLECT
button. The SPACE-BAR is the gamble key an
d is usedto stop the nudge spinner. On
the
12045 PRINT "numeric keypad, the top row of
numbersare used, when appropriate, to NUD
GE"
12050 PRINT "UP. The next row are used to NUD
GE DOWN.The next row are used to HOLD the 1s
t, 2nd and 3rd reels respectively. The sm
all ENTER key acts as a CANCEL button."
12060 PRINT "The TAB key is used to add cre
dits, atthe expense of your capital. When
theCREDITS window flashes, you can entercr
edits."
12065 ct=1:PEN 2
12067 WHILE INKEY$=""
12070 LOCATE 12+ct,25:PRINT MID$(ins$,ct,1):c
t=ct+1:IF ct>LEN(ins$) THEN LOCATE 13,25:PRIN
T "           ":ct=1
12080 FOR wa=1 TO 77:NEXT:WEND:CLS
12100 LOCATE 5,1:PEN 3:PRINT "***FRUIT MACHIN
E INSTRUCTIONS***":PEN 1
12120 LOCATE 1,3:PRINT "    At random points
you will be able tohold reels. When this is d
one, the reelswhich were held will not spin n
ext time.Also at random points, you will rec
eivenudges which will allow you to move the"
12130 PRINT "reels up and down in an attempt
to finda winning position."
12140 PRINT:PRINT "    If you press t
he START button whenyou have no credits, yo
u are deemed tohave finished the game, and it
will end."
12150 PEN 2:ct=1
12160 WHILE INKEY$=""
12170 LOCATE 12+ct,25:PRINT MID$(ins$,ct,1):c
t=ct+1:IF ct>LEN(ins$) THEN LOCATE 13,25:PRIN
T "           ":ct=1
12180 FOR wa=1 TO 77:NEXT:WEND
12200 MODE 0:CLS:RETURN
12999 REM instructions?
13000 INK 13,26,0:INK 12,26,0:CLS:LOCATE 1,1:
PEN 3:PRINT "INSTRUCTIONS ( / )":LOCATE 15,1:
PEN 12:PRINT "Y":LOCATE 17,1:PEN 13:PRINT "N"
13010 a$=INKEY$:IF a$="" THEN 13010
13020 CLS:RETURN
```

BASIC CONVERSION

This week Peter Green looks at the complexities of the SOUND commands in part five of our BASIC conversion series

As I pointed out in Part 4, the parts of BASIC which did not form part of the early standard have developed in wildly different ways on machines from different manufacturers. This was true of graphics, and is equally true of sound. Worse, sound can be even more complicated to program than graphics. Luckily most magazine listings only use sound for very simple tunes, and tones and noise for arcade effects.

It's not possible to duplicate sounds exactly from one machine to another. The best I can do is explain briefly how each BASIC lets you construct sound waveforms, so you can roughly identify the effect a source program is trying to achieve. Then you can try to develop a similar sound on your target machine, matching the pitch, duration, attack, decay, and so on.

Beep Beep...

Perhaps the simplest machine for sound is the Spectrum. It has one command, BEEP, which takes two parameters, duration and pitch. The duration is given in seconds, while the pitch is measured in "semitones above or below middle C" — positive numbers being above, negative below. Both numbers may be fractional. So BEEP 0.25,-12 would be a quarter-second note of C below middle C.

Middle C is a pitch of 440 cycles a second, and an octave is 12 semitones. Making a note an octave higher is the same as doubling the frequency. This will let you work out the frequency of Spectrum sounds, for use on other computers which use this as a parameter.

Zap, Ping — It's the Oric

The Oric/Atmos makes sound effects in games programs quite easy. ZAP produces a sort of laser gun sound, PING is a bell-like tone, SHOOT is a gunshot and EXPLODE is exactly what it says! You can probably find magazine articles or books which show how to make these sounds on your machine.

More complex sounds require other keywords. SOUND takes three parameters: channel number, tone, and volume. The channel number is 1, 2 or 3 for one of the three tone channels; 4, 5 or 6 if you want the single noise channel mixed with the first, second or third tone channel.

The tone value is the frequency of the note, while the volume is 1 (faint) to 15 (very loud) or zero if you wish to control the volume with the PLAY command.

MUSIC takes the parameters channel, octave, note and volume, making it easier to enter pure musical tones from sheet music. For example: Channel is 1, 2 or 3, while the octave may be from 0 to 6, 0 being the lowest tone. The note is a number from 1 to 12 indicating the semitone within an octave, C being 1 and working up through C#, D, D#, E, F, F#, G, G#, A, A#, and B, which is 12. Volume works the same as for SOUND, unless it is set to 0.

In this case, PLAY controls the volume. It takes the parameters channel enable, noise enable, envelope mode and envelope period. The first is a bit significant number from 0 to 7, the bit state deciding which channels are on (channel 1 is bit 0, 2 is bit 1, 3 is bit 2): if a bit is 1, that channel is enabled. Noise enable works the same way, and decides which channels have noise added.

Envelope mode is a number from 1 to 7, Figure 1 showing the corresponding waveforms generated. Envelope period is a number from 0 to 32767 controlling the duration of the envelope. As a rough guide, using 10,000 gives a note of about five and a half seconds.

PLAY 0,0,0,0 is useful: it immediately kills any sound. Sounds are often followed by WAIT statements, which let the sound finish before doing anything else. The number after the WAIT is the number of 10 millisecond periods to pause.

Beeb beats

The BBC SOUND command takes four parameters called Q, A, P and D. Q is the channel number, zero being noise and 1-3 the three tone channels. This is the least significant part of a 16 bit number, whose higher bits control sound queueing, channel flushing and

chord synchronisation. These are really beyond the scope of this article.

The other numbers are more straighforward. A is the amplitude, from 0 (off) to -15 (loud). A positive value for A, 1 to 4, causes the volume to vary according to the corresponding ENVELOPE, 1 to 4. P is the pitch, 0 to 255, with middle C sounding when P is 53. D is the duration of the note, 1 to 255, measured in twentieths of a second.

The ENVELOPE command is very complicated. It takes 14 parameters, which break the sound up into three sections with independent pitch changes, and provide an overall volume envelope. Figure 2 indicates how each parameter works: a fuller description would take pages, I'm afraid.

Am-sounds

The CPC464 uses a similar system to the Beeb, though conversion from one t'other isn't exactly trivial. There are three tone channels, each with a separate queue. SOUND inserts a sound into the queues and takes seven parameters, the last five being optional. The format is SOUND C,P,D,V,VE,TE,N. C is the channel status, where bits 0-2 are set to send the sound to channels A, B or C, and the other bits control channel synchronisation and queue flushing.

P is the tone period, 0 to 4095, a period P producing a frequency F where F is 125,000/P. If P is zero there is no tone, useful when a sound is to contain noise only.

If the duration of D is positive, it specifies the sound in 1/100ths of a second. If it's zero, the volume envelope controls the duration. If it's negative, the volume envelope is repeated ABS(D) times. If D is omitted, the default is 20.

V is the initial volume, from 0 (silent) to 15 (loud). The default
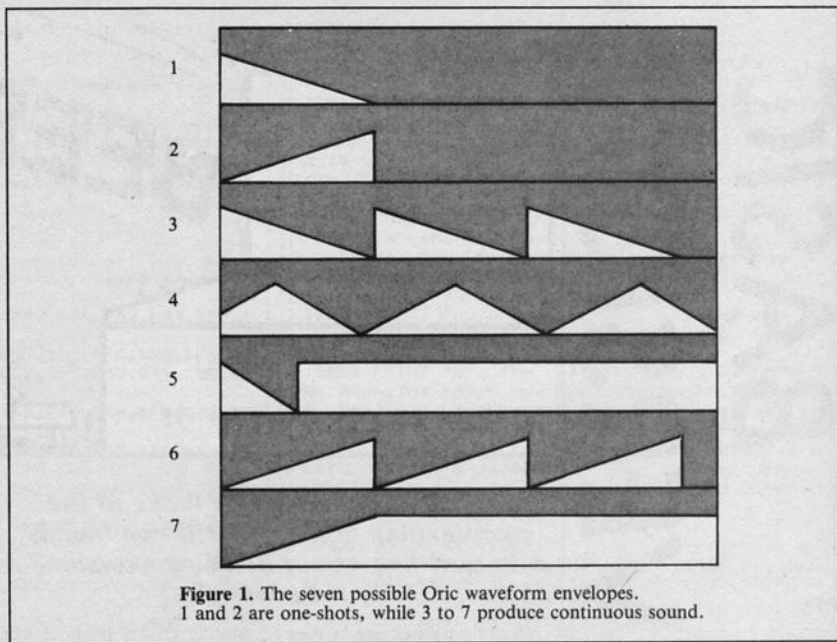
is 12. Using a volume envelope VE will cause the sound to vary according to the envelope number VE (1-15) or hold at volume V for two seconds if 0 is used. Similarly TE specifies which tone envelope, 1-15, to use, or keeps the tone constant if 0 is used.

Finally N is a number from 1 to 31 specifying the type of noise to mix with the tone channel(s). The default of zero means no noise.

ENT and ENV set up tone and volume envelopes and are simpler to use than the BBC. The first parameter is the envelope number, 1 to 15. A negative number gives a repeating tone envelope. This is followed by up to five envelope sections made up of three numbers: step count (number of steps), step size (amount to vary the tone or volume parameter), and pause time

(how many 1/100ths of a second to wait after each step).

This is rather simplifying things, as ENT and ENV are more complicated in practice. But as I keep saying, I'm writing an article, not a book.

Other sound commands are RELEASE, which triggers off channels frozen by a hold bit, and SQ, which tests the state of a sound queue or sets up interrupts for when a sound queue has a spare slot.

Commodore chords

The Commodore 64 has, unquestionably, the best sound facilities of any home micro. It is the only one that is capable of accurately simulating a commercial synthesiser, or even the human voice, without any additional hardware. However, this

makes it unbelievably complicated to program.

In fact, it's so complicated I can only offer users of other machines the same guidance as I did for Commodore graphics last time: that is, indicate which memory locations are PEEKed and POKEd to effect sound commands. At least you can then figure out what parts of a C64 program are making sounds, even if you can't duplicate them.

The frequency settings for the three channels involve locations 54272/3, 54279/80 and 54286/7. Waveform pulse widths involve 54274/5, 54281/2 and 54288/9, while the type of waveform is stored in 54276, 54283 and 54290. The attack/decay and sustain/release parameters go into 54277/8, 54284/5 and 54291/2. Finally, the master volume control for all three channels is 54296.

Figure 1. The seven possible Oric waveform envelopes. 1 and 2 are one-shots, while 3 to 7 produce continuous sound.

```
Figure 2. The BBC envelope command.

   ENVELOPE N,T,PI1,PI2,PI3,PN1,PN2,PN3,AA,AD,AS,AR,ALA,ALD

   Parameter      Range           Function

   N              1 to 4          Envelope number

  Pitch (Tone) envelope
```

T (bits 0-6)	1 to 127	Length of each step in 1/100ths of a second
(bit 7)	0 or 1	0 = auto-repeat pitch envelope 1 = don't repeat envelope
PI1	-128 to 127	Change of pitch per step in section 1
PI2	-128 to 127	Change of pitch per step in section 2
PI3	-128 to 127	Change of pitch per step in section 3
PN1	0 to 255	Number of steps in section 1
PN2	0 to 255	Number of steps in section 2
PN3	0 to 255	Number of steps in section 3

Volume envelope

AA	-127 to 127	Change of amplitude per step during attack phase
AD	-127 to 127	Change of amplitude per step during decay phase
AS	-127 to 0	Change of amplitude per step during sustain phase
AR	-127 to 0	Change of amplitude per step during release phase
ALA	0 to 126	Target level at end of attack phase
ALD	0 to 126	Target level at end of decay phase

LABEL IT!

You too can have good looking cassettes if you use S Domsett's label program for the Commodore printers and plotters.

If you are lucky enough to own either a 1520 printer plotter or a MPS 801 dot matrix printer then you can produce professional looking labels for your cassettes with this program.

The program is menu driven and allows you to print out copies onto the main menu in which you have the choice to create labels or inserts. To create a label you press the desired key then the screen prompts you to write in the label title. You have a maximum of 33 letters to type and once done if you are asked if it's right, if no is answered then you get to start again. If yes is answered then you are prompted to type in the load instructions, again you have up to 33 letters to play with.

Once this is done then you choose which printer you want to use, if you choose the printer plotter then you have a further choice of which colour you require your label to be printed in. When the printer is in operation the label title and load instructions will automatically be printed to the centre of the label, then when the printer has finished all you have to do is cut it to shape and you have a neat printed label that fits exactly to the cassette. Use Pritt Stick to glue the labels to the cassette as it's not as messy as ordinary sticky glue.

When you have done a label you are asked if you want another printout or a new one, the reason for this is many people use just one program per tape recorded on both sides, so you will need two of the same label without having to type the same thing twice.

Once past the insert title screen you choose which of the printers you want to use because the width of the plotter's paper is slightly less than the MPS 801 so you only get to use 37 letters per line as opposed to 39 letters on the MPS 801. Once you have chosen your printer type then you start to type in the lines. There are 22 lines in all but you can only use 20 for typing, as lines 17 and 19 are automatically printed with lines which are meant to be folded on to fit the cassette box. On line 18 you are prompted to type in the main title of the cassette so when it fits the box the title will be displayed on the edge as with commercial tapes.

Incidentally on lines 17 & 19 you can't type anything anyway as they are passed by as you will see when you run the program. The lines can be used for different titles if you have more than one program on the tape or a brief description of the program etc.

```
:LABELS AND INSERTS      0-59 APPROX  :
:TO LOAD PRESS SHIFT/RUNSTOP KEY.     :
:WHEN FOUND LABELS & INSERTS COMES ON :
:THE SCREEN-PRESS COMMODORE LOGO KEY. :
:                                     :
:THIS UTILITY IS FOR THE PRINTOUTS OF :
:CASSETTE LABELS AND INSERTS FOR YOUR :
:OWN CASSETTE GAMES OR UTILITYS.      :
:IT PROVIDES A NEAT AND TIDY WAY TO   :
:ORGANISE AND FILE YOUR TAPES PROPERLY:
:YOU WILL FIND THAT YOU WILL KNOW WHAT:
:IS WHAT AND WHERE TO FIND IT INSTEAD :
:OF SEARCHING THROUGH THOSE UN-NAMED  :
:CASSETTES FOR THAT IMPORTANT PROGRAM.:
:NOTE-DO NOT USE PUNCTUATION WITH THIS:
:PROGRAM OR THE EXTRA WILL BE IGNORED.:
:-------------------------------------:
:LABELS & INSERTS  CBM 64   0-59 APPROX:
:-------------------------------------:
:CASSETTE NO.1    C15   ORIGINAL COPY :
:THE PROPERTY OF S.R DOMMETT          :
:UTILITY PROGRAM                      :
---------------------------------------
```

```
---------------------------------------
:      CASSETTE LABELS AND INSERTS    :
:              CBM 64                 :
:          HOME SOFTWARE LIBRARY      :
:      :----------------------:       :
:      :                      :       :
:      :                      :       :
:      :                      :       :
:      :----------------------:       :
:  SHIFT/RUNSTOP.WHEN FOUND HIT LOGO  :
---------------------------------------
```

Variables

To start with there are a few lines that contain more than 80 characters and these lines have to be typed in with the abbreviations or else you will drop down to the third line which the computer will not understand.

Y$** and **P$ input strings for the inserts
Z$ keyboard control
B$** and **C$ input strings for label titles
T time delay
A the length of string title
B length of load instruction
L line count for MPS 801
nX line count for the 1520 plotter
S number of spaces in insert for MPS 801
P number of spaces in insert for 1520 plotter
I number of rows on 1520 plotter
K number of rows on MPS 801

How it works

5 & 6 dimensions the number of lines to use in the inserts
15 colours border to blue and screen to white
20-38 title screen
100-135 menu screen
155-244 menus and operation for printing on 1520 plotter
250-279 creating the title and load instructions for the label
280-328 menus and operation for printing on the MPS 801
400-520 insert title and instruction screen
530-595 insert menu screen
600-690 create and print out routine for the MPS 801
695-955 create and print out routine for the printer plotter
1000 restore screen with light blue border and dark blue screen

If it's a labour typing in all the listing then the title screens can be excluded and the particular

THIS IS AN EXAMPLE OF A CASSETTE
INSERT THAT HAS BEEN CREATED BY THIS
PROGRAM
JGD 1985

EXAMPLE INSERT DUCKSOFT

WANG

printer routines for which one you don't own, but you will have to delete the relevant GOTO commands and the line numbers which will probably take you as long as just typing the lot in the first place. Also you may end up owning both printers one day as well.

Conversion hints

To convert this program to any other machine would be unwise as the printers work on a different basis to other printers but the idea behind the program might prove fruitfull to start a program of your own.

WANG ZUMM
CBM 64
HOME SOFTWARE LIBRARY

LOAD"WANG-ZUMM"

```
5 DIMY$(22)
6 DIMP$(22)
15 POKE53280,6:POKE53281,1
20 PRINT"        CASSETTE LABELS & INSERTS       "
22 PRINT"     FOR THE COMMODORE 64 & PRINTER     "
24 PRINT"         BY S.R. DOMMETT MAY 1985       "
26 PRINT"    THE UTILITY IS FOR HARD COPYS OF LABELS"
28 PRINT"& INSERTS FOR CASSETTES TO ADD A TOUCH"
30 PRINT"OF CLASS TO YOUR GAMES & UTILITYS."       :
32 PRINT"FOR COMMODORE PRINTERS :-"
34 PRINT"THE 1520 PRINTER PLOTTER AND MPS 801 "
36 PRINT"                   PRESS RETURN "
38 GETZ$:IFZ$<>CHR$(13)THEN38
100 PRINT"            MENU SCREEN           "
105 PRINT"      TO CREATE CASSETTE LABELS    PRESS  F1 "
110 PRINT"      TO CREATE CASSETTE INSERTS   PRESS  F3 "
112 PRINT"    WHEN YOU TYPE IN THE LABEL TITLE"
113 PRINT"  IT AUTOMATICALLY CENTERS TO LABEL   ON"
114 PRINT"  THE HARD COPY PRINTOUT."
115 PRINT"   NOTE:-THE TITLE OF YOUR LABEL MUST NOT"
118 PRINT"EXCEED 33 CHARACTERS LONG."
120 PRINT"   NOTE:-THE TITLES OF YOUR INSERTS MUST"
122 PRINT"NOT EXCEED 40 CHARACTERS LONG."
130 GETZ$:IFZ$=""THEN130
132 IFZ$=" "THEN150
134 IFZ$=" "THEN400
135 PRINT" PRESS F1 OR F3 ONLY":FORT=1TO1200:NEXT:GOTO100
150 GOTO250
155 PRINT"     IS 1520 PLOTTER ON & CONNECTED"
160 PRINT"     TO PRINT IN  BLUE      PRESS 'L'"
162 PRINT"     TO PRINT IN  BLACK     PRESS 'B'"
164 PRINT"     TO PRINT IN  RED       PRESS 'R'"
166 PRINT"     TO PRINT IN  GREEN     PRESS 'G'"
167 OPEN2,6,2
168 GETZ$:IFZ$=""THEN168
170 IFZ$="L"THEN180
172 IFZ$="B"THEN182
174 IFZ$="R"THEN184
176 IFZ$="G"THEN186
178 GOTO168
```
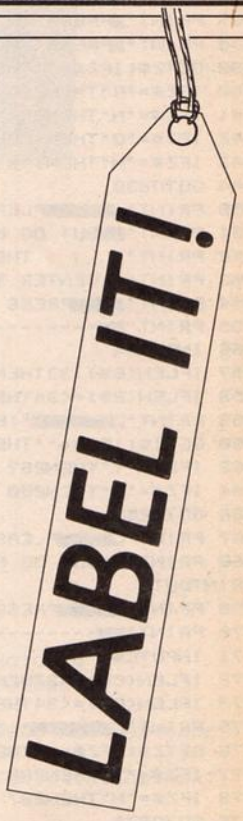
```
180 PRINT#2,"1":GOTO190
182 PRINT#2,"0":GOTO190
184 PRINT#2,"3":GOTO190
186 PRINT#2,"2"
190 PRINT"        PRINTING ON PLOTTER NOW!"
191 OPEN1,6
192 CMD1
210 PRINT"U"
212 PRINT"-------------------------------------"
214 PRINT":";TAB(A-17);B$;TAB(A-17)":"
216 PRINT":            CBM  64             :"
218 PRINT":       HOME SOFTWARE LIBRARY      :"
220 PRINT":      :-----------------------:   :"
221 PRINT":      :                       :   :"
222 PRINT":      :                       :   :"
224 PRINT":      :                       :   :"
226 PRINT":      :-----------------------:   :"
228 PRINT":";TAB(B-17);C$;TAB(B-17)":"
230 PRINT"-------------------------------------"
232 PRINT#1:CLOSE1:CLOSE2
235 PRINT"  PRESS  R  FOR A REPEAT PRINTOUT"
236 PRINT" PRESS  N  FOR A NEW PRINTOUT"
237 PRINT" PRESS  Q   TO QUIT TO PROGRAM"
238 PRINT" PRESS  M   TO RETURN TO MENU"
239 GETZ$:IFZ$=""THEN239
240 IFZ$="R"THEN280
241 IFZ$="N"THEN250
242 IFZ$="Q"THEN1000
243 IFZ$="M"THEN100
244 GOTO239
250 PRINT"     PLEASE TYPE IN LABEL TITLE NOW!"
251 PRINT"  BUT DO NOT EXCEED 33 CHARACTERS LONG."
252 PRINT"        THE TITLE WILL AUTOMATICALLY"
253 PRINT"   CENTER TO THE LABEL ON THE PRINTOUT."
254 PRINT"    PRESS  RETURN  WHEN FINISHED."
255 PRINT"  -------------------------------"
256 INPUTB$
257 IFLEN(B$)>33THENPRINT"TOO MANY":FORT=1TO1200:NEXT:GOTO250
258 IFLEN(B$)=<34THENA=34-LEN(B$)/2+1
259 PRINT"        ";B$:PRINT"     IS THIS CORRECT  (Y/N)"
260 GETZ$:IFZ$=""THEN260
262 IFZ$="Y"THEN267
264 IFZ$="N"THEN250
266 GOTO258
267 PRINT"     PLEASE TYPE IN LOADING INSTRUCTIONS"
268 PRINT"  BUT DO NOT EXCEED 33 CHARACTERS LONG":PRINT"  IT WILL CENTER TO THE PRINTOUT
269 PRINT"     PRESS  RETURN  WHEN FINISHED."
270 PRINT"  -------------------------------"
271 INPUTC$
272 IFLEN(C$)>33THENPRINT"TOO MANY":FORT=1TO1200:NEXT:GOTO267
273 IFLEN(C$)=<34THENB=34-LEN(C$)/2+1
275 PRINT"        ";C$:PRINT"     IS THIS CORRECT  (Y/N)"
276 GETZ$:IFZ$=""THEN276
277 IFZ$="Y"THEN280
278 IFZ$="N"THEN267
279 GOTO275
280 PRINT"     GET THE PRINTER READY FOR PRINTING"
281 PRINT"     FOR 1520 PRINTER PLOTTER PRESS  T  "
282 PRINT"     FOR MPS 801 PRINTER        PRESS  P  "
284 PRINT"     TO RETURN TO MENU          PRESS  M  "
286 PRINT"     TO QUIT THE PROGRAM        PRESS  Q  "
294 GETZ$:IFZ$=""THEN294
296 IFZ$="T"THEN155
```

```
298 IFZ$="P"THEN305
300 IFZ$="M"THEN100
302 IFZ$="Q"THEN1000
304 GOTO294
305 PRINT"🖪    PRINTING ON MPS 801 NOW!"
310 OPEN1,4
311 CMD1
312 PRINT"🖵"
314 PRINT"/                              \"
315 PRINT"| ";TAB(A-18);B$;TAB(A-18)" |"
316 PRINT"|              CBM  64            |"
317 PRINT"|       HOME SOFTWARE LIBRARY     |"
318 PRINT"|     /                      \    |"
319 PRINT"|     |                      |    |"
320 PRINT"|     |                      |    |"
321 PRINT"|     \                      /    |"
322 PRINT"| ";TAB(B-18);C$;TAB(B-18)" |"
323 PRINT"\                              /"
326 PRINT#1:CLOSE1
328 GOTO235
400 PRINT"🖵":POKE53280,5:POKE53281,1
410 PRINT"🖪                CASSETTE INSERTS          "
420 PRINT"🖪🖪YOU HAVE 20 LINES OF TEXT, BUT DONT"
430 PRINT"EXCEED 39 CHARACTERS PER LINE."
440 PRINT"PRINT IN MAIN TITLE OF THE CASSETTE WHEN"
450 PRINT"🖪PROMPTED(18TH LINE). TO LEAVE A LINE"
460 PRINT"BLANK, JUST PRESS RETURN."
470 PRINT"LINES 17 & 19 ARE INPUT WITH LINES."
480 PRINT"THESE LINES ARE TO BE FOLDED TO FIT THE"
490 PRINT"CASSETTE BOX, SO MAIN TITLE IS DISPLAYED"
500 PRINT"🖪ON THE EDGE OF THE CASSETTE."
510 PRINT"🖪🖪              🖪PRESS RETURN🖪"
520 GETZ$:IFZ$<>CHR$(13)THEN520
530 PRINT"🖪🖪🖪🖪🖪             INSERT MENU SCREEN           🖪"
540 PRINT"🖪🖪🖪🖪FOR 1520 PRINTER PLOTTER PRESS 🖪 T 🖪"
550 PRINT"🖪🖪🖪🖪FOR MPS 801 PRINTER        PRESS 🖪 P 🖪"
562 PRINT"🖪🖪🖪🖪TO RETURN TO MAIN MENU     PRESS 🖪 M 🖪"
570 PRINT"🖪🖪🖪🖪TO QUIT THE PROGRAM         PRESS 🖪 Q 🖪"
575 PRINT"🖪🖪PRESS 'ZZZ' TO END.(FOR SMALL PRINTOUT)"
580 GETZ$:IFZ$=""THEN580
590 IFZ$="T"THEN695
591 IFZ$="P"THEN600
593 IFZ$="Q"THEN1000
594 IFZ$="M"THEN100
595 GOTO580
600 PRINT"🖪FOR THE MPS 801 PRINTER"
602 L=0
604 L=L+1:PRINT"🖪LINE🖪:-";L
606 IFL=22THENPRINT"🖪LAST LINE TO TYPE IN🖪"
608 IFL=17THENP$(L)="═════════════════════════════════════":GOTO604
610 IFL=19THENP$(L)="═════════════════════════════════════":GOTO604
612 IFL=18THENPRINT"🖪TYPE IN MAIN CASSETTE TITLE NOW!🖪"
614 IFL>22THENPRINT"🖪🖪🖪FULL UP!  FULL UP!  FULL UP!🖪":FORT=1TO2000:NEXT:GOTO650
616 INPUTP$(L)
618 IFLEN(P$(L))>39THENPRINT"🖪🖪ONLY 39 PER LINE, TRY AGAIN!🖪":FORT=1TO1500:NEXT:
GOTO616
620 IFP$(L)="ZZZ"THEN650
622 GOTO604
650 PRINT"🖪🖪🖪🖪🖪MAKE SURE THE MPS 801 PRINTER IS"
652 PRINT"🖪🖪SWITCHED ON AND CONNECTED!"
654 PRINT"🖪🖪🖪WHEN READY! PRESS 'P' TO PRINT"
656 PRINT"🖪🖪🖪OR PRESS 'M' TO RETURN TO INSERT MENU"
658 GETZ$:IFZ$=""THEN658
660 IFZ$="P"THEN668
```
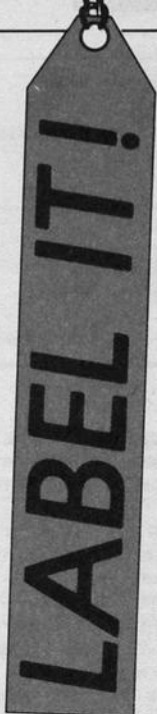
```
662 IFZ$="M"THEN400
664 GOTO658
668 PRINT"███████████████████PRINTING NOW!!█"
670 OPEN1,4
671 CMD1
672 PRINT"_____"
674 FORK=1TOL-1
676 PRINT"█ ";P$(K);
678 S=39-LEN(P$(K))
680 PRINTTAB(S);" █"
682 NEXTK
684 FORK=LTO20
686 PRINT"████████████████████████████████████"
688 PRINT#1:CLOSE1
690 GOTO100
695 PRINT"██████FOR THE 1520 PRINTER PLOTTER"
697 PRINT"██YOU ONLY HAVE 37 CHARACTERS PER LINE"
698 PRINT"█WHEN USING THE 1520 PRINTER PLOTTER"
700 X=0
710 X=X+1:PRINT"█LINE█:-";X
720 IFX=22THENPRINT"█LAST LINE TO TYPE IN█"
730 IFX=17THENY$(X)="-----------------------------------------":GOTO710
740 IFX=19THENY$(X)="-----------------------------------------":GOTO710
750 IFX=18THENPRINT"█TPYE IN MAIN CASSETTE TITLE NOW!█"
760 IFX>22THENPRINT"████FULL UP!  FULL UP!  FULL UP!█":FORT=1TO2000:NEXT:GOTO810
770 INPUTY$(X)
780 IFLEN(Y$(X))>37THENPRINT"ONLY 37 PER LINE, TRY AGAIN":FORT=1TO1500:NEXT:GOTO
    770
790 IFY$(X)="ZZZ"THEN810
800 GOTO710
810 PRINT"██████MAKE SURE 1520 PRINTER PLOTTER IS"
812 PRINT"██SWITCHED ON AND CONNECTED!"
814 PRINT"███TO PRINT IN █BLACK█ PRESS 'B'"
815 PRINT"███TO PRINT IN █BLUE█ PRESS 'L'"
816 PRINT"███TO PRINT IN █RED█ PRESS 'R'"
818 PRINT"███TO PRINT IN GREEN PRESS 'G'"
819 OPEN2,6,2
820 GETZ$:IFZ$=""THEN820
822 IFZ$="B"THEN841
824 IFZ$="L"THEN843
826 IFZ$="R"THEN845
828 IFZ$="G"THEN84,
830 GOTO820
841 PRINT#2,"0":GOTO848
843 PRINT#2,"1":GOTO848
845 PRINT#2,"3":GOTO848
847 PRINT#2,"2"
848 PRINT"███████████████████PRINTING NOW!!█"
850 OPEN1,6
860 CMD1
870 PRINT"-------------------------------------"
880 FORI=1TOX-1
890 PRINT":";Y$(I);
900 P=37-LEN(Y$(I))
910 PRINTTAB(P);":"
920 NEXTI
930 FORI=XTO20
940 PRINT"-------------------------------------"
950 PRINT#1:CLOSE1
952 CLOSE2
955 GOTO100
1000 PRINT"█X█":POKE53280,14:POKE53281,6:RESTORE
```

SAVE THOSE FACTS
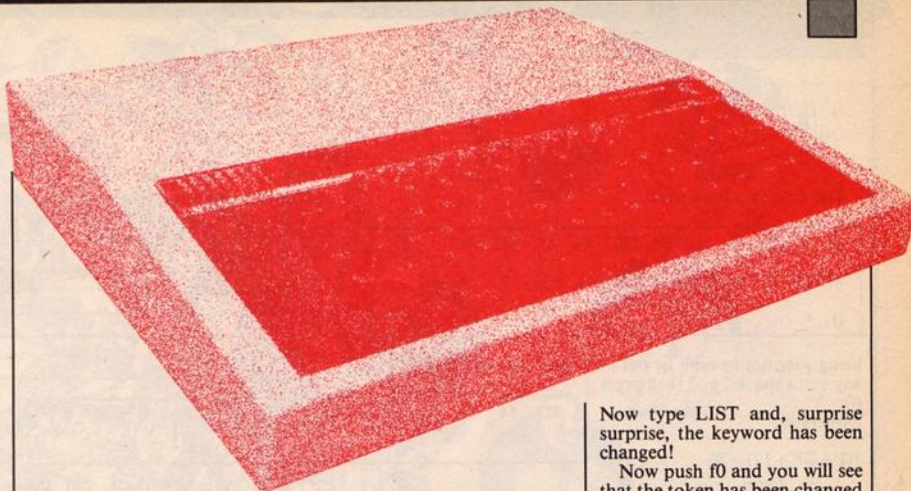
In Danny Tucker's article he shows you how to solve a particular problem with your BBC — saving data to disc

Recently, I came across a problem with my micro (don't we all). I have a long program which prints out lists. I wanted however to save this data to disc. This meant either changing all the lines to 'PRINT #X%,"...." or changing all the PRINT statements to DATA statements. Either way, I had to edit all 150 odd lines. This is the kind of time when I wish the BEEB had a replacement command in ROM. Since it doesn't, I decided to try to implement my own.

Before we can consider doing any substituting, firstly we must see how the BBC stores a BASIC line. Figure 1 is an example:

numbers may range from 0 to 32767 and the maximum number of bytes in a line, apart from the first four, is 251.

Following the length is the space after the line number, then there is the keyword PRINT in token form. Keywords are not stored as normal words, but only as one byte. The full list of keywords and corresponding token values is on page 483 of the User Guide. Following the token is the string (including the quotes). Finally there is a new line character and a terminator of &FF.

If we play about with BASIC lines in this way, we should make sure that we do not

Figure 1

```
10 PRINT "BORIS"

OD 00 OA OD 20 F1 22 42 4F 52 49 53 22 OD FF
                    "  B  O  R  I  S  "
Start line no lgth space token for PRINT          New line Terminator
```

When examining programs like this, it is handy to be able to dump a program to the screen in hex like above. I found the following key definition sufficient:

```
*KEY 0@%=0:FOR K%=PAGE TO TOP:PRINT~?K%;" ";
:NEXTiM
```

This will list out the hex as in Figure 1.

The first byte in a line must always be &0D. If it is not, the message 'Bad program' will be printed. The next byte is the high byte of the line number (which must not exceed &7F); the next is the low byte of the line number; and the last is the number of bytes in the line (including these four). This means that the line

confuse the computer by altering these numbers wrongly. For example, the computer adds the fourth byte (the line length) to the address of the first &0D and expects to find &0D at this new address. If it doesn't it outputs 'Bad program' once again.

Now we understand how a line of BASIC is stored, we may attempt to change it in some way. Enter the BASIC line shown in Figure 1 into the computer and then type:

```
?(PAGE+5)=&DC
```

Now type LIST and, surprise surprise, the keyword has been changed!

Now push f0 and you will see that the token has been changed (note the token for DATA is &DC). Rather than us having to search through a program and change all the PRINT tokens to DATA tokens (which wouldn't be any advantage over changing the keywords), a simple program will do this, viz Listing 1. This program searches from PAGE to TOP for any occurence of a PRINT token and changes any to DATA tokens. Notice we had to check for PRINT and the opening quotes. This is just in case there is any 'q's in the program (CHR$(&F1)), as the program would otherwise try to change any occurrences of these to DATA tokens as well.

The program is easily tacked on to the end of the program you wish to change. Note that you are not restricted to keywords; it is possible to change the whole structure and contents of lines, as long as you keep track of its length and you let the computer know what you are doing.

Having armed ourselves with the understanding of a line's structure, we may use this knowledge to stop people looking at all or parts of our programs. This is achieved by placing control codes in REM statements, by the same process that we used to change keywords. Type in Listing 2,

The first two lines read:

```
D  0  A  D  20  F4  20  48  45  4C  4C
4F 2A A D  0    REM      H   E   L   L
0  *
```

being sure not to omit or put in any extra spaces, and then press f0.
Now type:

?(PAGE + 12) = 26

then list the program.

We have changed the * at the end of the first REM statement to VDU code 6, which turns off the screen output, thus not showing our program when listed. In the mean time use the keys CTRL + F to get the display back to normal. This, as it is, however, appears unusual. We want to turn the display back on again after our program has listed. Notice the fourth and

hassle for everyday programs, so it is easier to use the following two function key definitions:

```
*K.0 F.K%=PA.TO TOP:IF?K%=123THEN?K%=21:N.ELSEIF?K%=125THEN?K%=6:N.ELSE N.
```

```
*K.0 F.K%=PA.TO TOP:IF?K%=6THEN?K%=125:N.ELSEIF?K%=21THEN?K%=123:N.ELSE N.
```

fifth line of our hex dump:

```
8D 54 54 40 D 0 28 7 20 F4 2A D FF A
                         REM *
```

Type:

?(PAGE + 43) = 6

This tells the computer to replace the * in the last REM statement with VDU code 6, which turns the screen back on again. Now type LIST. Bingo! There we have it, just a REM statement, but now type RUN. It all works OK but doesn't show when listed.

All this is a bit too much

In your programs, put the character ' ! ' (SHIFT + [where you want the display turned off and '] ' (SHIFT +]) where you want it on again.
Pushing f0 will put the control codes in place and f1 will remove them so that you can list the program once more.

Listing 1

```
10 FOR K%=PAGE TO TOP
20 IF ?K%=&F1 AND ?(K%+1)=&22 THEN ?K%=&DC
30 NEXT K%
```

Listing 2

```
10 REM HELLO*
20 PRINT"HELLO THERE"
30 GOTO 20
40 REM*
```

GET YOURS EVERY WEEK!

FOR EVERY A PRIZE LETTER PRINTED

HCW tonic

I am a regular buyer of HCW and, although I am in hospital at the moment, your magazine still gives me hours of pleasure.

I find it very colourful and well presented and unlike other computer magazines it is well designed and value for money.

I own a 48K Spectrum and would like to see machine code programs in the future.

G L Davies, Speke

Girl Talk

I have just read Karen Rolph's letter (HCW 116) and I was wondering how many females are interested in computing. At the school I go to all the girls seem to get put off by computers. Let's face it: what is there apart from computers and girls?

By the way, I have an Amstrad and am 15 years of age. How old is Karen? Not that I'm interested (ahem!).

Malcolm Logan, Harwick

We hadn't really thought of HCW as a way of making dates Malcolm, but if we can be of any assistance in your love life just keep writing!

Hand-me-downs

These days most software contains warnings about unauthorised copying etc. This is all very clear and just.

But almost all these warnings continue by saying: "this product must not be lent or resold". This is complete rubbish and it is designed to deter people from selling unwanted games at second hand prices.

You are perfectly within the law to sell your own games — the original copy, that it! — if you wish, and there is no law to say that you cannot lend it to a friend so long as he doesn't copy it.

This is probably the reason why we see very little second hand computer software for sale — you don't have to hoard those unwanted games forever, you know.

Andy Clarke, Baddesley Ensor

Price slashes needed

I am writing to express my views on the new copyright laws. It has been proposed that a tax should be put on blank audio cassettes. This is very unfair to those of us who also use blank cassettes for purposes other than computers and the taping of records.

Surely if computer programs were of excellent quality and offered good value for money, there would be less piracy since we would all want a genuine copy of these programs. Many programs are overpriced and are of poor quality, and many shops do not allow you to see programs before buying. You may pay £10 for a program which appears to be brilliant but you may get bored with it very quickly.

In the case of records it is different because you can hear the songs on the radio before you buy. When you buy an album you can get between six and 30 songs, depending on whether it's a compilation album or not. On a computer — mine is an Acorn Electron — you may pay £10 for only one program so record buyers pay less for more.

Although some software houses have realised this and cut their prices, the range of computers which these programs cover is relatively small. If some companies can offer software for about £2, surely others can follow this example.

David Black, Glasgow

Demos are the future

With computer graphics on three of the main machines now reaching a limit — that is, the Commodore 64, the Spectrum and the Beeb — it seems that one day we may see the computer movie.

This will be an entirely "sit back and watch" experience with little or no user involvement — i.e. no keybashing or joystick waggling.

There have been attempts at it but none up to the standard that today's graphics can command.

You needn't buy the computer movie on its own. I'm surprised that film makers haven't followed up the idea with a complete package comprising, say, two games based on the film and a computer movie version of the film.

Written in the right way it could be an entertaining idea and perhaps quite a popular one. Without the need for user input there would be additional spare memory, and speed.

It may not appeal to you put like this, but how many times have you watched a game in demo mode? On my Commodore 64 I find Spy v Spy, International Soccer and Basketball have enthralling demos.

What do other HCW readers think? Could it no longer be play the game, but instead view the game?

Andy Clarke, Baddesley Ensor

Ghost Gaffs

Please, please, please help me. I am writing this letter because I am desperate for help. I am working on a program for my TI (which I have had for 18 months), it is called Pacmania 99 — actually I am thinking of sending it to HCW.

The problem I have encountered is that I cannot get my computer to move two characters at the same time. For example: to move the Pacman upwards you use the E key, to move the ghost upwards you use the 0 key. If you press both keys at the same time, only one character moves and so you are forced to move them one at a time.

This is no good as in my version of the game two players should be able to move their characters simultaneously.

If what I am trying to do is impossible, could someone please write and tell me how I can get the ghost to move on its own.

Neil Luckman, Birmingham

Home Computing Weekly, No 1 Golden Square, London W1R 3AB.

Tread carefully

It seems that there has been an unfortunate conjuction of factors leading to your reviewer's unfavourable conclusions of our Spectrum version of Operation Caretaker.

The first and most straightforward point concerns the supposed lack of instructions. I know that you hold back inlays to use in the review headings. If you did that in this case then the reviewer wouldn't have seen the instructions printed on the reverse of the inlay. If, on the other hand, the reviewer had received an inlay as well as the program, then I can only assume that he didn't read the back of the pack which says that the instructions are printed on the back of the card. Most "boxo punters" who have seen the instructions found them comprehensive and comprehensible.

The other problem concerns the "bad" readings your reviewer must have been getting from his cassette deck. Unfortunately, there has been a problem with these early Spectrum samples caused by phase and level problems on the data string that the program uses when actually checking the azimuth alignment. We are currently working closely with our duplicators to resolve this problem and you will be pleased to note that no copies at all have reached the general public. All our distributors have been told to return their stocks.

I would greatly appreciate if you could find some space to let your readers know these points. The BBC and Amstrad versions are perfectly OK, and electronic tests indicate that cassette decks, when set up with Caretaker, are about as accurate in respect of alignment as it is possible to make them, by any means.

Mike Daniels, Global Software

We are sorry that you had cause to complain about our review and, as this was a slip up on our part, we apologise. We are glad that the problems on the Spectrum version are now being rectified and hope that it will soon be in the shops.

Weeklies biased?

I have owned an Acorn Electron for over a year now and have watched as it has changed from the promising newcomer to currently the second fastest selling computer in Britain.

Whilst the dedicated independent magazines have featured helpful articles and some very good programs, it seems that the weekly magazines are not only biased against the Electron but have a vendetta against it. Indeed one weekly announced that Acorn was withdrawing from the home computer market and said that the Electron was to be axed. Interesting — totally wrong — but interesting.

Obviously, every computer owner wants his machine to feature in the magazines and HCW is one of the better weekly publications as it covers a wide range of computer, especially the good old TI-99/4A.

My main complaint about HCW and others is not that you rarely feature the Electron 'and don't have a top 10 for it!) but that there's a noticeable lack of variety week after week. Since I am not a regular reader I may have missed some features, but I have never seen any articles on the whole spectrum (if you'll excuse the term) of computing. Artificial intelligence, games designing, robots and the uses of machines for instance would interest many readers who feel that games are not what their machine is best used for. I am not against games but surely featuring other areas can only do good for the computing public.

As for your software reviews, I am glad to see that you occasionally review an Electron program (but I do wish you would choose some good ones like Magic Mushrooms, Elite, Count-down to Doom or Contraption) other more serious programs. Even less serious ones are a very good idea like the witty review of Pavlov — I have visions of hordes of bats under the control of crazed Sinclair technicians.

The Electon is £70 cheaper than a C64, 5p cheaper that a Spectrum + and even works out cheaper than an Amstrad when bought with data recorder and quality monitor. It has structured BASIC, arguably the best, excellent peripherals available and a rapidly growing selection of quality software. I think it deserves a little more support and I know that around a quarter of a million people agree with me.

Incidentally, perhaps your competitions could be made more attractive to a wider range of machine user.

Jon Hancock, Stoke-on-Trent

You've brought up a lot of points in one letter, Jon, but we'll try and deal with them all.

We feature as much material as possible for the Electron but our space is limited so we often have to choose between machines.

If you look closely at recent HCWs, and also keep your eye on our Coming soon spot on page 3, you'll see that we are beginning to feature more general articles.

Our witty review of Pavlov was in fact an April fool, but don't worry, you're not the only one who fell for it!

Check chequered

I am writing concerning the letter you printed from Lee Goddard of Chesterfield in HCW 114. I would like to tell him that I had the same problem with Chequered Flag. It seemed to load fine but then, after choosing your lap number, the computer NEWed itself.

The way I cured it was to unplug my Kempston joy-stick or any other interface plugged into the back of the Spectrum, and then the game seemed to work fine. I hope this has solved his problem for him.

Helen Robson, Newton Aycliffe

Bad ads

I'll start off by saying that your magazine is the best I've ever read. Unfortunately my respect for it has started declining. This has happened for various reasons. I think that your magazine has too many ads which I consider completely — well almost completely — useless. I'm sick and tired of this attitude, one page out of five is full of ads. I believe that many people would like to pay a bit more money and read a review or an article instead of always seeing the same ads — they don't vary, do they?

Another bad thing is your attitude towards the Spectrum, I found that in your issue 113, 14 out of the 20 reviews were for the C64 and only four were for the Spectrum. Of these four, only one was supposed to be good. Fortunately there was a perfect program listing to make up for the cons.

That's all I wanted to say, although I do believe that your real attitude to the Spectrum can't be that bad. Am I wrong?

Demetrius Kalles, Volos, Greece

All magazines have to take ads to keep them going and since they give your news of new products they can actually be quite interetsing. Our attitude is not anti-Spectrum. When we feature more C64 reviews it is because there have been more new releases for the C64 and not because we don't want to feature Spectrum products.

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Games ace Tom Ahlberg

Readers' hi-score table

Name	Game	Machine	Score
Tom Ahlberg	Zaxxon	C64	12,535
	Blue Max	C64	23,340
	Suicide Express	C64	49,530
	Toy Bizarre	C64	50,350
	Pole Position	C64	67,410
	BC's Quest for Tires	C64	3,225
	Jet Set Willy	C64	32
James Donnan	Chuckie Egg	BBC	357,580
V Spanner	Killer Gorilla	BBC	49,150

Our hi-score table is dominated this week by Tom Ahlberg of Finland who has obviously been working overtime on his C64 to become so proficient in so many games. James Donnan has not yet managed to beat Carolyn Bell who seems to be the Chuckie Egg champion at the moment.

Solution to last week's puzzle

Lines 30 to 50 simply make the input number into a six-digit number by repeating it. 123 becomes 123123.

This has the effect of multiplying the original number by 1001 — try dividing 123123 by 123.

1001 is 7*11*13. Lines 70 to 120 divide by these numbers in turn. So having made the number 1001 times bigger it becomes 1001 times smaller — which takes you back to where you started from!

Just like clockwork?

Can you carve this clockface up to produce five pieces so that the sum of the numbers on each piece will produce these totals: 8, 10, 12, 14, 16?

Comment from down under

After discovering HCW about two months ago I have decided that it is the best computer magazine that I have ever seen. I feel I must make some comments about the situation for TI owners in Australia.
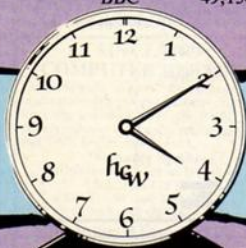
I would like to say how lucky British TI owners are to have a magazine that even knows that the TI-99/4A exists. Out here you are lucky to see one TI program in two years, so do not take this wonderful magazine of yours for granted.

John Green, Parkes, Australia

Thank you for your compliments John, we appreciate them, as we do work very hard to try and cater for as many popular home computers as possible. If you want to send us a program then please use the coupon which often appears in the magazine and please include a tape as it makes things a great deal easier.

Database / Micronet / Home Computing Weekly Competition

As we announced last week we will be running four clues for this competition in future issues of HCW. This week we introduce the task as a whole.

It won't be easy, we have already been puzzling over the clues, but there is a valuable reward to the winners.

This competition will be published in four clues with two parts to each clue.

So...

"Line parts A and B together,
To map a final clue,
The answer to the crossword,
Is where they all cross through."

Clue 1

Part A

"The Roman's Venta Belgarium became,
The Wessex Capital during King Alfred's reign,
In 1603 Walter Raleigh was tried,
In the City's gaol Thomas Hardy's Tess died."

Part B

CBTGMKL sounds Welsh already to Trithemius.

This competition has been written and designed by Micronet 800.

There are 30 prizes. All free subscriptions to Prestel/Micronet 800 for one year, each worth £66.

The prize winners will be announced on the "DATABASE" Television Series in September. Selected winners will be presented with their prizes on the "DATABASE" PCW Show program.
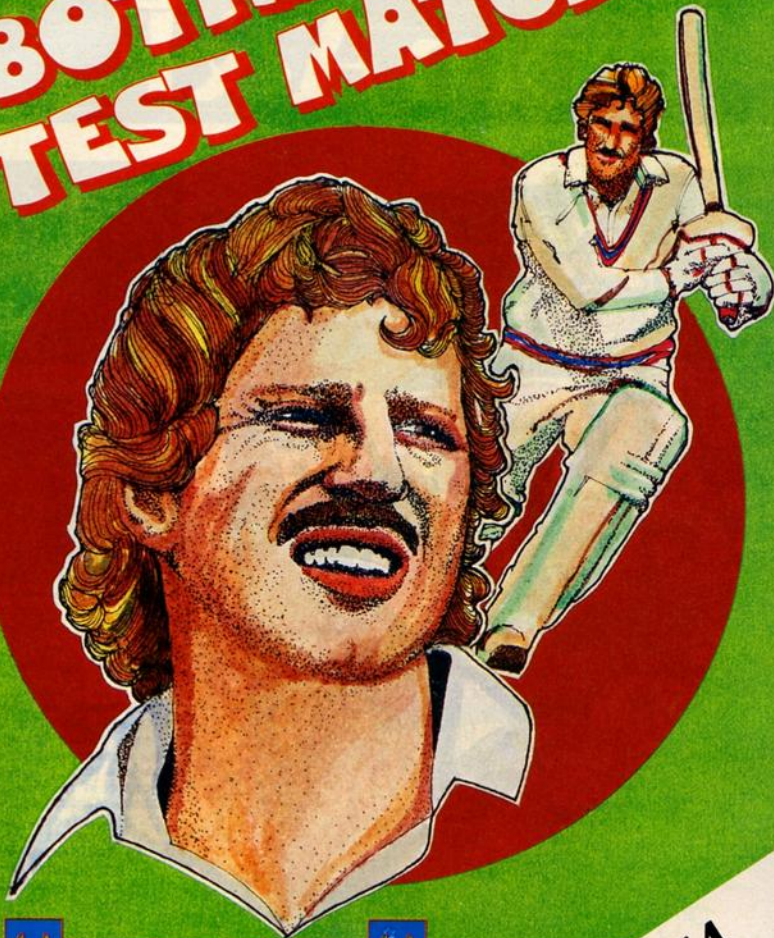
At the end of each competition clue there will be information as to how MICRONET 800 can be of use to you.

Communications — a new era in home computing has begun!

Micronet 800 is a living database. Continually growing, interacting and involving you. Micronet gives you information, communication, telesoftware and light-hearted fun. There are major new features under development including an Amstrad database, Executive Micronet and multi user games.

Don't forget to buy next week's issue for Clue 2!

READERS PAGE

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